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RECOMMENDATIONS FOR PHYSIOTHERAPIST-DELIVERED LIFESTYLE INTERVENTIONS FOR PATIENTS WITH COMORBID MENTAL AND PHYSICAL HEALTH DISORDERS

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A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Doctor of Philosophy

Johannesburg,

November 2025

DECLARATION

I, Sandy Lord, declare that the work contained in this research report is my own work.

This research report is being submitted for the degree of Doctor of Philosophy in Physiotherapy, at the University of the Witwatersrand, Johannesburg, South Africa. This work has not been submitted for any other degree or examination in this or any other university.



Signature

2 November 2025

Date:

DEDICATION

This work is dedicated to my family.

May it stand as a reminder that we can aspire to be and do whatever we dream with love, support, and determination.

“Strength does not come from physical capacity. It comes from an indomitable will.”
— **Mahatma Gandhi**

Presentations arising from this study

Lord S, Naidoo V, Mostert K. *Lifestyle interventions for comorbid mental and physical illness.* Faculty of Health Sciences, Research Day, University of Witwatersrand, 5 September 2024, Poster presentation

Lord S, Naidoo V, Mostert K. *Lifestyle interventions for comorbid mental and physical illness.* World Physiotherapy Africa Congress. Cape Town, South Africa, 17 September 2024. Oral platform presentation

Lord S, Naidoo V, Mostert K. *Lifestyle interventions for comorbid mental and physical illness.* World Physiotherapy Congress. Tokyo, Japan. 28 May 2025. Poster presentation

Publications arising from this study

Lord S, Naidoo V, Mostert K. 2023. Lifestyle interventions in comorbid mental and physical illness: A systematic review protocol. *South African Journal of Physiotherapy.* 79 (1), a1848. DOI: 10.4102/sajp. V79i1.1848

ABSTRACT

Introduction: Lifestyle interventions enhance health and well-being in patients with mental disorders. Mental disorders affect many bodily systems, compromising health and wellbeing. Epidemiological studies have found significant associations between mental disorders and non-communicable diseases. Lifestyle interventions address modifiable risk factors to prevent or manage chronic diseases. There are no guidelines for physiotherapists in South Africa to manage patients with mental disorders and multimorbidity.

Purpose: This study aimed to develop evidence-based, contextually relevant recommendations for physiotherapist-delivered lifestyle interventions in the management of patients with mental disorders (depression and anxiety) and comorbidities.

Methods. A mixed-methods multiphase framework, using an exploratory, convergent design was used in this study. Phase one of the study, a systematic review of effectiveness, identified effective lifestyle interventions in managing patients with mental disorders and comorbidities. Phase two, an international, multidisciplinary Delphi study, including South African experts, was used to develop recommendations. In the final phase, focus groups determined the acceptability and feasibility of these recommendations for South African physiotherapists. Data collected from the first two phases were collected concurrently. The findings of phases one and two were then used to inform the focus groups (qualitative) and finalise the recommendations.

Results: The meta-analysis showed that lifestyle interventions which combined a psychological behavioural change strategy and physical activity had modest effect sizes in improving quality of life. Thirty-two recommendations across five categories: general, sleep, physical activity and exercise, nutrition, and stress management emerged from the Delphi study. The South African physiotherapists found the recommendations from the Delphi study mostly acceptable and feasible. Concerns were raised about the feasibility of some of the recommendations due to the scope of practice of physiotherapists and resource constraints in the public health sector. Eighteen final recommendations were agreed upon following the focus groups.

Conclusion: Recommendations for physiotherapist-delivered lifestyle interventions were developed and contextualised to the South African environment. These recommendations can be used to manage patients with mental disorders and comorbidities, as no other guidelines exist to guide management in this specific patient population. Future research should focus on the implementation and evaluation of the recommendations, developing full clinical practice guidelines, increasing the inclusion of mental health in the physiotherapy undergraduate curriculum and addressing the resource constraints in mental health.

Keywords: mental disorders, comorbidities, recommendations, lifestyle interventions, physiotherapy, depression, anxiety, cardiovascular diseases, respiratory disorders, diabetes, obesity, chronic pain, psychological strategies.

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- To my parents, thank you for instilling in me the values of perseverance, curiosity, and integrity. Your belief in my potential has been a constant source of strength, and your sacrifices have made this achievement possible.
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DEFINITIONS OF TERMS

1. Health condition: Health conditions refer to any physical, mental, or emotional state that affects the overall well-being and functioning of an individual. These conditions can be acute or chronic, and they may vary in severity. Health conditions can encompass a wide range of illnesses, diseases, disorders, and injuries that impact various aspects of a person's health. Health conditions can significantly influence a person's quality of life and often require medical attention, treatment, and management to alleviate symptoms and promote overall health and wellbeing (World Health Organization (WHO), 2019).

2. Lifestyle interventions: Lifestyle interventions can be defined as the therapeutic use of structured programmes or evidence-based strategies aimed at changing a person's lifestyle behaviours to improve health outcomes and prevent or manage chronic diseases by promoting healthier practices in areas such as weight control, physical activity, and dietary habits (Leese et al., 2024; Bradley et al., 2022; Mechanick and Kushner, 2020). These interventions cover a range of activities that provide health knowledge and may also include practical experiences such as participating in physical workouts. Lifestyle interventions can be delivered individually or in groups, employing a variety of techniques (Bradley et al., 2022).

3. Mental health: "A state of wellbeing in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (WHO, 2022).

4. Mental health facility: According to the Mental Health Care Act, number 17 of 2002, a health establishment is any building, facility, institution or place where health care is provided. This includes rehabilitation centres, clinics and hospitals. A psychiatric hospital is a health establishment that provides services

to users who have mental health problems (Mental Health Care Act of South Africa, 2002).

5. Mental disorder: “A mental disorder is characterised by a clinically significant disturbance in an individual’s cognition, emotional regulation, or behaviour. It is usually associated with distress or impairment in important areas of functioning. There are many different types of mental disorders. Mental disorders may also be referred to as mental health conditions. The latter is a broader term covering mental disorders, psychosocial disabilities and (other) mental states associated with significant distress, impairment in functioning, or risk of self-harm.” (WHO, 2022).

6. Mental illness: “any condition characterised by cognitive and emotional disturbances, abnormal behaviours, impaired functioning, or any combination of these. Mental illness means a positive diagnosis of a mental-health related illness in terms of accepted diagnostic criteria made by a mental health care practitioner authorised to make such a diagnosis” (Mental Health Care Act, 2002).

   The terms ‘mental disorders’, ‘mental illness’ and ‘mental health conditions’ are often used interchangeably in the literature. For this report, ‘mental disorder’ is the preferred term as it encompasses all the aspects of the definitions but does not rely on a specific diagnosis being made by a mental health care professional, as stated in the definition of mental illness. According to the Mental Health Act of 2002, physiotherapists are not mentioned and as such may not be considered mental health professionals.

7. Quality of life: Quality of life refers to how individuals perceive their position in life, considering the cultural context and value systems they live within, as well as their personal aspirations, expectations, and concerns (WHO, 2012). Quality of life is a broad concept that includes multiple dimensions, typically categorised into four key areas: psychological well-being, physical health, social relationships, and functional ability (Owczarek, 2010).

8. Physical inactivity: refers to engaging in less physical activity than what is recommended for maintaining good health. For adults, this typically means participating in under 150 to 300 minutes of moderate aerobic exercise, or fewer than 75 to 150 minutes of vigorous aerobic activity per week. It also includes not achieving a comparable mix of both intensity levels over the same period. (WHO, 2018)

LIST OF ABBREVIATIONS

ADHD	Attention deficit hyperactivity disorder
AR	Applied relaxation
AT	Autogenic training
BMI	Body Mass Index
CB	Cognitive behavioural interventions
CBT	Cognitive behavioural therapy
CBT-I	Cognitive behavioural therapy for insomnia
CMD	Common mental disorder
CoCM	Collaborative care model
CPG	Clinical practice guideline
CRediT	Contributor role taxonomy
CVD	Cardiovascular disease
DALYs	Disability-adjusted life years
DSM-V	Diagnostics and Statistics Manual, fifth edition
EBP	Evidence-based practice
EtD	Evidence to decision framework
FGD	Focus group discussion
GAD	Generalised anxiety disorder
GAD-7	General anxiety disorder, 7-item
GBD	Global burden of disease
GHE	Global health estimates
HICs	High-income countries
HPCSA	Health Professions Council of South Africa
IPT	Interprofessional team
JBI	Joanna Briggs Institute
LI	Lifestyle interventions
LMICs	Low- and middle-income countries
LPA	Lifestyle physical activity
MCQ	Multiple choice question
MDT	Multidisciplinary team
MMR	Mixed-method research
MHCF	Mental healthcare facility
MHPG	Mental Health Physiotherapy Group
NCDs	Non-communicable diseases

PASA	Physiotherapy Association of South Africa
PHC	Primary health care
PHQ – 9	Patient Health Questionnaire, nine questions
PMPG	Pain Management Physiotherapy Group
PMR	Progressive muscular relaxation
RANZAC	Royal Australian and New Zealand College of Psychiatrists
RCT	Randomised controlled trial
SASP	South African Society of Physiotherapy
SIG	Special Interest Group
SM	Stress management
SMI	Severe mental illness
SSA	Sub-Saharan Africa
SSRI	Selective serotonin reuptake inhibitor
WHO	World Health Organization
YLD	Years lost to disability

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

Mental disorders are increasing globally. In 2019, the global estimate of mental disorders was 13.04% (Castaldelli-Maia and Bhugra, 2022; Firth et al., 2020). In South Africa, disorders related to mental health, neurological conditions, and substance abuse rank as the third leading cause of disease burden, following Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) and other infectious illnesses such as Tuberculosis and the impact of COVID-19. Locally, almost one-fifth of adults have experienced a mental disorder (especially mood and anxiety disorders) in their lifetime (Herman et al., 2009). As a result, physiotherapists are more likely to encounter patients with mental disorders in their daily practice.

Mental disorders affect many bodily systems, which can affect health and wellbeing and have been linked to increased levels of disability across work, family, and social settings (Sanchez and Vilugron, 2024; Lord et al., 2023; Linden et al., 2015). Common mental disorders (CMDs) include depression, anxiety and substance use disorders and are more prevalent in primary care and community settings (Buchanan-Barker and Barker, 2024; Brattmyr et al., 2023; Moitra et al., 2023; McKinnon et al., 2021; Firth et al., 2019). People with common mental disorders often do not seek treatment, even though their mental disorder may cause them serious distress (Risal, 2011). Serious mental illness (SMI) usually includes schizophrenia and bipolar disorder, with symptoms severe enough to disrupt daily functioning (Buchanan-Barker and Barker, 2024; Moitra et al., 2023; Firth et al., 2019). Severe mental illness usually requires intensive treatment and can lead to chronic disability (Brattmyr et al., 2023).

Patients with mental disorders often complain of pain and poor physical health. Epidemiological studies have found significant associations between mental disorders and non-communicable diseases (Stein et al., 2019). The literature indicates that patients with severe mental disorders have higher rates of cancers, respiratory disorders, cardiovascular disease, obesity and diabetes (Sanchez and Vilugron, 2024;

Manger, 2019; De Hert et al., 2011; Hodgson et al., 2011). Patients with mental disorders have a lower life expectancy, living on average ten to fifteen years less than the general population (Chan et al., 2023; De Hert et al., 2011; Hodgson et al., 2011). These increased mortality and morbidity rates are usually a result of physical illness, poor lifestyle choices (such as smoking and decreased physical activity) and the side effects of medication (Lee et al., 2017; Lederbogen et al., 2015; Chwastiak et al., 2014). Pain and depression also often co-exist, with more than half of patients with mental disorders experiencing pain (Filipčić and Filipčić, 2020; Ortenburger et al., 2017; Goesling et al., 2013; Knaster et al., 2012). Pain, chronic illness and comorbid psychiatric conditions have a higher burden of disease and lead to a poorer quality of life (Clauw et al., 2019; Ivanušić, 2019; Outcalt et al., 2015; Baumeister et al., 2011). Therefore, mental health professionals need to place greater emphasis on the physical health of their patients, given the elevated risks of illness and premature death associated with mental disorders (Bair and Owen-Smith, 2024; Butterly et al., 2023; Lord et al., 2023; Ivanušić, 2019).

It has been recommended that physiotherapy be included in mental health care services (Vancampfort et al., 2018). In Africa, little is known about the role that physiotherapy may play in the management of mental disorders. According to Vancampfort et al. (2018), in sub-Saharan Africa (SSA), only Namibia and Nigeria's mental health plans consider physiotherapy as part of the interprofessional team (IPT) when managing patients with mental disorders. Physiotherapists are not listed as mental health care professionals (which include psychiatrists, psychologists and occupational therapists) in the Mental Health Act, 2002 of South Africa (MHCA, 2002). These gaps may be due to a lack of knowledge of the benefits of physiotherapy for patients with mental disorders by healthcare professionals, policymakers and training institutes.

For individuals with mental disorders, treatment typically begins with the use of medication and therapeutic interventions such as psychotherapy (Gorman, 2016). However, lifestyle interventions (LI) are an effective adjunct treatment to manage patients with mental disorders to improve mental health, physical health, and quality of life. Lifestyle interventions are strategies designed to promote and support healthier behaviours and improve overall well-being, and have been associated with decreased

risk for chronic health conditions (Alorayf et al., 2024; Bradley et al., 2022). Lifestyle interventions typically focus on modifying habits related to physical activity, diet, and other health-related behaviours such as substance use and sleep. Lifestyle interventions often include components such as behavioural therapy, education, counselling, and stress management to support individuals in making lasting changes (Bradley et al., 2022; Tariq et al., 2022). Incorporating evidence-based lifestyle interventions alongside conventional treatment for individuals with mental illness has been shown to help reduce the disparity in life expectancy between those with severe mental health conditions and the general population (Manger, 2019). Research indicates that lifestyle interventions—including improvements in diet, physical activity, sleep hygiene, stress reduction, and the cessation of harmful substances are both effective and economical. These strategies have the potential to prevent a substantial proportion of chronic diseases, such as up to 93% of diabetes cases, 81% of heart attacks, 50% of strokes, and 36% of cancers (Alorayf et al., 2024; Dannecker et al., 2020).

Lifestyle interventions can be delivered by all members of the IPT (Manger, 2019). Physiotherapists manage chronic diseases and other physical ailments related to mental disorders and can bring together the physical and mental aspects of health and well-being using a biopsychosocial approach (Grunberg et al., 2024; Alvarez et al., 2022). According to Pope (2009), physiotherapists play a vital role in supporting individuals with mental health conditions by offering non-drug approaches to pain relief, designing tailored exercise programmes, promoting motivation and self-management, and addressing fall prevention in older adults. Physiotherapists also provide guidance on body awareness, as well as support for lifestyle changes and weight management. These interventions target the physical health issues that frequently accompany mental illness. By addressing both physical and mental health needs, physiotherapists help bridge the gap between the two aspects of care (Lord et al., 2023; Pope, 2009).

Low- and middle-income countries face distinct healthcare challenges, often contending with multimorbidity and, as a result, a higher burden of disease and poorer quality of life. As such, physiotherapists need to be able to provide comprehensive management strategies within their scope of practice, which is relevant to their

environment and context. In South Africa, private and public health systems exist, with most of the population receiving healthcare services from the public healthcare system (van den Heever, 2019).

Physiotherapy in mental health is a relatively new field of physiotherapy in South Africa. In South Africa, little research has been published about the role of physiotherapy in mental disorders. As a result, there is little information and an apparent lack of knowledge regarding the role of physiotherapy in mental disorders. To bridge the gap created by this lack of knowledge about the role of physiotherapy in mental health, clinical practice guidelines (CPGs) are needed. Clinical practice guidelines are systematically developed statements designed to assist practitioners and patients in making decisions about appropriate healthcare for specific clinical circumstances (Yi et al., 2021; Nakayama, 2014). Clinical practice guidelines aim to improve the quality of care for patients, based on recommendations developed from a systematic review of the best available evidence, expert opinion and an assessment of the benefits and harms of the intervention (Culleton, 2015).

Developing and implementing clinical practice guidelines (CPGs) is lengthy and costly (Eibling et al., 2014). Evidence-based recommendations are often more specific, focusing on a specific condition or issue than CPGs would (Cura Della Redazione, 2014). While both CPGs and evidence-based recommendations aim to improve patient care using evidence, CPGs are broader in scope and involve a more comprehensive development and implementation process. Evidence-based recommendations are more focused and specific, often providing clear grading of the strength and level of evidence for each recommendation (Cura Della Redazione, 2014; Eibling et al., 2014). Van der Wees et al. (2011) proposed developing evidence-based statements as a starting point for specifying and contextualising recommendations. Tailoring these recommendations may be related to characteristics of the physiotherapy service, available resources and patients with mental disorders. Therefore, this study aimed to develop evidence-based and expert-informed recommendations for the management of patients with comorbid mental and physical health disorders.

This study was underpinned by the Biopsychosocial Model, which provides a comprehensive framework for understanding the complex interplay between biological, psychological, and social factors in patients with comorbid mental and physical health disorders. Given the multifaceted nature of depression, anxiety, and associated non-communicable diseases, this model supports a holistic approach to physiotherapy-led lifestyle interventions that address not only physical symptoms but also mental health and contextual challenges within the South African healthcare system. To further inform the behavioural components of the recommendations, Social Cognitive Theory was integrated to guide the development of strategies that enhance patient self-efficacy, motivation, and engagement in health-promoting behaviours. This dual-framework approach enabled the formulation of evidence-based, contextually relevant recommendations that are both clinically grounded and behaviourally informed, ensuring that physiotherapists are equipped to support sustainable lifestyle changes in patients with multimorbidity.

1.2 PROBLEM STATEMENT

South African physiotherapists are unsure of their role in mental disorders and lack guidelines and/or training in this specialised field of physiotherapy, despite the global increase in mental disorders. Pain, chronic illness, and comorbid psychiatric conditions have an increased burden of disease and result in a poorer quality of life (QoL) (Aaron et al., 2025). Integrating physiotherapy into mental health services may lead to improved physical and mental health outcomes and patient well-being, as well as decrease the burden of disease. Internationally, physiotherapy in mental disorders is well established, however, to the contrary in South Africa (Hooblaul et al., 2023; Vancampfort et al., 2018). As a result, physiotherapy has remained an underprovided and underutilised service within the mental health sector in South Africa (Hooblaul et al., 2023). Currently, in South Africa, there are no CPGs or evidence-based recommendations for physiotherapy in mental disorders, especially for the use of lifestyle interventions in the management of patients with mental disorders and comorbidities.

1.3 RESEARCH QUESTION

1.3.1 Primary Question

Which physiotherapist-delivered lifestyle interventions are recommended for managing patients with comorbid mental and physical health disorders in South Africa?

1.3.2 Secondary questions

1.3.2.1 What evidence exists on lifestyle interventions in the management of patients with comorbid mental and physical health disorders?

1.3.2.2 What are the recommendations for physiotherapists when managing patients with comorbid mental and physical health disorders?

1.3.2.3 Are the recommendations acceptable and suitable for South African physiotherapists managing patients with comorbid mental and physical health conditions?

1.4 AIMS AND OBJECTIVES

1.4.1 Aims

This study aimed to develop recommendations for physiotherapist-delivered lifestyle interventions to manage patients with comorbid physical and mental disorders in South Africa.

1.4.2 Objectives

The objectives of this study were to:

1.4.2.1 Determine the available evidence regarding lifestyle interventions in the management of patients with comorbid physical and mental disorders by performing a systematic review. (Phase 1a)

1.4.2.2 Determine the certainty (quality) of evidence identified in the systematic review using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach. (Phase 1b)

1.4.2.3 Develop recommendations for physiotherapists to guide the management of patients with comorbid physical and mental disorders, using a Delphi technique. (Phase 2)

1.4.2.4 Determine the acceptability and suitability of recommendations for South African physiotherapists with comorbid physical and mental disorders using focus group discussions. (Phase 3)

1.5 SIGNIFICANCE

Physiotherapists have a clear role to play in managing patients with mental disorders. They can help decrease the burden of disease in these patients by managing the physical comorbidities, thus bridging the gap between physical and mental health. Patients with mental disorders would therefore be managed holistically within the biopsychosocial and International Classification of Functioning, Disability and Health frameworks (ICF). Currently, in South Africa, there are no clinical practice guidelines (CPG) or evidence-based recommendations for physiotherapy in mental disorders, especially for the use of LI in the management of patients with mental disorders. Evidence-based recommendations are needed to maximise patient outcomes. Evidence-based recommendations are needed to maximise patient outcomes and improve quality of life.

1.6 OUTLINE OF THIS THESIS

This thesis is organised into eight chapters. Chapters one and two introduce the research topic, aims and objectives and the significance of the study and provide a comprehensive literature review relevant to the research problem. Chapter three provides a brief overview and justification for the methodology used in the study. Chapters four to six describe each of the three phases of the study, including the in-depth methodology and procedures followed, results of the study and a discussion of the results, relevant to existing literature. Finally, chapters seven and eight synthesise the information, summarise key findings and provide recommendations for future research.

This thesis is presented as indicated in Figure 1.1 below.

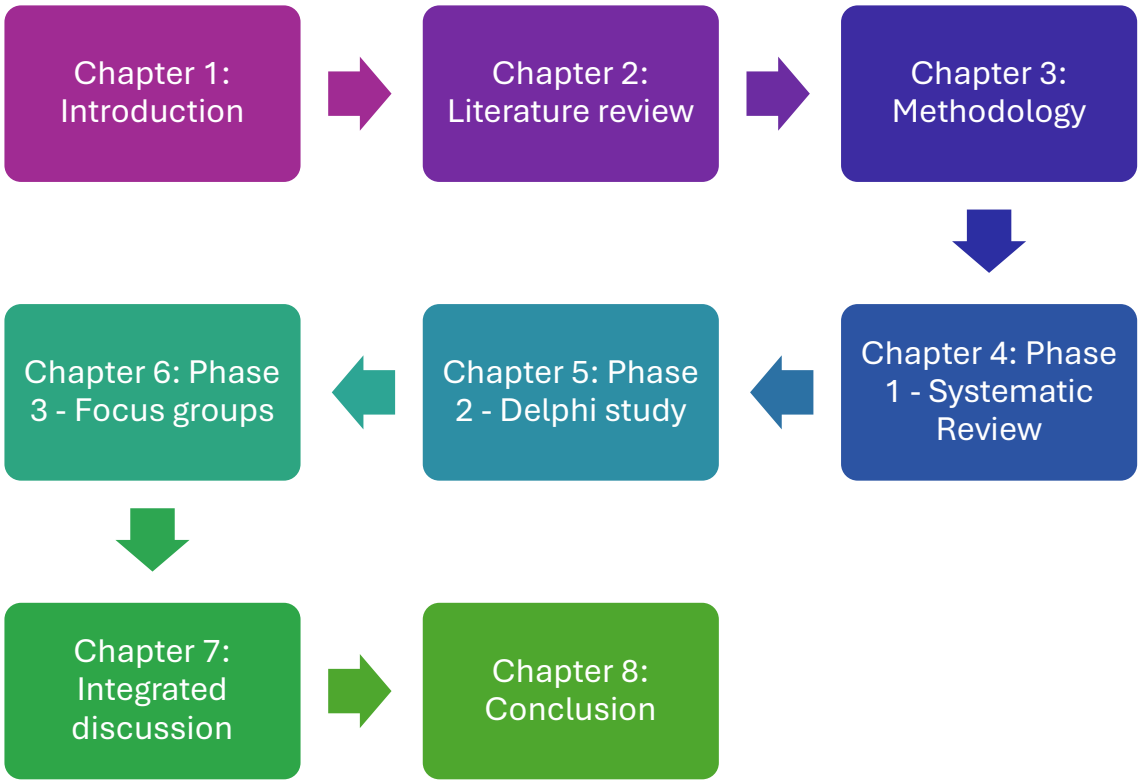


Figure 1.1 Outline of the thesis

1.7 CONCLUSION

Mental disorders are increasingly prevalent and are closely linked to physical health conditions, resulting in a significant burden of disease and reduced quality of life. Physiotherapists are well-positioned to address both physical and mental health needs through lifestyle interventions, yet their role in mental health care remains under-recognised in South Africa. This chapter highlighted the need for evidence-based recommendations to guide physiotherapists in managing patients with comorbid mental and physical health disorders. The study aims to fill this gap by developing contextually relevant recommendations through a multiphase, mixed-methods approach. In chapter two, an extensive literature review is provided. Chapter two explores the literature relevant to mental health and lifestyle interventions in the management of patients with mental disorders and comorbidities

CHAPTER 2

LITERATURE REVIEW

2.1. INTRODUCTION

This chapter provides an overview of the available literature as it pertains to lifestyle interventions, mental disorders and chronic non-communicable diseases (NCDs). Non-communicable diseases include cardiovascular diseases, chronic respiratory disorders (chronic obstructive pulmonary disorders (COPD) and asthma), diabetes, obesity and chronic musculoskeletal pain. This literature review focused predominantly on the common mental disorders, which include depression and anxiety. Serious mental illnesses such as bipolar disorder, schizophrenia and psychotic disorders are mentioned briefly but are beyond the scope of this literature review and study. The lifestyle interventions discussed were physical activity and exercise, nutrition, smoking cessation, sleep, and stress management strategies.

2.2 SEARCH STRATEGY

The following databases were searched: EBSCOhost, Google Scholar, PubMed and ClinicalKey for literature published in the last 20 years (2004 to 2025). The following key terms were used: ‘lifestyle’, ‘lifestyle interventions’, ‘healthy lifestyle’, ‘mental disorders’, ‘non-communicable disease’, ‘chronic illness’, ‘mental illness’, ‘anxiety’, ‘depression’, ‘comorbidity’, ‘epidemiology’, ‘pathophysiology’, ‘prevalence’, ‘incidence’.

This chapter is organised as follows:

- Definitions
    - Mental health, mental disorders and mental illness
    - Non-communicable diseases
    - Lifestyle interventions
- Epidemiology
    - Epidemiology of mental disorders
    - Epidemiology of non-communicable diseases
- Mental and physical health comorbidities
- Management of mental disorders and non-communicable diseases
    - Management of non-communicable diseases

- Lifestyle interventions
- Physiotherapy in mental health
- Clinical practice guidelines

2.3 DEFINING MENTAL HEALTH, MENTAL DISORDERS AND MENTAL ILLNESS

“Health” is a holistic concept defined as a state of complete physical, mental, social, and spiritual well-being, rather than merely the absence of disease (WHO, 1948). . These four components of health are interdependent: physical health ensures bodily function, mental and emotional health supports cognitive and emotional stability, social health enables meaningful relationships, and spiritual health provides purpose and meaning (Wüthrich-Grossenbacher, 2024; Schramme, 2023). According to *Health & Health Care 2010: The Forecast, The Challenge*, “perfect health” is achieved only when all these dimensions are adequately addressed, as neglect of any component predisposes individuals to an unhealthy state (Institute for the Future, 2003). This comprehensive view underscores that health is not static but a dynamic equilibrium requiring balance across all dimensions, reinforcing its role as a resource for living rather than a fixed condition (WHO, 1984 revision).

There is no universal definition of mental health, despite its widespread use across disciplines and policy frameworks, leading to challenges in research, policy, and practice (Manwell et al., 2015). Definitions of mental health vary according to how mental health is perceived, which may be according to the biomedical model or a more holistic approach. The lack of consensus on the definition of mental health may have implications for stigma, diagnosis and treatment, as well as policy. As such, there is a need for ongoing debate and a universally accepted definition of mental health.

Mental health is a fundamental human right and plays an important role in individual wellbeing, community resilience, and broader socioeconomic progress (WHO, 2022). The idea that mental health encompasses more than just the absence of mental illness is universally endorsed, but the definition of mental health is not. Mental health is also influenced by the culture that defines it (Galderisi et al. 2015). Different cultures express illness differently, which may affect how mental illness is perceived, voiced, diagnosed and treated (Schouler-Ocak and Graef-Calliess, 2024; Lasebikan, 2016; Gopalkrishnan and Babacan, 2015). Some mental health definitions consider

psychological, biological and/or social factors (Manwell et al., 2015), while other definitions also consider emotional and spiritual components.

The World Health Organization (WHO) defines mental health as

> *"a state of wellbeing in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community"* (WHO, 2022).

Manwell et al. (2015) aimed to gain consensus on the definition of mental health. In their study, experts in the field of mental health research, as well as patients who lived with mental disorders, responded to the "What is mental health survey?". The response rate for the surveys was 41% (with South Africa making up 2% of the respondents). Of the four definitions provided in the survey, 46% of the respondents preferred the Public Health Agency of Canada (PHAC) definition, which states:

> *"Mental health is the capacity of each and all of us to feel, think, and act in ways that enhance our ability to enjoy life and deal with the challenges we face. It is a positive sense of emotional and spiritual well-being that respects the importance of culture, equity, social justice, interconnections and personal dignity" (Manwell et al., 2015).*

Only 20% of the participants in the study preferred the WHO's definition of mental health. The survey by Manwell et al. (2015) also contained open-ended questions ('What are the core concepts of mental health?', 'What is missing from the current definitions and why?'). The authors asked these questions to capture diverse perspectives, identify what participants were dissatisfied with, to determine underlying frameworks and use this to develop a definition for mental health. The answers were thematically analysed, and four main themes emerged. These included: 'Positionality' 'Social/Environmental Factors', 'Paradigms/Theories/Models' and the 'Core Concepts of Mental Health'. From this, the authors concluded that many of the respondents in their study were unhappy with the current definitions of mental health, but there was also no agreement on a common definition. Participants in this study did agree on the components of mental health, especially the 'ability to adapt and self-manage', 'diversity and community identity' and creating distinct definitions for the individual, as well as one for the community and society at large. As such, Manwell et al. (2015) proposed a "Trans-domain Model of Health" (figure 2.1). This model expands on

previous definitions and includes areas of overlap between the mental, physical and social aspects of health.

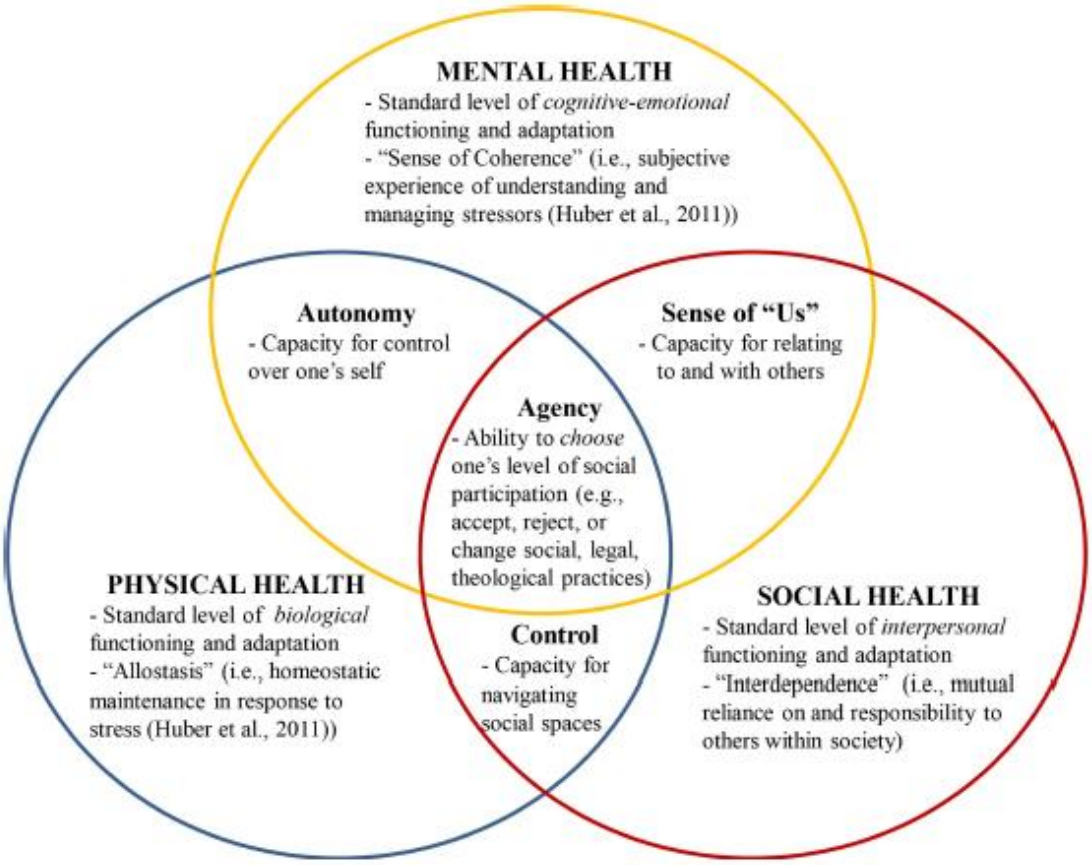


Figure 2.1: Trans domain Model of Health (taken from Manwell et al. (2015))

Galderisi et al. (2015) acknowledges that the WHO definition has made progress about a definition of mental health, which includes not merely the absence of disease, but they still argue that this definition may lead to misunderstandings when it identifies positive emotions and functioning as key factors for mental health. As a result, Galderisi et al. (2015) proposed a new definition of mental health, which includes 'imperfect functioning'. Their proposed definition of mental health states:

> *"Mental health is a dynamic state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society. Basic cognitive and social skills; ability to recognize, express and modulate one's own emotions, as well as empathize with others; flexibility and ability*

> *to cope with adverse life events and function in social roles; and harmonious relationship between body and mind represent important components of mental health which contribute, to varying degrees, to the state of internal equilibrium" (Galderisi et al., 2015 p231).*

This definition by Galderisi et al. (2015) seeks to embrace inclusivity, striving to be as unrestricted and culturally neutral as possible while resonating closely with human experiences. As outlined by Galderisi et al. (2015), this suggested definition aligns with the recovery movement's viewpoint, that is, recovery from an illness is viewed as a journey toward achieving a meaningful and rewarding life, using the abilities that remain unaffected by the illness despite the impairment of other functions (Slade et al., 2014).

Mental health is often described in positive terms and as something that a person strives towards. However, due to a variety of reasons, a person may not obtain optimal mental health. The terms "mental health disorder," "mental disorder," and "mental illness" are often used interchangeably in the literature. A mental disorder refers to a condition marked by a substantial disruption in a person's thinking, emotional regulation, or behaviour, indicating a dysfunction in the mental processes related to psychology, biology, or development. Such disorders typically come with considerable distress or impairment in key areas of life, such as social and work environments (APA, 2013). "Mental illness" refers to "any condition characterised by cognitive and emotional disturbances, abnormal behaviours, impaired functioning, or any combination of these" (MHCA, 2002). Furthermore, the term "mental illness" is used when a recognised mental health professional diagnoses a condition related to mental health, following established diagnostic guidelines (MHCA, 2002). For this thesis, the term "mental disorder" is preferred as it encompasses all the aspects of the definitions but does not rely on a specific diagnosis being made by a qualified mental healthcare professional. According to the Mental Healthcare Act of 2002, physiotherapists are not mentioned as mental health professionals, and physiotherapists are not qualified to diagnose mental illnesses and psychiatric disorders. As such, the term "mental disorder" is used throughout this thesis.

Mental disorders are often accompanied by comorbidities such as NCDs. Non-communicable diseases are defined in the next section.

2.4 DEFINING NON-COMMUNICABLE DISEASES

Non-communicable diseases are medical conditions that are not infectious and cannot be transferred from one person to another. They are often chronic, sometimes lasting a lifetime, and usually result from a combination of environmental, physiological, genetic, and behavioural influences. The four most common types of NCDs are cardiovascular diseases (e.g., heart attacks and strokes), chronic respiratory diseases, diabetes, and cancers (WHO, 2023a). Patients with NCDs often experience mental disorders, which will be discussed later in this chapter.

2.5 DEFINING LIFESTYLE AND LIFESTYLE INTERVENTIONS

Lifestyle is an important factor in health and influences mental and physical health (Farhud, 2015). Sobel (2013) stated that lifestyle is a “distinctive, yet recognisable way of living”. Van Acker (2016) further stated that the term ‘lifestyle’ must also consider an individual's ‘motivations’, ‘opinions’ or ‘orientations’, including their attitudes and beliefs (Van Acker, 2016). The main lifestyle factors that affect health include exercise, diet, sleep and substance misuse.

Lifestyle interventions can therefore be defined as the therapeutic use of structured programmes or evidence-based strategies aimed at changing a person’s lifestyle behaviours to improve health outcomes and prevent or manage chronic diseases by promoting healthier practices in areas such as weight control, physical activity, and dietary habits (Leese et al., 2024; Bradley et al., 2022; Mechanick and Kushner, 2020). These approaches encompass a variety of activities aimed at enhancing health awareness and may also involve hands-on experiences, such as engaging in physical exercise. Lifestyle interventions can be implemented either one-on-one or in group settings, using diverse methods and strategies. (Bradley et al., 2022).

Lifestyle interventions can be delivered by any healthcare professional (Manger, 2019). General practitioners often initiate these discussions and refer patients to specialists for targeted support, such as dieticians for nutrition, physiotherapists for exercise, occupational therapists for stress and lifestyle adjustments, and psychologists or psychiatrists for behavioural and mental health support (Bouma et al., 2022; van der Heiden et al., 2022; Blonstein et al., 2013). Effective implementation does, however, require a coordinated, interprofessional approach.

The connections between mental health, chronic pain and other physical illnesses are not well understood (Ngo et al., 2013). These chronic conditions are interconnected, and risk factors for NCDs, such as unhealthy eating, sedentary behaviour and substance misuse, are exacerbated by mental disorders, which in turn are also risk factors for NCDs (Ngo et al., 2013). Lifestyle interventions are strategies to help change unhealthy behaviours, which improve physical health. As the components of health are interconnected, improved physical health may lead to better mental health, and as a result, overall health. Physiotherapists are the experts in physical health and, as such, are well placed to provide lifestyle interventions to decrease the burden of disease and improve quality of life in patients with mental disorders and comorbidities.

The next section will discuss the epidemiology of mental disorders and NCDs.

2.6 EPIDEMIOLOGY

2.6.1 Epidemiology of mental disorders

2.6.1.1 Global epidemiology of mental disorders

Mental disorders are increasing globally (Petersen et al, 2019) and are among the top ten leading causes of disability (Castaldelli-Maia and Bhugra, 2022). In 2019, the global estimate of mental disorders was 13% (Castaldelli-Maia and Bhugra, 2022; Firth et al., 2020). This percentage increased by almost one per cent to 13.9% in 2021, which is mostly attributed to COVID-19 (IHME, 2024). In 2021, Lebanon, Portugal and Iran had the highest rates of mental disorders, followed by Australia, Western Europe, America and Brazil (IHME, 2024). Vietnam, Taiwan and Brunei had the lowest prevalence rates of mental disorders (IHME, 2024).

Depression and anxiety are the two most common and disabling mental disorders, accounting for approximately 970 million cases globally (Moitra et al., 2023; Santomauro et al., 2021; Farris and Abrantes, 2020). Depressive disorders (including major depressive disorder and dysthymia) were the second leading cause of years lost to disability (YLDs), and anxiety was the sixth leading cause of YLD in 2021 (Ferrari et al., 2024; GBD, 2022). In 2019, anxiety disorders were prevalent in 4.1% of the global population, followed by depressive disorders with a total of 3.8% (2.5% for major depressive disorder and 1.4% for dysthymia). Bipolar disorders had a prevalence rate of 0.5%, and schizophrenia had a total global prevalence of 0.3%.

Other mental disorders reported a prevalence of 1.6% (Castaldelli-Maia and Bhugra, 2022). The effect of the global COVID-19 pandemic on mental health has been well described in the literature (Moitra et al., 2023). It is estimated that there were an additional 53.2 million cases of depression and 76.2 million cases of anxiety due to the COVID-19 pandemic (Ferrari et al., 2024; Moitra et al., 2023; Santomauro et al., 2021). Between 2010 and 2021, the disability-adjusted life years (DALYs) rates increased most substantially for anxiety disorders (16.7%) and depressive disorders (16.4%) (Ferrari et al., 2024). The occurrence of mental disorders shows a persistent gender-based disparity, with females more often experiencing depression and anxiety, while males are more prone to attention deficit hyperactivity disorder (ADHD), conduct disorder and substance use disorders (Park and Park, 2024; Moitra et al., 2023; Cortese et al., 2016; Martinez-Raga et al., 2015). Attention deficit hyperactivity disorder is a neurodevelopmental disorder characterised by inattentiveness, impulsivity and hyperactivity. Substance use disorders involve the compulsive use of substances (such as alcohol and drugs), despite the harmful consequences. Conduct disorder is a behavioural disorder more prevalent in young boys and adolescents and is characterised by aggressive and destructive behaviour.

The prevalence of mental disorders remains unexplored in many low- and middle-income countries (LMICs) (Moitra et al., 2023; Moitra et al., 2022). Notwithstanding the predominance of data from high-income countries in mental disorder epidemiology, there is a need for more research from LMICs to gain a clearer picture of the worldwide prevalence (Moitra et al., 2023).

2.6.1.2 Epidemiology of mental disorders in Africa

Mental health issues are becoming increasingly significant in Africa. Although true estimates are limited, systematic reviews show a rise in mental disorders from 1990 to 2019 (Fan et al., 2025; Zergaw et al., 2023; Patel et al., 2018). According to Castaldelli-Maia and Bhugra (2022), the prevalence rates of mental disorders in Africa appear to be similar or slightly lower than the global prevalence rates. The prevalence of mental disorders in Africa was approximately 12%, with anxiety disorders most prevalent at 3.6% in 2019, followed by a 4.6% prevalence of depressive disorders (Castaldelli-Maia and Bhugra, 2022). Bipolar disorders had a prevalence rate of 0.6% and schizophrenia 0.2% (Castaldelli-Maia and Bhugra, 2022). A scoping review by

Greene et al. (2021) found that the lifetime occurrence of any mood disorder in Africa varied from 3.3% to 9.8%. Major depressive disorders showed a lifetime prevalence ranging from 0.3% to 26.2%. Depression rates were notably higher in females than males and were the lowest in Nigerian studies. The lifetime prevalence of bipolar disorder was reported to be between 0% and 5.2%. Gender comparisons in bipolar disorder studies yielded mixed results. In Addis Ababa, Ethiopia, the lifetime prevalence was six times higher in females in an urban setting, while a rural Ethiopian study found it to be twice as high in males. The prevalence of anxiety and stress disorders was estimated to be between 5.7% and 15.8%. Generalised anxiety disorder (GAD) was more prevalent in females than males, and the point prevalence among children was estimated at 12.6% (Greene et al., 2021). The variation in mental disorder prevalence between genders may be influenced by several factors, including hormonal fluctuations, biological differences in brain circuitry related to mood and anxiety, psychosocial stressors, societal expectations and gender roles, economic disparities, patterns in seeking help, and the critical role of social support, particularly for women (Lord et al., 2023; Borges et al., 2016; Schwartz et al., 2011).

The scoping review by Greene et al. (2021) only included data from 12 African countries, excluding central Africa. More than half of the epidemiological research conducted across Africa has been concentrated in just five nations: Ethiopia, Kenya, Nigeria, South Africa, and Uganda. These studies have largely focused on mood disorders and alcohol-related conditions, with limited attention given to psychotic disorders. Another weakness of the scoping review by Greene et al. (2021) is that most of the data retrieved regarding the prevalence of mental disorders were from the early 2000s.

Depression and anxiety disorders are more prevalent in the African region compared to global estimates (WHO, 2024a). The prevalence of depressive disorders in sub-Saharan Africa (SSA) was approximately 4 540 cases per 100 000 people, and for anxiety disorders, it was 3 462 per 100,000 people (GBD, 2022). Nigeria, the Democratic Republic of Congo, Ethiopia, and South Africa had the highest burden of both depressive and anxiety disorders, with these countries having over 7 000 cases per 100 000 (WHO, 2024a).

2.6.1.3 Epidemiology in South Africa

The South African Stress and Health Survey (SASH), conducted in 2004, remains the main source of data on mental health prevalence in the country. The survey revealed that 16.5% of South African adults experienced a common mental disorder within 12 months, while 30.3% had encountered at least one mental disorder during their lifetime (Jacob and Coetzee, 2018; Herman et al., 2009). The study found that neuropsychiatric disorders were ranked third as a contributor to the burden of disease, which surpassed other NCDs and was preceded only by HIV/AIDS and other infectious diseases. In South Africa, the WHO estimated 1 331 cases per 100 000 DALYs for mental disorders in 2020 (WHO, 2020a). In 2021, 13 825 cases were prevalent per 100 000 for mental disorders (IHME, 2024).

Craig et al. (2022) surveyed a nationally representative sample of adults in South Africa. Data was collected following the third wave of COVID-19 and was based on the presence of symptoms and not a diagnosis of mental disorder by a trained mental healthcare professional. The fieldworkers who carried out the face-to-face surveys used the Patient Health Questionnaire (PHQ-9) score to measure depression and the Generalised Anxiety Disorder Questionnaire (GAD-7) for anxiety, which are both self-reported measures which account for symptoms of depression and anxiety in the preceding two weeks. As a result, the medical diagnosis of depression and anxiety could not be made, and as such, the authors used the words ‘probable’ depression and ‘probable’ anxiety. Both the PHQ-9 and the GAD-7 are well-known screening tools and have good psychometric properties, making them reliable screening tools (Palmer et al., 2024; Johnson et al., 2019). The results determined a prevalence of ‘probable’ depression at just over 25% in South Africa, with the highest rates noted in the Northern Cape province (38,8%) and the lowest rates of ‘probable’ depression in the Free State (14.7%) and KwaZulu Natal (14.9%) with the lowest rate of ‘probable’ depression (14.7% and 14.9% respectively) (Craig et al., 2022). The Northern Cape also had the highest rate of ‘probable’ anxiety, while the North-West province had the lowest rate of ‘probable’ anxiety. Table 2.1 represents the prevalence rates of ‘probable’ anxiety and ‘probable’ depression in each of the nine provinces.

Table 2.1: Prevalence Rates of 'Probable' Depression and 'Probable' Anxiety in the Nine South African Provinces (Source: Craig et al. (2022))

Province	'Probable' Depression	'Probable' Anxiety
Northern Cape	38.8%	29.3%
Eastern Cape	34.7%	22.0%
Western Cape	31.8%	23.9%
Gauteng	29.2%	22.2%
Mpumalanga	25.1%	14.6%
Northwest	22.1%	10.4%
Limpopo	21.3%	12.1%
Kwa-Zulu Natal	14.9%	8.6%
Free State	14.7%	13.0%

According to Craig et al. (2022), 'probable' depression was highest in women, highest for 'probable' depression and anxiety for those who lived in a metropolitan area, with only a basic level of education and houses in the lowest asset-score tertile (Craig et al., 2022).

2.6.2 Epidemiology of non-communicable diseases

In 2021, NCDs accounted for 7.3 trillion global cases, 43.8 million deaths, and 1.73 billion DALYs (Li et al., 2025). The primary causes of these deaths are cardiovascular diseases (17.9 million annually), cancers (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (WHO, 2024a). The mortality rate due to NCDs ranges from 36% to 88% at present (WHO, 2024a; WHO, 2023b). According to Global Health Estimates (GHE), NCDs were responsible for 40,8 million deaths in 2019, with cancer, cardiovascular diseases, and diabetes accounting for approximately 37% of all deaths, up from 24% in 2000 (WHO, 2024a; WHO, 2024b; WHO, 2023b; WHO, 2023a).

Each year, 86% of premature deaths from NCDs occur in LMICs. In the WHO African Region, NCD-related premature mortality was approximately 64%. Men aged 30 to 70 years had a higher likelihood of dying from NCDs compared to women of the same age group (WHO, 2024a). The International Diabetes Federation (IDF) reports that in 2024, approximately 24 million adults in the African region were living with diabetes,

with 216,000 deaths directly attributed to the disease (IDF, 2024). In 2020, there were 845,946 new cancer cases and 543,471 cancer-related deaths (WHO, 2024a).

South Africa has a high burden of disease for both communicable and non-communicable illnesses. Non-communicable diseases made up 50.9% of the total deaths in 2019. Most of these deaths were from cardio and cerebrovascular diseases, accounting for the largest proportion of deaths at 18.9% (NDOH, 2022). This was followed by cancers (9.9%), diabetes and chronic kidney disease (7.7%), cancers (9.9%) and respiratory disorders (5.2%). In 2021, the age-standardised mortality rate for cancer, diabetes, cardiovascular and respiratory diseases was approximately 675 per 100 000 (WHO, 2023a). Often, NCDs are comorbid with mental disorders, which increases disease burden and affects overall quality of life negatively. In Africa and South Africa, this burden of disease is further impacted by the high rates of communicable diseases as well.

2.7 MENTAL AND PHYSICAL HEALTH COMORBIDITIES

Multimorbidity is defined as the presence of two or more long-term conditions in an individual (Halstead et al., 2024). The term ‘multimorbidity’ is beneficial as it allows for the appreciation of the cumulative effects of the illnesses, rather than seeing each illness as its separate illness or as secondary to the primary illness (Halstead et al., 2024).

People with mental disorders have an increased risk of physical disease and often live with chronic pain (Thomas et al., 2024; Firth et al., 2019). Mental health disorders frequently co-occur with chronic physical illnesses, with prevalence rates among individuals with such conditions estimated to be two to five times higher than in the general population (Heywood et al., 2022; Firth et al., 2019; Petersen et al., 2019). The high rate of physical comorbidities, including pain, negatively impacts the burden of disease and quality of life of patients (Heywood et al., 2022; Firth et al., 2019). Literature indicates that patients with mental disorders have higher rates of cancers, cardiovascular diseases, chronic respiratory disorders, diabetes and obesity and live on average ten to fifteen years less than the general population (Alotaibi et al., 2024; Stein et al., 2019). Chronic pain is also very prevalent in patients with mental disorders (Thomas et al., 2024). The prevalence of major depression is consistently higher for persons with physical illnesses and chronic pain than for those without these

disorders, e.g. 33% with cancer, 29% with hypertension, 27% with diabetes, and 22% with myocardial infarction (Aaron et al., 2025).

The connections between mental health, chronic pain and other physical illnesses are not well understood, and as a result, the burden of mental disorders and comorbidities has been misjudged (Ngo et al., 2013). These chronic conditions are interconnected, and risk factors for NCDs, such as unhealthy eating, sedentary behaviour and substance misuse, are exacerbated by mental disorders, which in turn are also risk factors for NCDs (Ngo et al., 2013). The link between chronic pain and mental disorders is bidirectional, with depression increasing the risk of developing chronic pain and vice versa (Thomas et al., 2024; Bondesson et al., 2018; Marchand, 2014). Epidemiological studies have shown associations of mental disorders and NCDs, such as anxiety as a risk factor for cardiovascular diseases (hypertension and stroke) and depression associated with alcohol misuse and increased risk of stroke and diabetes (Stein et al., 2019; Jacobs and Coetzee, 2018; Ngo et al., 2013).

Anxiety and depression are now widely acknowledged as systemic conditions. They involve various mechanisms, such as immune and inflammatory pathways, which also adversely impact physical health (Stein et al., 2019). On the other hand, NCDs like heart disease, diabetes, cancers, and their treatments, for example, steroids, can affect the brain and lead to depression. The presence of chronic pain in mental disorders is thought to be a result of shared neurobiological pathways between pain and mental disorders (Chen et al., 2022; Volel et al., 2019; Bondesson et al., 2018).

Psychosocial factors have also been linked to the development of chronic pain in mental disorders, and pain severity is thought to be higher in patients with comorbidities (Bair and Owen-Smith, 2024). The link between NCDs and poor mental health is especially strong in poorer areas, showing that societal factors also play a role, indicating that the management of patients with multimorbidity should include an integrated collaborative management plan. (Stein et al., 2019; Ngo et al., 2013).

These findings underscore the need for integrated care approaches that address both mental and physical health disorders simultaneously. The complex interplay between mental disorders, chronic pain, and non-communicable diseases (NCDs) highlights the limitations of isolated treatment models and calls for collaborative, multidisciplinary strategies. Given the bidirectional relationships and shared biological and

psychosocial pathways, physiotherapists are uniquely positioned to contribute to holistic care through lifestyle interventions that promote physical activity, pain management, and behavioural change. Lifestyle interventions have the potential to lessen the burden of multimorbidity, improve quality of life, and reduce health inequalities.

2.8 MANAGEMENT OF MENTAL DISORDERS AND NON-COMMUNICABLE DISEASES

A high level of comorbidity exists between NCDs and mental disorders (Jacobs and Coetzee, 2018). These comorbidities are associated with poor health outcomes and quality of life, and increased utilisation of healthcare services, which, in turn, increase the cost of care (Petersen et al., 2019). As a result of the strong associations and related causal mechanisms of NCDs and mental disorders, it is argued that a combined approach to care is needed (Moitra et al., 2023; Petersen et al., 2019; Stein et al., 2019). According to Petersen et al. (2019), chronic illness management should include treatment for mental disorders, and this is becoming a global priority. The need to integrate mental health services into chronic illness management is reinforced by the reporting of mental disorders as NCDs in many global estimates (WHO, 2024a).

Although non-communicable diseases (NCDs) and mental health conditions are widespread globally, access to treatment remains limited and varies significantly depending on the population and healthcare setting. There is little information about treatment coverage in LMICs, especially in the management of depression (Moitra et al., 2023; Moitra et al., 2022). According to Moitra et al. (2022) mental health treatment coverage is only 8% in LMICs, compared to 33% in high-income countries (HICs). These inequities of access to care affect socially disadvantaged communities, and individuals with mental illness are less likely to seek help for NCDs, and their symptoms may affect their adherence to treatment and overall prognosis.

2.8.1 Management of non-communicable diseases

Non-communicable diseases are one of the biggest health challenges (Checkley et al., 2014), but most of the research regarding NCDs has been undertaken in HICs (Budreviciute et al., 2020; Checkley et al., 2014). Low- and middle-income countries have unique challenges, which means that strategies used to manage NCDs developed in HIC may not work in LMICs (Budreviciute et al., 2020). These challenges

are a result of the large population size and the rapidly increasing prevalence of NCDs (Checkley et al., 2014). Other challenges include healthcare systems' limitations, e.g. infrastructure challenges and inadequately trained healthcare professionals who are unable to fully address the rising burden of NCD (Rao et al., 2023; Ganju et al., 2020). Cultural and lifestyle differences are also apparent between LMICs and HICs, which may also impact the translation of findings from studies done in HICs to LMICs (Alkhatib et al., 2021; Devi et al., 2020; Karachaliou et al., 2020). Public health measures and education have the greatest impact on prevention and management strategies for NCDs in LMICs (Checkley et al., 2014).

The WHO's strategy for targeting NCDs has identified a set of 'best buys', which are effective interventions with a cost-effectiveness analysis of ≤ $100 per healthy life year (HLY) gained in LMICs (WHO, 2024c). These interventions aim to prevent and manage smoking, alcohol use, unhealthy diets, and sedentary behaviour. Key interventions include: Increasing taxes and reducing the availability/accessibility of harmful substances, implementing warning labels on cigarette packs and alcohol bottles, enforcing laws to restrict the promotion, advertising, and sponsorship of harmful substances and conducting media campaigns to educate the public about behaviour change, the benefits and risks of engaging in unhealthy behaviours, and promoting exercise through community-based programmes and environmental improvements (WHO, 2024c). Specific NCD interventions can be found in Table 2.2.

Table 2.2: Specific non-communicable disease interventions (adapted from WHO, 2024c: Tackling Non-communicable diseases)

Cardiovascular Disease (CVD)	Secondary prevention of rheumatic fever and rheumatic heart disease.
Diabetes	Testing for protein in urine and using ACE inhibitors can help prevent and delay kidney diseases. Managing blood pressure in diabetics, prescribing statins for individuals over 40 years of age, educating on foot care to lower amputation risks, screening for diabetic retinopathy, and maintaining glycaemic control with home glucose monitoring are essential to prevent complications.
Chronic Respiratory Disease	Administering inhaled bronchodilators and oral steroids can effectively manage acute asthma and COPD flare-ups, while the long-term use of inhaled bronchodilators is recommended for ongoing COPD treatment.

Cancer	Vaccinations (e.g., human papillomavirus, hepatitis B), early and regular screening for cervical, breast, and colorectal cancer, as well as childhood cancers, and early detection linked to comprehensive treatment.

Checkley et al. (2014) argue that these approaches have political and financial challenges in LMICs and that other approaches are required. They argue that community-based programmes consisting primarily of lifestyle interventions and secondary prevention with medication for the management of hypertension and diabetes are needed. However, caution needs to be taken when translating information about effectiveness from HICs to LMICs (Suhrcke et al., 2012), which tend to be biased toward pharmacological interventions. Suhrcke et al. (2012) argue that this is a limitation of the WHO's 'best buys' strategy, but this was argued in 2012, and the WHO NCD strategy was updated in 2024.

A primary healthcare approach with integration of services is advocated for, especially in LMICs (Stein et al., 2019; Checkley et al., 2014). Integrated care requires generalist and specialist medical services to work together. Collaborative care appears to be a good way to seek a greater role for non-medical providers to provide primary care within the formal health sector (Checkley et al., 2014). Collaborative care models (CoCMs) have emerged to manage multimorbidity, especially for incorporating mental health care into primary care (Stein et al., 2019). According to Moitra et al. (2023), the University of Washington CoCM has been tested in many countries (including South Africa), where resources are scarce. This CoCM consists of a team of trained primary health care workers and established health specialists to manage more common mental disorders such as anxiety and depression (Moitra et al., 2023).

Petersen et al. (2019) conducted a pragmatic trial in Northwest Province of South Africa and found that a CoCM can improve the detection of common mental disorders (depression and anxiety) and decrease symptoms of depression in patients with other chronic illnesses. The healthcare professionals in this study included doctors and nurses. Petersen et al. (2022), then conducted two pragmatic cluster randomised controlled trials to integrate depression care for patients with chronic conditions such as hypertension and those on antiretroviral treatment. The trials revealed that the co-

design process with district stakeholders was crucial for system-level support and effective implementation (Petersen et al., 2022).

Due to the complexity and increased burden of diseases in patients with comorbid mental and physical health disorders, further approaches are needed to address the health needs (physical and mental) to affect public health. Lifestyle behavioural changes may be a suitable approach, as they have been shown to have an impact on both physical and mental health, and as a result, impact overall health outcomes and quality of life, addressing the treatment divide (Farris and Abrantes, 2020).

The evidence reinforces the need for integrated, context-sensitive approaches to managing mental disorders and NCDs, particularly in low- and middle-income countries (LMICs). The high burden of comorbidity, coupled with systemic challenges such as limited access to care, workforce shortages, and cultural diversity, calls for innovative and scalable solutions. Collaborative care models (CoCMs) have shown promise, especially when adapted to local contexts through stakeholder engagement and co-design processes. The complexity of multimorbidity requires a shift toward preventive and rehabilitative strategies that address behavioural risk factors and promote sustainable health practices.

Lifestyle interventions are an important component of comprehensive care. These interventions, which can be delivered by physiotherapists, play a transformative role in improving both physical and mental health outcomes. By targeting modifiable behaviours such as physical inactivity, poor diet, and substance use, lifestyle interventions offer a non-pharmacological, person-centred approach that aligns with global public health priorities and addresses the treatment divide in LMICs.

The following section explores the evidence base for lifestyle interventions.

2.9 LIFESTYLE INTERVENTIONS

Lifestyle interventions are strategies designed to promote and support healthier behaviours and improve overall wellbeing and have been associated with decreased risk for chronic health conditions (Bradley et al., 2022). These interventions typically focus on modifying habits related to physical activity, diet, and other health-related behaviours. Lifestyle interventions often include components such as behavioural therapy, education, counselling, and stress management to support individuals in

making lasting changes (Bradley et al., 2022; Tariq et al., 2022). Lifestyle interventions can be delivered in group or individual settings (Bradley et al., 2022).

The following is a description of lifestyle interventions of physical activity and exercise, diet, sleep and stress management.

2.9.1 Physical activity and exercise

It is well known that physical activity and exercise are important in the management and prevention of mental disorders (Teychenne et al., 2020). Physical activity refers to any movement produced by skeletal muscles that results in energy expenditure. Exercise, a specific type of physical activity, is characterised by being planned, structured, and repetitive, to enhance or maintain physical fitness (Caspersen et al., 1985). Physical activity guidelines are aimed at decreasing the risk of cardiometabolic and musculoskeletal disorders, cancer and depression (Teychenne et al., 2020; Powell et al., 2019). Teychenne et al. (2020) state that contextual factors are important considerations in the prescription of exercise. These contextual factors include social and environmental factors, personal factors such as autonomy, preference and ability to exercise. As such, physical activity guidelines may need to be expanded to consider these contextual factors.

The health benefits of physical activity and exercise are well-documented (Farris and Abrantes, 2020). The benefits of physical activity and exercise include improved body composition, lower cholesterol level, improved glucose control, lowered blood pressure, improved cardiovascular status, lowered inflammatory status and autonomic nervous system balance (Herbert, 2022; Blair et al., 2001). The proposed mechanisms through which exercise influences mental health are still unclear; however, there are a few proposed theories (Farris and Abrantes, 2020). These proposed mechanisms include effects on brain function, physiological and immune function and psychological strategies such as distraction and self-efficacy (Farris and Abrantes, 2020). Exercise may work by increasing neural plasticity in the hippocampus as well as endorphin release, improved hypothalamic-pituitary-adrenal axis (HPA) and increased anti-inflammatory cytokines (Farris and Abrantes, 2020).

Approximately one quarter of the global population is physically inactive, leading to a higher occurrence of NCDs, particularly cardiovascular disease (CVD) and type 2 diabetes (Ballin and Nordström, 2021). The WHO indicated that up to 80% of

premature deaths from NCDs can be prevented by lifestyle interventions, including physical activity (Ballin and Nordström, 2021). Interventions targeted at improving physical activity and exercise levels are sustainable and may be more accessible than pharmacological interventions (Bull et al., 2020; Farris and Abrantes, 2020). Exercise is usually a low-cost intervention and is not associated with side effects, as may be the case in pharmacological interventions (Farris and Abrantes, 2020).

Research suggests that supervised, structured aerobic exercises at moderate to vigorous intensity in 30 to 45 minute sessions, three times a week, appear to be the best prescription to obtain mental health benefits (Farris and Abrantes, 2020; Morres et al., 2019; Stubbs et al., 2017). According to Teychenne et al. (2020), systematic reviews have shown that health benefits can be obtained even at low levels of exercise. This is important to note, as most people with mental disorders lead sedentary lifestyles (Teychenne et al., 2020). Most of the research done on the effects of exercise on mental health has been done on aerobic exercise and depression, and physical activity has been recommended in the management of depression (Morres et al., 2019; Paolucci et al., 2018; Stubbs et al., 2017).

Morres et al. (2019) performed a meta-analysis of 11 randomised controlled trials which compared aerobic exercise with non-exercise interventions and only included participants with a medical diagnosis of depression according to the DSM-V. According to the authors, the largest effects for aerobic exercise were found in modalities that did not require equipment, were delivered in either a group or individual setting, and in both indoor and outdoor settings. Only moderate effects were found in equipment-based exercise and those that took place in hospital settings. When compared to treatment as usual or antidepressants, or psychological interventions, aerobic exercise showed a large antidepressant effect when these treatments were used as monotherapy (Morres et al., 2019). The meta-analysis had low levels of heterogeneity and risk of bias and is one of the only reviews to consider only patients from mental health services and with a diagnosis of major depressive disorders.

In an earlier study by Kvam et al. (2016), the effects of exercise on unipolar depression, either as an independent or adjunctive therapy, were investigated. This meta-analysis included 23 studies with 977 participants and found that exercise had a small yet significant effect when compared to control groups. When compared to no

interventions, it had a large effect size, and when compared to treatment as usual, exercise had a moderate effect (Kvam et al., 2016). The authors did note that the study results may have been affected by using arms of the largest clinical effect and not the largest dosage effect. This may have impacted the study findings, as the clinical effect (overall reduction in depressive symptoms) may have been the result of other variables such as participant characteristics. As such, the overall effect sizes may have been slightly larger than if the largest dosage effect had been used. Furthermore, if the largest dosage effect had been used in the meta-analysis, a more standardised comparison across the studies could have been done, focusing on the exercise intensity or duration and the outcomes. This was an updated review, building on previous studies which had collected data until 2011, with the studies included until December 2014 (Kvam et al., 2016).

Often, the first line of treatment for depressive disorders is pharmacological treatment using selective serotonin reuptake inhibitors (SSRIs), however, only 33% of people on SSRIs respond to treatment (Paolucci et al., 2018). According to research, inflammation has been linked to the onset of depression (Stein et al., 2019; Paolucci et al., 2018). As such, physical activity and exercise, which help decrease inflammation, may be suitable treatments for depression. Paolucci et al. (2018), examined the impact of a six-week structured exercise programme on mental wellbeing and levels of inflammatory markers among university students. The study compared different intensity levels of exercise and found that moderate intensity exercise decreases inflammation by decreasing, among other factors, TNF-Alpha and may be the ideal intensity of exercise when prescribing exercise for mental health in a non-clinical group of people who are under long-term stress (Paolucci et al., 2018).

The WHO recommends strengthening exercises of the major muscle groups be done on at least two days a week (WHO, 2020b). The effects of resistance exercise on depression and mental health have also been studied. O'Sullivan et al. (2023) performed a secondary analysis of existing data from two parallel eight-week randomised controlled trials. Resistance training was based on the WHO guidelines and done twice a week, with resistance gradually increasing over the eight weeks. The participants were initially given two sets of eight to twelve repetitions to perform. If the participant could perform two sets of twelve repetitions, the resistance was increased by 5%. If they could not perform eight repetitions, the resistance was decreased by

5%. The authors found that an eight-week programme of twice-weekly resistance exercise training led to a clinically meaningful decrease in depressive symptoms (Hedges' d = 1.01, 95% CI [0.44 to 1.57], p-value <0.001) in an otherwise healthy population, as well as an antidepressant effect in patients with anxiety (O'Sullivan et al., 2023).

Increased physical activity helps reduce the risk of mortality and morbidity by approximately 30-40%, but these estimates may be conservative (Ballin and Nordström, 2021). Larger effects may be gained when the activity happens at a higher intensity; however, observational studies suggest that "doing something is better than nothing" (Ballin and Nordström, 2021). A critical review by Ballin and Nordström (2021) reviewed RCTs of exercise in an older population and reported that although exercise can prevent type 2 diabetes when combined with nutrition advice and interventions, it does not prevent cardiovascular disease or premature death. These findings were different to previous findings from observational studies in the literature and Ballin and Nordström (2021) recommend that larger randomised controlled trials be conducted, as the studies included in their critical review had publication bias and an inadequate power in separate studies.

There are many challenges to exercise approaches in both the general population and those with mental disorders. These include motivation, adherence to the exercise programme and difficulty with long-term maintenance (Farris and Abrantes, 2020). As a result, lifestyle physical activity (LPA) programmes have been introduced. Dunn et al. (1998) define LPA as:

> *"The daily accumulation of at least 30 minutes of self-selected activities, which includes all leisure, occupational, or household activities that are at least moderate or vigorous in their intensity and could be planned or unplanned activities that are part of everyday life" (p. 399).*

Lifestyle physical activity programmes, therefore, involve activities which can be done throughout the day and include activities which the patient can select themselves (Farris and Abrantes, 2020).

It is increasingly evident that these guidelines may not sufficiently account for individual variability and often are difficult for patients with mental disorders and

comorbidities to engage in. As such, physical activity and exercise should be more flexible, context-sensitive and patient-specific and therefore all variations of physical activity and exercise will be considered in this study.

2.9.2 Nutrition and weight management

Poor diet and unhealthy eating habits have been associated with obesity and other cardiometabolic disorders (Granero, 2022). Cardiometabolic disorders, diabetes, musculoskeletal disorders, cancers and premature death are often a result of obesity. Obesity may lead to metabolic disorders such as diabetes and cardiovascular disease, musculoskeletal disorders, and cancers (Afzal et al., 2021; Hassan et al., 2016). Associations exist between obesity and diet as well as metabolic syndromes, stress and mental disorders (Bremner et al., 2020). Although the causal pathways are unclear, diet and obesity affect mood directly, and depression and anxiety or stress may lead to changes in eating habits that affect weight (Bremner et al., 2020). The WHO advocates for healthy eating as an important means of preventing disease (WHO, 2021). Healthy eating and exercise are important determinants of physical and mental health (Briguglio et al., 2020), however, according to Granero (2022), there is disagreement about the role of nutrition in the progression of mental disorders.

The prevalence of overweight and obesity has been progressively increasing over the years, with the current rate at 30% of the global population (Afzal et al., 2021). Patients with mental disorders have a higher risk of becoming overweight or obese, with the prevalence ranging from 10 to 60%, depending on the country and setting (Afzal et al., 2021). The increased rate of obesity has been attributed to the side effects of medication, which results in increased appetite (Afzal et al., 2021). Multiple unhealthy lifestyle factors (sedentary lifestyle and unhealthy eating habits) and social determinants of health (stigma and poverty) may also contribute to increased obesity in patients with mental disorders and comorbid NCDs.

The relationship between mental disorders and obesity is complex, involving biological, psychological and environmental factors. There is a reciprocal relationship between obesity and depression and anxiety (Abouzed et al., 2022; Chu and Mehrzad, 2020; Müller, 2015). Obesity and mental disorders are affected by inflammatory and neuroendocrine changes, which mainly affect the HPA (Martins et al., 2019). The gut

microbiota may also play a role in the link between obesity and mental disorders through the modulation of inflammation and the HPA (Martins et al., 2019).

According to a systematic review by Hassan et al. (2016), combined lifestyle interventions, especially diet and exercise in combination, have the greatest effect on obesity. The authors aimed to investigate the effects of lifestyle interventions on patients with severe obesity; however, only one of the 17 included studies in the systematic review considered severe obesity (defined as a Body Mass Index (BMI) of 40kg/m^2). The authors still reported that a wide range of interventions had a statistically significant effect on obesity. The interventions reported in this study included education classes on lifestyle changes and behavioural techniques, prescribed diets, prescribed physical activity programmes, counselling and the use of technology and self-reporting to monitor and track changes. The interventions were considered regardless of whether they were delivered in group sessions or individual support and on average lasted from three to 48 months (Hassan et al., 2016). It is important to note that in their systematic review, Hassan et al. (2016) only considered the effects of lifestyle interventions in people with obesity and physical comorbidities (CVD, diabetes, cholesterol) but did not report on all mental disorders.

A systematic review and meta-analysis by Bradley et al. (2022), also reported that lifestyle interventions improved BMI, diet, and weight as well as physical activity in patients with mental disorders. Unlike Hassan et al. (2016), the authors considered the effect of lifestyle interventions on patients with mental disorders in community and outpatient settings. Similar to Hassan et al. (2016), the interventions considered for inclusion in the systematic review were not limited to any specific intervention or delivery method (e.g. group or individual). The authors were able to conduct a meta-analysis and found that lifestyle interventions had a positive effect on weight, physical activity and diet. The authors noted mental health outcomes as their secondary outcomes and found that there appeared to be no effect on depression or anxiety when a meta-analysis was performed, but in the studies that were reported narratively, as they could not be included in the meta-analysis, reported favourable outcomes in mental disorders.

Briguglio et al. (2020) reported that dietary counselling and personalised support focusing on healthy eating recommendations can help reduce symptoms of

depression. This advice is probably best delivered in consultation with a dietician who would be able to provide eating plans, recipes and shopping lists to support the individual to manage their weight (Briguglio et al., 2020). Briguglio et al. (2020) provide the following suggestions for healthy eating: start with breakfast and avoid sugary drinks; eat whole grains, vegetables, and fruits daily; include a variety of proteins like meat, fish, legumes, dairy, or eggs; use olive oil instead of butter or lard; avoid fast food, sweets, and unnecessary supplements; eat in moderation; keep regular mealtimes; and enjoy meals with family or friends.

Intermittent fasting has also been shown to affect mood and mental health. Calorie restriction, a form of fasting, has been shown to improve psychological well-being and reduce stress in overweight women, suggesting that fasting can have mental health benefits when combined with psychological interventions (Kautzky et al., 2021). However, there is literature that has determined, in some cases, that fasting may adversely affect mental disorders and may lead to eating disorders (Perez-Kast and Camacho-Morales, 2025; Domaszewski et al., 2024). As such, when considering intermittent fasting as a means of achieving weight loss, the addition of psychosocial support may help improve both mental and physical health (Kautzky et al., 2021).

Mental disorders and obesity are closely linked and often affected by a variety of factors, as mentioned above. Due to the complexity, an integrated holistic approach to the management of obesity and mental disorders is required that considers the bidirectional relationship between the two comorbidities (Hachuła et al., 2023). Multidisciplinary lifestyle interventions that include physical activity and cognitive behavioural therapy have shown promise in treating both obesity and comorbid mental disorders (Vourdoumpa et al., 2024; Cena et al., 2022).

2.9.3 Sleep

Sleep is central to overall health and influences almost all bodily functions and systems, including cardiovascular health, immunity, hormone regulation and reproductive health, pain, and mental health (Stafford et al., 2024; Baranwal et al., 2023; Irish et al., 2015). There is a bidirectional relationship between sleep and mental health, with poor sleep and sleep disorders worsening mental health and mental disorders affecting sleep (Stafford et al., 2024).

Sleep hygiene encompasses guidelines aimed at fostering healthy sleep patterns, which refer to a set of adjustable environmental and behavioural factors used to improve sleep quality and quantity (De Pasquale et al., 2024; Baranwal et al., 2023; Irish et al., 2015). Initially created to address mild to moderate insomnia, these recommendations are taught to patients during sleep hygiene education. Patients are encouraged to adopt healthy sleep habits, such as limiting caffeine intake, exercising regularly, eliminating noise from the sleeping environment, and maintaining a consistent sleep schedule (Irish et al., 2015). According to Irish et al. (2015), sleep hygiene is an inexpensive lifestyle intervention and can be used as a first-line intervention as it does not rely on the healthcare professional for people to access sleep hygiene programmes and is easily accessible, especially for those who have limited resources and access to care.

De Pasquale et al. (2024) report that there is no consensus about what sleep hygiene education entails and, as a result, performed a bibliographic literature review which provides a broad overview of the existing literature. The authors aimed to define sleep hygiene and to determine the common components of sleep hygiene practices. The review included observational and interventional research. The authors reported that there was no standard definition of the term ‘sleep hygiene’ as less than half of the included studies provided a definition, but the themes that emerged from the definitions considered three aspects - behavioural strategies, environmental factors and ‘aspects of control’ (which refers to sleep hygiene that involves behaviours which are voluntary, modifiable and in the person’s control). The most common components of sleep hygiene include education about behavioural strategies, including managing substances such as caffeine, alcohol, and smoking, exercise, naps, timing of sleep, as well as environmental factors such as temperature, noise, stress, and night-time routine (De Pasquale et al., 2024). Limiting the amount of screen time in a day, especially before bedtime, may also positively affect the quality and quantity of sleep and, as such, should also be included in a sleep hygiene programme (Nagarajan et al., 2025; Saleem and Jan, 2024; Christensen et al., 2016).

A parallel RCT conducted by Sharma et al. (2025) investigated the effect of a sleep hygiene intervention on sleep duration in a rural community in America. The trial consisted of two arms, with arm one receiving the intervention and arm two receiving a delayed intervention. The sleep hygiene video consisted of education about common

sleep hygiene practices. Participants in the intervention group received a sleep hygiene intervention, which included a sleep hygiene video to view at four different time points over twelve weeks. The control group initially received no intervention but were able to view the sleep hygiene video at least twice from week eight to twelve. The authors concluded that while overall there was no significant effect on sleep duration, those who were compliant with the intervention had modest but significant effects on sleep duration (on average, one hour more sleep) (Sharma et al., 2025). It is, however, important to note that participants with mental disorders or illnesses were excluded from this study, and as such, these findings are not generalisable to a population with mental disorders and comorbidities.

Barati and Amini (2022) conducted a RCT to determine the effectiveness of a sleep hygiene programme on sleep quality and mental health in patients with substance abuse. Participants were randomly allocated to a control or intervention group. The intervention group received four group sessions, which included an introduction session, a session about sleep hygiene practices, healthy sleep habit formation and finally, methods to control stress and negative emotions and including imagery and mindfulness therapy. The study found that sleep quality improved in participants in the intervention group ($p=0.04$), and depression, anxiety and stress scores measured improved by 24 to 27% in the intervention group (Barati and Amini, 2022).

Poor quality and quantity of sleep have been shown to impact both physical and mental health, and interventions which integrate holistic strategies are required to ensure overall health and quality of life. The effectiveness of sleep hygiene interventions is varied and dependent on the specific population and is often affected by individual factors such as age, specific health conditions and comorbidities (Baranwal et al., 2023; Urbanová et al., 2023; De Biase et al., 2014). Sleep hygiene practices are more effective when combined with other modalities such as cognitive behavioural therapy and mindfulness (Hazlett-Stevens et al., 2019; Palermo et al., 2017).

2.9.4 Stress management

Stress is considered a “nonspecific response of the body to any demand” (Fink, 2010). In behavioural sciences, it is considered a response to perceived threat leading to anxiety (Fink, 2010). Literature indicates an overlap in behavioural, physiological,

psychological and social mechanisms (Alsubaie et al., 2017). As such, there is a need to find treatments that address both physical and mental health complaints due to the substantial burden on healthcare costs, medical outcomes and the effect on QoL (Alsubaie et al., 2017). An acute response to stress is necessary to protect the system, but chronic stress leads to decreased immune response, resulting in illness (Alotiby, 2024). Lengthy periods of ongoing and persistent stress often result in mental disorders, which can cause a worsening in overall health (Shah et al., 2014).

According to Ong et al. (2004), stress management (SM) is a widely used term and consists of varied interventions (imagery, relaxation, mindfulness techniques, and cognitive behavioural approaches). Stress management interventions are designed to help individuals cope with stressors and mitigate the negative health consequences which are associated with increased stress, and are effective in the management of both mental disorders and NCDs (Kenny, 2014). Stress management interventions are a non-pharmacological intervention and have the added benefit of no side effects, which are common in the pharmacological management of mental disorders (Shah et al., 2014). The side effects of psychotropic medication used in the management of depression and anxiety include weight gain, as well as effects on the cardiovascular and neurological systems (Shah et al., 2014). Stress management interventions have been shown to decrease symptoms of anxiety and depression (Amanvermez et al., 2023), and are relatively simple to administer, do not necessarily require advanced psychotherapeutic training or skills to administer (Klainin-Yobas et al., 2016).

Stress management interventions include a variety of techniques such as psychoeducation, cognitive behavioural therapy (CBT), relaxation techniques, mindfulness and problem-solving therapies (Tatta et al., 2022b; Klainin-Yobas et al., 2016). In their systematic review, Ong et al. (2004) set out to determine what techniques are used in stress management, what stress management therapy protocols include, and to determine if the outcomes of SM studies can be adequately compared to determine effectiveness. A total of 153 articles were included in the review, with most studies using cognitive behavioural therapy (CBT), relaxation therapies and meditation.

2.9.4.1 Cognitive behavioural therapy

Cognitive behavioural therapy is a time-limited, structured approach that investigates the link between thoughts, emotions and actions (Fenn and Byrne, 2013). It is a framework which allows patients to identify their thoughts and actions and provides 'tools' to change these (Fenn and Byrne, 2013). Cognitive behavioural therapy is effective in the management of various mental health disorders, particularly depression and anxiety, as well as in patients with comorbid mental and physical health disorders (Fadipe et al., 2023; Fordham et al., 2021).

Fordham et al. (2021) conducted an umbrella review which considered CBT for any condition (physical or mental) and where the outcomes of the included RCTs were pain, depression, anxiety and QoL. The authors reported that depression was the most studied condition for which CBT was used. The systematic review considered studies which included children and adolescents (under 18 years old), adults (18-65 years old), as well as older adults (over 65 years). The findings indicated that CBT, when compared to no other intervention, had a moderate effect on QoL, anxiety, and pain, but when compared to other active treatments such as education, exercise, medication or relaxation, the effect sizes were smaller. The authors noted that the findings have limited generalisability as no studies were found that were conducted in South America, Africa and Asia (Fordham et al., 2021). Seventy-seven per cent of the studies included adults. In contrast, only 6% of the included studies related to older adults. As such, the findings of the review could not be generalised to the older adult population.

Evidence suggests that there is a scope for physiotherapists to use cognitive behavioural therapy (Hall et al., 2018). However, the literature indicates that physiotherapists use elements of CBT in their treatment of patients with chronic conditions and mental disorders. Physiotherapist-delivered CBT is described in the literature as cognitive behavioural interventions, which include structured and systematic approaches, following the principles of CBT (Hall et al., 2018; Thompson et al., 2016; Brunner et al., 2013). These elements have been combined into treatment approaches such as cognitive functional therapy (CFT), Norwegian psychomotor therapy and self-management programmes which incorporate principles of cognition and behavioural change strategies (Holopainen et al., 2022; Richmond et al., 2018). Veillon et al. (2024) conducted a systematic review and meta-analysis to determine if

physiotherapist-led cognitive behavioural interventions (CB) could have an impact on quality of life and disability in patients with non-specific low back pain. The systematic review included fourteen studies, of which three were pooled into a meta-analysis, which showed that CB, especially cognitive functional therapy, improved disability but did not necessarily show improvements in quality of life. In South Africa, CBT is not within the scope of practice for physiotherapists. Still, physiotherapists may use cognitive and behavioural change principles in their management of patients with complex conditions and comorbidities. This is similar to the findings by Hall et al. (2018), which determined that physiotherapists can successfully implement CBT, especially in low back pain. Still, challenges such as a lack of procedural information, training and access to resources may hinder the successful implementation of CBT.

2.9.4.2 Relaxation therapy

Relaxation therapy is a psychological therapy which has shown to be effective in reducing symptoms of anxiety and depression (Hamdani et al., 2022; Kim and Kim, 2018). These techniques are effective in managing chronic pain, reducing blood pressure, and improving physical health (such as asthma and chronic pain) and cognitive function (Vambheim et al., 2021). Relaxation can be obtained using progressive muscular relaxation (PMR), autogenic training (AT), applied relaxation (AR), and mindfulness (Kim and Kim, 2018). Relaxation therapy has been compared to CBT in many studies, with relaxation therapy demonstrating higher effect sizes than CBT; however, CBT has been more widely studied than relaxation therapy (Kim and Kim, 2018).

A systematic review and meta-analysis by Kim and Kim (2018) included 39 articles on the effects of relaxation therapy on anxiety disorders, of which 16 studies met the inclusion criteria for meta-analysis. Most of the studies (10/16) were of a high methodological quality. The findings from the study revealed that relaxation therapy for anxiety had a moderate to high effect size, noting that relaxation therapy had a higher effect size than CBT in this study. However, only AR and mindfulness-based stress reduction (MBSR) were studied using RCTs, with these results indicating significant effect sizes.

2.9.4.3 Mindfulness interventions

Mindfulness involves being consciously aware of your thoughts, emotions, physical sensations, and the environment around you in the present moment (Zhang et al., 2021). Mindfulness-based interventions (MBIs) are promising strategies for the management of patients with mental disorders, chronic pain and chronic illnesses such as diabetes, hypertension, and obesity, to help decrease stress (Romas and Sharma, 2022; Manuello et al., 2016; Tang et al., 2015). Many MBIs have been formulated, and mindfulness has been incorporated into dialectical behavioural therapy (DBT), acceptance and commitment therapy (ACT), but the two most commonly used are MBSR and mindfulness-based cognitive therapy (MBCT) (Zhang et al., 2021; Spijkerman et al., 2016). Mindfulness-based stress reduction was initially developed as a group intervention which focuses on stress reduction and incorporates yoga and mindful meditation. Mindfulness-based CBT was initially developed to manage the symptoms of depression and anxiety and prevent depression relapse, and incorporates principles of CBT (Apolinário-Hagen et al., 2023; Zhang et al., 2021; Hazlett-Stevens, 2018). Both MBSR and MBCT were originally developed to be delivered in group settings, over approximately eight weeks (Loo and Salmon, 2024; Pedulla, 2017). Mindfulness-based interventions are effective in reducing distress and improving quality of life in various populations, including healthy populations, populations with mental disorders, and those with chronic somatic symptoms (Spijkerman et al., 2016).

A systematic review and meta-analysis conducted by Grossman et al. (2004) found that MBSR was useful in the management of chronic disorders. In this study, MBSR in both clinical and non-clinical populations were considered, and a total of 20 studies (experimental and observational) were included in the analysis (Grossman et al., 2004). Mindfulness-based stress reduction was shown to be effective in a range of mental disorders, as well as chronic illnesses (Mental health effect sizes: d = 0.50, 95% CI [0.43;0.56], p < .0001. Physical health effect sizes: d = 0.42, 95% CI [0.34; 0.50], p < .0001]). In 2015, Khoury et al. (2015) conducted a systematic review and meta-analysis of MBSR in non-clinical populations. The authors found that MBSR had moderate effect sizes in reducing symptoms of anxiety, depression and distress (n = 26; Hedge's g = .55; 95% CI [.44, .66], p < 0.00001).

Mindfulness-based interventions offer a promising approach for managing mental disorders and physical comorbidities, with evidence supporting their efficacy in improving both psychological and physiological outcomes. While many studies have been conducted on MBI, more research is needed which includes more rigorous studies to determine the mechanism of how they work, as well as the long-term effectiveness of these interventions (Greeson and Chin, 2019).

2.10 PHYSIOTHERAPY IN MENTAL HEALTH

According to World Physiotherapy, the international association of global physiotherapy,

> *"Physiotherapists help people maximise their quality of life, looking at physical, psychological, emotional and social wellbeing. They work in the health spheres of promotion, prevention, treatment/intervention, and rehabilitation"* (World Physiotherapy, 2024b)

Physiotherapists work within a variety of settings, across many populations. They work as members of interprofessional teams (IPTs) and independently to help people achieve optimal functional outcomes, and usually work as 'first line' practitioners to meet the increasing demands of healthcare in society (Physiopedia, 2024).

The integration of physiotherapy into mental health care is an emerging area within the broader physiotherapy profession. Physiotherapy in mental health aims

> *"... to optimise wellbeing and empower the individual by promoting functional movement, movement awareness, physical activity and exercises, bringing together physical and mental aspects. Physiotherapists in mental health contribute to the multidisciplinary team and inter-professional care."* (World Physiotherapy, 2024a)

Mental health and physical health are linked, and as a result, physiotherapists play an important role in the management of patients with mental disorders and comorbidities. However, despite the evidence of the impact of comorbidities prevalent in mental disorders, globally, there are inequalities in healthcare provision (Hemmings and Soundy, 2020).

Physiotherapy management in general is varied, dependent on the patient's needs. In mental health, physiotherapists can provide chronic pain management and lifestyle interventions in both preventive and curative roles. Physiotherapy can enhance the lives of people with mental disorders by managing the comorbid physical health issues, decreasing psychological and social issues and as an adjunctive therapy in addition to primary treatments such as medication and psychotherapy (Alotaibi et al., 2024). However, physiotherapists often lack knowledge and training in mental health, which may affect their knowledge, attitudes and beliefs (Alotaibi et al., 2024; Hooblaul et al., 2020).

Heywood et al. (2022) conducted a scoping review to determine the intersection between physical and mental health and used this to enhance professional practice and guide the future of physical therapy. Most of the studies were from HIC, including the United Kingdom (28 studies) and Sweden (27 studies). Most of the studies were conducted after 2015. The authors found that the most studied interventions were physical activity and exercise in people with mental disorders. This scoping review determined that physiotherapists' experiences differed greatly, and those physiotherapists who had a special interest in working with patients with mental disorders were more confident than those working in general practice (Heywood et al., 2022).

Alotaibi et al. (2024) and Hooblaul et al. (2020) performed descriptive cross-sectional studies using surveys (Alotaibi et al., 2024; Hooblaul et al., 2020) and focus groups (Hooblaul et al., 2020) to explore physiotherapists' understanding, attitudes, and perceptions regarding their involvement in mental health care. Hooblaul et al. (2020) investigated the knowledge, attitudes and beliefs of physiotherapists in the KwaZulu Natal public health care sector, while Alotaibi et al. (2024) considered physiotherapists in different regions of Saudi Arabia. It was found in both studies that participants generally had a positive attitude towards mental health physiotherapy, but participants in both studies indicated a general lack of knowledge regarding the role of physiotherapy in mental health. These studies, in South Africa and the Middle East, indicate that there is a need for improved training and inclusion of mental health in undergraduate curricula to help address the lack of knowledge and improve attitudes of physiotherapists (Alotaibi et al., 2024; Hooblaul et al., 2020). An earlier similar study by Connaughton and Gibson (2016) in Western Australia found that participants in

their study saw patients with mental disorders on average once a week, and participants also had a generally positive attitude towards patients with mental disorders. The participants in their study also identified a lack of preparedness to manage patients with mental disorders (Connaughton and Gibson, 2016).

Literature has indicated an overall lack of knowledge about the role of physiotherapy in mental health (Alotaibi et al., 2024; Hemmings and Soundy, 2020; Hooblaul et al., 2020; Lee et al., 2017; Connaughton and Gibson, 2016). This lack of knowledge about the role of physiotherapy in mental health is experienced by the general patient population, healthcare professionals, and physiotherapists themselves. The lack of knowledge of healthcare professionals may be a result of a lack of training in both undergraduate and postgraduate curricula, including the physiotherapy curriculum. According to Lee et al. (2017), approximately one in four individuals seeking physiotherapy treatment may have a mental health condition. With the global rise in mental health disorders, physiotherapists are increasingly likely to encounter such patients in their routine practice. This highlights the importance of equipping physiotherapists with the necessary skills and knowledge through appropriate training at both undergraduate and postgraduate levels.

Hooblaul et al. (2024) investigated the content of the undergraduate mental health curriculum across the eight universities in South Africa which offer physiotherapy degrees. The authors used a mixed-methods design of surveys to academic leaders and lecturers, as well as interviews and focus groups. Seven of the eight universities participated in the study, which found that the respondents reported that the undergraduate curriculum of all seven universities included a psychology module, but there was a lack of consistency in what each curriculum included about theoretical and practical teaching and experience (Hooblaul et al., 2024). The authors also engaged with physiotherapists on the board of the Health Professions Council of South Africa (HPCSA). The HPCSA is the regulatory body for healthcare professionals in South Africa and provides minimum training standards for medical and therapeutic sciences. From the engagement with the HPCSA, the authors noted that physiotherapists manage the physical aspects related to psychiatric illnesses, and have a role in preventative management (Hooblaul et al., 2024).

2.11 CLINICAL PRACTICE GUIDELINES

The focus on healthcare in LMICs is often on the immediate health needs of the population, such as infectious diseases (HIV/AIDS and Tuberculosis) and the high rates of NCDs (Jackson-Morris et al., 2024; Allotey et al., 2014). Mental disorders and physical comorbidities often co-exist, increasing the burden of disease for the patient (Heywood et al., 2022; Firth et al., 2019). As a result of the high multimorbidity prevalent in LMICs, it is necessary to develop treatment approaches which address these multiple conditions. Stein et al. (2019) advocated for the integration of mental disorders into NCDs to address the treatment gap.

Clinical practice guidelines, evidence-based statements and recommendations are forms of evidence-based medicine which help guide management and improve treatment outcomes in specific patient populations. While clinical practice guidelines provide a comprehensive framework for clinical decision-making, evidence-based statements and recommendations offer specific, actionable guidance derived from systematic evidence reviews (Shaw, 2023; Yi et al., 2021; Culleton, 2015). Each plays a crucial role in promoting evidence-based practice and improving patient care in healthcare settings. Table 2.2 compares CPGs, evidence-based statements and recommendations.

Table 2.3 Comparison of clinical practice guidelines, evidence-based statements and recommendations

	CPGs	Evidence-based statements	Recommendations
Definition	Systematically developed statements for clinical decisions	Specific statements derived from a systematic evidence review	Actionable suggestions within CPGs or statements
Purpose	Optimise patient care, reduce harmful interventions	Integrate the best evidence for clinical practice	Guide clinical practice with specific advice
Development Process	Systematic review, bias minimisation, evidence grading	Multidisciplinary evidence reviews, external review	Graded based on evidence level and strength
Types	Consensus-based, evidence-based	Evidence-based	Evidence-supported, expert consensus

Clinical practice guidelines (CPGs) are systematically developed statements intended to support healthcare providers and patients in making informed decisions about appropriate care for specific clinical situations (Nakayama, 2014). Their goal is to

enhance patient outcomes by offering evidence-based recommendations derived from comprehensive reviews and evaluations of the benefits and risks of various treatment options (Van der Wees et al., 2011). By promoting consistency and standardising care approaches, CPGs play a crucial role in improving healthcare quality and serve as a key resource for both clinicians and patients in the decision-making process.

Clinical practice guidelines and recommendations should be grounded in the best available evidence. Systematic reviews and RCTs offer the highest level of evidence to guide the management of patients and are an important starting point in the development of CPGs (Kaur and Li, 2024; Knoll et al., 2018; Ardern, 2016; Kisely et al., 2015; Ng and Peh, 2010). Systematic reviews follow clear and organised steps designed to reduce bias, so the results are more trustworthy and useful for making decisions (Platz, 2021; Chandler et al., 2019; Cura Della Redazione, 2014). This methodology ensures the highest quality of evidence is obtained and will determine the level of the CPGs and evidence-based recommendations (Platz, 2021). Once a systematic review has been completed, the quality and certainty of the evidence should be determined to state the quality of the recommendation (Granholm et al., 2024). The quality of the evidence is mostly assessed using either the AMSTAR checklist or the GRADE methodology (Granholm et al., 2024; Knoll et al., 2018).

Scoping reviews are another method of synthesising evidence. Scoping reviews help outline the breadth of research on a topic by mapping available studies, identifying their focus, and revealing gaps in the literature (Munn et al., 2019). Scoping reviews are particularly useful for exploring emerging evidence and guiding future, more targeted reviews (Munn et al., 2019). Scoping reviews, unlike systematic reviews, do not undergo critical analysis of each included article. This further emphasises the use of systematic reviews rather than scoping reviews in the development of CPGs. Table 2.4 summarises the indications for scoping reviews and systematic reviews.

Table 2.4 Indications for scoping reviews or systematic reviews (adapted from Munn et al. (2018))

Systematic reviews	Scoping reviews
Explore the evidence	To identify the types of available evidence
Validate existing practices, address inconsistencies, and explore emerging approaches	To explain essential concepts and definitions found within the existing literature
Highlight and guide potential directions for future research efforts	To examine how research is conducted on a certain topic or field and identify the key characteristics related to a concept
Identify and investigate conflicting results	To identify and analyse the knowledge gap
Produce statements to guide decision-making	As a precursor to a systematic review

Evidence-based medicine provides a framework to help improve healthcare decisions based on the best available evidence. This evidence should then be combined with the healthcare professionals' expertise and clinical judgement, and consider the context, needs and values of the patient (Tenny and Varacallo, 2025). Evidence-based medicine relies on clinicians' judgment and patients' preferences. Therefore, CPGs from different countries or contexts may not be universally applicable due to the varying patient needs and healthcare professional roles. Van der Wees et al. (2011) proposed developing evidence-based statements as a starting point for specifying and contextualising recommendations. Tailoring of these recommendations may be related to characteristics of the physiotherapy service, available resources and patients with mental disorders.

In European and Scandinavian countries, physiotherapy in mental health is well established, while in South Africa, it is a relatively new field, and as such, evidence-based recommendations and guidelines are required to guide treatment and improve patient outcomes. While guidelines relating to the management of mental disorders exist, they are not all specific to physiotherapy in mental health. Lifestyle interventions have been included in some of these guidelines, but these are not specific to physiotherapy.

The Royal Australian and New Zealand College of Psychiatrists (RANZAC) updated the 2015 clinical practice guidelines (CPGs) for the management of mood disorders in 2020. These guidelines were developed from literature searches to supplement

already known evidence about mood disorders as well as previously published CPGs. The evidence was appraised by a committee to develop consensus-based recommendations and clinical guidelines (Malhi et al., 2021). These guidelines are aimed at psychiatrists and psychologists, particularly, but refer to lifestyle interventions in the prevention and management of mood disorders (Malhi et al., 2021). These lifestyle interventions include sleep management, nutrition and diet, physical activity and exercise, and alcohol and substance use. The guidelines also provide management strategies for patients with mood disorders and comorbidities, with the following recommendations: including a general medical evaluation, monitoring lifestyle factors, providing ongoing education and support and finally checking medications to reduce the risk of adverse interactions and effects (Malhi et al., 2021).

Most CPGs have been developed in HIC and apply to the resources available within these contexts. There appear to be no CPGs or recommendations in the South African context, especially for physiotherapist-led lifestyle interventions in patients with comorbid mental and physical health conditions.

2.12 CONCLUSION

This chapter explores the relationship between mental disorders and NCDs, highlighting the growing global and regional burden of comorbidities and the need for integrated management strategies which are context-specific. The use of lifestyle interventions such as physical activity and exercise, nutrition, sleep hygiene, and stress management is supported by the literature. Lifestyle interventions are cost-effective approaches to improving both physical and mental health. Despite this, there remains a significant gap in the evidence base regarding the application of these interventions in populations with comorbid mental and physical health conditions, particularly in LMICs like South Africa.

Clinical practice guidelines increasingly acknowledge the role of lifestyle interventions in managing mental disorders and chronic diseases, however, these guidelines are often developed in HICs and are not specific to physiotherapy-led interventions or for use in resource-constrained settings. Furthermore, the role of physiotherapists in mental health care is under-recognised and underdeveloped, despite evidence supporting their contribution to holistic, interprofessional care.

The literature highlights the need for tailored, evidence-based recommendations that reflect the realities of LMICs and support physiotherapists in delivering lifestyle interventions to patients with complex comorbidities. Addressing these gaps is essential to improving quality of life, reducing disease burden, and promoting equitable healthcare access.

This chapter sets the foundation for the following chapters, which aim to describe the development of contextually relevant recommendations for physiotherapist-delivered lifestyle interventions in mental health care.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter provides an overview of the methodology used in each phase to develop recommendations for physiotherapist-led lifestyle interventions in the management of patients with comorbid mental and physical health disorders. The research design, methods and procedures will be explored for each phase of the study.

3.2 RESEARCH SETTING

In South Africa, private and public health systems exist, with most of the population receiving healthcare services from the public healthcare system (van den Heever, 2019). Individuals with mild to moderate mental health concerns are typically supported within community-based settings, where outpatient care can provide ongoing assistance (Sorsdahl et al., 2023; Lund et al., 2012). Individuals experiencing more severe psychiatric conditions are often referred to specialised mental health facilities equipped to deliver intensive treatment for acute and severe cases (Sorsdahl et al., 2023; Lund et al., 2012). The public healthcare system has specialised mental health facilities for long-term care of patients with ongoing and severe mental illness. The determination of the appropriate care setting depends on factors such as the severity of the disorder, the resources available, and the extent to which mental health services are integrated into the community (van Ens et al., 2024).

Physiotherapy in mental health is a relatively new field of physiotherapy in South Africa. There is a general lack of knowledge about the role of physiotherapy in mental disorders among healthcare professionals and physiotherapists alike. In South Africa, the eight universities which offer physiotherapy degrees abide by the minimum training requirements as set out by the Health Professions Council of South Africa (HPCSA); however, the content as it relates to mental health may differ between the curricula offered at each (Hooblaul et al., 2024). As such, many physiotherapists may not have sufficient

training in mental disorders. This may affect the quality of treatment provided to patients with complex disorders.

This study aimed to develop recommendations for physiotherapist-delivered lifestyle interventions, which are contextualised to South Africa, for physiotherapists working in any healthcare setting in South Africa.

In the systematic review, the research setting was online electronic databases, which were searched to source randomised controlled trials (RCTs) that investigated the effect of lifestyle interventions in the management of patients with comorbid mental and physical health disorders. The studies included in the systematic review were based in the United Kingdom (UK), the Netherlands and the United States of America.

In phase two of the study, participants in the Delphi study were both local and international experts in mental health from the United Kingdom (UK), the Netherlands and South Africa. The study was conducted online via the Research Electronic Data Capture (REDCap) system to allow participants from various geographical locations to participate. Participants included psychiatrists (South Africa and Australia), physiotherapists (from the UK, the Netherlands and South Africa), an occupational therapist (South Africa) and mental health nurses (from South Africa).

In the final phase of the study, South African physiotherapists participated in online focus group discussions, which were conducted using the MS Teams platform. As the recommendations were aimed at all physiotherapists working with patients with mental disorders, South African physiotherapists were invited. The focus group discussions (FGDs) were held online to be able to invite physiotherapists throughout South Africa, working in both public and private healthcare systems, in both rural and urban areas. The physiotherapists who participated in the FGDs were from Gauteng, Mpumalanga, Kwa-Zulu Natal and Western Cape.

3.3 RESEARCH DESIGN

Mixed-method research (MMR) incorporates both quantitative and qualitative research designs to provide a comprehensive understanding of complex phenomena (Chu et al., 2018). This is especially important in healthcare, where the problems are often complex

and multidimensional. As such, combining both approaches provided a comprehensive way to address these challenges (Chu et al., 2018; Fetters et al., 2013).

An important part of MMR is the integration of the methodologies to enhance the outcome of the research. According to Fetters et al. (2013), common MMR designs include exploratory sequential, explanatory sequential, and convergent designs and integration of the research can occur at the study design level. Integration strategies included triangulation protocols in which qualitative and quantitative data are analysed separately and then integrated during the interpretation stage to provide a comprehensive understanding of the research problem (Beretta, 2021; Tonkin-Crine et al., 2016). Furthermore, MMR may use sequential or concurrent analysis. Sequential analysis involves using the findings from one method to inform the other, while concurrent analysis involves analysing both datasets simultaneously (Östlund et al., 2011).

Integrating qualitative and quantitative data in MMR provided a more comprehensive understanding of complex problems. To ensure trustworthiness and rigour of the findings, triangulation was used. Triangulation in MMR is a research strategy that strengthens the reliability and accuracy of findings by incorporating multiple methods or sources of data (Meydan and Akkaş, 2024; Nightingale, 2019). Triangulation allowed for the comparison of results from different sources and confirmed that the findings were accurate and consistent (Nightingale, 2019). For the final recommendations, quantitative data from phases one and two were presented to the focus groups in phase 3. Triangulation was achieved by using data from multiple sources (in each phase of the study), detailed information from all phases of the study was kept (audit trail), and transferability was ensured by inviting participants from different geographical locations, locally and internationally and from both private and public healthcare settings.

Mixed-methods research allowed for more flexibility in data collection. The quantitative data collected may be more easily applied in real-world situations due to the inclusion of qualitative methodologies, which consider the voice of all stakeholders, making the recommendations more actionable in clinical practice.

A mixed-methods framework using an exploratory, convergent design was used in this study. Data collected from the systematic review (quantitative) and the Delphi technique (quantitative and qualitative) were collected concurrently. The findings of phases one and two were then used to inform the focus groups (qualitative) and finalise the recommendations (Fetters et al., 2013; Ivankova et al., 2006).

Figure 3.1 shows the phases of this study.

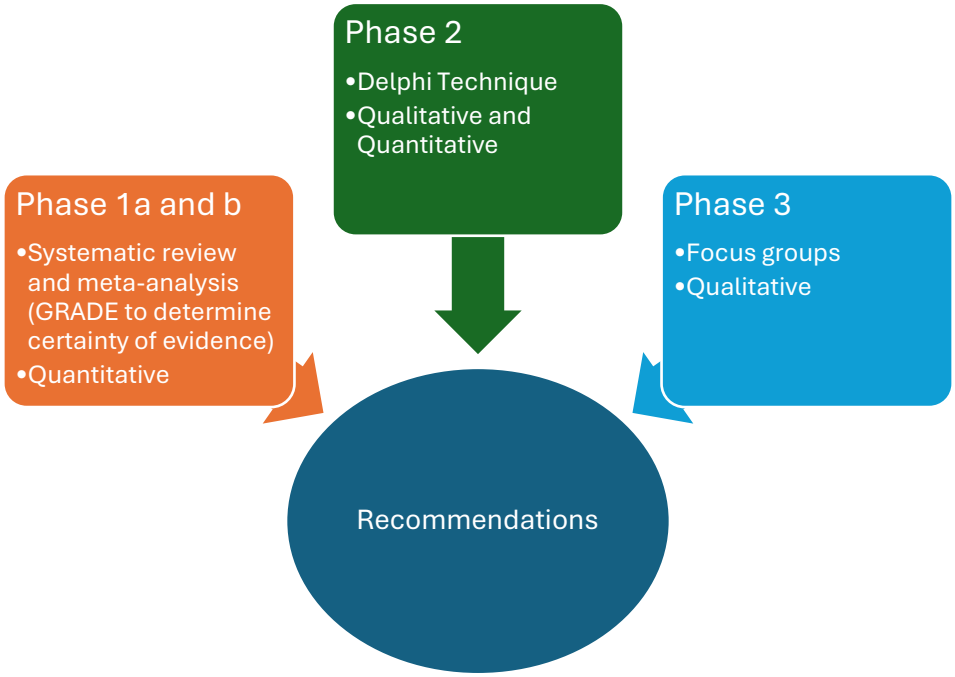


Figure 3.1: Outline of the study

A multiphase research design was used to meet the objectives of the study. The methodology used in the first phase was a review of the literature following the JBI methodology for systematic reviews of effectiveness. As the evidence was limited, a Delphi method was used to develop consensus using an international multidisciplinary expert panel. Finally, focus group discussions (FGDs), consisting of local physiotherapists, were used to determine the acceptability and feasibility of the recommendations for the South African context and South African physiotherapists. Table 3.1 provides an overview of the study design.

Table 3.1 Overview of the research design

	Phase 1a	Phase 1b	Phase 2	Phase 3
Objective	Determine the available evidence regarding lifestyle interventions delivered by physiotherapists in the management of patients with disorders by performing a systematic review	Determine the certainty (quality) of evidence identified in the systematic review using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.	Develop recommendations for physiotherapists to guide the management of patients with comorbid physical and mental disorders	Determine the acceptability and suitability of evidence-based recommendations for South African physiotherapists with comorbid physical and mental health disorders
Research Setting	Electronic databases - Internationally	Electronic Databases	Research Electronic Data Capture (REDCap) – Nationally in SA and Internationally – UK, Netherlands and Australia	MS Teams Nationally – South Africa Gauteng, Mpumalanga, Kwa-Zulu Natal and Western Cape – physiotherapists working in the private and public health sectors
Study design/approach	Systematic review **(quantitative)**	Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.	Delphi technique **(quantitative and qualitative)**	Focus groups **(qualitative)**
Population	Published literature (RCTs and quai-experimental studies) from electronic databases that considered adults with comorbid mental and physical health disorders	Systematic review findings from Phase 1a	International and South African experts in mental health care – these included Psychiatrists, physiotherapists, occupational therapists and mental health nurses)	South African physiotherapists with experience working in mental health
Sample Size	Four articles included	Four articles from the systematic review	Round 1: 14 Round 2: 9 Round 3: 12	Pilot FGD: participants FGD 1: 5 participants FGD 2: 2 participants FGD 3: 4 participants
Inclusion criteria	*Population:* Adults 18 years and older with comorbid mental and physical health disorders. The mental disorders of interest were depression, anxiety and bipolar disorder. Chronic illnesses included diabetes, obesity, cardiovascular diseases, respiratory disorders (chronic obstructive pulmonary disorders	As per the systematic review	International and South African healthcare professionals considered part of the multidisciplinary team working in mental health (Psychiatrists, psychologists, mental health nurses, occupational therapists, social workers, dieticians, exercise physiologists/biokineticists)	South African physiotherapists working in mental health in any setting, in either public or private healthcare settings, or with previous experience working in mental health

	Phase 1a	Phase 1b	Phase 2	Phase 3
	and asthma), metabolic disorders and chronic musculoskeletal pain. *Intervention*: Lifestyle interventions aimed at individuals were included in this review. These included physical activity and exercise, nutrition, sleep hygiene, stress management (cognitive behavioural therapy, mindfulness, relaxation and breathing exercises) *Comparators:* No treatment or treatment as usual, or waitlist *Outcomes*: Quality of life			
Procedure and instrumentation	JBI methodology for systematic reviews of effectiveness	Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.	Delphi technique over three rounds 80% consensus required for inclusion This phase was conducted concurrently with phases 1a and b. Participants were not presented with the findings from the systematic review, due to the dearth of literature and because they were experts in their field	Semi-structured focus group script The findings from phase 1a b and phase 2 were presented to the participants before the FGD took place.
Data analysis	Meta-analysis and narrative summary of studies not included in the meta-analysis	The GRADE system was used to determine the certainty of evidence. Studies were assessed based on the primary outcome of interest (QoL) and the factors which decreased the risk of bias - imprecision	Descriptive statistics for demographic information Thematic analysis Frequencies and percentages for consensus	Content analysis

3.4 PHASES OF THE STUDY

The in-depth methodology and procedures followed in each of the phases are described in detail in chapters four to six. Chapter four describes phase 1 of the study, the systematic review. Chapter five describes phase 2 of the study and chapter six describes phase 3 of the study. Below is a justification of the methodology used, a brief description and the link to the methodology in each chapter.

3.4.1 Phase 1: Systematic review, meta-analysis and the certainty of findings.

3.4.1.1 Phase 1a: Systematic review and meta-analysis

According to Munn et al. (2018), a systematic review is a type of research synthesis in which a team of experts gathers and reviews global evidence on specific questions to help guide practice, policy, and future research. A systematic review was determined to be the best approach for this phase, as the purpose of the overall study was to impact clinical outcomes and management. While many systematic reviews explore the effectiveness of treatment strategies used in mental disorders, there are a limited number of reviews that explore the effectiveness of lifestyle interventions in the management of patients with mental disorders and physical comorbidities and those that do, focus more on severe mental illness.

This systematic review adhered to the methodology outlined by the Joanna Briggs Institute (JBI) for evaluating the effectiveness of interventions (Tufanaru et al., 2020).

The protocol for the systematic review was published in the South African Journal of Physiotherapy and can be accessed at the following link: https://sajp.co.za/index.php/sajp/pages/view/policies#part_4

The protocol for the systematic review can be accessed here: Systematic_review_protocol

The systematic review included randomised controlled trials that investigated lifestyle interventions for managing individuals with comorbid mental and physical health disorders. Four studies were included in the systematic review (Rosas et al., 2020; Tovote et al., 2014; Parry et al., 2012; Piette et al., 2011).

The included studies were synthesised narratively and, where possible, outcome measures were pooled for meta-analysis. Two studies were included in the meta-analysis (Rosas et al., 2020; Piette et al., 2011). The random effects model for meta-analysis was used. Synthesis of the data was performed on the primary outcome of quality of life only.

3.4.1.2 Phase 1b: Assessing the certainty of the findings

The strength of the evidence was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework (Guyatt et al., 2008a; Guyatt et al., 2008b). Studies that were included in a meta-analysis with the outcome of quality of life were included in a Summary of Findings (SoF) table, which was created in the GRADEPro Guideline Development Tool (McMaster University, 2020). The evidence was categorised as high, moderate, low and very low based on factors such as study design, risk of bias, consistency of results, directness of evidence, precision, and publication bias.

3.4.2 Phase 2: Delphi Study

The Delphi technique is a structured communication method used to gather and refine the opinions of experts through multiple rounds of questionnaires to achieve consensus on a specific topic (Chalmers and Armour, 2019). The Delphi technique is a survey method widely used in health sciences to establish clinical guidelines or recommendations, identify research priorities, and solve clinical problems (Shang, 2023; Niederberger and Deckert, 2022; Jünger et al., 2017; Kezar and Maxey, 2016). The Delphi methodology is a useful technique as it is flexible, it can be adapted to any research field or question, and experts from different areas can participate, which allows for diverse expert opinions to be gathered (Ismail and Taliep, 2023; Shang, 2023). The Delphi also minimises the risk of bias as it is iterative and anonymous (Shang, 2023). The Delphi method is, however, time-consuming and analysing data obtained can be complicated (Shang, 2023; Schmalz et al., 2021).

The Delphi technique has been used to develop expert consensus and for the development of CPGs in healthcare, including physiotherapy. Bell et al. (2025) used a

four-round e-Delphi study to develop consensus statements for physiotherapy of the trunk related to sitting following stroke. Round one included a section with five open-ended questions, and the three subsequent rounds were used to determine agreements on the statements developed. Alexander et al. (2012) used the traditional Delphi technique to develop consensus for recommendations for overweight adults for Canadian physiotherapy practice. Peter et al. (2016) also used the Delphi technique to develop consensus for healthcare quality indicators for physiotherapy management in hip and knee osteoarthritis. More recently, Idris et al. (2021) used the Delphi technique to determine consensus about the minimum clinical standards of practice for physiotherapists in intensive care units in Nigeria. Peter et al. (2016) and Idris et al. (2021), used a modified Delphi technique, presenting existing statements to a panel for consensus. The Delphi methodology was used to gather expert consensus for the management of patients with comorbid mental and physical health disorders because of limited evidence from the systematic review (only four included studies: Rosas et al., 2020; Tovote et al., 2014; Parry et al., 2012; Piette et al., 2011, of which two were included in a meta-analysis).

The Delphi technique used in this study was an iterative process with an anonymous, multidisciplinary, international panel of experts, including South African experts, to develop consensus statements regarding the management of patients with comorbid mental and physical health disorders. Experts were identified from published research and invited to participate. For this study, a participant was considered an expert if they had worked clinically for more than five years, were academics or researchers, or had published in mental health. As such, they were considered suitably qualified to provide opinions and recommendations on the topic.

An email invitation was sent via the Research and Electronic Data Capture (REDCap) software programme. The email included a link to information about the study, a copy of the participant information sheet and a link to the survey for easy access to complete the survey (**Appendix F**). A section on consent was added as part of the survey, where participants could indicate their consent to participate. Consent was also implied by

completion of the survey. The predetermined consensus rate was set at 80% as reported by Bell et al. (2025) and Hohmann et al. (2025).

The survey consisted of three rounds. In round one (**Appendix G**), participants completed a demographic information section, questions about their working environment and the use of lifestyle interventions in patients with comorbid mental and physical health disorders. Participants were then asked to provide their recommendations for the use of specific lifestyle interventions in the management of patients with mental disorders and comorbidities. The recommendations provided by the participants were then thematically analysed and presented as statements for consensus in round two of the survey. Statements which reached consensus were included as recommendations, and those that did not were added to round three of the survey.

In each round, data were analysed in terms of frequencies and percentages. Answers to open-ended questions were analysed thematically (role of each healthcare professional, recommendations). Statements from the participants were coded and categorised, and themes emerged. These were presented in the subsequent rounds of the Delphi studies.

The systematic review and the Delphi study were conducted concurrently due to the dearth of evidence available in participants. The data from both the systematic review and the Delphi study were then presented to the participants in the focus groups to ensure they could determine the acceptability and feasibility of the recommendations developed from the Delphi study.

The detailed methodology for the Delphi study can be accessed here: Delphi_methodology

3.4.3 Phase Three: Focus Groups

Focus groups, a qualitative research method, gather data through group interactions and discussions (Smith, 2017). Focus groups are valuable for developing comprehensive and practical clinical practice recommendations by incorporating diverse perspectives, identifying challenges and facilitators, and enhancing stakeholder communication. Focus groups also highlight areas lacking evidence and suggest practical solutions where high-quality evidence is unavailable (Atkins et al., 2013; Turner, 2009). By fostering open

communication and consensus through a collaborative approach, focus groups lead to well-informed, balanced recommendations (van der Ham et al., 2016; Atkins et al., 2013).

Focus group discussions were used in this phase of the study, as they are generally time- and cost-efficient. Focus group discussions rely on the interaction of group members who may have shared experiences and may generate insights which may not come across in individual interviews due to a one-to-one setting (Baillie, 2019; Dias and Gama, 2018; Guest et al., 2017). The recommended number of participants for FGDs is between four and eight (Hennink and Kaiser, 2022). Participants were placed into focus groups based on their availability and preferences indicated from a poll that was distributed to participants. The pilot focus group consisted of four participants. The first FGD had five participants, the second FGD had two participants and the final FGD had four participants. These smaller sizes (a maximum of five participants) made the FGD easier to moderate and allowed for more interaction between participants, allowing each person's voice to be heard.

The involvement of key stakeholders in guideline development ensures the guidelines are more likely to be accepted and implemented in clinical practice. Rushton et al. (2016) used mixed methods research to develop recommendations for optimising physiotherapy for patients undergoing lumbar discectomy. Following systematic literature reviews, an expert panel reviewed the draft intervention developed. The FGDs were then used to determine the acceptability and feasibility of the intervention to physiotherapists. Kredo et al. (2018) also used FGDs to determine the barriers and facilitators to implementing CPGs by primary care healthcare professionals in South Africa.

The FGDs in this study aimed to determine the feasibility and applicability of the recommendations formulated in the Delphi study to the South African context and to the physiotherapists, who play an essential role in delivering lifestyle interventions. As such, physiotherapists with experience in mental health (in any setting) were invited to participate in FGDs. The findings from the systematic review (phase 1) and statements developed in the Delphi survey (phase 2) were made available to participants before the FGDs. In this way, participants in the FGDs were able to review the findings from the

previous phases and consider the information beforehand, to facilitate more in-depth discussions about the recommendations.

Data saturation in FGDs is affected by many factors such as the study purpose, the coding strategy and practicalities (Hancock et al., 2016; Carlsen and Glenton, 2011). Data saturation is usually achieved when no new information is obtained from the group (Hennink et al., 2019). However, more than one type of saturation exists. Coding saturation is used to identify a range of new issues and generally requires fewer FGDs (Hennink et al., 2019). This differs from 'meaning saturation' in which a full understanding of the issues is required, and as such, may require more FGDs. In this study, four focus groups (including the pilot FGD) were held due to the limited number and availability of participants. Ideally, participants would have been allocated to groups based on similar demographics (working environment, age, province), however, this was not possible in this phase of the study. The spread of participants was uneven, and as such, more than one focus group was used to determine the acceptability and feasibility of the recommendations.

Deductive analysis was used in this phase of the study. Deductive analysis uses a predetermined structure based on previous findings and is useful for testing theories in different contexts (Bucher, 2021; Galanis, 2018). In these FGDs, a pre-existing framework of recommendations, developed in phase two, was presented to the participants.

The detailed methodology for the FGDs can be found here: Focus_group_methodology

3.4.4 Combining the data to finalise the recommendations

The data collected from all the above phases were considered in finalising the recommendations, which were contextualised to South African physiotherapists managing patients with mental disorders and comorbidities. Phases one and two were conducted concurrently. Following the FGDs, which were informed by phases one and two, the final recommendations were developed, and the data from the systematic review were presented to the physiotherapists who participated in the focus groups to ensure that they agreed with any changes that may have been made and that recommendations

were acceptable and feasible. This further ensured the trustworthiness of the study and validated the findings to ensure that the recommendations are actionable.

3.5 ETHICAL CONSIDERATIONS

All phases of the study received ethical approval from the University of Witwatersrand Human Research Ethics Committee (Medical) (HREC (medical)) before data collection began. A separate ethics application was made and received for each of the three phases of the study.

For phase one of the study, an ethics waiver was obtained (Waiver number: W-CBP-22028-01, **Appendix A**) as information was being sourced from electronic databases with information already in the public domain and did not involve any participants. For phases two and three, separate ethics applications were made and received for each phase of the study. Ethics certificate number for the Delphi study was M2310008 (**Appendix E**), and for the focus groups was M240805 (**Appendix S**).

Information was provided to the participants through participant information sheets, and consent forms were signed before the study started. Participation in the research was voluntary, and participants could withdraw from the study at any point, without penalty. Participant information was kept confidential. For the Delphi study, information was anonymised by allocating a record number to the survey, and no identifying information was stored. Due to the nature of FGDs, confidentiality and anonymity could not be guaranteed. However, in all transcribed FGDs, participants' names were not recorded; initials (in the transcripts) and participant numbers (in the thesis) were assigned to each participant. This assigned list of participant numbers was kept separate from the transcriptions.

All documents were kept on a password-protected laptop and backed up to a password-protected cloud. Hard copies of printed information for analysis were stored in a locked drawer in the researcher's office. All data collected during the study will be securely retained for two years if a scientific publication arises from the study, and six years if there is no publication. Thereafter, it will be destroyed accordingly.

3.6 CONCLUSION

This chapter outlined the multiphase mixed-methods approach used to develop evidence-based recommendations for physiotherapist-delivered lifestyle interventions in the management of patients with comorbid mental and physical health disorders.

The use of a mixed-methods framework allowed for a comprehensive exploration of the available evidence, expert opinion, and stakeholder perspectives. This approach enhanced the rigour and applicability of the findings, particularly in a setting where physiotherapy in mental health is still emerging. The final recommendations aim to support physiotherapists in delivering holistic care to individuals with mental disorders and comorbidities.

The following chapters describe the procedure followed in each phase of the study.

CHAPTER 4

PHASE 1: SYSTEMATIC REVIEW AND META-ANALYSIS

4.1 INTRODUCTION

This chapter describes phase one of the study. A systematic review and meta-analysis were conducted to determine the available evidence regarding lifestyle interventions in the management of patients with comorbid physical and mental disorders (Phase 1a). The certainty of the evidence was determined using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach (Phase 1b).

The protocol for this systematic review was published in the '*South African Journal of Physiotherapy'*. It outlines the detailed methodology employed in the systematic review, including an example of the search strategy used. Further information about the publication can be found in Table 4.1.

The systematic review and meta-analysis are presented as an article to be submitted.

4.2 SYSTEMATIC REVIEW PROTOCOL

Information about the publication is presented in Table 4.1.

Table 4.1: Information about published systematic review protocol

Title of the publication	Lifestyle interventions in comorbid mental and physical illness: A systematic review protocol
Authors	Sandy Lord, Vaneshveri Naidoo, Karien Mostert
Journal Name	South African Journal of Physiotherapy
ISSN	0379-6175 (print) 2410-8219 (online)
Journal Impact Factor	1
Year	2023
Volume (Issue)	79 (1)
Pages	a1848
DOI number	https://doi.org/10.4102/sajp. v79i1.1848

4.2.1 Author contributions

Table 4.2 describes the authors' contributions using the terminology laid out by the Contributor Roles Taxonomy (CRediT) by Allen et al. (2019).

Table 4.2 Author contributions for systematic review protocol

	S Lord	V Naidoo	K Mostert
Conceptualisation	x	x	x
Methodology	x	x	x
Writing – original draft	x		
Writing – review and editing	x	x	x
Visualisation	x		
Supervision		x	x
Funding acquisition	x		

4.2.2 Copyright and permissions

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4.2.3 Associated documentation

An ethics waiver was applied for and granted by the Human Research Ethics Committee – Medical (HREC-medical). The ethics waiver number is W-CBP-22028-01 **(Appendix A)**.

4.2.4 Published systematic review protocol article. Available at:

https://doi.org/10.4102/sajp.v79i1.1848

South African Journal of Physiotherapy
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AOSIS

Page 1 of 6 Review Article

Lifestyle interventions in comorbid mental and physical illness: A systematic review protocol

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Background: Patients with mental health disorders (MHDs) often present with chronic illness and complain of pain and poor physical health. They present with a high burden of disease and poor quality of life. Significant associations between MHDs and chronic illness have been found. Lifestyle interventions are cost-effective strategies, which seem to be effective in managing comorbid mental and physical health disorders. Therefore, a summary of the evidence and clinical practice guidelines is needed in South Africa.

Objectives: Our study will aim to determine the effectiveness of lifestyle interventions on health-related quality of life, in patients with comorbid mental and physical health disorders.

Method: The systematic review will be conducted using the Joanna Briggs Institute (JBI) methodology for systematic reviews of effectiveness. MEDLINE (Ovid), CINAHL (EBSCO), LiLACS, Scopus, Physiotherapy Evidence Data Base (PEDro) and Cochrane Central Register of Controlled Trials will be searched. A three-step search strategy will identify published literature in all languages from 2011 to 2022. Critical appraisal of all included studies will be performed, and the relevant data will then be extracted. Where possible, data will be pooled in a statistical meta-analysis.

Results: The results will provide the best available evidence regarding lifestyle interventions in the management of patients with comorbid mental and physical health disorders.

Conclusion: Our review will provide evidence on the effectiveness of lifestyle interventions in the management of patients with comorbid mental and physical health disorders.

Clinical implications: The results may assist in determining the best use of lifestyle interventions in the management of patients with MHDs and comorbidities.

Keywords: lifestyle interventions; mental health; physical health; therapy; comorbidities; pain.

Introduction

Mental health disorders (MHDs) affect many bodily systems, which in turn can affect health and well-being and have been associated with increased disability in work, family and social environments (World Health Organization [WHO] 2022a, 2022b). Mental health disorders include anxiety, mood disorders and neurodevelopmental disorders (WHO 2022b). Substance use disorders often co-occur with MHDs and either contribute to the MHD or are a cause thereof. Patients with MHDs often complain of pain and poor physical health. Epidemiological studies have found significant associations between MHDs and non-communicable diseases (NCDs) (Ee et al. 2020; Stein et al. 2019). The evidence indicates that patients with severe MHDs have higher rates of cancers, respiratory disorders, cardiovascular disease, obesity and diabetes (De Hert et al. 2011; Ee et al. 2020; Stein et al. 2019). People with MHDs have a lower life expectancy than the general population. The main cause of mortality is chronic illness because of poor lifestyle factors (De Hert et al. 2011; Hodgson, Mcculloch & Fox 2011; Lee et al. 2017; Manger 2019). The side effects of psychotropic medication include metabolic syndrome, weight gain, neurological disorders, an increased risk of diabetes and coronary artery disease and therefore are a cause of many physical comorbidities (Ee et al. 2020). Pain and depression also often co-exist, with more than half of patients with MHDs experiencing pain (Goesling, Clauw & Hassett 2013). Mental and physical health disorders are not only highly comorbid but are also mutually reinforcing (Opie et al. 2021). As a result, patients with pain, chronic illness and comorbid psychiatric conditions have a high burden of disease and poorer quality of life (QoL) (Chen et al. 2006).

Quality of life is an important indicator of health (Owczarek 2010). It is the degree to which a healthy person participates in activities of daily living (Encylopedia Britannica 2022; Merriam-Webster 2023). According to the WHO (2012), QoL is:

> [A]n individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. (p. 1)

Quality of life is multidimensional and has four domains, which include mental and physical health as well as social and functional health (Aaronson 1988; Owczarek 2010).

Patients often have multiple unhealthy lifestyle factors, which may in turn worsen their physical and mental health (Zaman, Hankir & Jemni 2019). Poor mental health often leads to social isolation, lower motivation and engagement and less social or community involvement. These patients are, therefore, often less likely to implement lifestyle changes (Ee et al. 2020). Risk factors for chronic NCDs commonly cluster in people with MHDs (Stein et al. 2019). The four main lifestyle factors (poor diet, lower levels of physical activity, smoking and excessive alcohol consumption) often occur together. Patients with unhealthy eating habits often have lower levels of physical activity, both of which can contribute to obesity and cardiovascular disease. Smoking may cause chronic respiratory conditions and as such lead to decreased physical activity (Zaman et al. 2019). Many of the lifestyle factors, which contribute to these disorders, are modifiable and interventions that address these lifestyle factors should be included in the management of persons with MHDs and NCDs (Lee et al. 2017; Probst & Skjaerven 2017).

Lifestyle interventions include sleep, physical activity and exercise, diet, stress management and substance cessation (Ford et al. 2009). They are indicated for people with MHDs as an alternative or adjunct to usual care (Manger 2019). Lifestyle interventions are cost-effective strategies that could help prevent diabetes and heart attacks (Manger 2019). Exercise, mindfulness-based interventions and a healthy diet are also effective in the management of both mental and physical health disorders. Exercise, in particular, provides symptomatic improvements when used as an adjunctive therapy in major depressive disorders and may be used as a first-line therapy for mild to moderate depression. Furthermore, exercise reduces the risk of cancers, cardiovascular disease and diabetes, which is often associated with increased sedentary behaviour (Ee et al. 2020).

Lifestyle interventions are cost-effective therapies aimed at behaviour modification and can be delivered by diverse members of the inter-professional team. Medication and psychotherapy are usually the first line of treatment. Lifestyle interventions have been shown to be effective as adjunctive therapies for mental health. These therapies are evidence-based and have the potential to improve both mental and physical health, leading to improved health outcomes for people with chronic illness and MHDs (Ee et al. 2020). The main aim of our review is to determine the effectiveness of lifestyle interventions in the management of patients with comorbid physical and MHDs in order to guide management, decrease burden of disease and improve QoL for these patients.

An initial search of PROSPERO and the *JBI Database of Systematic Reviews and Implementation Reports* was conducted. Two reviews with similar protocols were identified on PROSPERO (Registration numbers: CRD42019148544 and CRD42018096514). These reviews, however, only focus on randomised controlled trials (RCTs) or include only youth and adolescents. Our review will also consider a broader range of interventions than previously reported. These include behaviour change techniques and stress management modalities which were not included in the previous reviews. Previous systematic reviews and RCTs often focus on either the effects of lifestyle interventions on MHDs alone or on the chronic illness. However, many patients present with comorbidities, and this protocol addresses the need to investigate the effects lifestyle interventions may have on MHDs with comorbid chronic physical health disorders.

Aim

The aim of our review will be to determine the effectiveness of lifestyle interventions on health-related QoL in the management of adults with comorbid mental and physical health disorders.

Research question

The question our review aims to answer is: What is the effectiveness of lifestyle interventions compared with treatment as usual (or no treatment) to improve health-related QoL in adults with comorbid mental (depression, anxiety, bipolar disorder) and physical health disorder (cardiovascular disease, respiratory disorders, diabetes, obesity, metabolic syndrome and chronic pain)?

Method

Our systematic review will be conducted using the Joanna Briggs's Institute (JBI) methodology for systematic reviews of effectiveness (Tufanaru et al. 2020). It will be reported using the *Preferred Reporting Items for Systematic Reviews and Meta-Analysis* (PRISMA) statement (Page et al. 2021). This protocol has been registered on the Prospective Register of Systematic Reviews (PROSPERO). Registration number: CRD42021265704.

Eligibility criteria

The review will include all experimental and quasi-experimental study designs. Only studies in English, published from 2011 to December 2022 will be considered for inclusion.

The Participants, Intervention, Comparator, Outcomes (PICO) framework will be used to answer the review question and to determine the exclusion and inclusion criteria. For our review, the population will include adults with comorbid mental (depression, anxiety, bipolar disorder) and chronic illness (cardiovascular disease, respiratory disorders, diabetes,

obesity, metabolic syndrome and chronic musculoskeletal pain). The interventions will include the following lifestyle interventions: movement (physical activity and exercise), sleep hygiene, diet, stress management and cessation of substance use. Studies will be compared with those with no treatment or treatment as usual, and the outcomes will include health-related QoL (outcome measures may include the Short Form Health Survey: SF-36 and SF-12, the Sickness Impact Profile, WHO Quality of life [WHOQOL] Quality of Well-being Scale, EuroQOL-5 Dimension questionnaire [EQ-5D]). Studies of all methodological quality will be included provided they meet the inclusion criteria.

The following conditions will be excluded: schizophrenia, psychosis, pregnancy and pregnancy-related conditions (e.g. gestational diabetes and pre-eclampsia), coronavirus disease 2019 (COVID-19), organ transplants, acute hospitalisation (e.g. surgery or acute coronary syndrome) and neurological conditions (e.g. stroke, dementia and cognitive decline) and human immunodeficiency virus infection and acquired immunodeficiency syndrome (HIV and AIDS). Only interventions aimed at the individual patient will be considered.

Search strategy

The JBI three-step search strategy will be used to identify studies, which will be included in the systematic review. This three-step search strategy started with developing a full strategy using the text words contained in the titles and abstracts of relevant articles identified during an initial literature search, and the Index or Medical Subject Headings (MeSH), identified during the initial search, used to describe the articles. The search strategy will be adapted for each specific database or information source. Step two involves searching each identified database for relevant studies. In step three, the reference list of included studies will be screened for possible inclusion in the full text screening. Authors of studies may be contacted if additional information is required (Tufanaru et al. 2020).

A librarian helped to develop the initial pilot search strategy and will help to adapt the search strategy to each database identified. The following databases will be searched: Medline (Ovid), CINAHL (EBSCO), SCOPUS, PEDRO, Cochrane Central Register of Controlled Trials as well as LiLACS. A preliminary search of MEDLINE (Ovid) was conducted to determine availability and suitability of articles that comply with the eligibility criteria (Appendix 1).

Selection process

A pilot search will be conducted to ensure that the search strategy is appropriate and relevant studies are identified. All citations will be uploaded to EndNote (version 20) and duplicates will be removed. The JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI) software will be used to conduct the systematic review (Munn et al. 2019). The relevant citations and full-text versions of the articles will then be imported into the JBI SUMARI software program. All studies will be screened for inclusion by reviewing titles and abstracts initially and then reviewing of full text-versions in order to ensure they meet the inclusion criteria. The screening will be performed by two independent reviewers and disagreements will be discussed and if consensus is not achieved, a third reviewer will decide.

Assessment for methodological quality

Following the screening process, the JBI critical appraisal tools (JBI CATs) will be used to assess the methodological quality of the included studies. The JBI CATs are specific to a specific study type, for example, JBI CAT for RCTs will be used to assess RCTs. Studies of all methodological quality will be included in the systematic review provided they meet the inclusion criteria.

Data extraction

Two reviewers will extract the data independently. Any discrepancies will be settled by discussion and if the need arises, a third reviewer will make the final decision.

Data to be extracted will include participants, study methods, interventions, and outcomes related to the aim of the review and will be presented in a table. The main outcome will include health-related QoL.

Data analysis

Using JBI SUMARI, if feasible, studies will be pooled, and a meta-analysis will be performed. If a meta-analysis is not possible, the findings will be presented in a narrative form and using tables and figures where it is suitable. The random effects model will be used for statistical analysis.

Odds ratios or weighted final post-intervention mean differences will be used to express the effect sizes, and a 95% confidence interval will be determined. To test for heterogeneity, chi-square and I-square tests will be applied. A funnel plot will be used in order to determine publication bias, if 10 or more publications are included in a meta-analysis (Tufanaru et al. 2015). A funnel plot asymmetry test will be carried out where applicable (Tufanaru et al. 2015).

Assessing the certainty in the findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach for grading the certainty of evidence will be followed (Alonso-Coello et al. 2016; Guyatt et al. 2008) and a Summary of Findings (SoF) will be created using the GRADEPro Guideline Development Tool (McMaster University 2020). The SoF will present the following information where appropriate: absolute risks for the treatment and control, estimates of relative risk and will rank the quality of the evidence based on the direct risk of bias, precision and publication bias and heterogeneity of the review results (Tufanaru et al. 2020). The outcomes

reported in the SoF will be: health-related QoL (Tufanaru et al. 2020).

Ethical considerations

An ethical waiver was obtained from the University of the Witwatersrand Human Research and Ethics Committee (Medical) (Reference no.: W-CBP-220328-01), as the study is a review of information in the public domain and no human participants are included in our review.

Discussion and conclusion

Mental health disorders are increasing globally, and many patients with MHDs have comorbid physical health disorders. Pain, chronic illness and psychiatric comorbidities all increase the burden of disease experienced by these patients and lead to a poorer QoL. As such, healthcare approaches are needed that have an effect on both physical and mental health concurrently (Ee et al. 2020). Previous research suggests that lifestyle interventions are effective management strategies for MHDs and NCDs and, as such, should form part of the treatment plan for patients to improve treatment outcomes and QoL of these patients.

Previous studies have focussed on lifestyle interventions for MHDs and chronic illness as separate conditions in separate studies, but as patients often present with multi-morbidity, more information is needed regarding the outcomes of lifestyle interventions in patients with comorbid physical and MHDs. Evidence suggests that lifestyle interventions have a positive effect on both MHDs and chronic illness and therefore may improve QoL. Our review therefore aims to determine the effectiveness of lifestyle interventions in order to develop evidence-based recommendations for healthcare professionals.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

S.L. conceived of and presented the idea and drafted the first version of the article. V.N. and K.M. assisted with finalising the protocol. All authors contributed to the final manuscript.

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Data availability

Data sharing is not applicable to our article, as no new data were created in our study.

Disclaimer

The views expressed in the submitted article are the authors' own and not an official position of the institution or funder.

References

Alonso-Coello, P., Schünemann, H.J., Moberg, J., Brignardellopetersen, R., Akl, E.A., Davoli, M. et al., 2016, 'GRADE Evidence to Decision (EtD) frameworks: A systematic and transparent approach to making well informed healthcare choices. 1: Introduction', *British Medical Journal* 353, i2016. https://doi.org/10.1136/bmj.i2016

Aaronson, N.K., 1988, 'Quantitative issues in health related quality of life assessment', *Health Policy* 10(3), 217–230. https://doi.org/10.1016/0168-8510(88)90058-9

Chen, H., Cohen, P., Kasen, S., Johnson, J.G., Berenson, K. & Gordon, K., 2006, 'Impact of adolescent mental disorders and physical illnesses on quality of life 17 years later', *Archives of Pediatrics & Adolescent Medicine* 160(1), 93–99. https://doi.org/10.1001/archpedi.160.1.93

De Hert, M., Correll, C.U., Bobes, J., Cetkovich-Bakmas, M., Cohen, D., Asai, I. et al., 2011, 'Physical illness in patients with severe mental disorders. I. Prevalence, impact of medications and disparities in health care', *World Psychiatry: Official Journal of the World Psychiatric Association (WPA)* 10(1), 52–77. https://doi.org/10.1002/j.2051-5545.2011.tb00014.x

Ee, C., Lake, J., Firth, J., Hargraves, F., De Manincor, M., Meade, T. et al., 2020, 'An integrative collaborative care model for people with mental illness and physcial comorbidities', *International Journal of Mental Health Systems* 14(1), 83. https://doi.org/10.1186/s13033-020-00410-6

Encylopedia Britannica, 2022, *Quality of life*, viewed 19 February 2023, from www.britannica.com.

Ford, E.S., Bergmann, M.M., Kröger, J., Schienkiewitz, A., Weikert, C. & Boeing, H., 2009, 'Healthy living is the best revenge: Findings from the European Prospective Investigation Into Cancer and Nutrition-Potsdam study', *Archives of Internal Medicine* 169(15), 1355–1362. https://doi.org/10.1001/archinternmed.2009.237

Goesling, J., Clauw, D.J. & Hassett, A.L., 2013, 'Pain and depression: An integrative review of neurobiological and psychological factors', *Current Psychiatry Reports* 15, 421. https://doi.org/10.1007/s11920-013-0421-0

GRADEpro GDT: GRADEpro Guideline Development Tool [Software], McMaster University and Evidence Prime, 2022. Viewed n.d., from https://www/gradepro.org.

Guyatt, G.H., Oxman, A.D., Vist, G.E., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P. et al., 2008, 'GRADE: An emerging consensus on rating quality of evidence and strength of recommendations', *British Medical Journal (Clinical research edition)* 336, 924–926. https://doi.org/10.1136/bmj.39489.470347.AD

Hodgson, M.H., Mcculloch, H.P. & Fox, K.R., 2011, 'The experiences of people with severe and enduring mental illness engaged in a physical activity programme integrated into the mental health service', *Mental Health and Physical Activity* 4(1), 23–29. https://doi.org/10.1016/j.mhpa.2011.01.002

Lee, S., Waters, F., Briffa, K. & Fary, R.E., 2017, 'Limited interface between physiotherapy primary care and people with severe mental illness: A qualitative study', *Journal of Physiotherapy* 63(3), 168–174. https://doi.org/10.1016/j.jphys.2017.05.014

Manger, S., 2019, 'Lifestyle interventions for mental health', *Australian Journal of General Practice* 48(10), 670–673. https://doi.org/10.31128/AJGP-06-19-4964

Merriam-Webster, 2023, *Quality of life*, viewed 19 February 2023, from https://www.merriam-webster.com.

Munn, Z., Aromataris, E., Tufanaru, C., Stern, C., Porritt, K., Farrow, J. et al., 2019, 'The development of software to support multiple systematic review types: The Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI)', *International Journal of Evidence-based Healthcare* 17(1), 36–43. https://doi.org/10.1097/XEB.0000000000000152

Opie, R., Jacka, F., Marx, W., Rocks, T., Young, C. & O'Neil, A., 2021, 'Designing lifestyle interventions for common mental disorders: What can we learn from diabetes prevention programs?', *Nutrients* 13(11), 3766. https://doi.org/10.3390/nu13113766

Owczarek, K., 2010, 'The concept of quality of life', *Acta Neuropsychologica* 8(3), 207–213.

Page, M.J., Mckenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D. et al., 2021, 'The PRISMA 2020 statement: An updated guideline for reporting systematic reviews', *Systematic Reviews* 10(1), 89. https://doi.org/10.1186/s13643-021-01626-4.

Probst, M. & Skjaerven, L. (eds.), 2017, *Physiotherapy in mental health: A scientific and clinical approach*, 1st edn., Elsevier, Amsterdam.

Stein, D.J., Benjet, C., Gureje, O., Lund, C., Scott, K.M., Poznyak, V. et al., 2019, 'Integrating mental health with other non-communicable diseases', *British Medical Journal – Clinical Research Edition* 364, 1295. https://doi.org/10.1136/bmj.l295

Tufanaru, C., Munn, Z., Aromataris, E., Campbell, J., Hopp, L., 2020, 'Chapter 3: Systematic reviews of effectiveness', in E. Aromataris & Z. Munn (eds.), *JBI Manual for Evidence Synthesis*, n.p., JBI, South Australia. https://doi.org/10.46658/JBIMES-20-04

Tufanaru, C., Munn, Z., Stephenson, M. & Aromataris, E.I., 2015, 'Fixed or random effects meta-analysis? Common methodological issues in systematic reviews of effectiveness', *International Journal of Evidence-Based Healthcare* 13(3), 196–207. https://doi.org/10.1097/XEB.0000000000000065

World Health Organization (WHO), 2012, *WHOQOL: Measuring quality of life*, viewed 18 February 2023, from https://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/.

World Health Organization (WHO), 2022a, *Mental health: Strengthening our response*, viewed 10 January 2023, from https://www.ccih.org/resource_index/world-health-organization-mental-health-strengthening-our-response/.

World Health Organization (WHO), 2022b, *Mental disorders*, viewed 10 January 2023, from https://www.who.int/news-room/fact-sheets/detail/mental-disorders.

Zaman, R., Hankir, A. & Jemni, M., 2019, 'Lifestyle factors and mental health', *Psychiatria Danubina* 31, 217–220.

Appendix 1 starts on the next page→

Appendix 1: Search strategy for MEDLINE (Ovid)

Search for: limit 22 to (yr="2011 - 2022" and "adult (19 to 44 years)" and english)

Results: 231

Database: Ovid MEDLINE(R) ALL <1946 to February 14, 2023>Search Strategy:

1 exp Bipolar Disorder/ (44691)
2 exp Depression/ (147312)
3 exp Anxiety/ or exp Anxiety Disorders/ (184353)
4 exp Cardiovascular Diseases/ (2683766)
5 exp Respiratory Tract Diseases/ (1686804)
6 exp Metabolic Syndrome/ (37607)
7 exp Diabetes Mellitus/ (497921)
8 exp Musculoskeletal Pain/ (7197)
9 exp Obesity/ (254958)
10 1 or 2 or 3 (329566)
11 4 or 5 or 6 or 7 or 8 or 9 (4726226)
12 exp Exercise/ (241601)
13 exp Diet/ (323841)
14 exp Stress, Psychological/ (151021)
15 exp Behavior Therapy/ (87793)
16 12 or 13 or 14 or 15 (770270)
17 10 and 11 and 16 (5964)
18 exp "Quality of Life"/ (259705)
19 exp Social Integration/ (264)
20 exp Community Participation/ (47535)
21 18 or 19 or 20 (305632)
22 17 and 21 (759)
23 limit 22 to (yr="2011 - 2022" and "adult (19 to 44 years)" and english) (231)

4.3 SYSTEMATIC REVIEW AND META-ANALYSIS

The systematic review and meta-analysis are presented below as an article for submission to a journal. The journal guidelines for Physical Therapy Reviews were followed, which can be accessed here: Submit to Physical Therapy Reviews

4.3.1 Author contributions

Table 4.3 describes the authors' contributions using the terminology laid out by the Contributor Roles Taxonomy (CRediT) by Allen et al. (2019)

Table 4.3 Systematic review submission: authors' contribution

	S Lord	V Naidoo	K Mostert
Conceptualisation	x	x	x
Methodology	x	x	x
Writing – original draft	x		
Writing – review and editing	x	x	x
Visualisation	x		
Supervision		x	x
Funding acquisition	x		

4.3.2 Associated documentation

Supplemental material to the article includes full search strategies adapted to each database **(Appendix B)**, a list of included and excluded articles following full-text screening **(Appendix C)** and data supporting the meta-analysis **(Appendix D).**

4.3.3 Systematic review article for submission

Lifestyle interventions for the management of comorbid mental and physical illness: A systematic review

Abstract

Purpose: Lifestyle interventions are effective strategies aimed at preventing, treating or changing the course of the illness, to improve the health and quality of life in patients with mental disorders and non-communicable diseases. Our review aimed to determine the effectiveness of lifestyle interventions in the management of patients with comorbid mental and physical health disorders to improve the quality of life for these patients.

Methods: The Joanna Briggs Institute (JBI) methodology for systematic reviews of effectiveness was used. Randomised controlled trials from 2011 to 2022 were included, where lifestyle interventions were compared to no treatment or treatment as usual.

Results: Four studies were eligible for inclusion in this review. The included studies investigated depression and obesity, two studies investigated depression and diabetes, and one study investigated asthma and anxiety. Two studies were included in meta-analysis, indicating a small effect on the mental domain of quality of life (SMD: 0.22, 95%CI [0.06, 0.37]), more so than the physical domain (SMD: 0.17, 95%CI [0.00,0.35]). Lifestyle interventions, which include a psychological behavioural change component, show some promise.

Conclusion: Further research is needed to determine the effectiveness of lifestyle interventions in the management of patients with mental disorders and comorbidities, however, due to the limited number of included studies and the low quality of evidence, findings should be interpreted with caution.

PRISMA/PROSPERO: The authors followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines on reporting for systematic reviews. The initial protocol was registered on PROSPERO (registration number: CRD42021265704).

Keywords: mental health, chronic illness, comorbidity, lifestyle interventions

Introduction

Mental disorders involve significant disruptions in thinking, emotional control, or behaviour, often leading to distress or impaired functioning (WHO, 2022). Patients with mental disorders have a lower life expectancy than the general population, living on average approximately 15 to 20 years less (Ee et al., 2020; Stein et al., 2019; Lee et al., 2017). This higher rate of mortality and morbidity is usually the result of chronic illness, often exacerbated by unhealthy lifestyle habits (which are usually modifiable and preventable), as well as the side effects of medication used to manage the mental disorder (Zaman et al., 2019). Patients with mental disorders have higher rates of various non-communicable diseases (NCDs), including cancers, respiratory disorders, obesity, diabetes and cardiovascular diseases (Ee et al., 2020; Stein et al., 2019; Lee et al., 2017). Patients with comorbid mental and physical health disorders, consequently, have an increased burden of disease and a poorer quality of life.

Quality of life (QoL) serves as a crucial health indicator (Owczarek, 2010). According to the World Health Organization (2012), quality of life refers to how individuals perceive their position in life, considering the cultural context and value systems they live within, as well as their personal aspirations, expectations, and concerns. Quality of life is a broad concept that includes multiple dimensions, typically categorised into four key areas: psychological well-being, physical health, social relationships, and functional ability (Owczarek, 2010).

Unhealthy lifestyle behaviours such as poor diet, physical inactivity, substance use, inadequate sleep and chronic stress are strongly linked to increased mortality in people with mental disorders and NCDs (Zaman et al., 2019). Lifestyle interventions refer to the deliberate changes people make in their everyday behaviours, habits, and choices to improve their overall health and well-being (Kushner and Mechanick, 2015; Derman et al., 2008). Lifestyle interventions involve behavioural change strategies which include healthy eating, physical activity and exercise, stopping the use of harmful substances, sleep hygiene and stress management (Kushner and Mechanick, 2015; Derman et al., 2008). Stress management interventions include cognitive behavioural therapy (CBT), mindfulness, deep breathing exercises and relaxation techniques (Corsica and Bradley,

2017). Lifestyle interventions are aimed at preventing, treating or changing the course of the illness to improve the health and quality of life in patients with comorbid mental disorders and chronic illness (Lee et al., 2017).

Lifestyle interventions are cost-effective and can be implemented by various healthcare professionals, including physiotherapists (Ee et al., 2020; Stein et al., 2019). While the benefits of lifestyle interventions for physical and mental health have been studied separately, their effectiveness in individuals with co-occurring mental and physical disorders remains underexplored. Existing reviews often focus on single interventions or specific conditions, reporting improvements in outcomes like body weight, depressive symptoms, and physical activity. However, few have examined quality of life as a primary outcome. Bradley et al. (2022) found that while lifestyle interventions improved weight, diet, and activity levels in individuals with mental disorders, they had no significant impact on depression, anxiety, or overall psychological symptom severity.

Given the need for integrated care approaches that address both physical and mental health (Ee et al., 2020), further research is needed to evaluate the effectiveness of lifestyle interventions in individuals with multiple health conditions. This review aimed to fill that gap by assessing the impact of lifestyle interventions on quality of life in people with comorbid mental and physical disorders, to inform evidence-based recommendations for physiotherapists and other healthcare professionals.

Systematic review question

What is the effectiveness of lifestyle interventions compared to treatment as usual (TAU) or no treatment to improve health-related quality of life in adults with comorbid mental disorders, specifically, anxiety, bipolar disorder and depression and physical health disorders, namely, cardiovascular disease, respiratory disorders, diabetes, obesity, metabolic syndrome and chronic pain?

Materials and methods

The Joanna Briggs Institute (JBI) method for systematic reviews of effectiveness was followed, and studies were included if they were published in English between 2011 and 2022 (Tufanaru et al., 2020). This protocol has been registered on the Prospective Register of Systematic Reviews (PROSPERO). Registration number: CRD42021265704. An ethical waiver was obtained from the University of Witwatersrand Human Research Ethics Committee – Medical. The ethical waiver number is W-CBP-220328-01. The protocol was published previously (Lord et al., 2023).

Eligibility criteria

Studies that were published in English from January 2011 to December 2022 were included in our review. The Participant, Intervention, Comparator, Outcome (PICO) framework was used to determine the eligibility criteria for this review.

Participants

The participants included adults 18 years and older with comorbid mental and physical health disorders. The mental disorders of interest were depression, anxiety and bipolar disorder. The chronic illnesses included diabetes, obesity, cardiovascular diseases, respiratory disorders (chronic obstructive pulmonary disorders and asthma), metabolic disorders and chronic musculoskeletal pain.

Schizophrenia and psychosis were excluded from our review, as these are considered more severe mental illnesses, usually requiring medication and often including periods of hospitalisation. Previous systematic reviews also focused on more severe mental disorders, and as such, these were excluded from our review.

Studies with participants with cancer, neurological conditions (e.g. stroke, dementia and cognitive decline), pregnancy-related conditions such as gestational diabetes and pre-eclampsia, coronavirus disease 2019 (COVID-19), acute hospitalisations (e.g. surgery, acute coronary syndrome), human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) were excluded. These conditions were excluded (especially cancer and neurological conditions) because they involve different types of

care, which are more complex and often require specialised rehabilitation. These treatments may affect their ability to participate in lifestyle interventions such as physical activity and exercise, which are primarily delivered by physiotherapists.

Interventions

Lifestyle interventions aimed at individuals were included in this review. These included physical activity and exercise, nutrition, sleep hygiene, stress management (cognitive behavioural therapy, mindfulness, relaxation and breathing exercises) and substance cessation. Studies which included group interventions were excluded.

Comparators

Studies that compared lifestyle interventions to no treatment or TAU were included. Treatment as usual includes standard care typically provided for a mental disorder within a specific healthcare setting or discipline. For mental disorders, this includes medication and/or psychotherapy.

Outcomes

The outcome of interest was health-related quality of life, for example, the Short Form Health Survey: SF-36 and SF-12, the Sickness Impact Profile, WHO Quality of Life [WHOQOL], Quality of Well-being Scale, EuroQOL-5 Dimension questionnaire [EQ-5D].

Types of studies and study selection

As this review was a review of effectiveness, only randomised controlled trials (RCTs) and quasi-experimental studies were considered for inclusion. Randomised controlled trials are considered the best study design for assessing the effectiveness of an intervention, as confounding variables are controlled for. Cross-sectional and cohort studies are usually best for assessing aetiology, prognosis, or risk factor reviews, and as such were not included in this study. As per the described search strategy, all identified citations were imported into EndNote version 20 (Clarivate Analytics, PA, USA).

Search strategy

The JBI three-step search strategy was followed to identify all the relevant publications. A librarian assisted in developing the final search strategy and adapted it to the various databases. The search strategy aimed to find studies published in English from 2011 to 2022. The initial pilot strategy aimed to search for lifestyle interventions delivered by physiotherapists, however, this limitation was removed, as no studies were found in the pilot search, as often, the healthcare professional was not specified.

The search strategy included the following:

(((behav* or lifestyle)n3 (adapt* or modif* or intervention*)) or "physical* activ*" or exercis* or diet* or "Social* Integrat*" or "Community Participat*" or "cognitive behav* therap*") AND ("psychological* distress*" or "mental disorder*" or depress* or anxiety or bipolar) AND ("physical illness" or "physical disease*" or "physical health" or "cardiovascular disease*" or "respiratory disorder*" or "Respiratory Tract Disease*" or diabet* or obes* or "metabolic syndrome" or "chronic pain*" or "Musculoskeletal Pain*" or "Physical Disorder*") AND comorbid* AND “Quality of Life"

An initial search of Medline (Ovid) was done to determine the suitability of articles which met the eligibility requirements. This initial search yielded 233 possible articles which fit the inclusion criteria. The search strategy was then adapted and applied to the following databases: Medline (Ovid), Cochrane Register of Controlled Trials, Scopus, and the Physiotherapy Evidence Database (PEDro), and yielded 619 articles. Due to the limited number of initial articles, as well as the type of interventions, it was decided to include APA PsycInfo in the databases. The final search strategy was adapted to MEDLINE, Academic Search Ultimate, APA PsycINFO and Cinahl via EBSCOhost, Physiotherapy Evidence Database (PEDRo), Cochrane Central Register of Controlled Trials, as well as LiLACS. The reference lists of all included studies were then also searched for possible studies for inclusion.

Assessment of methodological quality

Included studies underwent an assessment of methodological quality. The JBI critical appraisal tool for RCTs was used (Tufanaru et al., 2020). The critical appraisal tool consists of 13 questions, and the reviewer is asked to answer “yes”, “no”, “unclear”, or “not applicable”. Each “yes” indicated the criteria were met, and every “yes” answer was

scored as one, with each study allocated a score out of 13. Studies were considered high quality if they scored above 11, moderate quality if they scored between 8-10 and low quality if they scored below seven. Regardless of methodological quality, all included studies underwent data extraction.

Data extraction

Data were extracted from the included articles by two independent reviewers. Discrepancies between the reviewers were discussed and resolved. As the reviewers were able to discuss and resolve the disputes, an independent third reviewer was not consulted. The extracted data included study design, country and setting, participant characteristics, details about the intervention and comparator, and relevant outcomes. Data extraction was performed using Microsoft Excel and then imported into the JBI System for Unified Management of Assessment and Review of Information (SUMARI) (Munn et al., 2019).

Data analysis and synthesis

The included studies were synthesised narratively and, where possible, outcome measures were pooled for meta-analysis. The random effects model for meta-analysis was used. Synthesis of the data was performed on the primary outcome of quality of life only.

Assessing the certainty in the findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach for grading the certainty of evidence was followed (Alonso-Coello et al. 2016; Guyatt et al. 2008). The GRADE approach categorises the certainty of evidence into four levels: high, moderate, low and very low. Evidence is categorised based on factors such as study design, risk of bias, consistency of results, directness of evidence, precision, and publication bias. Studies that were included in a meta-analysis with the outcome of quality of life were included in a Summary of Findings (SoF) table (Table 3) created in the GRADEPro Guideline Development Tool (McMaster University 2020).

Results

Study inclusions

A total of 2 225 citations were imported to EndNote, and after 297 duplicates had been removed, a total of 1 928 citations were uploaded to the JBI SUMARI tool (Munn et al., 2019). After title and abstract screening, 34 articles were included for full-text screening. Following the full-text screening process, a total of four RCTs met the inclusion criteria and were included in the systematic review. Two reviewers performed the screening, critical appraisal and data extraction independently. Where discrepancies were found, the reviewers discussed these and came to a decision. The process and decisions are shown in the PRISMA diagram (Page et al., 2021). (Figure 1)

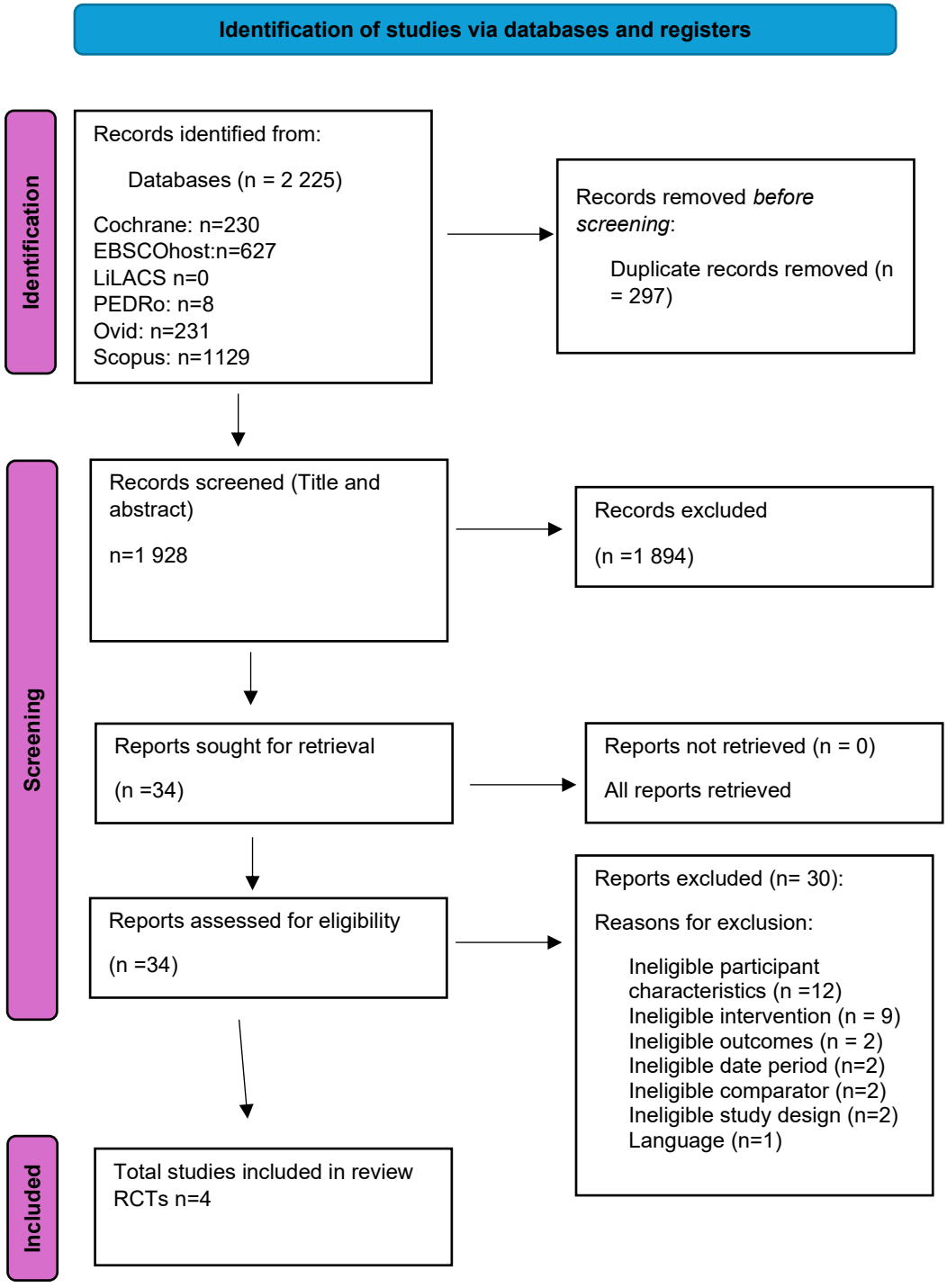


Figure 1: PRISMA Diagram (Page et al., 2021)

Methodological quality

Following full-text screening, four RCTs were included. Data were extracted from four included articles by two independent reviewers. All four included RCTs had moderate to high methodological quality. Three studies used true randomisation, and in three studies, the group allocation was concealed. In the remaining study, the randomisation or group allocation was ‘unclear’. In all the studies, the experimental and control groups were similar at baseline (Table 1).

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Table 1: Critical Appraisal of Eligible Randomised Controlled Trial

Citation	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10	Q 11	Q 12	Q 13	Total
Rosas LG, Azar KMJ, Lv N, Xiao L, Goldhaber-Fiebert JD, Snowden MB, et al. 2020.	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	10/13
Tovote KA, Fleer J, Snippe E, Peeters ACTM, Emmelkamp PMG, Sanderman R, et al. 2014.	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	11/13
Parry GD, Cooper CL, Moore JM, Yadegarfar G, Campbell MJ, Esmonde L, et al. 2012.	U	Y	Y	U	N	U	Y	N	Y	Y	Y	Y	Y	8/13
Piette JD, Richardson C, Himle J, Duffy S, Torres T, Vogel M, et al. 2011.	Y	U	Y	Y	N	U	Y	U	Y	Y	Y	Y	U	8/13
%	75	75	100	50	0	0	100	50	100	100	100	100	75	

[1] Q1: Was true randomisation used for the assignment of participants to treatment groups? Q2: Was allocation to treatment groups concealed? Q3: Were the treatment groups similar at the baseline? Q4: Were participants blind to treatment assignment? Q5: Were those delivering treatment blind to treatment assignment? Q6: Were outcomes assessors blind to treatment assignment? Q7: Were treatment groups treated identically, other than the intervention of interest? Q8: Was follow-up complete, and if not, were differences between groups in terms of their follow-up adequately described and analysed? Q9: Were participants analysed in the groups to which they were randomised? Q10: Were outcomes measured in the same way for treatment groups? Q11: Were outcomes measured in a reliable way? Q12: Was appropriate statistical analysis used? Q13: Was the trial design appropriate, and were any deviations from the standard RCT design (individual randomisation, parallel groups) accounted for in the conduct and analysis of the trial?

Study characteristics

The study characteristics of each study are presented in Table 2. All the included studies were randomised controlled trials that compared an intervention to either treatment as usual (medication and/or psychotherapy) or no treatment. Three studies compared an intervention group to a control or waitlist group (Rosas et al., 2020; Parry et al., 2012; Piette et al., 2011) and one study had three arms comparing two interventions to a wait-list group (Tovote et al., 2014). Two of the studies were undertaken in America (Rosas et al., 2020; Piette et al., 2011), one in the United Kingdom (Parry et al., 2012) and one in the Netherlands (Tovote et al., 2014). Participants were recruited from primary care facilities and hospital outpatient settings, with adults aged 18 and above included in the studies. The most recent study was published in 2020, with the remaining three published before 2015.

A total of 888 participants were enrolled across the four studies, with an average age of 52 years (ranging from 25 to 66 years). Most participants were female, comprising 59.9% of the total sample. In Rosas et al. (2020), 70% of the study sample were female.

Table 2: Characteristics of included studies

Study	Type of randomisation	Country	Setting/ context	Participant characteristics	Intervention/ Control	Duration of intervention	QoL Outcomes measured	Description of main results
Rosas LG, Azar KMJ, Lv N, Xiao L, Goldhaber-Fiebert JD, Snowden MB, et al. 2020.	1:1 ratio using Pocock and Simon's covariate-adaptive minimisation. Efron's biased coin method	USA	Adult Primary care	Primarily middle-aged participants (51 SD 12.1). 70% female Obesity: BMI of 30 or higher Depression: PHQ-9 score < 10	*Intervention*: A 12-month I-CARE intervention was used, which combined components of the GLB programme for obesity and the PEARLS for depression. Nine individual face-to-face sessions with a trained health coach and 11 home-viewed GLB videos of 20–30 minutes each, over 6 months of intensive treatment. *Control: TAU*	12 months (6 months and 6 months follow-up)	Short Form-8 Health Survey Obesity-Related Problems Scale Patient-Reported Outcomes Measurement Information System	The I-CARE intervention improved quality of life, sleep, and functional status in patients with obesity and depression during the first six months, but these benefits were not sustained over 12 months <u>Mental domain of quality of life</u> six months: MD 2.9 +-SD 95% CI [0.7,5.0]; *p* = 0.01; d = 0.37 12 months: MD 1.7 95% CI [-0.4,3.9]; *p* = 0.11; d = 0.26 <u>Physical domain of quality of life</u>, MD 0.9 95% CI [-0.9,2.7]; *p* = 0.35; d = 0.06.
Tovote KA, Fleer J, Snippe E, Peeters	Computerised, stratified randomisation	Netherlands	Adult outpatient clinics and physician or	Adults 18-70 years	*Intervention 1:* MBCT (formal meditation, yoga exercises	8 weeks	The Well-Being Index (WHO-5).	MBCT and CBT led to significant improvements in well-being, as measured by the WHO-5 Well-Being

Study	Type of randomisation	Country	Setting/ context	Participant characteristics	Intervention/ Control	Duration of intervention	QoL Outcomes measured	Description of main results
ACTM, Emmelkamp PMG, Sanderman R, et al. 2014.			self-referral.	Diagnosed type 1 or 2 diabetes Depression: BDI-II score ≥14.	and informal daily mindfulness practices). *Intervention 2*: CBT: CBT consists of behavioural activation and cognitive restructuring *Control:* Waitlisted for 3 months and received no psychological interventions			Index, compared to the waiting-list control group. MBCT: =ANOVA: F=17.35; *p*<0.001; d=0.92 [0.39 – 1.43]; CBT: ANOVA: F = 18.95 p<0.001; d =1.02 [0.48-1.53]) This indicates that both interventions positively impacted QoL in patients with diabetes and comorbid depressive symptoms.
Parry GD, Cooper CL, Moore JM, Yadegarfar G, Campbell MJ, Esmonde L, et al. 2012.	Blocked and stratified randomisation	United Kingdom	Sheffield UK hospital outpatients	Adults 18-65 Clinical diagnosis of asthma Anxiety: HADS <8 and ASC-PF <28	*Intervention*: CBT tailored to asthma-specific fear and anxiety management. *Control*: Routine clinical care.	Approx. 8 sessions over 5-12 weeks Follow up at 6 months	Euroqol – 5D (EQ-5D). Asthma-Specific Quality of Life (Asthma Bother Profile).	CBT improved asthma-specific QoL immediately after treatment, but these improvements were not sustained at the six-month follow-up. Modest clinical effects of CBT for asthma-related anxiety, it did not show a significant cost advantage, and the specific change in EQ-5D scores was not detailed in the summary available

Study	Type of randomisation	Country	Setting/ context	Participant characteristics	Intervention/ Control	Duration of intervention	QoL Outcomes measured	Description of main results
								CBT group's ANCOVA results were -0.11 (95% CI [-0.20 to -0.03]; p = 0.012 Control group's ANCOVA results were -0.12 (95% CI [-0.25 to 0.02])
Piette JD, Richardson C, Himle J, Duffy S, Torres T, Vogel M, et al. 2011.	Block randomisation using sealed envelopes and table of random numbers	USA	Outpatients from community-based non-profit healthcare system, University healthcare system and Veteran Affairs healthcare	Adults Diagnosed Type 2 Diabetes Depression: Beck Depression Inventory scores ≥14	*Intervention:* Randomised to a 12-month telephone-delivered CBT programme. *Control:* Enhanced usual care consisting of a copy of the 'Feeling Good Handbook'.	12 months: (Initial 12 weekly sessions, followed by 9 booster sessions).	Short Form Health Survey - 12	The telephone-delivered CBT programme combined with a pedometer-based walking initiative did not improve glycaemic control but led to significant reductions in depressive symptoms and systolic blood pressure, along with increased physical activity, factors that contribute positively to overall quality of life in patients with T2D. mental domain of quality of life at 12 months MD 3.4 95% CI [0.97,5.2] and p = 0.006). Physical domain of quality of life: at 12 months (MD: 3.0 95% CI [0.92-5.2] and p = 0.005)

Key: ANOVA – analysis of variance (F=statistic), ANCOVA – Analysis of co-variance, BDI – Beck's Depression Inventory, CI-confidence interval, CBT – cognitive behavioural therapy, HADS – Hospital anxiety and depression score, MBCT – mindfulness-based cognitive therapy, MD – mean difference, QoL – quality of life, T2D – Type 2 diabetes, TAU – treatment as usual

Data analysis and synthesis

The included studies were synthesised narratively and, where possible, outcome measures were pooled for meta-analysis. Two studies were included in the meta-analysis, as they reported on the mental domain of quality of life and the physical domain of quality of life, using the SF-8 and SF-12 and are presented in the meta-analysis below. All the included studies compared a psychological treatment strategy such as cognitive behavioural therapy (CBT), behavioural activation strategies or counselling and three studies included physical activity (walking or yoga) (Rosas et al., 2020; Tovote et al., 2014; Piette et al., 2011) to treatment as usual or no treatment (waitlist/control). Parry et al. (2012), however, only used CBT and did not include a physical activity component. Piette et al. (2011) and Tovote et al. (2014) investigated the effect of the intervention on depression and diabetes. Parry et al. (2012) investigated the effect of the intervention on anxiety and asthma, and Rosas et al. (2020) investigated the effect of the intervention on depression and obesity.

The diagnosis or severity of a mental disorder was measured using a self-reported outcome measure. Rosas et al. (2020) used the Symptom Checklist (SCL-20) to measure changes in depression score over time. The Beck's Depression Inventory (BDI-II) and Toronto Hamilton Depression Scale (HAM-D7) were used by Tovote et al. (2014) in their study, the Hospital Anxiety and Depression Score (HADS) was used as a self-reported outcome measure for depression in the study by Parry et al. (2012). Piette et al. (2011) used the Beck's Depression Inventory (BDI) as an outcome measure for depression.

Physical health outcome measures included Body Mass Index (BMI) (Rosas et al., 2020), and glycaemic control (as measured by HbA1c values) (Tovote et al., 2014; Piette et al., 2011). Participants in the study by Parry et al. (2012) had a confirmed clinical diagnosis of asthma, defined as airflow obstruction with variation of symptomology and hyper-irritability of the airways.

Rosas et al. (2020) investigated the effects of a combined intervention called the "Integrated Coaching for Better Mood and Weight" (I-CARE), for depression and obesity,

which combined the “Group Lifestyle Balance” (GLB) programme for obesity and the “Programme to Encourage Active Rewarding Lives” (PEARLS) for depression which included problem solving therapy and behaviour activation strategies as well as changes to medication if needed. The GLB programme is an adaptation of the “Diabetes Prevention Programme” lifestyle intervention, which focuses on attaining a 5 to 10% weight loss by improving diet and incorporating 150 minutes of moderate intensity physical activity daily and can be delivered in person or can be patient-directed in video format (Ma et al., 2013). In the study by Rosas et al. (2020), the GLB videos were used by the individual participants in this study.

Tovote et al. (2014) compared individual CBT and mindfulness-based CBT (MBCT) to a waitlist in depressed patients with diabetes. The authors report that the MBCT protocol involved formal meditation, yoga and informal mindfulness practices while CBT focused on behavioural activation and cognitive restructuring. Parry et al. (2012) compared the effects of CBT in patients with anxiety and depression to a waitlist control group. The content of the CBT delivered to the intervention group also included education about asthma in the CBT protocol.

Piette et al. (2011) compared the effect of telephonic CBT and walking programmes in patients with depression and diabetes to an enhanced usual care (which consisted of the provision of a self-help book). The participants in the intervention group received CBT telephonically for 12 months, initially with 12 weekly sessions of CBT, followed by nine monthly booster sessions. The CBT programme first focused on depressive symptoms, and after five sessions, a walking programme was introduced. Step counts were measured by a pedometer to increase the step count throughout the study.

The frequency and duration of the interventions varied between studies. Initially, all interventions were delivered weekly. Rosas et al. (2020) provided follow-up telephonic sessions for six months after the initial interventions, whereas Piette et al. (2011) included nine booster sessions after the initial 12 weekly sessions. Parry et al. (2012) and Tovote

et al. (2014) used brief CBT interventions (average of 4-8 sessions). Quality of life consists of four domains, however, Rosas et al. (2020) and Piette et al. (2011) only reported on the mental and physical domains of quality of life. Rosas et al. (2020), found that the I-CARE (GLB and PEARLS) intervention improved the mental domain of quality of life at six months (mean difference (MD) 2.9 +-SD 95% CI [0.7,5.0]; p = 0.01; d = 0.37), but these findings were not statistically significant at 12 months, although a small effect size did remain at 12 months (MD, 1.7 95% CI [-0.4,3.9]; p = 0.11; d = 0.26), indicating the intervention was maintained in the longer term. However, Rosas et al. (2020) reported the I-CARE intervention did not significantly improve the physical domain of quality of life, with the effect size almost negligible (MD 0.9, 95% CI [-0.9,2.7]; p = 0.35; d = 0.06).

Tovote et al. (2014) reported on the effect of MBCT and CBT in patients with depression and diabetes. When comparing both interventions to an enhanced usual care protocol (the control group received a “self–help booklet”), they found statistically significant improvements in both intervention groups (MBCT: F=17.35; p<0.001; d=0.92 95% CI [0.39 – 1.43]; CBT: F = 18.95 p<0.001; d =1.02 95% CI [0.48-1.53]) with large effect sizes in both intervention groups when compared to the control group. The outcome measure used was WHO-5, which focuses on mental wellbeing only, so they could not report on the other domains of quality of life. Physical health improvements (diabetes) were measured by HbA1c and diabetes medication, which showed no significant difference.

Parry et al. (2012) observed a notable decrease in EQ-5D scores in the CBT group relative to the control group six months post-intervention. This indicated a favourable effect of the intervention in improving quality of life. The CBT group’s ANCOVA results were -0.11 (95%CI [-0.20 to -0.03]; p = .012), while the control group’s ANCOVA results were -0.12 (95% CI [-0.25 to 0.02]) for both intention-to-treat and complete case analyses. The authors did report that one patient in the CBT arm of the trial died of an asthma attack between the first and second endpoints.

Piette et al. (2011) found that intervention (CBT and walking) also improved the mental domain of quality of life (MD 3.4, 95% CI [0.97,5.2] and p = .006). However, for the physical domain of quality of life, Piette et al. (2011) reported a statistically significant improvement of the intervention at 12 months (MD: 3.0, 95% CI [0.92-5.2] and p = .005). The statistical significance for this study was set at p=.05.

Data synthesis

Synthesis of the data was performed only on the primary outcome of health-related quality of life at the available endpoint of the intervention. The quality-of-life outcome measures in this study were the Short Form Health Survey (SF-8) (Rosas et al., 2020), the SF-12 (Piette et al., 2011), the WHO Well-being Index (WHO-5) (Tovote et al., 2014) and the EuroQol-5D (Parry et al., 2012). Two studies used condition-specific quality of life outcome measures: The “Obesity Related Problem scale” for quality of life related to obesity (Rosas et al., 2020) and the “Asthma Bother Profile” for asthma-specific quality of life (Parry et al., 2012).

Two studies provided sufficient information to be pooled into a meta-analysis for the effects of CBT on quality of life. Piette et al. (2011) and Rosas et al. (2020) both used shorter versions of the SF-36 (SF-12 and SF-8, respectively), and outcomes related to the physical domain and mental domain of quality of life were reported on. As such, it was determined that sufficient information was provided to pool the studies together and synthesise the information on quality of life in the separate sections the instrument reported on. The standardised mean differences (SMD) with a 95% confidence interval (CI) were used to report continuous data outcomes. Standardised mean differences were used to combine quality of life outcomes measured by different instruments (SF-8 and SF-12). Both tools assess similar health domains but differ in format and scoring. Standardised mean differences standardise effect sizes, allowing meaningful comparison across studies using different scales.

Heterogeneity was assessed using the I^2 statistic. The I^2 statistic measures the percentage of total variation across studies that is due to heterogeneity rather than chance. Scores of 25% or less indicate low heterogeneity, scores of 50% indicate moderate heterogeneity, and scores above 75% indicate high heterogeneity. Funnel plots for publication bias were not performed due to the small number of studies included in the systematic review and meta-analysis (only two studies included in the meta-analysis; funnel plots are best suited to ten or more studies in a meta-analysis). The interventions in these studies included CBT and walking (Piette et al., 2011) and CBT and yoga (Rosas et al., 2020).

Effect of the intervention on the physical domain of quality of life: Results from the meta-analysis show that CBT and physical activity (walking and yoga) did not significantly improve the physical aspect of quality of life (measured by the SF-8 and SF-12) in patients with comorbid conditions, depression and obesity (Rosas et al., 2020) and depression and diabetes (Piette et al., 2011): Standardised mean difference (SMD): 0.17 95%CI [0.00,0.35]). This indicates a small effect of the interventions on the physical domain of quality of life, however, the confidence intervals were large, and results should be interpreted with caution. The low level of heterogeneity (I^2 = 15.23%) was probably due to the small number of included studies (Figure 2).

Effect of the intervention on the mental domain of quality of life: There was a small statistically significant difference in the mental domain of quality of life between patients who received CBT and physical activity when compared to patients who received usual care (SMD: 0.22, 95%CI [0.06, 0.37]) (Figure 3). No heterogeneity [I^2 = 0%] existed. When compared to the physical domain of quality of life, it appears that CBT and physical activity have a slightly larger effect size on the mental domain of quality of life, although this effect size remains small, with large confidence intervals.

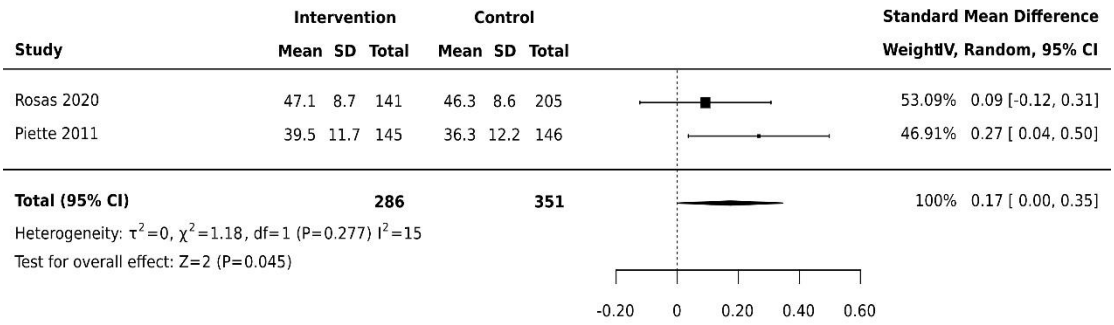


Figure 2: Results of meta-analysis for physical domain of quality of life

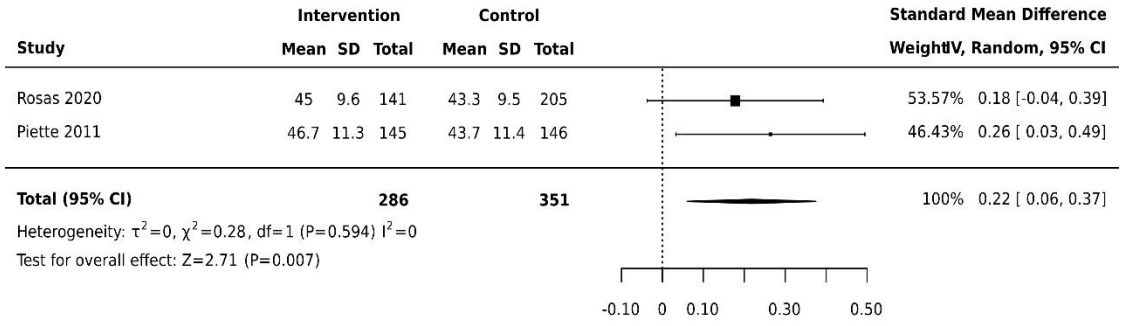


Figure 3: Results of meta-analysis for mental domain of quality of life

Certainty of evidence

The outcome of interest, quality of life, and rating of the evidence can be found in the Summary of Findings table (Table 3). The GRADE assessment classified the evidence as low quality, indicating that the confidence in the estimated effect is limited, and the true effect may be substantially different (Balshem et al., 2011).

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Table 3: Summary of findings

Certainty assessment							Summary of findings				
							Study event rates (%)			Anticipated absolute effects	
Participants (studies) Follow-up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	With treatment as usual or no	With Lifestyle interventions	Relative effect (95% CI)	Risk with treatment as usual or no	Risk difference with Lifestyle interventions
Quality of Life - Physical domain (follow-up: mean 12 months; assessed with: SF 8 or SF 12)											
637 (2 RCTs)[1,2]	not serious[a]	not serious	serious[b,c]	serious[d,e]	none	⨁⨁◯◯ Low[a,b,c,d,e]	351	286	-	-	SMD **0.17 SD higher** (0 to 0.35 higher)
Quality of life - Mental domain (follow-up: mean 12 months; assessed with: SF-8 or SF 12)											
637 (2 RCTs)[1,2]	not serious	not serious	serious[b,c]	serious[d,e]	none	⨁⨁◯◯ Low[b,c,d,e]	351	286	-	-	SMD **0.22 SD higher** (0.06 higher to 0.37 higher)

CI: confidence interval; **SMD:** standardised mean difference

Explanations

a. Approximately 20% loss to follow up in the intervention group vs the control group

b. One study compared an I-CARE in a population of obesity and depression. One study compared CBT and walking in patients with diabetes and depression. Differences also exist in the interventions, while both studies include physical activity -e.g brisk walking, the coaching and CBT interventions may differ

c. In both studies the majority of the participants were female and middle aged

d. Wide confidence intervals of 0.0 -0.35 (therefore downgraded)

e. Sample size of 637 participants across two studies. Sample sizes of less than 400 considered insufficient ("rule of thumb")

References:

1.Piette J, Richardson C,Himle J,Duffy S,Torres T,Vogel M,Barber K,Valenstein M. A randomised trial of telephonic counseling plus walking for depressed diabetes patients.Medical Care; 2011.

2.Rosas L, Azar K,Nan L,Lan X,Goldhaber-Fiebert J,Snowden M,Venditti E,Lewis M,Goldstein-Piekarski A,Ma N. Effect of an intervention for obesity and depression on patient-centred outcomes: A RCT.Am J Prev Med; 2020.

Discussion

This systematic review aimed to determine the effectiveness of lifestyle interventions on quality of life in the management of patients with comorbid physical and mental health disorders. Many studies have been conducted investigating specific lifestyle interventions in either mental health disorders or chronic illnesses, but as the limited number of studies in this review indicates, there are far fewer studies which investigate the effectiveness of lifestyle interventions in comorbid conditions. Many studies were also excluded from this review as they did not consider the effects of the intervention on quality of life. Often in trials, the effect of the intervention was considered in terms of mental or physical health outcomes, but less so on overall quality of life, which is an important overall indicator of health (Owczarek, 2010).

This systematic review initially set out to include all lifestyle interventions which may be used in the management of patients with comorbid mental and physical health disorders. These include physical activity and exercise, nutrition and weight management, sleep hygiene and stress management interventions to help maintain overall health. The final included articles, however, only investigated CBT and physical activity. This finding reflects the current state of the evidence, indicating more research is required to determine the effect of other lifestyle interventions such as diet and sleep.

A meta-analysis was conducted using two eligible studies (Rosas et al., 2020; Piette et al., 2011). The findings suggest that lifestyle interventions combining psychological components (e.g. CBT, problem-solving) with physical activity (e.g. walking, yoga) did not significantly improve the physical health domain of quality of life, though a trend towards the positive was observed in the analysed studies. In contrast, a small but statistically significant improvement was found in the mental health domain, indicating slightly greater effectiveness in mental well-being. However, large confidence intervals and small effect sizes in both domains suggest the results should be interpreted with caution, and further research is needed to confirm the true effect. Rosas et al. (2020) had more participants and larger effect sizes, but the results in their study were not statistically significant. Piette

et al. (2011) showed significant findings, though with smaller effect sizes and lower methodological quality.

There was a low level of heterogeneity in the pooled studies. This may be due to the small number of studies included in the meta-analysis. Further research is needed, and this may change the heterogeneity scores. Slight variations may have existed between the interventions in each study, as CBT protocols may vary slightly depending on the needs of the patients. The physical activity interventions also varied slightly, which may affect the heterogeneity. Both studies included in the meta-analysis included patients with depression, but variations in the comorbidities were also evident (obesity and diabetes), which limits the generalisability of the findings from the studies.

The outcome of interest in this review was quality of life. The studies included in the meta-analysis both reported on quality of life, but these were secondary outcomes. This suggests that while the studies may have shown that improvements in quality of life are possible, they may not be definite and further research is needed. Statistically significant findings from secondary outcomes are typically viewed as exploratory and should be interpreted with caution rather than as definitive evidence. Furthermore, the secondary outcomes reported in RCTs may affect the quality of the evidence, and the overall confidence in the evidence for that outcome may be reduced due to limitations in study design or reporting focus (Grade Working Group, 2013).

The quality of evidence is rated as low, according to the GRADE methodology. This level of uncertainty implies that decisions based on such evidence should be made cautiously, considering other important factors like patient values, costs, and feasibility. It also highlights the need for further high-quality research, as future studies are likely to change our current understanding. Ultimately, the estimated benefits may not be reliable, and the actual effect could be larger, smaller, or even in the opposite direction.

Cognitive behavioural therapy aims to improve quality of life by employing cognitive and behavioural psychological strategies to effect change (Fordham et al., 2021). Cognitive behavioural therapy is effective across many different conditions. According to Fordham et al. (2021) CBT delivered in a high or low intensity format generally improves quality of life as shown by studies with follow-ups of more than a year, however, the effect becomes smaller when compared to pharmacotherapy or exercise and relaxation therapy (Yu et al., 2023; Fordham et al., 2021).

Exercise has been shown to have a moderate effect on depression (Krogh et al., 2017; Knapen et al., 2015; Cooney et al., 2018), however, there are certain challenges which should be considered when prescribing exercise for patients with mental disorders. These include a lack of motivation and interest, as well as fatigue and decreased energy levels (Knapen et al., 2015). By managing the mental disorder effectively, patients may then have more motivation and energy to participate in physical activity and exercise programmes, therefore improving their physical health outcomes and overall quality of life.

All except one of the studies included in this review included a physical activity component. The three studies which included physical activity as a component of the interventions (Rosas et al., 2020; Tovote et al., 2014; Piette et al., 2011) used it in conjunction with CBT. It would be expected that this inclusion would increase the effect size of the intervention, however, the effect sizes for the mental domain of quality of life were small. These findings may be in part due to the severity of the symptoms of depression, which may affect the participant's ability or preference for exercise, therefore leading to a negligible effect on the physical domain of quality of life (Soong et al., 2025; Dauwan et al., 2021).

The integrated collaborative care intervention investigated by Rosas et al. (2020) was shown to be effective in the short term (six months) but was not maintained at 12 months. The I-CARE programme, initially investigated by Ma et al. (2013), was based on the

Diabetes Prevention Programme (DPP), which is considered a “gold-standard lifestyle intervention” for diabetes (Firth et al., 2019) The DPP was translated into use for primary care and was adapted to determine if it could assist in the management of patients with obesity and depression. The DPP also includes individual and group maintenance sessions, as well as motivational and adherence strategies (Firth et al., 2019). The findings from the I-CARE intervention (Rosas et al., 2020) in our review, however, only demonstrated a small effect size for quality of life, especially the mental domain in patients with depression and obesity. This may be because the intervention was provided in a shorter period (nine individual sessions and six follow-up sessions). The immediate results were statistically significant but less so after twelve months. Similarly, van der Veen et al. (2024) also considered an integrated intervention in patients with comorbid mental and physical health disorders. Their intervention, referred to as the ‘BigMove’, consisted of individual and group sessions of motivational interviewing, goal setting, CBT and physical activity. The expected duration of the intervention was six months, a longer intervention than that of Rosas et al. (2020) The quasi-experimental study by van der Veen et al. (2024) demonstrated moderate to large effect sizes, which were statistically significant for all outcomes, including quality of life, indicating that an integrated collaborative care intervention over a longer time may be more beneficial than a short-term, brief intervention.

Piette et al. (2011) used telephonic CBT and a walking programme to improve diabetes and mental health in depressed patients with diabetes. The goal of the walking programme was to increase steps walked a day, which was incorporated into the CBT programme. Participants in this trial had, on average, a low initial daily step count, and by the end of the intervention, the step counts had improved. However, the meta-analysis indicated a very small effect on physical health. This may have been a result of the intervention and support being delivered telephonically instead of supervised and in-person, which may provide more motivation (Doren et al., 2023; Teixeira et al., 2012).

In their study, Tovote et al. (2014) found large effect sizes between both intervention groups (CBT and MBCT) when compared to the wait-listed control group. This study

only investigated the effect immediately after the intervention was completed (on average, three months), and it is unclear if this effect size would still be maintained in the long term. The authors used the WHO-5, a well-being index which focuses on mental wellbeing and not physical health.

A recent systematic review and meta-analysis by Bradley et al. (2022) investigated the effect of lifestyle interventions for improving physical activity, diet and weight in people with mental health conditions. The interventions included in the meta-analysis (health promotion strategies, physical activity, weight loss, education) demonstrated a significant reduction in weight loss, enhanced physical activity and contributed to weight maintenance (Bradley et al., 2022). According to the authors, no significant effect on mental health was found in the meta-analysis, unlike our meta-analysis results, which indicate a small effect size of the mental aspect of quality of life. Like our study, Bradley et al. (2022) considered not only severe mental illness but also more common mental health conditions such as depression and anxiety.

A meta-review by Firth et al. (2020) investigated the effect of exercise, sleep, smoking and diet interventions in the management of patients with mental health disorders only. The authors indicated that physical activity was the most researched modifiable lifestyle intervention and may be effective as an adjunctive therapy for anxiety and depressive disorders (Firth et al., 2020). Our review indicated that combined interventions, which included physical activity components, may affect quality of life. Quality of life is affected not only by the mental and physical health of a patient but also by other factors, including social and environmental factors, economic stability and personal and cultural values (Phyo et al., 2020). According to Butterly et al. (2023), multimorbidity often presents complex challenges to the management of these multiple health conditions and, as such, decreases quality of life in these patients. The authors found that patients with higher numbers of comorbidities usually had a poorer quality of life at baseline or entry into RCTs and as such, this may impact the quality-of-life outcomes following an intervention (Butterly et al., 2023).

Limitations

Findings from this systematic review should be interpreted with caution due to the small number of included studies. The initial search strategy yielded 2 225 studies, and ultimately, only four RCTs were included. Most RCTs considered lifestyle interventions in either a mental health disorder or chronic illness, but few considered the effect of lifestyle interventions in comorbid conditions and few within the specified date range considered quality of life as an outcome. The GRADE method was used to ascertain the quality of the evidence, and it was determined that the quality of evidence was low, indicating that more robust research is necessary in this area.

Quality of life was reported as a secondary outcome in the studies included in the meta-analysis. This limits the strength of the evidence, as secondary outcomes are often less rigorously measured or prioritised, thereby reducing overall confidence in the findings.

Our review also excluded group interventions to try and determine the effect of the intervention at the individual level. However, this excluded many studies as most studies involving lifestyle interventions, especially physical activity and exercise and some stress management interventions, are delivered in group formats. The benefits of group interventions cannot be underestimated.

Finally, all four included studies were from high-income countries, indicating a paucity of literature available in low- and middle-income countries (LMICs). As such, these findings may not be generalisable in LMICs.

Recommendations and implications for practice

Patients often present with complex health problems due to the confounding effects of multimorbidity. As a result of the limited studies and low quality of evidence, more studies are required to investigate the effect of interventions in patients with comorbidities to determine the most effective management strategies in this patient population.

Lifestyle interventions are an effective way of managing unhealthy lifestyle behaviours and can be delivered by any member of the interprofessional team within their scope of practice. As such, the delivery of lifestyle interventions should be a collaborative interprofessional approach and referral to the most suitable healthcare professional should be encouraged.

As the studies indicate that effects were noted in the short term, it is recommended that patients receive ongoing support and interventions throughout their treatment to maintain the positive health benefits in the long term, to help decrease the burden of disease and improve quality of life. This may also be assisted by providing access to group interventions where patients may benefit from peer-support systems. Other factors which may improve motivation in patients with mental disorders and comorbidities include setting goals, providing resources and developing a therapeutic alliance (Shi et al., 2025; Ee et al., 2020; McGrath et al., 2020).

Conclusion

Combined lifestyle interventions, which include a psychological behavioural change component and moderate-intensity physical activity, may be appropriate in the management of patients with comorbid mental and physical health disorders. The effect sizes are small with large confidence intervals, which indicates that the results should be interpreted with caution. The findings may not be generalisable, and further research is needed to determine the effectiveness of lifestyle interventions in the management of patients with mental disorders and comorbidities.

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References

Balshem, H., Helfand, M., Schünemann, H. J., Oxman, A. D., Kunz, R., Brozek, J., Vist, G. E., Falck-Ytter, Y., Meerpohl, J., Norris, S., & Guyatt, G. H. (2011). GRADE guidelines: 3. Rating the quality of evidence. *Journal of Clinical Epidemiology*, *64*(4), 401-406. https://doi.org/10.1016/j.jclinepi.2010.07.015

Bradley, T., Campbell, E., Dray, J., Bartlem, K., Wye, P., Hanly, G., Gibson, L., Fehily, C., Bailey, J., Wynne, O., Colyvas, K., & Bowman, J. (2022). Systematic review of lifestyle interventions to improve weight, physical activity and diet among people with a mental health condition. *Syst Rev*, *11*(1), 198. https://doi.org/10.1186/s13643-022-02067-3

Butterly, E. W., Hanlon, P., Shah, A. S. V., Hannigan, L. J., McIntosh, E., Lewsey, J., Wild, S. H., Guthrie, B., Mair, F. S., Kent, D. M., Dias, S., Welton, N. J., & McAllister, D. A. (2023). Comorbidity and health-related quality of life in people with a chronic medical condition in randomised clinical trials: An individual participant data meta-analysis. *PLoS Med*, *20*(1), e1004154. https://doi.org/https://doi.org/10.1371/journal.pmed.1004154

Cooney, G. M., Dwan, K., Greig, C. A., Lawlor, D. A., Rimer, J., Waugh, F. R., McMurdo, M., & Mead, G. E. (2013). Exercise for depression. *Cochrane Database Syst Rev*, *2013*(9), Cd004366. https://doi.org/10.1002/14651858.CD004366.pub6

Corsica, J. A., & Bradley, L. E. (2017). Stress Management. In J. Kreutzer, J. DeLuca, & B. Caplan (Eds.), *Encyclopedia of Clinical Neuropsychology* (pp. 1-2). Springer International Publishing. https://doi.org/10.1007/978-3-319-56782-2_429-3

Dauwan, M., Begemann, M. J. H., Slot, M. I. E., Lee, E. H. M., Scheltens, P., & Sommer, I. E. C. (2021). Physical exercise improves quality of life, depressive symptoms, and cognition across chronic brain disorders: a transdiagnostic systematic review and meta-analysis of randomized controlled trials. *Journal of Neurology*, *268*(4), 1222-1246. https://doi.org/10.1007/s00415-019-09493-9

De Hert, M., Correll, C. U., Bobes, J., Cetkovich-Bakmas, M., Cohen, D., Asai, I., Detraux, J., Gautam, S., Möller, H. J., Ndetei, D. M., Newcomer, J. W., Uwakwe, R., & Leucht, S. (2011). Physical illness in patients with severe mental disorders. I. Prevalence, impact of medications and disparities in health care. *World Psychiatry*, *10*(1), 52-77. https://doi.org/10.1002/j.2051-5545.2011.tb00014.x

Derman, E., Patel, D., Nossel, C., & Schwellnus, M. (2008). Healthy lifestyle interventions in general practice: Part 1: An introduction to lifestyle and diseases of lifestyle. *South African Family Practice*, *50*(4), 6-12.

Doren, S., Schwab, S. M., Bigner, K., Calvelage, J., Preston, K., Laughlin, A., Drury, C., Tincher, B., Carl, D., Awosika, O. O., & Boyne, P. (2023). Evaluating the Neural Underpinnings of Motivation for Walking Exercise. *Physical therapy*, *104*(3). https://doi.org/10.1093/ptj/pzad159

Ee, C., Lake, J., Firth, J., Hargraves, F., de Manincor, M., Meade, T., Marx, W., & Sarris, J. (2020). An integrative collaborative care model for people with mental illness and physical comorbidities. *Int J Ment Health Syst*, *14*(1), 83. https://doi.org/10.1186/s13033-020-00410-6

Firth, J., Siddiqi, N., Koyanagi, A., Siskind, D., Rosenbaum, S., Galletly, C., Allan, S., Caneo, C., Carney, R., Carvalho, A. F., Chatterton, M. L., Correll, C. U., Curtis, J., Gaughran, F., Heald, A., Hoare, E., Jackson, S. E., Kisely, S., Lovell, K., . . . Stubbs, B. (2019). The Lancet Psychiatry Commission: a blueprint for protecting physical health in people with mental illness. *Lancet Psychiatry*, *6*(8), 675-712. https://doi.org/10.1016/s2215-0366(19)30132-4

Firth, J., Solmi, M., Wootton, R. E., Vancampfort, D., Schuch, F. B., Hoare, E., Gilbody, S., Torous, J., Teasdale, S. B., Jackson, S. E., Smith, L., Eaton, M., Jacka, F. N., Veronese, N., Marx, W., Ashdown-Franks, G., Siskind, D., Sarris, J., Rosenbaum, S., . . . Stubbs, B. (2020). A meta-review of "lifestyle psychiatry": the role of exercise, smoking, diet and sleep in the prevention and treatment of mental disorders. *World Psychiatry*, *19*(3), 360-380. https://doi.org/10.1002/wps.20773

Fordham, B., Sugavanam, T., Edwards, K., Hemming, K., Howick, J., Copsey, B., Lee, H., Kaidesoja, M., Kirtley, S., Hopewell, S., das Nair, R., Howard, R., Stallard, P., Hamer-Hunt, J., Cooper, Z., & Lamb, S. E. (2021). Cognitive-behavioural therapy for a variety of conditions: an overview of systematic reviews and panoramic meta-analysis. *Health Technol Assess*, *25*(9), 1-378. https://doi.org/10.3310/hta25090

GRADE Working Group.2013. GRADE Handbook. Available at: https://gdt.gradepro.org/app/handbook/handbook.html. [Accessed 22 July 2025]

Knapen, J., Vancampfort, D., Moriën, Y., & Marchal, Y. (2015). Exercise therapy improves both mental and physical health in patients with major depression. *Disability and Rehabilitation: An International, Multidisciplinary Journal*, *37*(16), 1490-1495. https://doi.org/10.3109/09638288.2014.972579

Krogh, J., Hjorthøj, C., Speyer, H., Gluud, C., & Nordentoft, M. (2017). Exercise for patients with major depression: A systematic review with meta-analysis and trial sequential analysis [Article]. *BMJ open*, *7*(9), Article e014820. https://doi.org/10.1136/bmjopen-2016-014820

Kushner, R. F., & Mechanick, J. I. (2015). Lifestyle medicine-An emerging new discipline. *US Endocrinology*, *11*(1), 36-40.

Lee, S., Waters, F., Briffa, K., & Fary, R. E. (2017). Limited interface between physiotherapy primary care and people with severe mental illness: a qualitative study. *J Physiother*, *63*(3), 168-174. https://doi.org/10.1016/j.jphys.2017.05.014

Lord, S., Naidoo, V., & Mostert, K. (2023). Lifestyle interventions in comorbid mental and physical illness: A systematic review protocol [Article]. *South African Journal of Physiotherapy*, *79*(1), 1-6. https://doi.org/10.4102/sajp.v79i1.1848

Ma, J., Yank, V., Xiao, L., Lavori, P. W., Wilson, S. R., Rosas, L. G., & Stafford, R. S. (2013). Translating the Diabetes Prevention Program lifestyle intervention for weight loss into primary care: a randomized trial. *JAMA Intern Med*, *173*(2), 113-121. https://doi.org/10.1001/2013.jamainternmed.987

McGrath, J. J., Lim, C. C. W., Plana-Ripoll, O., Holtz, Y., Agerbo, E., Momen, N. C., Mortensen, P. B., Pedersen, C. B., Abdulmalik, J., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Bromet, E. J., Bruffaerts, R., Bunting, B., de Almeida, J. M. C., de Girolamo, G., De Vries, Y. A., Florescu, S., . . . de Jonge, P. (2020). Comorbidity within mental disorders: a comprehensive analysis based on 145 990 survey respondents from 27 countries. *Epidemiology and Psychiatric Sciences*, *29*, e153, Article e153. https://doi.org/10.1017/S2045796020000633

Munn, Z., Aromataris, E., Tufanaru, C., Stern, C., Porritt, K., Farrow, J., Lockwood, C., Stephenson, M., Moola, S., & Lizarondo, L. (2019). The development of software to support multiple systematic review types: the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI). *JBI evidence implementation*, *17*(1), 36-43.

Owczarek, K. (2010). The concept of quality of life. *Acta Neuropsychologica*, *8*(3), 207-213.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., & Brennan, S. E. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, *372*.

Parry, G. D., Cooper, C. L., Moore, J. M., Yadegarfar, G., Campbell, M. J., Esmonde, L., Morice, A. H., & Hutchcroft, B. J. (2012). Cognitive behavioural intervention for adults with anxiety complications of asthma: prospective randomised trial. *Respiratory Medicine*, *106*(6), 802-810. https://doi.org/https://dx.doi.org/10.1016/j.rmed.2012.02.006

Phyo, A. Z. Z., Freak-Poli, R., Craig, H., Gasevic, D., Stocks, N. P., Gonzalez-Chica, D. A., & Ryan, J. (2020). Quality of life and mortality in the general population: a systematic review and meta-analysis. *BMC public health*, *20*(1), 1596. https://doi.org/10.1186/s12889-020-09639-9

Piette, J. D., Richardson, C., Himle, J., Duffy, S., Torres, T., Vogel, M., Barber, K., & Valenstein, M. (2011). A randomized trial of telephonic counseling plus walking for depressed diabetes patients [Article]. *Medical care*, *49*(7), 641-648. https://doi.org/https://doi.org/10.1097/MLR.0b013e318215d0c9

Rosas, L. G., Azar, K. M. J., Lv, N., Xiao, L., Goldhaber-Fiebert, J. D., Snowden, M. B., Venditti, E. M., Lewis, M. M., Goldstein-Piekarski, A. N., & Ma, J. (2020). Effect of an Intervention for Obesity and Depression on Patient-Centered Outcomes: an RCT [Journal article]. *American journal of preventive medicine*, *58*(4), 496-505. https://doi.org/https://doi.org/10.1016/j.amepre.2019.11.005

Shi, W., Serafimovska, A., & Zhao, E. (2025). Psychological interventions in reducing post-traumatic stress disorder in post-myocardial infarction patients as an understudied yet critical intersection of physical and mental health for patients at

a period of high vulnerability and risk of developing comorbidities: a commentary. *European Journal of Cardiovascular Nursing*. https://doi.org/10.1093/eurjcn/zvaf013

Soong, R. Y., Low, C. E., Ong, V., Sim, I., Lee, C., Lee, F., Chew, L., Yau, C. E., Lee, A. R. Y. B., & Chen, M. Z. (2025). Exercise Interventions for Depression, Anxiety, and Quality of Life in Older Adults With Cancer: A Systematic Review and Meta-Analysis. *JAMA Network Open*, *8*(2), e2457859-e2457859. https://doi.org/10.1001/jamanetworkopen.2024.57859

Stein, D. J., Benjet, C., Gureje, O., Lund, C., Scott, K. M., Poznyak, V., & van Ommeren, M. (2019). Integrating mental health with other non-communicable diseases. *Bmj*, *364*, l295. https://doi.org/10.1136/bmj.l295

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *9*(1), 78. https://doi.org/10.1186/1479-5868-9-78

Tovote, K. A., Fleer, J., Snippe, E., Peeters, A. C. T. M., Emmelkamp, P. M. G., Sanderman, R., Links, T. P., & Schroevers, M. J. (2014). Individual mindfulness-based cognitive therapy and cognitive behavior therapy for treating depressive symptoms in patients with diabetes: results of a randomized controlled trial. *Diabetes care*, *37*(9), 2427-2434. https://doi.org/10.2337/dc13-2918

Tufanaru, C., Munn, Z., Aromataris, E., Campbell, J., & , & Hopp, L. (2020). Chapter 3: Systematic reviews of effectiveness. In I. E. A. Z. M. (Eds.) (Ed.), *JBI Manual for Evidence Synthesis*. JBI.

van der Veen, S., Evans, N., Widdershoven, G., & Huisman, M. (2024). The BigMove Intervention for People With Physical and Mental Health Conditions: A First Evaluation of Self-Perceived Health, Quality of Life, Coping and Mental and Social Functioning. *Int J Integr Care*, *24*(1), 12. https://doi.org/10.5334/ijic.8317

World Health Organization (WHO). 2012. *WHOQOL: Measuring Quality of Life*. [online] Available at: https://www.who.int/tools/whoqol [Accessed 22 Jul. 2025].

Yu, D. J., Recchia, F., Bernal, J. D. K., Yu, A. P., Fong, D. Y., Li, S. X., Chan, R. N. Y., Hu, X., & Siu, P. M. (2023). Effectiveness of Exercise, Cognitive Behavioral Therapy, and Pharmacotherapy on Improving Sleep in Adults with Chronic Insomnia: A Systematic Review and Network Meta-Analysis of Randomized Controlled Trials. *Healthcare*, *11*(15), 2207. https://www.mdpi.com/2227-9032/11/15/2207

Zaman, R., Hankir, A., & Jemni, M. (2019). Lifestyle Factors and Mental Health. *Psychiatr Danub*, *31*(Suppl 3), 217-220.

4.4 Conclusion

This systematic review and meta-analysis evaluated the effectiveness of lifestyle interventions on health-related quality of life in adults with comorbid mental and physical health disorders. Despite the increased burden of mental disorders and comorbidities, only four eligible studies were identified, with just two suitable for meta-analysis. This review found that lifestyle interventions combining CBT and physical activity have a small positive impact on mental quality of life, with a weaker effect on physical health. These benefits tend to decline over time, emphasising the need for ongoing support.

The overall certainty of evidence was rated low, indicating that further high-quality research is needed. The review highlighted a gap in the literature, particularly in LMICs, and a lack of studies evaluating broader lifestyle interventions such as nutrition, sleep, and chronic pain management in this population. These findings emphasise the need for more comprehensive, contextually relevant research to inform clinical practice and guide the development of integrated, long-term care strategies for individuals with complex comorbidities.

CHAPTER 5

PHASE 2: DELPHI STUDY

5.1 INTRODUCTION

This Delphi study considered the recommendations for lifestyle interventions (physical activity and exercise, sleep, nutrition and weight management, and stress management) for the management of depression and anxiety, which were comorbid with any of the following comorbidities: cardiovascular disease, respiratory disorders, obesity, diabetes, metabolic syndrome and musculoskeletal pain.

The findings of the systematic review indicated that combined lifestyle interventions that used a psychological strategy and physical activity component had small effect sizes on the mental and physical sub-domains of quality of life. The literature indicates that lifestyle interventions may be an effective intervention in the management of patients with either mental disorders or chronic illness, but little is known about the effects of these interventions in the management of patients with mental disorders and comorbidities. As no specific clinical guidelines regarding the delivery of lifestyle interventions in the management of patients with comorbidities were found, the Delphi consensus methodology was used to gain international consensus to guide the management of these patients.

5.2 METHODOLOGY

5.2.1 Study Design

This phase of the study used the Delphi methodology to obtain expert consensus about the recommendations for lifestyle interventions for the management of patients with mental disorders and comorbidities from an international multidisciplinary panel. The Delphi methodology is used to gather expert consensus, develop evidence-based recommendations and guidelines, particularly where there is a lack of existing evidence (Hasson et al, 2007). In this study, three rounds were conducted to determine consensus

on the recommendations developed. The predetermined level of consensus was set at 80%. The process is outlined in Figure 5.1 below.

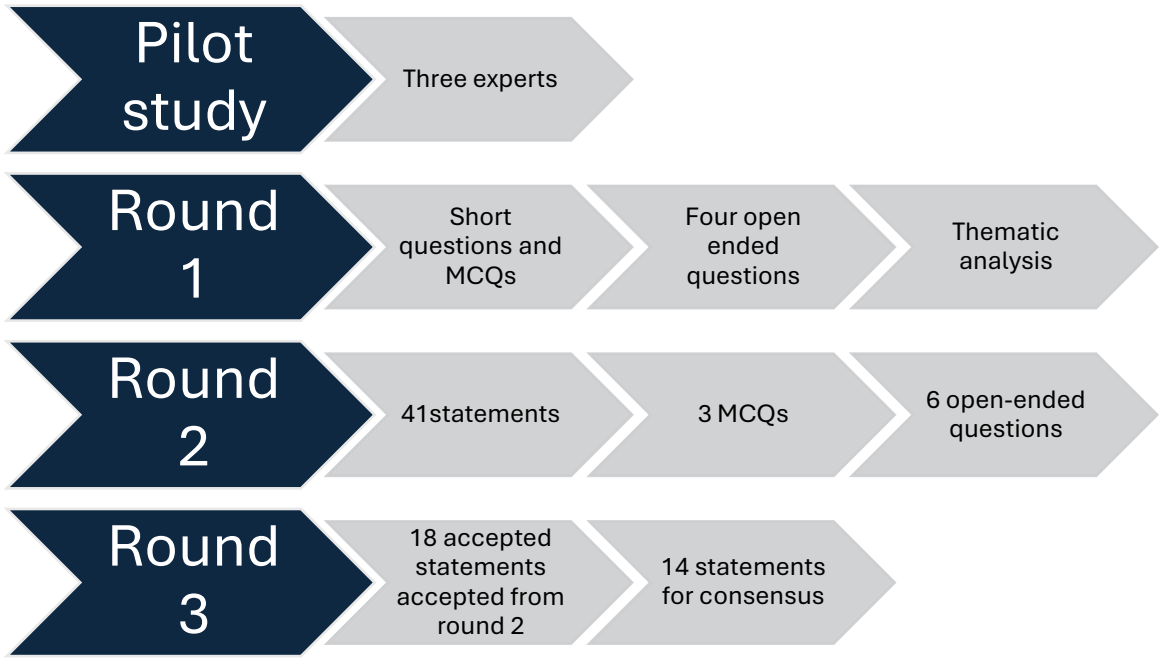


Figure 5.1: Outline of the Delphi process

5.2.2 Study Setting

The research setting for this phase was local (South Africa: private and public health settings) and international experts (UK, Netherlands and Australia) in mental health. The Research Electronic Data Capture (REDCap), a secure, web-based software platform designed to facilitate data capture for research studies, was used (Harris et al., 2009; Harris et al., 2019)

5.2.3 Study Population and Participants

A panel of both local and international experts, forming part of the interprofessional team who worked in mental health, were invited to participate. Potential participants were considered experts if they had five or more years of clinical experience or had researched

or published in mental health. Psychiatrists, psychologists, mental health nurses, occupational therapists, social workers, exercise physiologists, biokineticists, dieticians and physiotherapists were invited to participate. Fourteen participants completed round one of the study, nine participants completed round two of the study and 12 completed round three of the study. In round one, 10 of the 14 participants were South African, while in round 3, eight of the 12 participants were South African.

5.2.4 Procedure

Recruitment began after ethical clearance to conduct this Delphi study was obtained from the University of Witwatersrand, HREC (Medical). The ethics clearance number is M231008 **(Appendix E)**.

A pilot study was conducted to ensure the face validity of round one of the Delphi surveys. The participants were invited as they were experts in mental health and/or familiar with the research methodology used. Two academics and one clinician were asked to participate in the pilot study. This included completing round one of the Delphi study. Participants provided feedback on the ease of use, wording and suggestions for change. Minor grammatical or spelling errors were identified and corrected before distributing the survey to potential participants.

An initial invitation was sent out to potential participants who had been identified as authors and experts in mental health and/or lifestyle interventions, through a search of published articles on key databases. The corresponding authors of the published manuscripts were contacted via email and invited to participate in the study (**Appendix F**). A total of 27 invitations were sent to international experts. The invitation was sent out through the Research Electronic Database (REDCap) software programme with a link to the survey so that participants could complete the survey (**Appendix F** and **Appendix G**). Completion of the survey implied consent to participate. One participant responded that they did not wish to participate and asked to be removed from the mailing list.

As the initial response rate was low (four surveys completed in round one), round one of the Delphi was extended by three weeks as new participants were invited to serve on the panel. To increase the number of participants in round one, snowball sampling was used

as clinicians and academics known to work in mental health were asked to share the information about the study with colleagues.

5.2.5 Data management

Data was collected and managed using the Research Electronic Database (REDCap) version 14.8.3, hosted by the University of Witwatersrand. REDCap is a secure, web-based software platform designed to facilitate data capture for research studies (Harris et al., 2009; Harris et al., 2019). Exported data for analysis was stored in a secure, password-protected hard drive and backed up to a password-protected cloud system

5.2.6 Data analysis

Data was analysed using thematic analysis in round one and frequencies and percentages in the subsequent rounds. The demographic information of the participants was also analysed using descriptive statistics. Data was exported from REDCap to Excel spreadsheets for analysis. Frequencies and percentages were calculated from the Excel spreadsheets.

5.3 DELPHI ROUND ONE

In the first Delphi round, participants were required to indicate their agreement or disagreement with the use of lifestyle interventions, the healthcare professional that should provide the lifestyle interventions and their recommendations about physical activity and exercise, nutrition and weight management, sleep and stress management for patients with comorbid mental (depression and anxiety) and physical health conditions (cardiovascular and respiratory diseases, obesity, diabetes mellitus, metabolic syndrome and musculoskeletal pain). (**Appendix G** shows the first round of questions in the Delphi).

The survey consisted of a demographic section, as well as closed- and open-ended questions. The closed-ended questions aimed to determine the use of lifestyle interventions in the management of patients with mental disorders and comorbidities, as well as to determine if, and what, lifestyle interventions physiotherapists used **(Appendix G).**

Twenty-one participants responded by completing the survey link. A total of seven records were excluded from the analysis of round one. Six records were excluded as the surveys were not completed (only the demographic section or parts of the demographic section were completed). One other participant's response was excluded as they did not meet the inclusion criteria. This participant only had one year of working experience and, as such, did not meet the criteria to be included as an expert. A total of 14 records (63%) were included for analysis in round one. Figure 5.2 is a graphical representation of the collection process for round one of the Delphi.

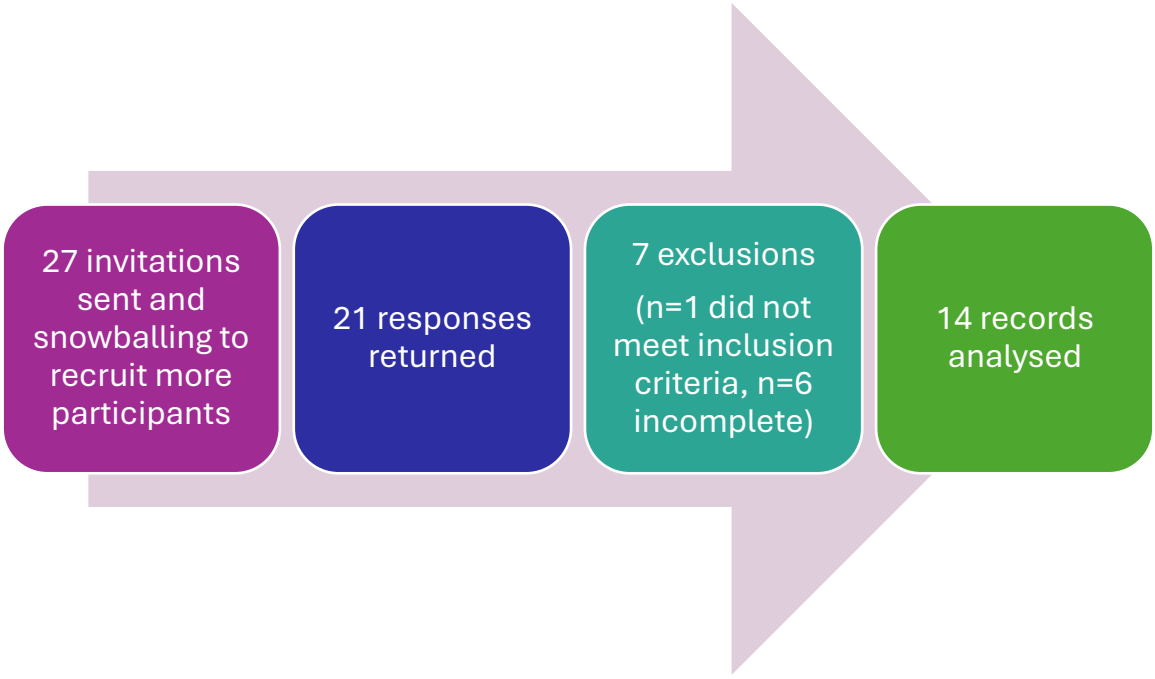


Figure 5.2 Procedure round one

Most of the participants were female, psychiatrists and from South Africa. No dieticians, biokineticists or exercise physiologists, psychologists or social workers participated in this survey despite numerous attempts to recruit them. The demographic characteristics of the participants who completed the survey are described in Table 5.1.

Table 5.1: Demographic information of participants in round one (n=14)

Variable		n (%)
Gender: n (%)	Female:	10 (71%)
	Male:	4 (29%)
	Other:	0
Profession	Mental health nurse:	3 (21%)
	Occupational therapist	1 (7%)
	Physiotherapist	4 (29%)
	Psychiatrist	6 (43%)
Work environment	Academic only	1 (7%)
	Academic and researcher	1 (7%)
	Academic, researcher and clinician	3 (21%)
	Academic and clinician	1 (21%)
	Clinician	8 (57%)
Years experience (years)	0-4	1 (7%)*
	5-9	0
	10-14	3 (21%)
	15-19	3 (21%)
	20-24	2 (14%)
	25-30	4 (29%)
	31+	1 (7%)
Country	United Kingdom	2 (14%)
	Australia	1 (7%)
	Netherlands	1 (7%)
	South Africa	10 (71%)

*Participant included as worked as an academic, clinician and had published nine articles relating to SMI or multimorbidity.

In round one, all participants (100%) agreed that lifestyle interventions should be used to manage patients with comorbid mental and physical health disorders. These lifestyle interventions included stress management (100%), nutrition (86%), sleep (86%), movement and physical activity (78%), and substance cessation (78%). All participants agreed that any member of the IPT could deliver lifestyle interventions, with 64% of the

participants reporting that physiotherapists delivered lifestyle interventions in their setting. The lifestyle interventions used by physiotherapists included movement and physical activity (58%), stress management (50%), sleep hygiene (21%), and nutrition (7%). There were no physiotherapists who delivered interventions for substance cessation.

5.3.1.1 Role of each member of the IPT

Each participant was asked what the role of each healthcare professional was in the management of patients with comorbid mental and physical health disorders regarding lifestyle interventions. All participants agreed that all members of the IPT play a role in screening and providing education about general lifestyle factors and behaviours, supporting members of the IPT and referral to appropriate resources and healthcare professionals. In summary, the participants agreed on the following roles:

Dietician – nutrition and lifestyle guidance, healthy eating plans in the prevention and management of metabolic syndromes.

Exercise physiologist – involved in exercise interventions, including dosage and type of exercise recommendation for individuals and groups.

Mental health nurse – general health screening and baseline checkups, assist with the coordination of LI.

Physiotherapists – Lifestyle guidance, education and exercise, health promotion.

Psychiatrists – leading patient care, medication management, coordination of care and referral to appropriate healthcare professional for specific lifestyle interventions.

Psychologists - provide counselling and assist in psychotherapy, CBT.

Occupational therapists – assisting with daily activities and integrating routines, reinforcing motivation and sustaining the success of interventions, functional screening of patients.

Themes developed from open-ended questions

The answers from the open-ended questions provided by the participants were analysed; shared or repetitive ideas were grouped into statements, which were presented in round two. For nutrition, sleep, and stress management, general advice was provided by some participants in these sections. These pieces of advice were added to the MCQs to determine consensus for the advice provided.

Common themes which emerged from round one of the Delphi included:

1. Information and treatment should be provided within the scope of practice of the healthcare professional.
2. Refer to a qualified and trained healthcare professional for more in-depth management.
3. Patient preference and context should be considered when delivering lifestyle interventions.
4. Combined lifestyle interventions can be used to manage multiple chronic conditions.

5.4 Delphi Round Two

Fifty items were included in round two of the Delphi study **(Appendix H).** Participants were asked to choose between 'yes', 'no', or 'maybe' to indicate their agreement with a statement. Participants were also allowed to comment after each statement, allowing them to provide a rationale or alternative way of wording the statement if they wished to. A general section was added to round two, which included general recommendations, as several statements in round one were considered 'universal' across all lifestyle interventions. In round one of the Delphi study, participants provided specific recommendations for what should be included in sleep hygiene programmes, stress management programmes and healthy eating. These included ideas such as 'routine bedtime', 'limited use of device', 'journaling', etc. Three MCQs were included in round two of the Delphi to determine what the components of the sleep hygiene or modalities of the stress programmes should include.

All participants from round one were sent round two of the Delphi study to complete. Despite numerous emails and reminders, only nine participants (64%) who completed round one completed the survey in round two. The survey in round two did not include a demographic section and no identifying data was collected as this was collected in round one with the assumption that all participants would complete all rounds of the Delphi study.

In this round, 25/41 (61%) statements received more than 80% consensus and were accepted as statements to be included in the recommendations. The remaining 16 statements (39%) moved into round 3. Table 5.2 indicates the percentage consensus reached for each question following round two. (Appendix I indicates the corresponding statements for the item numbers).

Table 5.2 Percentage consensus following round two (n=9)

General Recommendations									
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
100%	89%	67%	89%	100%	100%	100%	89%	100%	100%

Sleep					
Q11	Q12	Q13	Q15	Q16	Q17
100%	77%	89%	89%	44%	66%

Physical Activity and Exercise												
Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
89%	100%	66%	66%	89%	100%	66%	44%	33%	77%	67%	89%	22%

Nutrition					
Q31	Q32	Q33	Q34	Q35	Q37
100%	100%	89%	33%	100%	100%

Stress					
Q38	Q39	Q40	Q41	Q43	Q44
78%	100%	100%	100%	44%	44%

*Note *Q14, Q36 and Q42 are omitted from table as they are MCQs about content (see table 5.3)

Participants were able to comment after each question, to rephrase or add additional comments to the statement. While 61% of the statements in round two received more than 80% consensus, comments about the statements provided by participants were not

always in agreement. Where discrepancies were apparent, these were also included in round three of the Delphi study.

The following statement (item 30) was excluded after round two as it received less than 25% consensus: "*Passive exercises should be done"*

Three MCQs were presented in round two, relating to advice or types of activities included in a specific statement. The MCQs which were included were about specific recommendations for nutrition, stress management modalities and sleep hygiene. The frequencies and percentages of the responses to each MCQ are shown in Table 5.3.

Table 5.3 Responses to multiple-choice questions in round two

Question	Choices	Frequencies and percentages
Sleep*	• Relaxation activities, such as yoga self-awareness.	0%
	• Consistent sleep routine.	67%
	• Adequate sun exposure throughout the day.	0%
	• Limited device use and screen time just before bed	33%
Nutrition**	• Eat a variety of foods, proteins and wholegrains	89%
	• Ensure adequate hydration	78%
	• Limit processed food, sugar and alcohol	89%
Stress management**	• Mindfulness	89%
	• Cognitive behavioural therapy	67%
	• Dialectical behavioural therapy	33%
	• Yoga	44%
	• Breathing exercise/breathwork	67%
	• Journalling	56%

*Participants were only able to choose one answer
** Participants were able to choose more than one answer

Participants agreed that advice to eat a variety of foods, including proteins, ensure adequate hydration and limit processed food should be recommended to patients with comorbid mental and physical health disorders. The most frequently chosen options for

stress management were mindfulness and CBT, with yoga and Dialectal Behavioural Therapy (DBT) being the least chosen options. The most frequently chosen sleep hygiene choices were a consistent sleep routine and limiting device use before bedtime. Participants commented that they were unable to choose more than one option for sleep hygiene MCQs and commented in the available space that stress management modalities and sleep hygiene programmes should be tailored to the individual patients' needs and preferences, and as such, all the options provided should be included in a stress management or sleep hygiene programme.

5.5 Delphi Round Three

In the third and final round, only two choices for each item were presented – “yes” or “no” – to finalise consensus. Statements that did not receive 80% consensus in round two, as well as open-ended comments where variations or disagreements in responses appeared, were included in this round. The survey for round three was sent to all participants (n=14) who completed round one of the Delphi study, regardless of whether they responded to round two or not. As such, the statements that had received 80% consensus in the previous rounds were presented at the beginning of round three, and participants were given a final opportunity to comment on the accepted statements.

Twelve participants completed round three of the survey. Demographic information collected in round three included the healthcare professional and the country where the panellists worked. Most of the panellists in round three were psychiatrists and physiotherapists (n=4, 33%), and physiotherapists (n=4, 33%). Five participants (67%) were South African, two (16%) were from the UK, one participant was from the Netherlands, and one participant was from Australia. Figures 5.3 and 5.4 indicate the demographic information of the panellists in round three of the Delphi study.

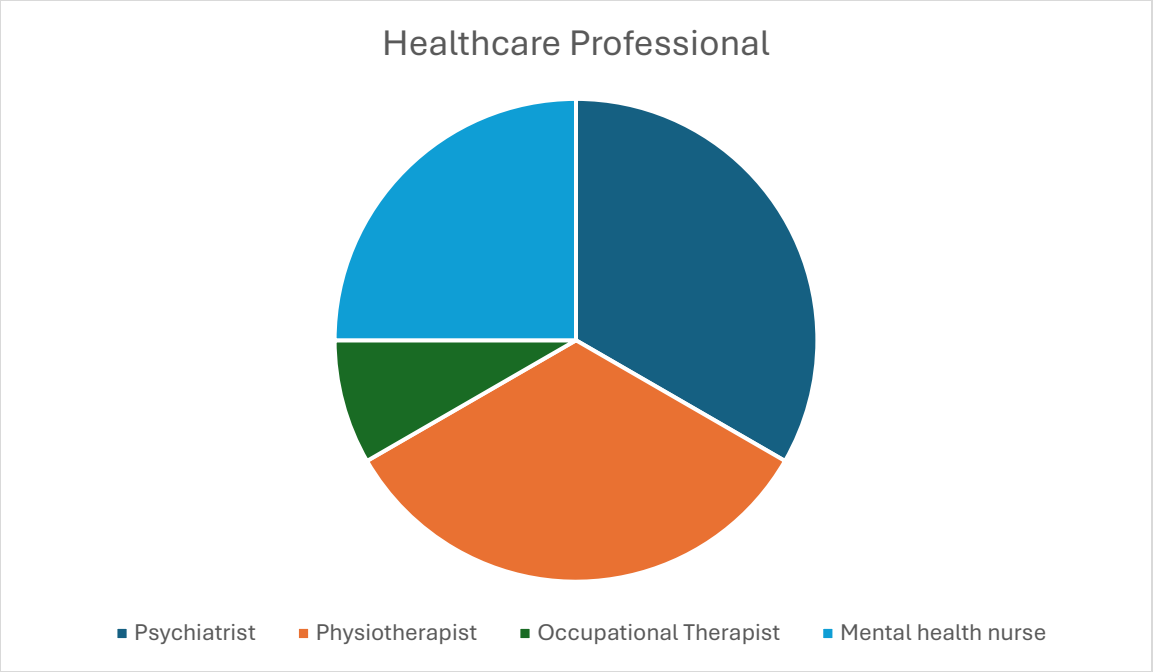


Figure 5.3 Healthcare professionals responding to round three

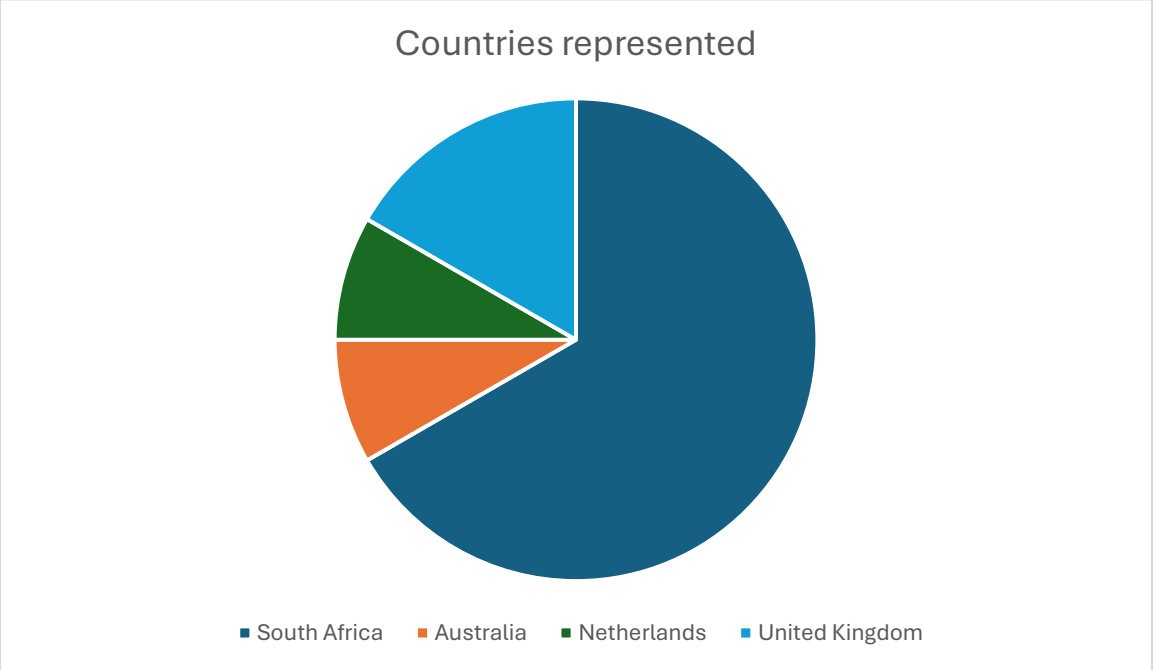


Figure 5.4 Countries represented in round three of the Delphi study

Of the 16 statements included in round three, all but one received over 80% consensus and were incorporated into the final accepted statements and recommendations.

Question nine *("Lifestyle physical activity programmes are more beneficial than structured exercise programmes in patients with comorbid mental and physical health"*) only received 75% consensus and, as such, was discarded as it did not meet the 80% agreed-upon rate. Table 5.4 shows the results from round three.

Table 5.4 Consensus rates following round three

General		Sleep					Exercise				Nutrition	Stress management	
Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	Q5(%)	Q6 (%)	Q7 (%)	Q8 (%)	Q9 (%)	Q10 (%)	Q11 (%)	Q12 (%)	Q13 (%)	Q14 (%)
83	83	100	100	92	92	100	100	75	83	100	92	100	92

Following round three of the Delphi study, the thirteen accepted statements (shown in Table 5.4) were added to the already accepted statements. A total of 32 statements were included in the final list at the end of round three.

The comments provided by participants about the accepted statements were general and did not affect the overall outcome of the statements presented, as they had already formed part of the previous statements. These included:

> *'It is important not to reinforce 'diet culture' with nutrition guidelines and equate being thin with being healthy"*
>
> *"Essentially, absolutely perfect. But I would like to see that the issue of the EXERCISE GAP be addressed. I have a slide that I use in my lectures on the subject, should you be interested."*
>
> *"In terms of physical activity and exercise delivery, I wonder if a qualification in an exercise-related field (e.g. physiotherapy) should also be required for overseeing exercise delivery. Input from a dietician or similar may also be important for nutritional advice."*

One participant had commented: "*The only thing that I might want to change is the "nutrition and weight management". To my opinion only the relevant items should be addressed with a "thorough assessment".* This comment, initially presented in round two, received 80% consensus in the second round and as such, was left unchanged in

the final recommendations. The participant provided this comment in round three after noting the wording of the statement in the section related previously accepted statements.

For round three of the Delphi study **(Appendix J),** a section on the role of the occupational therapist and biokineticist was included, as these had been accidentally omitted in the round two survey (see role of HCP previously). Participants were also asked to provide any additional comments on the role of each healthcare professional that had been presented at the beginning of round three to ensure that the role of each healthcare professional was captured. Further comments included the unequal access to all healthcare professionals in peri-urban and rural areas, the inclusion of the family or caregiver in the management, and the lead coordinator should be the person who sees the patient most.

Fifty per cent (6/12) of participants commented on the role of the biokineticist. Participants from the UK and the Netherlands indicated that they did not know what a biokineticist was or did not have such a healthcare professional in their context. One participant indicated that a parallel was drawn between an exercise physiologist and a biokineticist.

The final accepted statements from the Delphi rounds are presented in Tables 5.5 to 5.9.

Table 5.5 Section A: General recommendations

1. Lifestyle interventions should be included as a preventative strategy in patients with comorbid mental and physical health disorders.
2. Lifestyle interventions should be offered as 'first-line' management in patients with comorbid mental and physical health disorders.
3. Lifestyle interventions are used as an adjunctive therapy in patients with comorbid mental and physical health disorders.
4. An assessment of the patient's lifestyle factors (eating habits, physical activity and exercise, sleeping patterns) to identify relevant factors should be included in the management plan.
5. Delivery of lifestyle interventions to patients with comorbid mental and physical health disorders should be an interprofessional approach, within the scope of practice of the healthcare professional.
6. A case manager should coordinate the delivery of lifestyle interventions to prevent overlapping or duplication of services.
7. All members of the interprofessional team should be able to provide basic health promotion strategies, including lifestyle advice and education about lifestyle factors (physical activity and exercise, nutrition and weight management, stress management interventions, and sleep hygiene).
8. Referral to a specific healthcare professional with more extensive knowledge and training in a particular lifestyle intervention should be considered for more in-depth management.
9. Lifestyle interventions should be patient-centred and align with the patient's goals and needs, and consideration should be given to the specific context of the patient and the available resources within that context.
10. Lifestyle interventions are more effective when used in combination to address specific health and lifestyle factors identified by patients (e.g. physical activity, psychological strategies and diet in the management of obesity and depression).

Table 5.6 Section B: Sleep Recommendations

1. Physical factors affecting sleep should be evaluated and managed as appropriate.
2. Sleep should be monitored and interventions to help track sleep should be made available to patients if a sleep problem is suspected.
3. Screening for quality and quantity of sleep, or a sleep disorder, can be done by any member of the interprofessional team, but sleep disorders can only be diagnosed by a trained healthcare professional.
4. If a sleep disorder is diagnosed, a sleep hygiene programme is important in the management of patients with comorbid mental and physical health disorders.
5. If patients are still waking feeling tired, they should be referred to appropriate resources (including online resources) and healthcare professionals for management.
6. Medication can be used to assist sleep, but only if the sleep disturbance is severe.
7. Medication should be used judiciously, avoiding substances which may be addictive and should only be used in the short term and only prescribed by a trained healthcare provider (physician or psychiatrist).

Table 5.7 Section C: Physical activity and exercise recommendations

1. A healthcare professional with knowledge of both the physical and mental health of the patient should have a role in overseeing the exercise interventions.
2. A lifestyle physical activity programme aims to decrease sedentary time and increase movement.
3. Regular, frequent and consistent exercise is more important than exercise intensity/exertion.
4. A combination of structured and lifestyle physical activity programmes are better suited to patients with comorbid mental and physical health disorders.
5. Exercise should be a tailored approach depending on patient preferences, lifestyle and current health status.
6. Exercise programmes should be supervised in patients with comorbid mental and physical health disorders.
7. Exercise programmes should include a variety of exercise types, in a format (group or individual) preferred by the patient.

Table 5.8 Section D: Nutrition and weight management recommendations

1. A thorough assessment should include the patient's knowledge of nutrition and current eating patterns and behaviours, sleeping patterns, physical activity levels and emotional regulation as these impact eating patterns and behaviours.
2. Healthy eating and weight management should be done in conjunction with physical activity and exercise, as well as stress management interventions.
3. All members of the interprofessional team can provide basic information related to diet and healthy eating but should refer to a trained healthcare professional should a more in-depth assessment and intervention be needed.

Table 5.9 Section E: Stress management recommendations

1. Stress management should be targeted to the specific goals identified by the patient.
2. Stress management modalities are used to support the mental and physical health of the patient within a biopsychosocial framework.
3. Education and information advice about stress management modalities should be provided to all patients with comorbid mental and physical health disorders.
4. Stress management interventions should be targeted to the specific needs of the patients and should be delivered within a biopsychosocial framework.
5. Cognitive behavioural therapy (CBT) is an important stress management modality and can be delivered by any member of the interprofessional team with the appropriate training and expertise. It can be used in conjunction with other lifestyle interventions to affect behavioural change.

5.6 DISCUSSION

This phase aimed to develop consensus for recommendations from an international panel of experts about recommendations for the management of patients with comorbid mental (depression and anxiety) and physical health disorders (cardiovascular disease, respiratory disorders, obesity, diabetes, metabolic syndrome and chronic musculoskeletal pain). The role of members of the interprofessional team was also explored.

The recommendations were categorised into sleep, physical activity and exercise, nutrition and weight management, and stress management are discussed below under each of these subheadings. Recommendations that were repeated across all lifestyle interventions were grouped under the subheading: General recommendations.

5.6.1 Recommendations

5.6.1.1 General recommendations

Participants in this study indicated that lifestyle interventions should be used as ‘first-line’, ‘preventative’ and ‘adjunctive’ interventions. Factors such as the severity of the illness, the primary aim of the intervention, and the timing of the intervention would determine whether lifestyle interventions could be ‘first-line’, ‘preventative’ or ‘adjunctive’ treatments. This is supported by Maurus et al. (2024), Malhi et al. (2021) and WHO (2018), who also support the use of lifestyle interventions across various levels of care. Malhi et al. (2021) state that lifestyle interventions can be used as preventative strategies when patients are well or between episodes (Malhi et al., 2021). The WHO guidelines on the management of physical health conditions in adults with SMI recommend lifestyle interventions as first-line interventions to prevent cardiovascular diseases (Maurus et al., 2024; WHO, 2018).

Participants in this study agreed that interprofessional management is important in the management of patients with mental disorders. They agreed that while all healthcare professionals can provide basic health promotion and advice, referral to a suitably qualified member of the IPT was necessary if more in-depth management related to a specific lifestyle intervention (e.g. exercise or nutrition) is required. Collaborative care is especially useful in the management of patients with multimorbidity where conditions are multi-factorial and are influenced by biological, social and environmental factors (Ee et

al., 2020). To coordinate this delivery of care, participants also suggested a ‘case manager’ to oversee the delivery of lifestyle interventions. In IPTs, case managers help coordinate care, make sure there is consistency in communication, as well as ensure comprehensive and person-centred care, which is collaborative (Campagna and Lee-Riley, 2025; McCullough, 2009). Similarly, participants in this study felt that having a ‘case manager’ was important to ensure that there was no duplication of services provided, and that the scope of practice was adhered to.

Combining lifestyle interventions was echoed by the participants who agreed that lifestyle interventions should be delivered according to the patient's preferences and needs, and in various combinations to ensure the best outcomes. Lifestyle interventions, when used in combination with each other, seem to be superior to using single lifestyle interventions (Maurus et al., 2024; Croatto et al., 2023; Malhi et al., 2021). This was further supported by the findings of the systematic review and meta-analysis conducted in the first phase of this study, which showed that combining psychological interventions with physical activity and collaborative care programmes were effective in the management of patients with mental disorders and comorbidities. (See **Chapter 4: Systematic review)**

5.6.1.2 Sleep

Sleep hygiene programmes consist of environmental and behavioural factors which can be changed to improve sleep (De Pasquale et al., 2024; Baranwal et al., 2023). The recommendations for components of a sleep hygiene practice recommended by the participants in this study were similar to findings by Irish et al. (2015). According to Irish et al. (2015), exercising regularly, avoiding high levels of caffeine, maintaining a consistent sleep routine and schedule, and ensuring the environment is cool and quiet are important factors to ensure a good night’s sleep. According to Maurus et al. (2024), however, evidence related to the effectiveness of sleep interventions in patients with mental disorders is limited.

Malhi et al. (2021) noted that sleep hygiene may not be sufficient if sleep difficulties are severe. Participants in this Delphi study commented on the use of medication to assist with sleep disturbances, but only if sleep is severely disrupted. Forty-one per cent of the participants in this study were psychiatrists and, as such, can prescribe medications.

Psychiatrists can therefore provide recommendations for the use of pharmacological interventions to manage sleep. Forty-nine per cent of the participants cannot prescribe medication and would have to refer to psychiatrists or other medical professionals who can prescribe.

5.6.1.3 Physical activity and exercise

Most of the information provided by the expert panel in this study was about exercise and physical activity. This may be because exercise is the most researched lifestyle intervention in mental health and depression (Maurus et al., 2024; Croatto et al., 2023; Malhi et al., 2021). The use of physical activity and exercise in the management of chronic illnesses, such as cardiometabolic disorders, is also well known and understood (Liao, 2024; Lobelo et al., 2018; Allison, 2017; Bassuk and Manson, 2014). Physical activity and exercise are associated with improved quality of life in patients with common mental disorders, SMI and chronic illnesses (Malhi et al., 2021; Ee et al., 2020).

The WHO recommends 150 minutes of moderate to vigorous intensity exercise a week, or 75 minutes of vigorous intensity, to maintain health benefits (Farris and Abrantes, 2020). Structured and supervised aerobic exercise, three times a week, at moderate to vigorous intensity in 30 to 45 minute sessions, was the best prescription for mental health benefits; however, health benefits can be obtained at low levels of exercise, as well (Farris and Abrantes, 2020; Teychenne et al., 2020; Morres et al., 2019). Patients with mental disorders often lead a sedentary lifestyle and may lack the motivation to exercise (Malhi et al., 2021; Teychenne et al., 2020), which may make adhering to WHO exercise guidelines difficult.

Recommendations from this study for physical activity and exercise were also in line with the Royal Australian and New Zealand College of Psychiatrists (RANZAC) guidelines developed by Malhi et al. (2021) for the management of mood disorders (depression and bipolar disorders). Participants in this Delphi study agreed that patient preferences and abilities are important factors to consider when prescribing exercise and physical activity, to reduce sedentary time with a focus on consistent, regular physical activity. This is similar to Maurus et al. (2024), Croatto et al. (2023) and Malhi et al. (2021), however, Morgan et al. (2013) stated that exercise should at least meet the minimum physical

activity guidelines to maintain health. Patients with comorbid mental and physical health disorders may not always be able to attain these levels, and as such, a varied approach is needed. Providing exercise according to patient preferences and incorporating physical activity and exercise into routine care ensures that exercise implementation is more effective (Austin et al., 2025; Rosenbaum et al., 2016).

Participants in this study also agreed that exercise programmes should be supervised and include various types and formats, and that patient preferences should be considered. Stanton (2018) reports that supervised exercise, by a qualified healthcare professional, in a supportive environment, can lead to improved outcomes and adherence. Supervised exercise programmes also improve adherence to an exercise programme and ensure safety when exercising, which is particularly important in patients with more serious illnesses who may be at a higher risk of adverse events (Ashdown-Franks et al., 2021).

5.6.1.4 Nutrition and weight management

Three recommendations were developed for nutrition and weight management, with participants specifying that referral to the appropriate healthcare professional is important for healthy eating plans and weight management. It is important to note that dieticians, who are the experts in nutrition and weight management, were not represented in the panel. Dietary interventions may improve mood in MDD; however, there is a lack of research specific to diet and improving mood and therefore, more research is needed (Maurus et al., 2024). The participants in this study recommended that a ‘thorough’ assessment of factors relating to nutrition knowledge and other factors be conducted. Research suggests that patient knowledge is important as it may lead to improved eating behaviours (Bany-yasin et al., 2023; Khalidi et al., 2022). Knowledge of the patient's emotional regulation strategies, level of physical activity, eating and sleep patterns will assist with approaches for effective management, which may include a variety of lifestyle interventions in combination, depending on the needs of the patient (Carraça et al., 2024; Fernandes et al., 2023; Papatriantafyllou et al., 2022; Prefit and Szentagotai-Tătar, 2018).

Obesity is a common side effect of pharmacological interventions and needs to be addressed because of its effect on overall health and quality of life. The relationship

between obesity and mental disorders is multifaceted and requires a biopsychosocial approach to management. Maurus et al. (2024) recommended that:

> *"Lifestyle interventions that combine behaviour change techniques, dietary modifications, and physical activity should be offered to individuals with SMI for reducing weight and other metabolic components, as well as depressive and anxiety symptoms" (page 5)*

This recommendation is further supported by Hassan et al. (2016), who investigated lifestyle interventions in the management of patients with severe obesity. Participants in our Delphi study also agreed that combined lifestyle interventions should be considered for patients with comorbid mental and physical health disorders but stressed the importance of referral to a suitably trained healthcare professional.

5.6.1.5 Stress management

Stress management interventions include a variety of interventions and are more recently being included as part of lifestyle interventions (Maurus et al., 2024). These interventions form part of the holistic management of patients with mental disorders and comorbidities and include, among others, CBT, relaxation therapies and mindfulness (Tatta et al., 2022b; Klainin-Yobas et al., 2016). Cognitive behavioural therapy appears to be the most researched stress management modality and is effective in the management of both mental and physical health disorders (Fordham et al., 2021). Mindfulness and CBT were the most recommended modalities by the participants in this study, however, CBT can only be used by healthcare professionals who are adequately trained, and as such, this prompted the recommendation to refer to a healthcare professional with knowledge and expertise in this modality.

5.6.2 Clinical practice guidelines and recommendations

The CPGs and recommendations by Maurus et al. (2024) and Malhi et al. (2021) were informed by high-level evidence from systematic reviews and meta-analyses. Where such evidence was available, it was used to develop recommendations for lifestyle interventions in individuals with SMI. Maurus et al. (2024) focused on conditions including schizophrenia and other psychotic disorders, major depressive disorder, and bipolar

disorder. In contrast, Malhi et al. (2021) concentrated on developing CPGs specifically for the management of mood disorders.

Malhi et al. (2021) included a subsection on lifestyle interventions in the prevention and management of these mood disorders. While the findings from this Delphi study echo the findings from Malhi et al. (2021), the RANZAC guidelines are specific to the management of mood disorders only (Malhi et al., 2021). In contrast to the RANZAC guidelines, the American Psychological Association (APA) guidelines in 2019 (updated in 2024) do not make provision for comorbidities and only consider the mental disorder. The APA guidelines, however, do refer to exercise in depression, where pharmacotherapy or psychotherapy is unsuccessful. The expert panel of the APA also refers to the use of CBT when considering combination treatments with antidepressants (APA, 2019).

According to Croatta et al. (2023), psychosocial interventions and CBT had small to moderate effect sizes on improving diabetes; exercise had a slightly larger moderate effect size in improving cardiorespiratory fitness and therefore improving physical health and quality of life when compared to treatment as usual or waitlisted groups. Croatto et al. (2023) acknowledge that the reviews were very heterogeneous and that conclusions related to pharmacological and non-pharmacological interventions could not be directly made.

5.7 LIMITATIONS

The main limitation of this phase of the study was the limited number of participants who initially responded to the survey. Dieticians and psychologists were invited to participate, but none accepted the invitation. As such, their expert opinion on nutrition and stress management, particularly, was not included in the study.

5.8 CONCLUSION

This Delphi study successfully developed expert consensus on recommendations for lifestyle intervention for managing patients with comorbid mental and physical health disorders. Following three rounds of surveys, 32 statements were agreed upon by a multidisciplinary panel. These recommendations emphasise the importance of interprofessional collaboration, patient-centred care, and tailoring interventions to individual needs and contexts. The next chapter will report on the FGDs, which were conducted to contextualise these recommendations to the South African context, as well as to physiotherapists specifically.

CHAPTER 6

PHASE 3: FOCUS GROUPS

6.1 INTRODUCTION

This chapter describes the focus group discussions held with registered South African physiotherapists working in mental health. The focus group discussions (FGDs) aimed to determine the feasibility and acceptability of the consensus statements for South African physiotherapists. In this phase, the findings from the systematic review (phase one) and the Delphi consensus (phase two) were presented to the participants and recommendations relevant to the local context were formulated.

6.2 METHODOLOGY

6.2.1 Study design

This study employed a qualitative design, using FGDs. Focus groups are a widely used research technique to discuss a topic (Smith, 2017). Focus group discussions usually consist of four to 12 participants guided by a facilitator (Croucher, 2024; Smith, 2017). Group interactions and dynamics help generate in-depth perspectives and insights on a particular topic, which may not necessarily be gathered from individual interviews (Croucher, 2024). Focus groups are usually more cost-effective and can be conducted over a shorter time than individual interviews (Croucher, 2024).

For this study, FGDs were chosen over methods such as individual interviews, the Nominal Group Technique (NGT) or the Delphi method because they foster rich, interactive conversation. This approach was particularly valuable for gaining a deeper understanding of participants' perceptions, experiences, and the contextual factors influencing the feasibility of proposed recommendations in the South African context. The open format encouraged participants to share freely, leading to more nuanced and meaningful data, which may not have been obtained with either a NGT or another Delphi study.

6.2.2 Study Setting

The focus groups for this study took place online using the MS Teams platform. This was the preferred method to include participants from all over South Africa, allowing for diverse data collection from all geographical locations and health contexts.

6.2.3 Study population and participants

Mental health physiotherapy is a relatively new field of physiotherapy in South Africa, and as such, fewer physiotherapists are working in this field when compared to other, more established fields of physiotherapy. According to the Health Professions Council of South Africa (HPCSA), there were 8 783 registered physiotherapists in October 2024 (HPCSA, 2024). There are two physiotherapy societies in South Africa – the South African Society of Physiotherapy (SASP) and the Physiotherapy Association of South Africa (PASA). Membership in these societies is voluntary. The Mental Health Physiotherapy Group (MHPG) is a newly formed Special Interest Group (SIG) of the SASP, established in 2021. The members of the SIG are physiotherapists who have a special interest in mental health. There were 43 members of the MHPG registered in January 2025.

For these focus groups, qualified South African physiotherapists, registered with the HPCSA and with experience working in mental health, were invited to participate. Physiotherapists in both private and public health systems who worked in a variety of settings, from outpatient departments to mental health facilities, participated in this phase of the study.

6.2.4 Participant recruitment

Inclusion criteria for the focus groups required participants to be South African physiotherapists registered with the HPCSA and experienced in mental health. Eligible participants worked in both public and private healthcare settings, including outpatient departments and mental health facilities. Both purposive and snowball sampling were used to recruit participants to this study. Snowball sampling is when participants recruit future participants who may be their colleagues or associates (McLaughlin, 2023). Purposive sampling involves recruiting participants based on specific criteria relevant to the phenomenon being studied (Memon et al., 2025). Participants were recruited through

the two professional physiotherapy societies, and snowball sampling was used to try and increase the number of participants for the focus. The PASA did not respond to any requests to advertise the study to their members **(**Appendix K). The SASP shared the details of the study through bulk emails. A recruitment poster with brief study details (Appendix L) was also placed on the MHPG Facebook page and the Pain Management Physiotherapy Group (PMPG) Facebook page. These two SIGs were targeted because members have a special interest in mental health and chronic pain. Many patients with chronic pain have comorbid mental disorders, and as such, physiotherapists working in this field may have experience with mental disorders as well. Interested physiotherapists completed the form (Appendix M), providing their contact details and permission for the researcher to contact them, or they contacted the researcher directly via the email address provided on the poster. A participant information sheet (Appendix N) was then sent to the potential participants, who were also asked to share the details of the study with any physiotherapists in their networks who may also work in mental health and may also be interested in participating in the focus groups. A further attempt to recruit participants involved identifying physiotherapy practices that worked in mental health facilities, and invitations were sent via email or through telephone calls.

Once the physiotherapists had read the participant information sheet and agreed to participate, dates and times of focus groups were established by polling the participants, and the meeting links and meeting information and consent forms were sent via email (Appendix O and Appendix P).

6.2.5 Data collection tools and measurement

A demographic questionnaire (Appendix Q) was sent to all participants before the scheduled focus group to help establish the profile of physiotherapists participating in the study. The survey collected information on participants' age, education level, province of employment, overall work experience, and years of experience in the mental health. A semi-structured focus group script (Appendix R) was developed to guide the focus groups and assist with moderation. The focus group questions were designed to gather the perceptions of the participants and then to determine the opinions on the provided consensus statements. The main questions were:

Question 1

What are your thoughts on integrating lifestyle interventions into routine physiotherapy sessions for patients with comorbid mental and physical health disorders?

Question 2

How do you feel about the recommendations developed from the Delphi?

Prompts: Is there anything you would change (further prompt: add or remove).

Question 3

What suggestions do you have for improving the feasibility of these interventions in the South African context?

Prompts: can you explain, can you elaborate. Resources – human, financial, education, support.

6.2.6 Procedure

Recruitment began after ethical clearance to conduct these focus groups was obtained from the University of Witwatersrand, Human Research Ethics Committee (Medical). The ethics clearance number is M240805 **(Appendix S).**

6.2.6.1 Pilot study

A pilot focus group was done to determine the process and procedures to follow for the main study, determine the length of the focus group and to practice and improve probing skills for focus groups. For the pilot study, three academics and one clinician who had experience in mental health research were invited to participate. Once they agreed to participate, the participant information sheet, consent forms to participate and consent forms for audio and visual recording were sent to them. The completed forms were returned to the researcher before the focus group. A date and time for the focus groups were set, and a meeting link was sent to the participants.

The FGD commenced with participant introductions and an explanation of the session's proceedings. The findings from the systematic review (phase one) and the Delphi study (phase two) were explained to the participants, and participants had a chance to ask questions. The statements from phase two were shared on the screen, and time was provided for the participants to review each section before the discussion took place, which was moderated by the researcher. The FGD was transcribed using the MS Teams transcription function.

Once the focus group was completed, a form was emailed to each participant requesting feedback on the processes and procedures of the focus groups.

6.2.6.1.1 Findings from the pilot study

Positive feedback was received. Participants suggested that the consensus statements be shared with participants before the FGDs took place to allow the participants time to review and contemplate the statements before the focus group. Also, it was suggested that the facilitator use more open-ended questions to guide the discussion and to obtain more detailed responses. No changes were required for the consent forms and the demographic questionnaires, as they were easy to use and complete.

The following changes were made following the pilot focus group:

1. The focus group script was adapted slightly to ensure that the same information was presented at each of the focus groups.
2. The prompts were refined so that they were more open-ended to elicit richer discussions.
3. This question was added: 'What are your thoughts on integrating lifestyle interventions into routine physiotherapy sessions for patients with comorbid mental and physical health disorders?'

   This was to include the perceptions of physiotherapists regarding the delivery of lifestyle interventions for patients with comorbid mental and physical health disorders.

4. The time for the focus group discussion was changed from one hour to 90 minutes.
5. Two documents were drawn up to provide information about the findings from the systematic review completed in phase one and provide the participants with a copy of the statements from the Delphi study (phase two). This was to ensure that the participants could read this information before the focus group. (**Appendix T** and **Appendix U**)

There were no major changes suggested, and the information obtained from the pilot focus group was insightful and relevant, and included in the analysis of the main study.

6.2.6.2 Main study

The focus groups were conducted in February and March 2025. A total of 11 physiotherapists participated in three focus group discussions (excluding the pilot focus group). Focus group one consisted of five participants, two participants were in focus group two and four participants were in the third and final focus group. A script **(Appendix R)** was followed to ensure each focus group received the same information. The main study followed the pilot study's procedure, incorporating its changes.

The information from phases one and two was emailed to the participants one week before the focus group was scheduled to give them enough time to review it. Participant information sheets, demographic questionnaires, and consent forms were also sent via email before the focus group and returned to the researcher before the FGD took place.

The recording and transcription commenced once the introductions had been done. Following the introduction of all the participants to each other, the purpose of the FGD was reiterated (to determine the feasibility and acceptability of the proposed statements for the management of patients with comorbid mental and physical health disorders and not just mental health). Next, the information from the systematic review (phase one) was briefly summarised again, and the participants had the opportunity to ask questions about the information which was shared via email before the FGDs. The participants were then asked about their perceptions of using lifestyle interventions in routine physiotherapy management (question one). Thereafter, the findings from the Delphi study (phase two)

were shared online, one section at a time, followed by discussion as per script. Participants were asked what they thought about each section of the recommendations under each specific heading: general, sleep, physical activity and exercise, nutrition and weight management, and stress management. Finally, the participants were asked if they found the recommendations feasible and acceptable.

Four focus group discussions (FGDs), including a pilot study, were conducted with a total of 15 participants. Following each FGD, transcripts were reviewed to ensure they accurately reflected the audio recordings and were transcribed verbatim. These transcripts were then uploaded to MAXQDA (version 20.4.1) for qualitative analysis. Based on the findings, suggested changes were made to the recommendations developed in phase two. To ensure trustworthiness, the updated recommendations and focus group transcripts were sent back to participants for member checking.

Following the focus groups, the consensus statements were revised and articulated as recommendations. The new recommendations were then sent to each participant, along with a copy of the transcript from their focus group for member checks and validation.

6.2.7 Data Management

The recording and verbatim transcriptions were downloaded from the MS Teams platform and stored in a secure, password-protected external hard drive and backed up to a password-protected cloud storage.

6.2.8 Data analysis

Data was analysed using content analysis. Deductive analysis was used in this study. Deductive analysis uses a predetermined structure based on previous findings (Bucher, 2021; Galanis, 2018). In these FGDs, a pre-existing framework of recommendations, developed in phase two, was presented to the participants **(Appendix U**).

The FGDs were transcribed verbatim. The transcripts were cleaned and anonymised. The names of the participants were removed from the transcripts, and participants were identified by initials on the transcripts. The transcripts were then uploaded to MAXQDA

(Version 20.4.1). The transcripts were then coded by the researcher and were checked by a second coder, with expertise in qualitative research methodologies and analysis.

6.2.8.1 Trustworthiness

Trustworthiness in qualitative research refers to the credibility, dependability and reliability of the findings (Shenton, 2004; Lincoln and Guba, 1985). It is the degree to which the findings represent the experiences and perspectives of the participants. Aspects of trustworthiness include credibility, transferability, dependability and confirmability (Megheirkouni and Moir, 2023; Plummer, 2017; Braun and Clarke, 2006).

To ensure the trustworthiness of the study, the following steps were taken:

Credibility

Credibility refers to the accuracy and truth of the findings (Ozertugrul, 2017; Lincoln and Guba, 1985). Techniques used to ensure credibility in this study included prolonged engagement and persistent observation, triangulation and member checks. The duration of the FGDs was extended to 90 minutes, following the pilot focus group (instead of one hour) to allow participants adequate time for discussion and engagement. Triangulation (the use of multiple data sources to ensure a comprehensive understanding of the topic) was done by checking research notes taken in a fieldwork journal and comparing them to verbatim transcripts (Meydan and Akkaş, 2024). The researcher coded the verbatim transcripts, which were checked by a second coder to ensure accuracy (Puppis, 2019). Member checks were done during the FGDs to ensure understanding of what each participant was saying, and once the FGDs had been completed, the verbatim transcripts and the final recommendations were sent to each participant to check that the records were accurate.

Dependability

Dependability is ensured by maintaining an ‘audit trail’ of the study (Carcary, 2020; Lincoln and Guba, 1985). Detailed records of all stages of the research were kept. The study was initially piloted, and changes made following the pilot study were documented (reported above *6.2.6.1: **Findings from pilot study**).* A focus group script was developed

and used in all FGDs to ensure that all participants across the four FGDs were given the same information and followed the same procedure. The findings from the systematic review and the recommendations from the Delphi study were also shared before the FGDs to ensure participants had a copy of all the information needed. Observers were also present in two of the FGDs. An observer was present in two of the FGDs to ensure dependability.

Confirmability

Confirmability is defined as the degree to which the findings of the study are determined by the respondents and not because of the researcher's bias (Johnson et al., 2020; Lincoln and Guba, 1985). In this study, confirmability was ensured by the researcher independently coding the verbatim transcripts. A second coder, familiar with qualitative research methodologies, then checked the coding.

Reflexivity is the influence that the researchers' ideas, beliefs and background may bias the findings of the study. The researcher's experience in mental health physiotherapy included working as a physiotherapist in a mental health facility for ten years and as a researcher with a special interest in the role of the physiotherapist in mental health. As a clinician, the researcher had first-hand knowledge of the challenges faced by physiotherapists in managing these complex patients, which included poor treatment outcomes as well as resource constraints, among others. This experience has shaped how the researcher thinks and feels about physiotherapy in mental health. There is very little guidance and research on the management of patients with mental disorders and comorbidities in the South African context, and the researcher was determined to find the evidence to support physiotherapeutic management.

As a result of the researcher's own potential biases, experiences and background, before each FGD, the researcher took time to prepare and reflect on any biases, to ensure that she did not bring them to the FGDs. The researcher allowed participants of the FGDs space to talk and tried to confirm their points during the FGDs to ensure that her understanding of what the participant said was what they meant and not her interpretation of that. This also assisted in ensuring impartiality in the qualitative analysis of the transcripts for each FGD.

To ensure that this impartiality was maintained in the analysis of the FGDs, the researcher familiarised herself with each transcript, reading and immersing herself in the information. Coding was done independently, and to ensure that bias was reduced, a second coder, familiar with qualitative analysis, checked all the transcripts and the coding of all FGDs. An observer was present in two FGDs to mitigate potential bias.

Transferability

Transferability refers to the extent to which the research findings apply to other contexts (Hamilton, 2020). In this study, four FGDs were held with a total of 15 participants. The participants were from different geographical locations and different healthcare settings, consulting a variety of patients with mental disorders. The demographic information of the participants was provided, and the findings were detailed by providing quotes from the participants to ensure the contextual meaning of the findings. Therefore, readers are equipped to assess whether the findings apply to their contexts and to determine the relevance of findings based on the contextual information given (Stalmeijer et al., 2024; Lincoln and Guba, 1985)

6.2.9 Ethical considerations

Ethical clearance to conduct these focus groups was obtained from the University of Witwatersrand, HREC (Medical). The ethics clearance number is M240805 **(**Appendix S). Participants were invited to participate in the study and could withdraw at any point. Information about the study was shared via the participant information sheet **(Appendix N),** and all participants had a chance to ask questions before signing the consent forms.

Due to the nature of focus group discussions, confidentiality and anonymity could not be guaranteed. However, in all transcribed FGDs, participants' names were not recorded; initials (in the transcripts) and participant numbers (in the thesis) were assigned to each participant. This assigned list of participant numbers was kept separate from the transcriptions.

All documents were kept on a password-protected laptop and backed up to a password-protected cloud. Hard copies of printed information for analysis were stored in a locked drawer in the researcher’s office. All data collected during the study will be securely

retained for two years if a scientific publication arises from the study, and six years if there is no publication. Thereafter, it will be destroyed accordingly.

6.3 RESULTS

6.3.1 Demographic Information

Fifteen participants agreed to take part in the focus group discussions (FGDs). Four FGDs took place between February and March 2025, with an average of 3.75 participants in each group. Figure 6.1 provides the information regarding dates and participant numbers in each focus group.

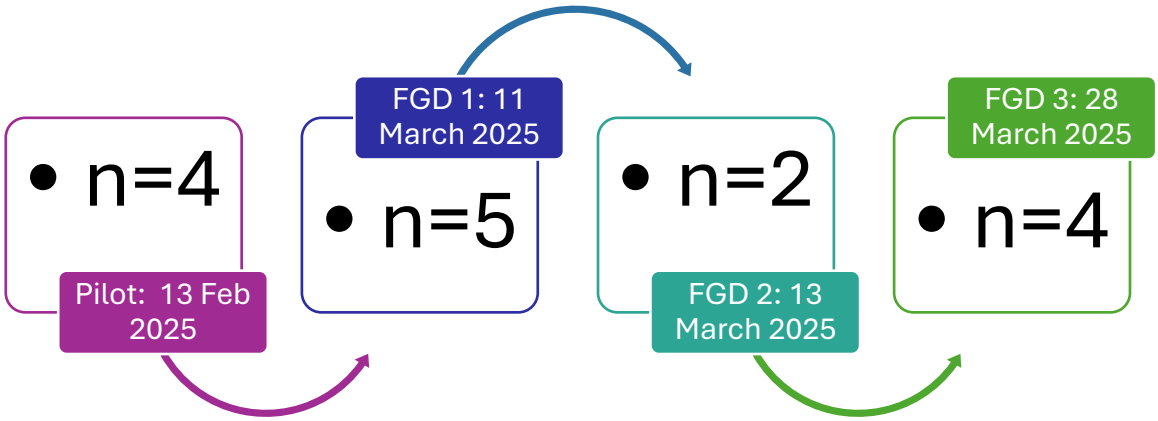


Figure 6.1 Focus group information

Most of the participants were female (87%), between 40 to 49 years old (47%), and working in the private healthcare sector (87%). Participants who worked in the private healthcare sector worked across various settings, including hospital and outpatient settings. Forty per cent of the participants worked in mental healthcare facilities, all of which were private facilities except one. Sixty per cent of the participants had less than

five years of experience working in mental health, while 36% had more than ten years' experience working in mental health.

Table 6.1 shows the demographic information of the participants.

Table 6.1 Demographic information of the participants (n=15)

Age							Gender		Highest Qualification			Years working in mental health					Province				*Working Environment					
25-29	30-34	35-39	40-44	45-49	50+	70+	M	F	B	M	PhD	0-4	5-9	10-14	20-25	25+	G	WC	KZN	L	Private	Public	H	MHF	OPD	**Other
1	2	1	6	3	1	1	2	13	4	7	4	9	1	3	2	0	9	4	1	1	9	2	3	6	4	5

*Most participants worked in more than one clinical setting and indicated all the clinical settings they worked in when indicating the working environment
** Other: 4 were academics. 1 = home visit
Key:
F = female; B = Bachelor's degree; M = Master's degree, PhD = Doctorate
G = Gauteng; WC = Western Cape; KZN = KwaZulu Natal; L = Limpopo
H = Hospital; MHF = Mental health facility; OPD = Outpatient department

6.3.2 Recommendations

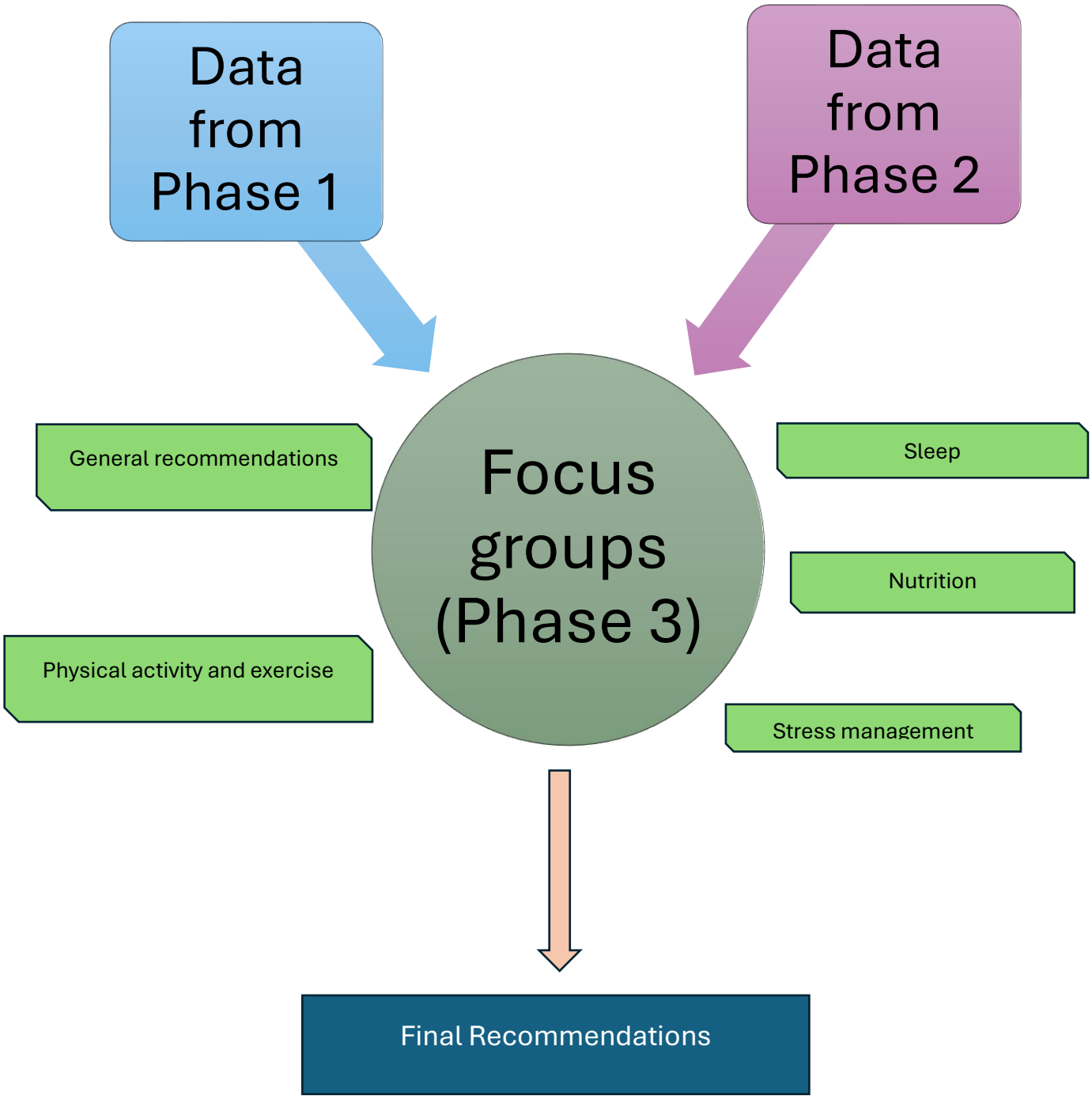


Figure 6.2 Diagrammatic representation of development of final recommendations

6.3.2.1 Feasibility and acceptability of recommendations

Most of the participants agreed that the recommendations were feasible and acceptable. This was eloquently expressed by participant 6, who said, *"I think they are very feasible. They are not too difficult; they are not over the top. I think it's very feasible, and we might even be able to use this to put some kind of training programme together, you know, for people that are interested."* Participant 5 additionally stated that *"... It is like it gives people who don't know what to do, some ideas as to what can be done, but also reigns in those far thinkers".* Participant 10 added that it is adaptable to the South African context, *"I don' think it is not adaptable to our environment at all",* while participant 13 concurred and also stated that this information must be included in the undergraduate curriculum to spread awareness and implementation: *"We need to apply more of this or implement more of this in the undergraduate curriculum so that people can become more aware, and I think the more awareness is out there, the more feasible the recommendations."*

Some concerns were raised that these recommendations may not be feasible within certain contexts or environments, like long-term public mental health facilities and outpatient practices where practitioners work in isolation. Participant 10 felt that if you do not work in a mental health facility, implementation may be difficult, "*but if you are not in a clinic and like a clinic that focuses on mental health to try and put all of this together within a team, it would be difficult".* Participant 12 felt that resources were core to implementation of these recommendations, *"And again, it goes back to resources and what's within our means as well as time. Because we have 500 patients, a lot of our programmes involve group therapy, and we try as much as possible to do one-on-ones with patients.".* Participants who worked in private short-term mental health care facilities were more positive about the recommendations

While the general response from participants was that the recommendations were feasible, some participants noted that changes to wording, ordering and number of recommendations may be needed to make them more acceptable. These suggestions are presented below in separate sections as they were discussed. Each subsection is presented (with a link to the recommendations developed in Delphi study). At the end of each subsection, the new acceptable recommendations are presented.

6.3.2.2 Section A: General recommendations

(see Section A: General recommendations from Delphi)

When considering the general recommendations above, participants stated all statements should be ordered in such a way that prioritised the needs of the patients and according to the care path the patient may have to follow (e.g. assessment, treatment, referral as needed). Participant 4 indicated that "*Somewhere along the line, it needs to… maybe somebody can fill in my blanks for me, so maybe, needs to state that these considerations are in order of importance or something like… hierarchical, or something like that, 'cause now it just seems like this person's going to go everywhere. Do you know what I'm saying? So, if you got up to number 4, you do the assessment. … Is it the mental health issues? Is it the, um, the lack of physical activity? Where to start? So does somewhere in your recommendations, need to state something, in you know, that it needs to be, it needs to be, I suppose, organises what I want to say in order of importance, or like you say, with patient-centred or person-centred interventions.",* while participant 11 stated that *"You know, I've read these so many times over the last two days. …I really, I do like them. I think my one question mark is whether they could be almost prioritised in terms of importance."*

One participant (participant 5) felt strongly that there should be a statement indicating that evidence-based practice should be followed, *"... but it feels to me like, that there's nothing mentioned about evidence, and the evidence base for lifestyle interventions. I mean, there are weird and wonderful lifestyle interventions, but they, which may work for certain patients, but there are definitely an evidence base for certain things, like mindfulness, certain things to change that, with a better evidence based, and I think we, the team, should at least think of that, that they follow the same and that they explain to, to their patients. I mean, so often if you work with people that are intellectually a bit higher, they just say, but what do you know, and you can say, well, this and this and this study's been done, and it shows… So, I think we somewhere evidence should come in. I thought it could be one point under Section A to say that lifestyle interventions should be, should follow the best available evidence."* This was supported by other participants in the FGDs.

Participant 8 indicated that the overall recommendations seem to echo the International Classification of Functioning (ICF) framework, and recommended that the statement should explicitly state that the ICF should be followed, commenting, *"I was just reading here in terms of the recommendations under section A. They almost talk about, you know, those aspects of the ICF [International Classification of Functioning, Disability and Health]. But they don't say ICF. How about we just put the ICF? That assessment of the patient should use the ICF. As you know, like number nine, the last intervention should be patient-centred, align with patient goals, consideration… and number ten as*

well. Why don't we? Because I see we have it. Why don't we just say let's use it as well in the assessment and management of the patient?"

Participants agreed that lifestyle interventions should be 'first line', 'preventative' and 'adjunctive', but did report that these appeared to be slightly repetitive and would also depend on the patients and when they present to physiotherapy. There was some debate among participants about what the correct word should be. Participant 10 stated, *"No, I think they need to be, they need to be separate for me because preventative is before we are seeing, you know major fallout. First line is that when we are starting to see symptoms and adjunctive is when we are actually having… I don't know how to explain it better…. I think they need to be written as three separate things.".* However, participant 15 stated that, "*I just think that they should be combined because it feels like we are repeating, but the adjunctive therapy and prevention therapy is the most crucial aspect. First line should come from the doctor first.".* Participant 5 seemed to provide a solution that appeased most of the participants, stating that *"My feeling is that I would leave out number three and say: lifestyle interventions should be offered as an essential part of the management of patients with comorbid mental and physical health disorders. It takes two and three, it doesn't say it's adjunctive, or it doesn't say it's first line, it just says it's an essential part of the management.""*

For statement five (interprofessional care), and for the assessment of lifestyle factors (statement four), Participant 12 indicated that "*I think each professional treating or managing the patient should have some impact on the lifestyle interventions because they would be able to maybe focus on a different avenue. For example, my focus is a lot on the physical activity, and you know, basically curbing your sedentary behaviour and things, whereas the dietician will provide more information on nutrition. But as a combined goal, we could have a programme where we could work together. For example, a walking, a walking club, or a walking activity for patients losing weight…What happens at our institution is every component, whether it's the OT or the physio or the dietician, makes sure they can do whatever they can do within their means for the patients."* Participant 1 also stated that "*members of the interprofessional team should be able to provide basic health promotion strategies. I think this one is similar to, number [inaudible], or I'm suggesting that you phrase it similarly, similar to number one. If you look at number one, you just mentioned prevention should be... That's a recommendation. Because, if we leave it this way, we are basically saying you must ensure that all the, the health, all the health professionals are trained in basic health promotion strategies and that's [not] the case.'*

There was a lot of discussion around statement six of the recommendations: '*a case manager should coordinate the delivery of lifestyle interventions to prevent overlapping or duplication of*

services.' Participants reported that, especially in the public health setting or the private outpatient setting, 'case managers' did not exist in these contexts. Participant 12 stated, "*For public services, public services, we don't actually have case managers. So, for us, that could not be relevant, especially with our setting in public health. I know, in private, you might have a case manager who manages the patients in private, but for us, it won't work.".* Participant 1 supported this statement by saying, "*A case manager should coordinate the delivery of lifestyle interventions to prevent overload, overlapping. OK. I'm, I'm, in my head, I'm trying to understand the case manager story. Do we have case managers in our public sector, or was this just written in general, including the private sector? I was not sure…".* Participant 10 further suggested that "*Perhaps just a suggestion would be "Services should be coordinated, to prevent, so instead of seeing a case manager, because in my head, a case manager, somebody's, really is, like, that's your job. You could maybe just say services should be coordinated to prevent overlapping or duplication of services… So that could be done by a physio, that could be done by OT ja".*

Participants 8 and 9 provided the perspective from the private practice setting indicating that "*I think I think that the word case manager in my context, like you say, it's very much, it sounds like the, the manager of the case who's sitting in the hospital and working out the finances and the authorisations and so on." (Participant 9) and participant 8 stated that "I agree because case managers, like they're dealing with the medical aid upstairs somewhere. I think it's not a good tip for our context.' Participant 5 'In private practice, I'm the one that makes contact with the GP and if, it's necessary with the sleep clinic or whatever, whatever. So, I would, I would say that one person of a team should coordinate everything, then it will fit everybody's situation. I don't know.'*

Alternative terms for the word 'case manager' were suggested as participants felt that 'case manager' was not appropriate in their contexts. Participant 2 and 9 suggested the term "coordinator' stating that "'*You know, in terms of case management, it's very specific in what they do. So, I would put coordinator." (participant 2) and I would suggest changing that word manager and maybe a case, that a case coordinator, maybe should be appointed from the team or something like that, or just a coordinator.'*

As for statement number seven, participant 1 indicated that the wording of the recommendations inferred that all healthcare professionals must deliver all lifestyle interventions, stating that "[for] *Number seven, all members of the Interprofessional team should be able to provide basic health promotion strategies. I think this one is similar to, or I'm suggesting that you phrase it similarly, similar to number one. If you look at number one, you just mentioned prevention should be … Lifestyle intervention should be included in preventative strategies. Now we are saying all*

members must be able to [deliver lifestyle interventions]. What if they are not? It would be… provide basic health promotion strategies. So, I would not put "all members of the interprofessional". I don't know if you understand what I mean. So, it was just that they provide basic health promotion strategies, including lifestyle advice and education, whether it is done by the OT by the physio, because right now it's like all, remember our curriculum. Or the way we are taught is not the same. So, for me, the recommendation is - let's make sure that we provide basic health promotion strategies. This patient must be educated."

For statement number nine, some participants did not feel that 'patient' was a suitable term. There was some debate about what the correct term should be. Participant 1 suggested that "*Instead of seeing patients, rather say person-centred … Is there a reason why we, for, for, all or maybe that's what you've got from the from the other studies 'patients' maybe slash 'individual' because I'm just thinking of, if you're seeing a person in the community, OK, we call them clients. because "Patients" it gives the, the idea of hospital or clinic."* However, participant 5 did not like the term 'client', providing the following reasons: *"I mean, I don't like the word client, because it immediately thinks of money, so I never use the word client*". There was agreement, however, with the term 'person-centred care'. Participant 5 clearly stated, "*But for all the rest, say: the care of a patient should be person-centred. Also, I feel if I have to agree with general recommendations, I would very much, it should be person-centred. There should be one or other something said that you have decided together that this is where I want to be and this is how I'm going to get there. I don't see that specifically mentioned as the changing of lifestyle. It should be person-centred and agreed upon."* Other participants in the FGDs also agreed with this statement provided by participant 5.

For statement number ten, participants indicated that this statement should be placed first in the list of statements. This was clearly indicated by participant 11 who stated that. "*You know, for example, like I read number 10 is probably the most important to me, is what is the patient's identified importance is, because that then tails into collaboration that will get you know, but they are broad, they make sense. It's exactly what the physio should be going"*

The above suggestions were considered, and the final recommendations for Section A: General recommendations were decreased from ten statements to six statements. The final statements for Section A are shown in Table 6.2

Table 6.2 Final recommendations for Section A: General recommendations

1. Lifestyle interventions should be person-centred and align with their goals and needs and consideration should be given to the specific context of the patient and the available resources within that context.
2. Lifestyle interventions should be offered as an essential part of management of people with comorbid mental and physical health disorders through all stages and all levels of care.
3. The International Classification of Functioning, Disability and Health (ICF) framework should be used to develop person-centred lifestyle interventions.
4. As far as possible delivery of lifestyle interventions should be coordinated within the interprofessional team and within the scope of practice.
5. Delivery of lifestyle interventions should be evidence-based and in line with best practices in the best interest of the patient.
6. Health promotion strategies including lifestyle advice and education about lifestyle factors should be provided to all persons with comorbid mental and physical health disorders, and if more in-depth specific assessment and intervention is needed, referral to a healthcare professional with more in-depth knowledge.

6.3.2.3 Section B: Sleep recommendations

(see **Section B: Sleep recommendations from the Delphi**)

Participants reported that minor changes were needed to some of the sleep statements. While participant 6 agreed with the first statement that physical factors affecting sleep should be assessed, however, participant 1 stated that "*For number one, is there a reason why we are only looking at physical factors? There could be social factors as well…maybe just change to factors affecting sleep".* They did feel strongly that physically monitoring sleep and prescribing and monitoring sleep medication is not within the physiotherapy scope of practice, but that it was important to keep these in the recommendations to make sure that physiotherapists can refer to a suitable healthcare professional as and when needed. This was stated by participant 5: "*It is just that sleep should be monitored - it is not within the ability of most therapists, who don't sleep in the room with the patient. It's an in-hospital, in-patient kind of monitoring, I think. But it should stay in there so that physios take care of it, so that they sort of ask that in their assessment at least, even though it's just by asking a questionnaire or asking questions. Usually it's the patient tells you, I don't sleep well, I think you should say, should be referred for monitoring."* This was further supported by participant 13, "*With the second point - sleep should be monitored and interventions to track sleep*

should… I don't know, maybe [name removed], I just don't know that government facilities have the resources to provide that service."

Participant 5 stated that physiotherapists could screen for sleep issues but should refer to suitably trained healthcare professional for further diagnosis and further suggested changes in the order of the recommendations: "*So, I would [suggest] that, if in screening it is found that there is some sleep disorders, the patient could be referred for monitoring, and if a sleep disorder is diagnosed, a programme can be sorted. Number two must come after number three, just before four or incorporated into four."*

Participants agreed that prescribing medication for sleep is not within the scope of practice of physiotherapists, but the statements should be reworded and kept in the recommendations as physiotherapists should be aware of medications but refer to psychiatrist or doctor if medication is needed. Participants 12 stated, "*So, with regards to" medication can be used to assist sleep but only if the sleep disturbance is severe and medication should be used judiciously, avoiding substances which may be addictive and should only be", like, is that a recommendation for us? Is that something where we monitor what medications are and provide advice? Personally, I know all the medications and I may sometimes be hesitant, and because I see the patients more than their psychiatrist, I might like… message a psychiatrist, and be like "patient still not sleeping well" or "patient is waking up drowsy" but I like, I feel those are very strong statements from a physiotherapy position point to say that can be used, but only if it's severe, like, I don't feel comfortable to make that statement."* This was supported by participant 10 who stated that*, "Both six and seven, I feel like it's possibly outside our scope of practice. Maybe something like – liaising with a psychiatrist about medication for sleep. I feel that the whole, those two whole points, need to be written, in that we can monitor sleep and monitor medication and feed back to the doctor with possible suggestions, you know, based on previous experience and based on how the patient's doing. I think it is very important for us to still know about medication, talk to the patients about medication. Liaise. I still think that that's crucial, so I would definitely leave it in".* Participant 12 went on to state that physiotherapists could use non-pharmacological interventions to help assist with sleep ("*Medication can be used to assist sleep – so from our point of view, we try not to medicate patients unnecessarily, for example, giving them a sleeping tablet and stuff like that. What we recommend is them trying to have less sedentary behaviour during the day, so that when it is night, they can actually sleep")*

The final recommendations for sleep following the FGDs are presented in Table 6.3 The recommendations were reduced from seven to four recommendations.

Table 6.3 Final recommendations for Section B: Sleep recommendations

1. Factors affecting sleep should be evaluated and managed as appropriate.
2. Physiotherapists should screen for quality and quantity of sleep and refer to appropriate healthcare professionals for diagnosing, monitoring and medical management of sleep.
3. If a sleep disorder is diagnosed, a sleep hygiene programme is important in the management of patients with comorbid mental and physical health disorders.
4. Non-pharmacological interventions can be used by physiotherapists to assist with improving sleep considering the person's preferences, goals, lifestyle and current health status.

6.3.2.4 Section C: Physical activity and exercise recommendations

(see Section C: Recommendations for physical activity and exercise following the Delphi)

Participants generally agreed with the recommendations for exercise that were developed in phase two of this study. The generally supported the idea that the term physical activity should be included in the recommendations and not just exercise, as this is often mentioned in the literature as participant 5 stated, *"In persistent pain literature, they talk more about physical activity than exercise, because that includes good, good exercise."'* When considering the type of exercise that should be recommended to patients with mental disorders and comorbidities, participant 11 stated that "*So, I think in the recommendations maybe something on goal development, where it's focused on goals, that's focused on individualised programmes and working towards improving adherence through, sort of this, this give and take. It's "what did you enjoy?" "What did you not enjoy?" "What do you see yourself doing?" "Where do you want to work?" "What do you not want to work on?" So, just a little more emphasis on the individualised and how do we progress it from there"*

For physical activity and exercise, participants reported that exercise should be prescribed, supported, progressed and then maintained. This is supported by statements made by participant 8 who stated that "*Also, number five as well, because I think it's, it brings up an important thing here with the tailored because. With our patients here, we sort of have to meet them where they are. But as we meet them where we are, it's, it doesn't mean that we want them to just stay there, because we need to also come back to who we are as physios, we do, where we are improving, we're always looking at taking someone from one level to the higher level. Also, there is in the World Health Organization, says 150 minutes is needed to prevent comorbidities. Because we want them not to get*

sicker, we want them to get better. We want them not to get secondary complications. So, as we are tailoring the approach, we also need to consider from our side as well, what our role is, physios."

Participants were happy with the rest of the statements but did indicate the importance of the recommendations stating that exercise should be tailored, progressed and monitored to support the patients to meet their goals an also emphasised the need for ongoing support and monitoring in a format that suited the patient – Participant 10 stated "*Oh, ja, the structure that you are saying and the lifestyle, I think the lifestyle is something that is more manageable for them and to try and implement themselves, because it is something small. But they need guidance on it, and we should be providing programmes, then progressing and monitoring these programmes."* However, participant 1 stated that in a public health and community setting it may not be feasible to provide individualised exercise programmes, stating that "*I would add that because we will not be able to, number six, we will not always be able to supervise it. I am just thinking about patients in the community, patients who go to the clinic. They will be given a programme, and they must go home and do it.'*

Finally, participants provided comments on adherence and providing strategies to ensure that exercise is adhered to. Participant 2 posed the question, "*I just wanted to ask whether, with exercise, we know that compliance is a big thing. Do you want to add something about how it should be monitored – maybe a diary or a telehealth reminder, or something like that?"*

The final recommendations from the Delphi were combined into fewer recommendations and are presented below in Table 6.4

Table 6.4 Final recommendations for Section C: Physical activity and exercise

1. Exercise should be a tailored approach depending on patient preferences, lifestyle and current health status and include a variety of physical activity and exercise types in a format preferred by the person, depending on their context and available resources.
2. Physiotherapists should monitor adherence to the exercise and provide ongoing support in a manner that is suitable to the person's environment and context.
3. Physical activity and exercise should be prescribed according to a specific aim or health needs of the person encouraging regular, frequent physical activity and exercise. Additionally, recommendations by WHO for exercise should be considered and guide exercise prescription

6.3.2.5 Section D: Nutrition and weight management

(see **Section D: Nutrition and weight management recommendations from the Delphi**)

Participants generally agreed with the nutrition and weight management recommendations. As participant 11 stated, "*I think it's good. I think it's a nice, concise way of summarising it. The only thing I think that should maybe be added is, again, just an individualised approach to what is possible for their patient. Obviously, different settings have different ways of healthy eating. So, having the discussion with the patient, and then finding an individualised agreed upon, agreed-upon eating programme that meets the nutritional demands but also is in line with recommendations. Something along that line.'* For the first recommendation, participants felt that the word 'thorough' should be removed as nutrition is not necessarily within the physiotherapist's scope of practice, and patients should be referred to a dietician for more in-depth management. Participant 12 stated that "*As well as that, you mentioned the thorough assessment. I mean, I wouldn't do a thorough assessment. I would do a basic question, which will be one question. I would ask the patients about their eating patterns and nutrition."* This was supported by participant 6 that stated, "*I'm a little bit worried because, not worried, because it says a thorough assessment should include a patient's knowledge of nutrition. So that means that we need knowledge of nutrition, and how much knowledge do we have of nutrition, and eating patterns and behaviours. And then I think if you, with your basic knowledge, pick something up, then that person needs to be referred to a dietician for management. I don't think that's something that we can actually manage…I can tell the patient the basics of what I think, but I might be wrong. I might tell them to do intermittent fasting because that's what I think works, or you must go on a keto diet because that's what worked for me. So, ja, I think a basic assessment, because you have a thorough assessment now'*

The final recommendations for nutrition and weight management are presented in Table 6.5.

Table 6.5 Final recommendations for Section D: Nutrition and weight management

1. Physiotherapists can provide basic health promotion strategies as it pertains to diet and weight management but should refer on to a qualified healthcare professional for more comprehensive management of eating patterns and diet to maintain overall health and well-being. 2. Collaboration with members of the interprofessional team should be considered in the management of nutrition and weight, according to the best available evidence.

6.3.2.6 Section E: Stress management recommendations

(see **Section E: Stress management recommendations from Delphi**)

Participants in the FGDs felt that stress management recommendations should indicate shared decision making rather be specifically targeted at the goals identified by the patient. Participant 12 said "*So, the first point was targeted, the specific goals identified by the patient. I think, I don't know, I could stand to be corrected, but I think it should be shared specific goals with the patient and the physio. Because some patients would have unrealistic goals, and I've seen that in practice. They want stuff that I, we cannot deliver on, and so I think, I think it should be a combined effort, with the physio and the patient.".* Participant 13 indicated her agreement with this statement by participant 12, adding "*I was going to make the same comment that [participant name] made, that I don't think that it should be a patient, I don't think the patient should identify their own goals independently, but it should be done in conjunction with a physiotherapist.* Participant 13 further added "*And then when I look at point four, we say that the interventions, interventions should be targeted to the specific needs of the patient, which almost speaks to the same thing for me. But now you're bringing in the biopsychosocial framework, so that is where other members of the MDT will also then be involved…So, I feel like those two points, almost, can be combined in a sense…'So, I'm just trying to understand the difference between two and four, stress management modalities are used to support the mental…, OK, and those interventions are targeted to specific".* Participant 10 explained that for statements two and four which were raised by participant 13 above, "*So, I see the one is like supporting the health, and the other one is doing an intervention. So, I mean, I think it would make it a long sentence if you combine them. But if you maybe put them directly underneath each other, then people could be like, oh, OK, this is this and this is this rather than having number three in between them"*

Participants felt that stress management modalities which could be used by physiotherapists should be specified in the recommendations. Participant 5 also stated "*I would take the word "modality" out of there, if we change the sentence to "principles…or approach", for example, "psychologically informed physiotherapy," for example, so and so at any approach based on the principles of cognitive behavioural therapy, could be followed, will be useful."* These approaches, participants suggested be included are: "mindfulness therapy", "relaxation" and "deep breathing exercises".

There were some disagreements between participants about the use of CBT by physiotherapists in the management of patients with mental disorders and comorbidities. Participant 10 felt that physiotherapists could use CBT in their treatment programmes "*…number five there about CBT and where physios can, are able to perform cognitive behavioural therapy with patients…. they have to be trained, there has to be extra training on it, absolutely has to be".* This was somewhat supported by participant 12, who indicated CBT was not within physiotherapy scope but stated *"… I don't know about everybody but myself … CBT is not something that I've been trained at, but I'm learning certain techniques and things that I can do. It does say delivered by the interprofessional team with appropriate training and expertise. I'm not sure how specific that is to physio. We had many arguments about this through my research, saying that it is not the physio's job to do CBT, it's not in our scope of practice, we don't have the proper training and I hear them, but in order to make sure my patients comply or adhere to our treatment, am I not doing cognitive behavioural therapy just by doing my motivational interviewing".* Participant 5, however, clearly stated that CBT was not within the physiotherapy scope of practice, noting that "*… cognitive behavioural therapy is outside the scope of a physiotherapist, so we have developed interventions based on CBT, but we are not allowed to do CBT. It's a psychologist's scope." Participant 5 then went on to say, "I will, I will keep it there, but then we'll say, "following the principles of cognitive behavioural therapy, … following the principles of CBT is an important stress management modality". That doesn't say we, we do CBT."*

The final recommendations for stress management following the FGDs can be found in Table 6.6. The number of recommendations for this section was reduced from five to three.

Table 6.6 Final recommendations for Section E: Stress management recommendations

1. Stress management interventions should be targeted to the specific needs of the person and should be delivered within a biopsychosocial framework. 2. Physiotherapists should use psychologically informed practice when managing people with comorbid mental and physical health disorders, using a variety of modalities provided they are suitably trained, and it is within the scope of practice 3. Stress management modalities/approaches which physiotherapists can use include mindfulness therapy, relaxation and deep breathing exercises, and the principles of cognitive behavioural therapy in the management of people with comorbid mental and physical health disorders

The final recommendations following the changes suggested in the focus groups are presented in Table 6.7 below. The number of recommendations was reduced from 32 to 18 following the FGDs.

Table 6.7 Changes following focus group discussions

Recommendations from Delphi	Changes following Focus Groups
Section A: General Recommendations	
1. Lifestyle interventions should be included as a preventative strategy in patients with comorbid mental and physical health disorders. 2. Lifestyle interventions should be offered as 'first-line' management in patients with comorbid mental and physical health disorders. 3. Lifestyle interventions are used as an adjunctive therapy in patients with comorbid mental and physical health disorders. 4. An assessment of the patient's lifestyle factors (eating habits, physical activity and exercise, sleeping patterns) to identify relevant factors should be included in the management plan 5. Delivery of lifestyle interventions to patients with comorbid mental and physical health disorders should be an interprofessional approach, within the	1. Lifestyle interventions should be person-centred and align with their goals and needs and consideration should be given to the specific context of the patient and the available resources within that context 2. Lifestyle interventions should be offered as an essential part of management of people with comorbid mental and physical health disorders through all stages and all levels of care. 3. The International Classification of Functioning, Disability and Health (ICF) framework should be used to develop person-centred lifestyle interventions. 4. As far as possible delivery of lifestyle interventions should be coordinated within the interprofessional team and within the scope of practice. 5. Delivery of lifestyle interventions should be evidence-based and in line with best

scope of practice of the healthcare professional 6. A case manager should coordinate the delivery of lifestyle interventions to prevent overlapping or duplication of services. 7. All members of the interprofessional team should be able to provide basic health promotion strategies, including lifestyle advice and education about lifestyle factors (physical activity and exercise, nutrition and weight management, stress management interventions, and sleep hygiene) 8. Referral to a specific healthcare professional with more extensive knowledge and training in a particular lifestyle intervention should be considered for more in-depth management 9. Lifestyle interventions should be patient-centred and align with the patient's goals and needs and consideration should be given to the specific context of the patient and the available resources within that context 10. Lifestyle interventions are more effective when used in combination to address specific health and lifestyle factors identified by patients (e.g. physical activity, psychological strategies and diet in the management of obesity and depression)	practices in the best interest of the patient. 6. Health promotion strategies including lifestyle advice and education about lifestyle factors should be provided to all persons with comorbid mental and physical health disorders, and if more in-depth specific assessment and intervention is needed, referral to a healthcare professional with more in-depth knowledge
Section B: Sleep Recommendations	
1. Physical factors affecting sleep should be evaluated and managed as appropriate. 2. Sleep should be monitored, and interventions to help track sleep should be made available to patients if a sleep problem is suspected. 3. Screening for quality and quantity of sleep, or a sleep disorder, can be done by any member of the interprofessional team, but sleep disorders can only be diagnosed by trained healthcare professionals.	1. Factors affecting sleep should be evaluated and managed as appropriate. 2. Physiotherapists should screen for quality and quantity of sleep and refer to appropriate healthcare professionals for diagnosing, monitoring and medical management of sleep. 3. If a sleep disorder is diagnosed, a sleep hygiene programme is important in the management of patients with comorbid mental and physical health disorders.

4. If a sleep disorder is diagnosed, a sleep hygiene programme is important in the management of patients with comorbid mental and physical health disorders 5. If patients are still waking feeling tired, they should be referred to appropriate resources (including online resources) and healthcare professionals for management. 6. Medication can be used to assist sleep, but only if the sleep disturbance is severe. 7. Medication should be used judiciously, avoiding substances which may be addictive and should only be used in the short term and only prescribed by a trained healthcare provider (physician or psychiatrist).	4. Non-pharmacological interventions can be used by physiotherapists to assist with improving sleep considering the person's preferences, goals, lifestyle and current health status.
Section C: Physical Activity and Exercise	
1. A healthcare professional with knowledge of both the physical and mental health of the patient should have a role in overseeing the exercise interventions 2. A lifestyle physical activity programme aims to decrease sedentary time and increase movement 3. Regular, frequent and consistent exercise is more important than exercise intensity/exertion 4. A combination of structured and lifestyle physical activity programmes are better suited to patients with comorbid mental and physical health disorders. 5. Exercise should be a tailored approach depending on patient preferences, lifestyle and current health status 6. Exercise programmes should be supervised in patients with comorbid mental and physical health disorders 7. Exercise programmes should include a variety of exercise types, in a format (group or individual) preferred by the	1. Exercise should be a tailored approach depending on patient preferences, lifestyle and current health status and include a variety of physical activity and exercise types in a format preferred by the person, depending on their context and available resources. 2. Physiotherapists should monitor adherence to the exercise and provide ongoing support in a manner that is suitable to the person's environment and context. 3. Physical activity and exercise should be prescribed according to a specific aim or health needs of the person encouraging regular, frequent physical activity and exercise. Additionally, recommendations by WHO for exercise should be considered and guide exercise prescription

patient.	
Section D: Nutrition and weight management	
1. A thorough assessment should include the patient's knowledge of nutrition and current eating patterns and behaviours, sleeping patterns, physical activity levels and emotional regulation as these impact eating patterns and behaviours 2. Healthy eating and weight management should be done in conjunction with physical activity and exercise, as well as stress management interventions 3. All members of the interprofessional team can provide basic information related to diet and healthy eating but should refer to a trained healthcare professional should a more in-depth assessment and intervention be needed	1. Physiotherapists can provide basic health promotion strategies as it pertains to diet and weight management but should refer on to a qualified healthcare professional for more comprehensive management of eating patterns and diet to maintain overall health and well-being 2. Collaboration with members of the interprofessional team should be considered in the management of nutrition and weight, according to the best available evidence
Section E: Stress Management	
1. Stress management should be targeted to the specific goals identified by the patient 2. Stress management modalities are used to support the mental and physical health of the patient within a biopsychosocial framework 3. Education and information about stress management modalities should be provided to all patients with comorbid mental and physical health disorders 4. Stress management interventions should be targeted to the specific needs of the patient and should be delivered within a biopsychosocial framework 5. Cognitive behavioural therapy (CBT) is an important stress management modality and can be delivered by any member of the interprofessional team with appropriate training and expertise. It can be used in conjunction with other lifestyle interventions to affect behaviour change	1. Stress management interventions should be targeted to the specific needs of the person and should be delivered within a biopsychosocial framework. 2. Physiotherapists should use psychologically informed practice when managing people with comorbid mental and physical health disorders, using a variety of modalities provided they are suitably trained, and it is within the scope of practice 3. Stress management modalities/approaches which physiotherapists can use include mindfulness therapy, relaxation and deep breathing exercises, and the principles of cognitive behavioural therapy in the management of people with comorbid mental and physical health disorders

6.4 Discussion

The objectives of the FGDs were to determine the acceptability and feasibility of the recommendations developed from the Delphi study in the South African context. The data obtained from the FGDs provided insight into the perceptions of the physiotherapists about the recommendations developed in phase two of this study. The feedback from the FGDs was used to develop the final recommendations for physiotherapists who manage patients with mental disorders and comorbidities. The challenges faced by the participants in their contexts and settings, as well, appear to have influenced the feedback received and shaped the final recommendations.

6.4.1. Feasibility and acceptability

Overall, participants found the recommendations feasible and acceptable. According to van Vuuren (2022), there is a need to balance local healthcare needs with the available resources, which include both financial and human resources, which are unique to the local context and may differ from the international recommendations. Stander et al. (2020) and Grimmer et al. (2019), found that international clinical practice guidelines (CPGs) can be adapted and contextualised to the local physiotherapy environment. The authors used existing CPGs for low back pain (Stander et al., 2020) and stroke rehabilitation (Grimmer et al., 2019), available internationally, and adapted them using different methodologies to make them more user-friendly and easier to implement in the local context. In this study, recommendations were developed as there were no CPGs or recommendations that could be found relating to the management of patients with comorbid mental and physical health disorders. As previously discussed (see ***Chapter 2.9 Clinical Practice Guidelines***), the full development of CPGs involves implementation, dissemination and evaluation of the CPGs, which is beyond the scope of this study; however, the challenges to the feasibility of these recommendations (scope of practice, resource constraints and education and awareness) is similar to those of van Vuuren (2022), Stander et al. (2020) and Grimmer et al. (2019).

Concerns were raised about the feasibility of the recommendations in public sector environments due to resource constraints. Some participants felt that the recommendations were less feasible in long-term, chronic public mental healthcare

facilities. This, they reported, was predominantly due to the high patient-to-healthcare professional ratio, making individual treatments and management programmes difficult, prompting innovative treatment strategies such as group therapies. Further challenges experienced in the public healthcare system include the need for better integration of rehabilitation services within primary health care (PHC), addressing the urban-rural divide, and ensuring adequate training and resources for physiotherapists, as well as a need for capacity-building in the development and implementation of locally relevant CPGs (Maseko et al., 2024; Narain and Mathye, 2023; Louw et al., 2018). Low- and middle-income countries often face challenges such as staff shortages and budget constraints (Scheffler et al., 2018). In South Africa, there is a significant shortage of mental health professionals (Docrat et al., 2019). This provides challenges to managing patients with mental disorders and is further complicated by the high rate of comorbidities experienced by this patient population. According to the Mental Health Care Act of 2002 (MHCA, 2002), physiotherapists are not considered mental health professionals, however, they do play a role in the management of patients with mental disorders. According to Vancampfort et al. (2018) physiotherapists play a role in reducing the burden of disease, but are still underutilised in the management of patients with mental disorders. Physiotherapists may be able to help decrease the burden of disease by addressing the physical health complaints of patients with mental disorders (Maurus et al., 2024; Hooblaul et al., 2020; Vancampfort et al., 2020).

6.4.2 Recommendations for each subsection

6.4.2.1 General recommendations

Participants agreed that lifestyle interventions are important in the management of patients with mental disorders and comorbidities. These interventions can be considered essential and may be used as preventative and adjunctive management strategies. The ICF framework considers body structure and function, activity and participation, as well as personal and environmental factors in the assessment and management of health conditions (Stucki et al., 2017; Vargus-Adams and Majnemer, 2014). Participants felt that the recommendations did encompass the ICF framework; however, they felt this could be stated more explicitly, making the recommendations

more holistic and applicable to the specific patient population and ensuring person-centred care.

Person-centred care considers the person's needs, preferences and circumstances and emphasises a holistic approach to patients, focusing on informed and shared decision-making, self-management skills and patient empowerment (Kelsall-Knight and Stevens, 2024; Ng, 2024; Harris et al., 2013). The results of this study echoed these findings, with participants indicating that the management of patients with comorbidities and integrating lifestyle interventions depends on the patient's needs and preferences as well as the patient's context and healthcare setting.

Person-centred care requires coordination and continuity of care, and as such, a more interprofessional approach is required that allows for care to be coordinated, leading to improved patient outcomes (Kelsall-Knight and Stevens, 2024). Participants in this study agreed that delivery of lifestyle interventions should be coordinated, but this was dependent on the context. Neither the participants from public health nor private healthcare settings agreed with the term 'case manager' in this context, as agreed to in the recommendations developed from the Delphi study. According to Campagna and Lee-Riley (2025), case management occurs across a variety of settings, including mental health care, where various healthcare professionals are involved in the management of a patient and allows for professional and collaborative care and support. This implies that coordination of the delivery of services is important in the management of patients, especially those with comorbidities. The participants felt that this term was not used in the public healthcare setting and that it indicated a power dynamic which was far removed from person-centred care. Participants agreed that there should be a 'coordinator' of sorts, but this was dependent on the setting (mental health facility versus outpatient and private versus public).

Physiotherapists are well known to deliver health promotion and education, as well as physical activity and exercise for patients with multimorbidity (Fisher et al., 2025; Pacheco-Brousseau et al., 2024). Health promotion empowers individuals and communities to take control of their health through comprehensive strategies that address behavioural, social, and environmental factors, whereas health education is a structured

process designed to encourage learning and support healthy behaviour change (Lesh and Thompson, 2024; Mittelmark et al., 2016; Kok and de Vries, 2015). Health promotion and education aim to improve wellbeing and prevent illness, and focuses on building knowledge, skills, and behaviours that support healthy living (Tilford et al., 2025). Physiotherapists are involved in health promotion and education by addressing lifestyle-related chronic diseases by promoting physical activity, healthy eating and smoking cessation (Ngeh et al., 2023; Abaraogu et al., 2017). When participants considered each lifestyle intervention, they felt strongly that physiotherapists could deliver basic health promotion and education; however, referral to a more suitably qualified member of the IPT was necessary, particularly for interventions such as nutrition.

The scope of physiotherapy practice was an important consideration in the delivery of lifestyle interventions and the ability to make these recommendations feasible for physiotherapists. Physiotherapists are known as the physical health experts and are well known to deliver lifestyle interventions for patients with chronic illness (Stubbs et al., 2014). Participants felt that physical activity and exercise, and chronic pain management were within their scope, but felt that nutrition interventions and certain psychological strategies (e.g. CBT) were not. This was mostly due to a lack of knowledge and training in these aspects. Physiotherapists work across a variety of settings and are well placed to address health challenges faced by patients, especially in PHC settings (Narain and Mathye, 2023). Interprofessional communication and training, which includes collaborative practice, can address the challenges in the scope of practice for physiotherapy, especially in resource-constrained environments.

In physiotherapy, evidence-based practice (EBP) is a vital approach that combines scientific research, clinical expertise, and patient values to improve care quality and treatment outcomes (Pedersen et al., 2024). Evidence-based practice includes the integration of the best available evidence in patient care, combined with clinical expertise and patient preference (Pedersen et al., 2024). Time constraints, lack of research skills and a lack of access to the available evidence are barriers to EBP (Pedersen et al., 2024; Nair et al., 2021). Clinical practice guidelines and evidence-based recommendations can assist physiotherapists in making evidence-based decisions in patient management. For

patients with mental disorders and comorbidities, there is limited high-level evidence which guides management in this patient cohort. Adding a statement on following the best available evidence to the recommendations will help with the consistency of application of the recommendations developed in this study.

6.4.2.2 Sleep recommendations

Participants supported the inclusion of sleep-related interventions in the recommendations. The importance of the scope of physiotherapy practice was once again highlighted, especially in diagnosing, monitoring and the prescription of medication for sleep disorders. Siengsukon et al. (2022) supported the idea that physiotherapists assess lifestyle factors, including sleep, and can provide recommendations for sleep hygiene programmes. Like Frange et al. (2022) and Siengsukon et al. (2022), participants in this study agreed that complex sleep disorders should be referred to a specialist healthcare professional.

Siengsukon et al. (2022) found that physiotherapists can apply a sleep decision tree in simple sleep disturbances, but were unable to do so in more complex cases, which necessitates the need for interprofessional practice and referral for the assessment and management of complex sleep disorders. Physiotherapists are, however, able to screen for sleep disorders and provide sleep hygiene programmes to help manage sleep disorders (Frange et al., 2022; Siengsukon et al., 2022; Eadie et al., 2013).

6.4.2.3 Physical activity and exercise recommendations

A patient-centred approach that aligns with individual preferences and goals is strongly linked to better health outcomes, greater treatment adherence, and improved satisfaction (Alsagoor et al., 2024; Kirk, 2020; Dixon et al., 2016). Consideration of patient preferences and goals has been shown to improve adherence to exercise programmes and improve health outcomes in patients with mental disorders and comorbidities. Patient-centred care emphasises the patients' needs, preferences and values, which may lead to better engagement in treatment programmes, and ultimately may lead to improved quality of life (Bauman et al., 2003).

Exercise and depression are the most researched fields in mental health (Maurus et al., 2024; Croatto et al., 2023). Participants in this study strongly agreed that physical activity and exercise play an important role in the management of patients with mental disorders and physical comorbidities. As indicated in the final recommendations, participants felt that any form of activity (structured or unstructured, lifestyle physical activity or exercise) that is consistent should be recommended and emphasised, as, depending on the stage of illness or disorder, many patients may not be able to achieve the WHO recommendations for physical activity.

Farris and Abrantes (2020) also reported that structured and supervised exercise three times a week was necessary to obtain mental health benefits, but Teychenne et al. (2020) reported that benefits of exercise can be achieved at a lower level of exercise, similar to the beliefs of the participants in this study. Participants in this study agreed with the findings that supervised and structured exercise may be beneficial in this patient population, but limited resources, rural settings and other contexts mean this is not always feasible. As such, a tailored approach is necessary, but consideration should be given to supporting the patient in their context and with their needs. The participants did agree that prescription, ongoing support, monitoring and progression of the exercise plans were also important.

6.4.2.4 Nutrition and weight management recommendations

Diet is an important part of health promotion, and physiotherapists can provide basic advice and counselling (Abaraogu et al., 2017). Abaraogu et al. (2017) found that Nigerian physiotherapists were confident in providing dietary counselling to help patients change unhealthy eating patterns. This contrasts with the findings of this study, where participants felt strongly that basic health promotion and education strategies could be provided to patients with mental disorders and comorbidities, and that physiotherapists could not do a thorough assessment and treatment, as nutrition was generally not within the scope of practice for physiotherapists. As such, the recommendations reflected that physiotherapists should only do a basic assessment of nutrition status in patients and refer to a more suitably qualified healthcare professional.

Physiotherapists are equipped to conduct thorough biopsychosocial assessments and deliver holistic patient care (Tatta et al., 2022a). Like the participants in this study, Tatta et al. (2022a), stated that physiotherapists often lack clear guidance on their role in nutrition, leading them to refer patients to other IPT members rather than provide nutritional counselling themselves. In PHC and other resource-constrained environments, task-shifting may help address the growing healthcare needs of the patient, and as such, physiotherapists should be able to initiate and support healthy eating and other health promotion strategies (Tatta et al., 2022a; Abaraogu et al., 2016). Enhanced training and collaborative approaches can help overcome barriers to physiotherapists confidently delivering nutrition advice and counselling as part of their health promotion (Ngeh et al., 2023; Abaraogu et al., 2016).

Patients with mental disorders often have a low mood and lack motivation to engage in healthy lifestyle activities. As a result of unhealthy lifestyles and the side effects of medication, obesity is prevalent in patients with mental disorders (Fentie and Derese, 2022; Lee et al., 2017). Obesity often results in multimorbidity, with patients often developing diabetes, metabolic syndrome, and cardiovascular diseases (Starostina, 2025). These comorbidities can be managed with diet and healthy eating plans (Barber et al., 2024). Health promotion strategies which are patient-centred and combine healthy eating, physical activity and behavioural interventions are effective strategies to address obesity and comorbidities in patients with mental disorders (Looijmans et al., 2017). Physiotherapists are the experts in physical health, using health promotion to manage chronic illness and as such, can include nutrition in their management plans in collaboration with other members of the IPT.

6.4.2.5 Stress management recommendations

Psychologically informed physiotherapy practice includes the use of psychological principles in physiotherapy to manage patients holistically (Main et al., 2025; Baez and Jochimsen, 2023). According to Furness et al. (2025) and Main et al. (2025) psychologically informed physiotherapy practice includes stress management modalities such as mindfulness, motivational interviewing, cognitive behavioural techniques, acceptance and commitment therapy and relaxation therapies. The participants in this

study also included mindfulness and relaxation therapies as stress management modalities.

There was some debate among participants about CBT as a stress management modality which physiotherapists could use. The recommendations from the Delphi and the findings from the systematic review indicated that CBT was a well-established modality and effective in the management of patients with mental disorders and comorbidities. The Delphi study included international, multidisciplinary experts, and therefore, CBT may have been more acceptable to them. Most of the participants in this study agreed that CBT was beyond the scope of practice of physiotherapists, and psychologists were the trained professionals to deliver this modality. The literature indicates that with adequate training, any healthcare professional can deliver CBT (Alvarez et al., 2022). The participants in the FGDs did, however, agree that the principles of CBT could be used in the management of patients with comorbid mental and physical health disorders. According to Alvarez et al. (2022), physiotherapists can provide mental health interventions such as CBT, focusing on behaviour change, which is important in the context of chronic conditions and comorbidities.

6.5. Limitations

While FGDs facilitate rich, in-depth data collection, the small sample size may have limited the diversity of perspectives and input.

It was envisaged that the end user of the recommendations would be physiotherapists working in mental health; however, ultimately, the recommendations affect patient management. There were no patients who were invited to participate in the FGDs, and this may affect the feasibility of recommendations or CPGs in the future, as the patient voice has not been considered.

The findings from the systematic review and Delphi study are more relevant to individual treatments, as group interventions were excluded. While participants in both the Delphi study and FGDs stressed the importance of patient-centred care tailored to individual needs, some participants in the FGDs noted that high patient volumes and limited resources in the public sector often make this difficult. Group therapy helps address staff

shortages by ensuring broader access to care, though it may compromise the individualised approach recommended.

6.6 Conclusion

This chapter explored the feasibility and acceptability of recommendations for lifestyle interventions for physiotherapists managing patients with comorbid mental and physical health disorders in South Africa. Through focus group discussions with experienced physiotherapists, valuable insights were gained into the practical application of these recommendations within diverse clinical settings.

The feedback led to meaningful changes to the recommendations formulated by the expert panel in the Delphi study, including alignment with the ICF framework and an emphasis on evidence-based practice. Importantly, the role of physiotherapists in delivering basic health promotion and education was stated, while the need for referral to other professionals for specialised interventions, such as nutrition, was emphasised.

Participants generally supported the recommendations, however, they also highlighted challenges such as limited resources, high patient volumes, and scope-of-practice constraints. These factors often necessitate group-based interventions, which may compromise the individualised, patient-centred approach advocated in the recommendations.

The findings of these FGDs contributed to the development of guidelines that support physiotherapists in delivering holistic, person-centred care to patients with complex health needs.

CHAPTER 7

INTEGRATED DISCUSSION

7.1 INTRODUCTION

This chapter discusses the study's findings and links them together as they relate to the overall aim and objectives. It includes a summary of each phase of the study, its strengths and limitations, and clinical implications and research and education recommendations.

This was a mixed-method, multiphase study using an exploratory, concurrent design comprising a systematic literature review, a Delphi study and FGDs to develop and contextualise recommendations for South African physiotherapists to deliver lifestyle interventions for patients with mental disorders and comorbidities. The study was divided into three phases based on the summarised objectives:

1. Determine the available evidence (and quality) regarding lifestyle interventions in the management of patients with disorders: Phase 1 – Systematic review and meta-analysis (quantitative study).
2. Develop recommendations to guide the management of patients with comorbid physical and mental disorders: Phase 2 – Delphi consensus study (Qualitative and quantitative).
3. Determine the acceptability and suitability of for South African physiotherapists with comorbid physical and mental disorders: Phase 3 – Focus groups (Qualitative).

7.2 **DISCUSSION**

7.2.1 Development of recommendations

A few frameworks exist to help develop recommendations by providing steps and guidelines for assessing the evidence's quality and the strength of the recommendations (Quilodrán et al., 2021; Hoffmann-Eßer et al., 2017; Cooper et al., 2015). These frameworks are structured to ensure that decisions are transparent, systematic and informed by the best available evidence. The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) framework is a prominent example of one of these frameworks and was used in this study, particularly to assess the quality of evidence in the systematic review and meta-analysis, which determines the strength of the recommendations (Granholm et al., 2024; Guyatt et al., 2008a; Guyatt et al., 2008b). Another method to assess the strength of recommendations is the Scottish Intercollegiate Guidelines Network (SIGN) method. The SIGN method is often seen as preferable to the GRADE methodology, as it is easier to use and more flexible (Cooper et al., 2015; Baker et al., 2011). However, the GRADE methodology is the most rigorous and transparent (Cooper et al., 2015).

Key components in developing recommendations are identifying the problem and formulating the question to be answered (Quilodrán et al., 2021; Conrad et al., 2019). An important part of this is considering the needs of the population and contextual factors affecting these populations (Quilodrán et al., 2021; Conrad et al., 2019). The literature is searched for available evidence and then assessed for the quality of the evidence (Prasad, 2024; Moberg et al., 2018). Additional considerations which can be factored into recommendations include the benefits and harms, patient values, resources, equity and the acceptability and feasibility of the recommendations (Prasad, 2024; Quilodrán et al., 2021; Conrad et al., 2019; Moberg et al., 2018). Recommendations should be based on either existing systematic reviews or, if no appropriate systematic reviews are available, as was the case in this study, one is conducted as the starting point (Granholm et al., 2024).

Another component of developing recommendations is the use of an expert panel to review the evidence and provide feedback on the applicability and feasibility of the

recommendations (Granholm et al., 2024; Prasad, 2024; Neumann et al., 2016). These groups are typically composed of multidisciplinary experts, including clinicians, researchers, and sometimes patient representatives, who work together to ensure that guidelines are evidence-based and relevant to clinical practice (McCartney et al., 2022; Brignardello-Petersen et al., 2021). The summary of the processes discussed in the previous chapters is presented below.

7.2.2 Systematic review (Phase one)

The first phase in this study was a systematic review of the literature to determine the availability and quality of evidence as it relates to lifestyle interventions in the management of patients with mental disorders and comorbidities and the effect they may have on improving quality of life. Systematic reviews of effectiveness inform clinical practice as they allow for the critical appraisal of studies and the synthesis of evidence on the impact of interventions on a particular health issue (Tufanaru et al., 2017; Munn et al., 2014).

The systematic review was limited to patients with mental disorders (depression and anxiety) and comorbidities (cardiovascular diseases, respiratory disorders, diabetes, obesity, metabolic disorders and chronic musculoskeletal pain), which limited the amount of evidence available due to the specificity of the patient problems. Lifestyle interventions may be delivered by any member of the multidisciplinary team (MDT); however, most of the literature does not specify which healthcare professional is responsible for delivering them. Therefore, the systematic review did not restrict its search to interventions provided by physiotherapists, aiming instead to gather broader evidence on the effectiveness of lifestyle interventions for this patient population.

Systematic reviews of effectiveness consider experimental and quasi-experimental studies to determine the effectiveness of an intervention. Randomised controlled trials are a high level of evidence, comparing an intervention to a control group, and therefore are suitable to determine the effectiveness of an intervention. Following the JBI methodology for systematic reviews of effectiveness, only RCTs and quasi-experimental studies were considered for the systematic review. The exclusion of other types of studies further limited the number of included studies in the systematic review. The inclusion of

observational study designs, such as cross-sectional and cohort studies, may add depth and breadth to the systematic review outcome.

Many articles were excluded from the systematic review because they focused on group interventions rather than individual management strategies. Since physical activity and exercise are commonly delivered in group settings, key findings related to prescription and guidelines were omitted. This is noteworthy, as FGD participants emphasised that interventions should align with the scope of practice and context, often requiring group-based care due to limited human resources.

Finally, the systematic review considered all lifestyle interventions for managing patients with comorbid mental and physical health disorders; however, the only studies included in the final review considered stress management or psychological strategies and physical activity. This shows that the most researched lifestyle interventions are exercise and stress management, particularly CBT. No studies included nutrition, sleep or chronic pain management in patients with depression and anxiety and comorbidities (cardiovascular diseases, respiratory disorders, diabetes, obesity, metabolic disorders and chronic musculoskeletal pain). The included studies found that combining lifestyle interventions, such as CBT and moderate-intensity physical activity, had small effect sizes in this patient population, however, these results should be interpreted with caution due to the large confidence intervals and limited number of studies. The findings of the systematic review and meta-analysis are similar to the findings of Schillemans et al. (2024), who demonstrated in their pilot RCT that lifestyle interventions showed preliminary effectiveness in all domains of quality of life; however, the largest improvement was seen in the societal domain, and the smallest recovery was observed in the clinical domain of recovery. Despite modest effect sizes, lifestyle interventions remain a valuable, holistic approach to supporting recovery and improving quality of life in individuals with complex comorbid conditions.

7.2.3 Delphi consensus study (Phase two)

The Delphi method is widely used to create recommendations and clinical practice guidelines (CPGs), particularly when evidence is lacking, to connect scientific research with practical use (Beaufils et al., 2023; Liang et al., 2023). Lifestyle interventions have

been widely studied, and recent CPGs support their use in managing mental disorders and chronic diseases. However, our systematic review revealed a lack of studies specifically addressing lifestyle interventions for patients with both mental disorders and physical comorbidities, as well as their impact on quality of life. The Delphi study was therefore used to gain expert consensus from a multidisciplinary, local and international panel of experts.

Challenges to the Delphi method include difficulty recruiting participants, high drop-out rates between rounds and potential bias when selecting participants (Mozelius et al., 2023). This was true in our Delphi study. The time between rounds was extended as response rates were poor. This prolonged the study, and as such, some participants may not have completed the second and third rounds, which may have affected the outcome of the Delphi. The Delphi panel lacked dieticians, social workers, and psychologists, resulting in limited expertise in nutrition and psychological strategies. Recommendations in these areas were based on input from other healthcare professionals, which may have been outside their scope of practice and reliant on general knowledge**.** This Delphi was anonymous; however, the reliance on expert opinion can introduce personal biases and interpretations, potentially affecting the objectivity of the recommendations (McGinnis et al., 2010).

The strengths of the Delphi method are its ability to gather and refine expert opinions to reach consensus on complex or uncertain topics using an iterative, anonymous process (Ismail and Taliep, 2023; Shang, 2023; Shelton et al., 2022). The anonymity of the participants helped minimise the influence of dominant individuals. The iterative nature of this Delphi study and the use of multiple rounds allowed participants to reflect on and revise their responses based on group feedback (Mozelius et al., 2023). The statements which received a predetermined consensus rate of 80% were presented to participants on the panel in round three, ensuring all participants could see the previously accepted statements, regardless of whether they completed the second round or not. Additionally, this Delphi study was conducted online, which allowed for flexibility and the inclusion of panellists from different geographic locations, both locally and internationally.

7.2.4 Focus group discussions (Phase three)

The experts in the Delphi study were an international, multidisciplinary panel of experts, and findings may therefore not be relevant to the local South African context. Therefore, the third and final phase of this study was FGDs to determine the acceptability and feasibility of the recommendations for the South African context. The FGD participants were South African physiotherapists with some experience in mental health. The participants were provided with a summary of the findings from the systematic review (Phase one), as well as the recommendations from the Delphi study, before the FGDs took place. This strategy allowed participants to study the information provided and be informed about the findings before the FGDs.

Focus group discussions have many advantages. The primary reason for the use of this qualitative methodology was to gather deep insights, perceptions and recommendations from a group interaction, which would not be possible using a quantitative design such as online surveys (Brandl et al., 2018). The use of FGDs in the development of recommendations may also improve the implementation of recommendations in practice as they are more actionable and relevant to the context of the physiotherapists, and ultimately, the patients (Langford et al., 2024; Brandl et al., 2018). Furthermore, the FGDs allowed for the identification of barriers to the delivery of lifestyle interventions, which could be considered in the development of the final recommendations.

Four FGDs took place (including the pilot FGD), providing 15 participants the opportunity to comment on the acceptability and feasibility of the recommendations. It is important to note that only two participants indicated that they worked in the public healthcare system. In South Africa, most of the population uses the public sector to access and receive healthcare, which is not always equitable. The types of conditions seen by the participants also varied from acute short-stay facilities to long-term psychiatric facilities, which may have an impact on the feasibility of the recommendations. The large numbers of patients and the lack of adequate staff (all healthcare professionals) require an innovative approach to managing patients with mental disorders by using collaborative care strategies and group therapy to meet the needs of the patients. This is an important consideration as the systematic review excluded group interventions; however, the

findings from the Delphi study did indicate that the patient context and setting were important factors to consider when deciding between group or individual treatments.

7.3 Strength of the recommendations

The GRADE methodology was used to assess the quality of evidence but also to determine the strength of recommendations. Determining the strength of a recommendation using the GRADE methodology involves a complex, multifaceted process (Granholm et al., 2024). The strength of evidence-based recommendations is assessed by evaluating the quality of available evidence (high, moderate, low, very low), weighing potential benefits against harms, considering patient preferences, resource use, and contextual factors (Quilodrán et al., 2021). The strength of the recommendations is categorised as either strong or weak/conditional, for or against the recommendation, depending on the level of confidence that the benefits of an intervention outweigh its potential harms (Quilodrán et al., 2021). The GRADE Evidence to Decision (EtD) provides a framework for a transparent method for formulating recommendations based on the evidence and the judgements made from it (Moberg et al., 2018).

The recommendations developed in this study were assessed using the EtD guideline development tool available at www.GRADEPro.org website The outcomes and the strength of the recommendations are presented in Table 7.1.

Table 7.1 Summary of judgements to determine the strength of recommendations using GRADE

a. Summary of Judgments

	JUDGEMENT						
PROBLEM	No	Probably no	**Probably yes**	Yes		Varies	Don't know
DESIRABLE EFFECTS	Trivial	**Small**	Moderate	Large		Varies	Don't know
UNDESIRABLE EFFECTS	**Trivial**	Small	Moderate	Large		Varies	Don't know
CERTAINTY OF EVIDENCE	Very low	Low	**Moderate**	High			No included studies
VALUES	Important uncertainty or variability	**Possibly important uncertainty or variability**	Probably no important uncertainty or variability	No important uncertainty or variability			
BALANCE OF EFFECTS	Favours the comparison	Probably favours the comparison	Does not favour either the intervention or the comparison	**Probably favours the intervention**	Favours the intervention	Varies	Don't know
RESOURCES REQUIRED	Large costs	Moderate costs	Negligible costs and savings	Moderate savings	Large savings	Varies	**Don't know**
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			**No included studies**
COST EFFECTIVENESS	Favours the comparison	Probably favours the comparison	Does not favour either the intervention or the comparison	Probably favours the intervention	Favours the intervention	Varies	**No included studies**
EQUITY	Reduced	Probably reduced	Probably no impact	Probably increased	Increased	Varies	**Don't know**

	JUDGEMENT						
ACCEPTABILITY	No	Probably no	Probably yes	**Yes**		Varies	Don't know
FEASIBILITY	No	Probably no	**Probably yes**	Yes		Varies	Don't know

B. Type of recommendation

Strong recommendation against the intervention	Conditional recommendation against the intervention	Conditional recommendation for either the intervention or the comparison	**Conditional recommendation for the intervention**	Strong recommendation for the intervention
○	○	○	●	○

The GRADE framework offers a rigorous and transparent method for assessing evidence quality and recommendation strength, but it presents challenges, particularly with complex interventions (Movsisyan et al., 2016). Further limitations include reduced flexibility, difficulty generalising findings beyond specified populations and outcomes, and challenges in evaluating multifaceted interventions like lifestyle changes.

In this study, lifestyle interventions were assessed collectively rather than individually, complicating the application of GRADE. Unlike the comprehensive evidence bases used by Maurus et al. (2024) and the APA (2019), which drew on multiple systematic reviews, no such reviews were available for lifestyle interventions in patients with mental disorders and comorbidities. This lack of evidence, along with missing data on cost-effectiveness, equity, and patient input, made it difficult to meet GRADE's criteria for strong recommendations. Consequently, the strength of recommendations relied primarily on findings from a single systematic review and qualitative data from FGDs assessing feasibility and acceptability.

An alternative framework for determining the strength of recommendations is the Scottish Intercollegiate Guidelines Network (SIGN) method. This may be a more suitable framework for determining the strength of these recommendations, as they are more flexible and user-friendly (Cooper et al., 2015). The ranking system for SIGN is indicated below in Table 7.2.

Table 7.2 Grading of recommendations using SIGN method (taken from (Maurus et al., 2024)

Grade	Description
A	At least one review rated as High quality and directly applicable to the target population, OR a body of evidence consisting principally of reviews rated as High quality, directly applicable to the target population, and demonstrating overall consistency of results
B	A body of evidence including reviews rated as Acceptable, directly applicable to the target population, and demonstrating overall consistency of results OR extrapolated evidence from reviews rated as High quality or Acceptable
C	A body of evidence including reviews rated as acceptable to Low quality, directly applicable to the target population, and demonstrating overall consistency of results or extrapolated evidence from reviews rated as acceptable or Low quality.
D	Reviews rated as Low quality or Unacceptable OR extrapolated evidence from reviews rated as Low quality, Unacceptable OR Expert consensus.

The SIGN methodology for grading the strength of the recommendation also indicates level D – weak recommendations, based on the lack of many high-quality systematic reviews and the reliance on expert consensus at an international multidisciplinary Delphi consensus and local specialised physiotherapy consensus. The SIGN methodology was used by Maurus et al. (2024) to determine the strength of the recommendations that were developed for the management of serious mental disorders.

The development of the recommendations in this study was more consensus-based due to the limited evidence available for this specific patient population. Consensus-based recommendations are defined as recommendations developed when high-quality evidence is lacking and expert agreement is needed (Beaufils et al., 2023; Yao et al., 2021; Vermeulen et al., 2019). Only one systematic review with a few included studies and moderate quality of evidence (phase one) was used to guide the development of these recommendations, as no other reviews could be found. The complexity of the interventions also made it difficult to determine the strength of each recommendation.

7.4 Final recommendations

The focus of these recommendations was for patients with depression and anxiety, predominantly, as these are the most common disorders seen in physiotherapy practice. Depression and anxiety were the two mental disorders included in the systematic review conducted during phase one. Although bipolar disorder was initially considered, no studies meeting the inclusion criteria were identified. Consequently, bipolar disorder was excluded from the expert consensus process.

The final recommendations are presented below.

Section A: General Recommendations

1. Lifestyle interventions should be person-centred and align with their goals and needs, and consideration should be given to the specific context of the patient and the available resources within that context.
2. Lifestyle interventions should be offered as an essential part of the management of people with comorbid mental and physical health disorders through all stages and all levels of care.
3. The International Classification of Functioning, Disability and Health (ICF) framework should be used to develop person-centred lifestyle interventions.
4. As far as possible, delivery of lifestyle interventions should be coordinated within the interprofessional team and the scope of practice.
5. Delivery of lifestyle interventions should be evidence-based and in line with best practices in the best interest of the patient.
6. Health promotion strategies, including lifestyle advice and education about lifestyle factors, should be provided to all persons with comorbid mental and physical health disorders, and if more in-depth specific assessment and intervention is needed, referral to a healthcare professional with more in-depth knowledge should be done.

Section B: Sleep recommendations

1. Factors affecting sleep should be evaluated and managed as appropriate.
2. Physiotherapists should screen for quality and quantity of sleep and refer to appropriate healthcare professionals for diagnosis, monitoring and medical management of sleep disorders.
3. If a sleep disorder is diagnosed, a sleep hygiene programme is important in the management of patients with comorbid mental and physical health disorders.
4. Non-pharmacological interventions can be used by physiotherapists to assist with improving sleep, considering the person's preferences, goals, lifestyle and current health status.

Section C: Physical Activity and Exercise

1. Exercise should be a tailored approach depending on patient preferences, lifestyle and current health status and include a variety of physical activity and exercise types in a format preferred by the person, depending on their context and available resources.
2. Physiotherapists should monitor adherence to the exercise and provide ongoing support in a manner that is suitable to the person's environment and context.
3. Physical activity and exercise should be prescribed according to the specific aim or health needs of the person, encouraging regular, frequent physical activity and exercise. Additionally, the recommendations by WHO for exercise should be considered and guide exercise prescription.

Section D: Nutrition and weight management

1. Physiotherapists can provide basic health promotion strategies as it pertains to diet and weight management but should refer on to a qualified healthcare professional for more comprehensive management of eating patterns and diet to maintain overall health and well-being.
2. Collaboration with members of the interprofessional team should be considered in the management of nutrition and weight, according to the best available evidence.

Section E: Stress management

1. Stress management interventions should be targeted to the specific needs of the person and should be delivered within a biopsychosocial framework.
2. Physiotherapists should use psychologically informed practice when managing people with comorbid mental and physical health disorders, using a variety of modalities provided they are suitably trained, and it is within the scope of practice.
3. Stress management approaches which physiotherapists can use include mindfulness therapy, relaxation and deep breathing exercises, and the principles of cognitive behavioural therapy in the management of people with comorbid mental and physical health disorders.

7.5 Conclusion

This chapter integrated the findings from all three phases of the study to provide a comprehensive understanding of the development and contextualisation of lifestyle intervention recommendations for South African physiotherapists managing patients with mental disorders and comorbidities. The mixed-method approach emphasised both the potential and the challenges of implementing lifestyle interventions in this complex patient population.

While the GRADE framework provided a structured method for evaluating evidence and formulating recommendations, its use may be limited in addressing multifaceted interventions. The lack of high-quality systematic reviews and limited data on cost-effectiveness, equity, and patient input necessitated a consensus-based approach, supported by the Delphi method and local expert insights from FGDs.

The final recommendations emphasise a person-centred, context-sensitive approach to lifestyle interventions. Despite the modest effect sizes found in the literature, lifestyle interventions remain a valuable strategy for enhancing quality of life and supporting recovery in individuals with complex health needs.

Chapter 8

CONCLUSION

The aim and objectives of this study were to develop recommendations for physiotherapist-delivered lifestyle interventions for patients with comorbid mental and physical health disorders. This mixed-method, multiphase study employed an exploratory concurrent design to develop and contextualise recommendations for South African physiotherapists delivering lifestyle interventions to patients with mental disorders and comorbidities. It comprised three phases aligned with the study objectives: a systematic review and meta-analysis to assess existing evidence (Phase 1), a Delphi study to formulate expert consensus-based recommendations (Phase 2) and focus group discussions to evaluate the acceptability and applicability of these recommendations in the South African context (Phase 3). The aims and objectives of this study were met, although the strength of the recommendations, as determined by the GRADE methodology, the recommendations were not considered strong recommendations. This is because there is a lack of available literature regarding the use of lifestyle interventions in patients with mental disorders and physical comorbidities. As a result, the recommendations were more consensus-based and indicate that more research needs to be conducted in this area.

With the global rise in mental disorders, physiotherapists are increasingly likely to encounter patients with mental illnesses and related comorbidities in their practice. Neuropsychiatric disorders rank as the third leading cause of disability-adjusted life years (DALYs) in South Africa, highlighting the significant burden and high morbidity associated with mental illness in the country (Jacobs and Coetzee, 2018). Mental disorders, especially depression, commonly occur alongside non-communicable diseases (NCDs) like cardiovascular disorders. This co-occurrence complicates both prevention and treatment, placing additional pressure on healthcare services and negatively affecting population health (Folb et al., 2015).

Physiotherapists are the physical health experts and an integral part of the rehabilitation team. Physiotherapists treat patients with non-communicable diseases (NCDs) by using

lifestyle interventions, health education and health promotion, as well as patients with mental disorders (Hodgson et al., 2025; Shakya et al., 2024; Stubbs et al., 2014). Physiotherapists can therefore provide management strategies such as lifestyle interventions, which may positively impact the physical and mental health of the patient, making them a valuable part of the interprofessional team (IPT). Physiotherapy in mental health is a relatively new field in physiotherapy, in South Africa, and with limited research and experience, recommendations and CPGs are useful to help guide the management of patients with mental disorders.

Developing recommendations is a multistep approach, which was spread over three phases of data collection in this study. The first phase involved a systematic review of the literature, the second phase was a Delphi study, and the final phase included focus group discussions.

8.1 Phase One: Systematic review (see: Phase One)

In the first phase of the study, a systematic review of effectiveness was conducted to determine the best available evidence, as well as the quality of the evidence. The JBI methodology for systematic reviews of effectiveness was followed. Articles were included in the systematic review if they considered lifestyle interventions (physical activity and exercise, sleep, nutrition and stress management approaches) in adults over the age of 18 years who had comorbid mental disorders (depression, anxiety and bipolar disorder) and physical health disorders (cardiovascular disease, respiratory disorders, diabetes, obesity, metabolic syndrome or chronic musculoskeletal pain). The outcome of interest was quality of life. After full text screening, only four articles met the inclusion criteria, and two studies were included in the meta-analysis. Two articles considered diabetes and depression, one article considered obesity and depression, and the final article considered anxiety and asthma. The systematic review and meta-analysis found that lifestyle interventions, especially interventions that combined a psychological stress management component, cognitive behavioural therapy (CBT), and moderate intensity physical activity, had a small effect size on quality of life, but should be interpreted with caution. These effects were mostly on improving the mental disorder, and to a lesser extent, on the chronic illness of the person.

8.2 Phase Two: Delphi Study (see Phase Two)

As the findings from the systematic review were limited and based in high-income countries (HICs), further investigation was needed to support the findings and develop recommendations. The second phase of this study determined consensus, using the Delphi methodology, on the recommendations for all lifestyle interventions used by all healthcare professionals at an international, multidisciplinary level in the management of patients with comorbid mental and physical health disorders (see **Delphi Recommendations**). Fourteen participants completed the first round of the Delphi study, nine participants completed the second round of the Delphi study, and twelve participants completed the third and final round of the Delphi study.

Round one of the Delphi study included short and multiple-choice questions to assess the use of lifestyle interventions in clinical settings, with four open-ended questions focused on physical activity, nutrition, sleep, and stress management. Responses were thematically analysed, resulting in 50 items (41 statements, 3 MCQs, and 6 open-ended questions) for round two. One statement was discarded due to low consensus (<25%), while 25 statements reached 80% consensus. In round three, 18 statements from round two were re-evaluated, and participants could comment on accepted items, especially since not all had completed the previous round. The role of each healthcare professional was also explored in round three. Fourteen statements were presented for consensus in round three, as they had not achieved 80% consensus. These statements were then combined into recommendations, and 32 recommendations were included in the final recommendations. (see: **Delphi Recommendations**)

8.3 Phase three: Focus group discussions (see Phase Three)

The aim of phase three of the study was to determine the acceptability and feasibility of these recommendations to South African physiotherapists. The findings from the systematic review and the recommendations developed in the Delphi study were shared with 15 physiotherapists who participated in four FGDs.

Participants agreed that the recommendations were mostly feasible but that some minor changes were needed to make sure they were more acceptable to the environment and

context. Most of the participants agreed that the recommendations were more suitable to the private health care system, especially where the IPT worked closely together and considered the physiotherapists as part of the team. However, one participant reported that the recommendations were feasible in the public health system, although resources were limited and, as a result, patients were seen in group settings. In the FGDs, some changes were made to the recommendations, making them more suitable to the South African context. These included reducing the number of recommendations from 32 to 18, minor wording changes and placing the patient at the top of the list of priorities. (see **Physiotherapy recommendations**).

Following the three phases discussed above, the strength of the recommendations was determined using the GRADE methodology; however, due to the limited available evidence, lack of patient involvement, and the fact that cost-effectiveness, health equity and resources were not investigated, these recommendations were considered 'conditional'. With further research, these recommendations can be used to develop effective CPGs specifically for physiotherapists, to effectively manage patients with mental disorders and comorbidities, and to help improve their quality of life.

8.4 Strengths and limitations of the study

8.4.1. Strengths of the study

One of the main strengths of this study is the mixed-methods approach (rigorous methodology) to developing recommendations for physiotherapists managing patients with mental disorders and comorbidities. The systematic review and meta-analysis provided quantitative results for the effectiveness of lifestyle interventions in the management of this complex patient population. This provided a baseline for the development of recommendations as it provided evidence to support the use of certain lifestyle interventions to help improve the mental and physical domains of quality of life.

The international, multidisciplinary Delphi study (quantitative and qualitative data) further helped provide consensus on the recommendations for specific lifestyle interventions based on participants who have expertise in their specific healthcare profession. The qualitative component allowed the participants to provide their recommendations without

limitation or influence, and this was considered in the statements, which were developed after the third and final round.

The qualitative FGDs allowed for rich, in-depth interaction and data obtained from local physiotherapists. The data collected reflected the perceptions of physiotherapists of the delivery of lifestyle interventions in the management of patients with mental disorders and comorbidities in South Africa. It has also helped identify barriers to the management of these patients, which could further impact the recommendations developed.

While the local physiotherapists who participated in the FGDs all had some experience in mental health (research and/or clinical expertise), the setting and context of each participant varied. This allowed for a broad overview of the setting as well as varied views and opinions from the participants based on their experience and context, strengthening the recommendations and making them applicable to physiotherapists working in a variety of mental health settings. Due to the small number of participants and their limited availability, FGDs were smaller; this may have been a strength of the study, as the FGDs were easier to moderate and the voices of all participants could be heard.

8.4.2 Limitations of the study

The process for developing CPGs is complex and can be costly. Developing evidence-based statements and recommendations may serve as a starting point for CPGs, as they do not consider the implementation and evaluation of the CPGs.

There is a wealth of knowledge as it relates to lifestyle interventions to manage patients with either mental disorders or NCDs, but there is a dearth of evidence available relating to the effectiveness of lifestyle interventions in this patient cohort. The systematic review showed small effect sizes of the lifestyle interventions, and the quality of evidence was moderate, indicating that more research is needed in this patient population. Consequently, it was difficult to link the individual recommendations to the evidence.

No dieticians, psychologists, exercise physiologists, biokineticists, or social workers participated, which may have negatively impacted the available recommendations as they related to nutrition and stress management, as well as the holistic general recommendations, hence a lack of expertise for these recommendations.

Not all these lifestyle interventions are relevant to physiotherapy as they go beyond the scope of practice of physiotherapists. These lifestyle interventions include nutrition and many psychological strategies, in which physiotherapists are not adequately trained. Physiotherapists may, however, have some basic knowledge and information and can provide information on a basic level. Especially in health education/ prevention and health promotion, which is an integral part of primary health care service delivery and an invaluable member of the multidisciplinary team (MDT).

Substance cessation is also considered a lifestyle intervention, but this was not included in this study because no articles met the inclusion criteria for the systematic review. Additionally, participants in round one of the Delphi study indicated that the physiotherapists in their settings did not use substance cessation as a lifestyle intervention. Henceforth, the focus of this study was physical activity and exercise, sleep, nutrition and stress management.

Recruitment of participants for this study proved to be difficult. For the Delphi study, experts were identified from published literature; however, many did not respond to the invitation. Participation varied across rounds, with some contributors not completing round two, potentially impacting the study's outcomes and consensus rates. Recruitment for the FGDs was difficult, despite numerous attempts to invite participants. Most of the participants were from the private sector, possibly making these recommendations more applicable to the private healthcare sector. With more participants, particularly from the public healthcare sector, a broader view of both the private and public health sectors would have been possible, making the recommendations more applicable and generalisable to both healthcare sectors.

Patients who experience mental disorders and comorbidities were not invited to participate. This meant that the patient experience and preference were not considered when developing the recommendations, which is likely to have an impact on the final recommendations, and this, in turn, impacts the strength of the recommendations.

8.5 Recommendations

There are a few recommendations which can be determined from the study findings and the identified strengths and limitations. These include recommendations for research, education and clinical impact. These are listed below.

8.5.1 Recommendations for research

Research recommendations include:

- More high-level studies, such as randomised controlled trials (RCTs) should be conducted, which include the delivery of lifestyle interventions in patient populations which have mental disorders and multimorbidity to determine the effectiveness of lifestyle interventions specifically.
- More research is needed in South Africa to determine the use of lifestyle interventions and their effectiveness, applicability and feasibility in our local context. This will add to the limited body of evidence and will further strengthen recommendations and CPGs.
- The role of the physiotherapist in the mental health IPT and the management of patients with mental disorders should be further explored, as the management of patients with mental disorders should be holistic, keeping in mind the high mortality and morbidity rates in this patient population.
- Many of the developed evidence-based recommendations and CPGs are developed in HICs, and as such, may not be relevant in the context of LMICs like South Africa. Testing and adapting already developed CPGs in the local context may be a future research option, but the consideration of the patient context and setting should be included in this development.
- The finalised recommendations were developed by assessing and synthesising the available evidence, expert international consensus and local physiotherapists' perceptions and ideas. They can be used in their current form to guide the management in patients with mental disorders and comorbidities; however, dissemination, implementation and evaluation of these should be investigated, and this should include the patient's perceptions, preferences and needs.

- The systematic review excluded group interventions, which excluded many studies. Considering the resource constraints in LMICs such as South Africa, research into the effectiveness and cost-effectiveness of group interventions are needed and may make future CPGs more feasible in the public health sector as well.
- The systematic review consisted of RCTs which were published between 2011 and 2022. There has been a large amount of research conducted within the last few years, which is ongoing, and as such, it would be useful to update the systematic review at regular intervals.

8.5.2 Recommendations for education

Participants in this study highlighted the lack of knowledge among all healthcare professionals regarding the role of physiotherapy in mental health. This lack of knowledge affects patient and healthcare attitudes towards physiotherapy in the management of patients with mental disorders.

Recommendations for education include:

- The development of these recommendations will provide the knowledge needed to manage patients with mental disorders. This achievement in turn, can be used to inform curricula at higher education institutions at an undergraduate and postgraduate level to ensure graduates are equipped to manage patients with mental disorders, particularly in their community service year, if placed at a mental health facility, in the absence of a mentor.
- More consideration should be given to the inclusion of mental health in the physiotherapy undergraduate curriculum, with opportunities provided for students to participate in the management of patients with mental disorders at various levels of healthcare.
- It is recommended that the International Organisation of Physical Therapists in Mental Health (IOPTMH) minimum standards for training be applied in the context of undergraduate and postgraduate training (IOPTMH, 2020). This training document defines the minimum standards of training at undergraduate and

postgraduate levels, for physiotherapists to manage mental disorders ranging from common mental disorders (depression and anxiety), to SMIs such as schizophrenia.

- Providing suitable and ongoing training of physiotherapists in the management of patients with mental disorders, and with clear evidence-based recommendations, patient outcomes may improve, which helps decrease the burden of disease and improve quality of life for these patients.

8.5.3 Recommendations for clinical practice

This study developed recommendations for physiotherapists for the use of lifestyle interventions in the management of patients with comorbid mental and physical health disorders. These recommendations act as a starting point for the development of guidelines which can be used by physiotherapists; however, further development is needed.

Recommendations for clinical practice include:

- The finalised recommendations were developed by assessing and synthesising the available evidence, expert international consensus and local physiotherapists' perceptions and ideas. They can be used in their current form to guide the management of patients with mental disorders and comorbidities.
- Physiotherapy is an underutilised service in the interprofessional management of patients with mental disorders. This situation may largely be due to a lack of awareness and knowledge regarding the role of physiotherapy in mental disorders and comorbidities. By providing these recommendations, physiotherapy may be included as part of the IPT, providing services to patients with mental disorders.
- There is a lack of financial and human resources for physiotherapy services for patients with mental disorders, possibly due to the dearth of research in this area of physiotherapy. This lack of funding impedes physiotherapists from providing essential treatment for these patients, as well as patient access to holistic management. Funders rely on outcome-based measures and evidence-based

approaches when considering funding for managed care programmes. The use of these recommendations may ultimately affect patient outcomes positively.

8.6 CONCLUSION

In conclusion, this study developed recommendations for the use of lifestyle interventions by physiotherapists in the management of patients with comorbid mental and physical health disorders. It is trusted that the dissemination, implementation and evaluation of these recommendations will lead to improved patient care and assist in decreasing the burden of disease and improving quality of life for these patients.

"The important thing is not to stop questioning. Curiosity has its own reason for existing."

— Albert Einstein



REFERENCES

Aaron, R. V., Ravyts, S. G., Carnahan, N. D., Bhattiprolu, K., Harte, N., McCaulley, C. C., Vitalicia, L., Rogers, A. B., Wegener, S. T. and Dudeney, J. 2025. Prevalence of Depression and Anxiety among Adults with Chronic Pain: A Systematic Review and Meta-Analysis. *Journal of American Medical Association Network Open,* 8**,** e250268-e250268. https://doi.org/10.1001/jamanetworkopen.2025.0268

Abaraogu, U. O., Ogaga, M. O. and Dean, E. 2017. Practices of Nigerian Physiotherapists with Respect to Lifestyle Risk Factor Assessment and Intervention: A National Cross-Sectional Survey. *Physiotherapy Theory and Practice,* 33**,** 497-507. https://doi.org/10.1080/09593985.2017.1318421

Abaraogu, U. O., Ogaga, M. O., Odidika, E. and Frantz, J. 2016. Promotion of Healthy Nutrition in Clinical Practice: A Cross-Sectional Survey of Practices and Barriers among Physiotherapists in Southeast Nigeria. *Hong Kong Physiotherapy Journal,* 35**,** 21-29. https://doi.org/10.1016/j.hkpj.2016.05.002

Abouzed, M., Elsherbiny, A. M., Kamel, A., Salama, B., Elag, K. A., Abou Elzahab, N. F., Abdelkader, H. R. and Altuhayni, A. S. 2022. Relation of Depression and Anxiety Disorders in Choosing Obesity Management in Obese Patients. *International Journal of Preventive Medicine,* 13**,** 136. https://doi.org/10.4103/ijpvm.ijpvm_102_21

Afzal, M., Siddiqi, N., Ahmad, B., Afsheen, N., Aslam, F., Ali, A., Ayesha, R., Bryant, M., Holt, R. and Khalid, H. 2021. Prevalence of Overweight and Obesity in People with Severe Mental Illness: Systematic Review and Meta-Analysis. *Frontiers in Endocrinology,* 12**,** 769309. https://doi.org/10.3389/fendo.2021.769309

Alexander, E., Rosenthal, S. and Evans, C. 2012. Achieving Consensus on Recommendations for the Clinical Management of Overweight and Obese Adults for Canadian Physiotherapy Practice. *Physiotherapy Canada,* 64**,** 42-52. https://doi.org/10.3138/ptc.2010-39

Alkhatib, A., Nnyanzi, L. A., Mujuni, B., Amanya, G. and Ibingira, C. 2021. Preventing Multimorbidity with Lifestyle Interventions in Sub-Saharan Africa: A New Challenge for Public Health in Low and Middle-Income Countries. *International Journal Of Environmental Research And Public Health,* 18.https://doi.org/10.3390/ijerph182312449

Allen, L., O'connell, A. and Kiermer, V. 2019. How Can We Ensure Visibility and Diversity in Research Contributions? How the Contributor Role Taxonomy (Credit) Is Helping the Shift from Authorship to Contributorship. *Learned Publishing,* 32**,** 71-74. https://doi.org/10.1002/leap.1210

Allison, R. L. 2017. Back to Basics: The Effect of Healthy Diet and Exercise on Chronic Disease Management. *South Dakota Medicine: The Journal Of The South Dakota State Medical Association***,** 10-18

Allotey, P., Davey, T. and Reidpath, D. D. 2014. NCDs in Low and Middle-Income Countries-Assessing the Capacity of Health Systems to Respond to Population Needs. *BioMed Central: Public Health,* 14**,** S1. https://doi.org/10.1186/1471-2458-14-S2-S1

Alorayf, A. E. A., Alhamamah, M. a. M., Alhamamah, S. a. M., Alhamamah, H. a. M., Almasabi, F. M., Al Jamish, Y. a. A., Al-Aorif, F. M. A., Allajam, M. M. M., Alsoma, M. a. H. and Al Abbas, A. M. H. 2024. Evaluating the Effectiveness of Lifestyle Interventions in Preventing Chronic Diseases: A Systematic Review. *Journal of Ecohumanism,* 3**,** 4651-4659. https://doi.org/10.62754/joe.v3i7.4576

Alotaibi, M., Alotaibi, A., Alqahtani, A., Alghonaim, R., Alzahrani, S., Altamimi, T., Aljasser, D., Alqabbani, S. and Almuwais, A. 2024. Physiotherapists Lack Knowledge in Mental Health: A Survey of Knowledge and Attitudes of Physical Therapists About Their Role in Mental Health. *Journal of Multidisciplinary Healthcare,* 17**,** 2821-2830.10.2147/jmdh.S461746

Alotiby, A. 2024. Immunology of Stress: A Review Article. *Journal of Clinical Medicine,* 13**,** 6394. https://doi.org/10.3390/jcm13216394

Alsagoor, H. M. S., Alsagoor, M. M. H., Al Fadhil, S. H. B., Almushraaf, A. S. H., Almansour, A. M. A., Alqawban, S. M. H., Al Atiq, A. Q. H., Alghubari, F. M. M., Alyami, M. M. H. and Algahes, M. M. 2024. Patient-Centred Care Models in Primary Healthcare: A Systematic Review of Implementation and Outcomes. *Journal of Ecohumanism,* 3**,** 2682-2690. https://doi.org/10.62754/joe.v3i7.4667

Alsubaie, M., Abbott, R., Dunn, B., Dickens, C., Keil, T. F., Henley, W. and Kuyken, W. 2017. Mechanisms of Action in Mindfulness-Based Cognitive Therapy (MBCT) and Mindfulness-Based Stress Reduction (MBSR) in People with Physical and/or Psychological Conditions: A Systematic Review. *Clinical Psychology Review,* 55**,** 74-91. https://doi.org/0.1016/j.cpr.2017.04.008

Alvarez, E., Garvin, A., Germaine, N., Guidoni, L. and Schnurr, M. 2022. Use of Mental Health Interventions by Physiotherapists to Treat Individuals with Chronic Conditions: A Systematic Scoping Review. *Physiotherapy Canada,* 74**,** 35-43. https://doi.org/10.3138/ptc-2020-0066

Amanvermez, Y., Rahmadiana, M., Karyotaki, E., De Wit, L., Ebert, D. D., Kessler, R. C. and Cuijpers, P. 2023. Stress Management Interventions for College Students: A Systematic Review and Meta-Analysis. *Clinical Psychology: Science and Practice,* 30**,** 423. https://doi.org/10.1111/cpsp.12342

APA. 2013. *American Psychiatry Association: Diagnostic and Statistical Manual of Mental Disorders: Dsm-5™, 5th Ed,* Arlington, VA, US, American Psychiatric Publishing, Inc. https://doi.org/10.1176/appi.books.9780890425596

APA. 2019. *American Psychology Association Clinical Practice Guideline for the Treatment of Depression across Three Age Cohorts* [Online]. Available: https://www.apa.org/depression-guideline [Accessed 26 May 2025].

Apolinário-Hagen, J., Drüge, M., Danino, R. and Tasseit, S. 2023. Anxiety Disorders: Mindfulness-Based Cognitive Behavioral Therapy. *Handbook of Cognitive Behavioral Therapy by Disorder: Case Studies and Application for Adults.* https://doi.org/10.1016/B978-0-323-85726-0.00014-4

Ardern, C. L. 2016. Systematic Review Hacks for the Sports and Exercise Clinician: Five Essential Methodological Elements. *British Journal of Sports Medicine,* 50**,** 447-449. https://doi.org/10.1136/bjsports-2015-095548

Ashdown-Franks, G., Pilieci, C. and Sabiston, C. M. 2021. Physical Activity and Exercise in the Pathophysiology and Treatment of Bipolar Disorder. *In:* Quevedo, J., Carvalho, A. F. and Vieta, E. (eds.) *Neurobiology of Bipolar Disorder: Road to Novel Therapeutics.* San Diego, CA: Elsevier Academic Press. https://doi.org/10.1016/B978-0-12-819182-8.00035-1

Austin, F., Wright, K. E., Jackson, B., Budden, T., Mcmahen, C. and Furzer, B. J. 2025. Experiences of Exercise Services for Individuals with Severe Mental Illness: A Qualitative Approach. *Psychology of Sport and Exercise,* 78. https://doi.org/10.1016/j.psychsport.2025.102826

Baez, S. and Jochimsen, K. 2023. Current Clinical Concepts: Integration of Psychologically Informed Practice for Management of Patients with Sport-Related Injuries. *Journal of Athletic Training,* 58**,** 687-696. https://doi.org/10.4085/1062-6050-0556.22

Baillie, L. 2019. Exchanging Focus Groups for Individual Interviews When Collecting Qualitative Data. *Nurse Researcher,* 27.https://doi.org/10.7748/nr.2019.e1633

Bair, M. J. and Owen-Smith, A. A. 2024. Other Psychiatric Disorders, Psychosocial Factors, Sleep, and Pain. *Pain, the Opioid Epidemic, and Depression.* https://doi.org/10.1093/9780197675250.003.0006

Baker, A., Potter, J., Young, K. and Madan, I. 2011. The Applicability of Grading Systems for Guidelines. *Journal of Evaluation in Clinical Practice,* 17**,** 758-762. https://doi.org/10.1111/j.1365-2753.2011.01693.x

Ballin, M. and Nordström, P. 2021. Does Exercise Prevent Major Non-Communicable Diseases and Premature Mortality? A Critical Review Based on Results from Randomized Controlled Trials. *Journal of Internal Medicine,* 290**,** 1112-1129. https://doi.org/10.1111/joim.13353

Balshem, H., Helfand, M., Schünemann, H. J., Oxman, A. D., Kunz, R., Brozek, J., Vist, G. E., Falck-Ytter, Y., Meerpohl, J., Norris, S., et al. 2011. GRADE Guidelines: 3. Rating the Quality of Evidence. *Journal of Clinical Epidemiology,* 64**,** 401-406. https://doi.org/10.1016/j.jclinepi.2010.07.015

Bany-Yasin, H., Elmor, A. A., Ebrahim, B. K., Ahmed, A. A. M., Alarachi, M. R., Abedalqader, L., Amer, R., Alyousef, A. M. S., Alhajeh, Y. F., Alyoussef, A., et al. 2023. Exploration of the Nutrition Knowledge among General Population: Multi—National Study in Arab Countries. *BMC Public Health,* 23. https://doi.org/10.1186/s12889-023-15791-9

Baranwal, N., Yu, P. K. and Siegel, N. S. 2023. Sleep Physiology, Pathophysiology, and Sleep Hygiene. *Progress in Cardiovascular Disease,* 77**,** 59-69. https://doi.org/10.1016/j.pcad.2023.02.005

Barati, N. and Amini, Z. 2022. The Effect of Multicomponent Sleep Hygiene Education on Sleep Quality and Mental Health in Patients Suffering from Substance Abuse. *Current Psychology,* 41**,** 6474-6480.https://doi.org/10.1007/s12144-020-01145-w

Barber, T. M., Kabisch, S., Pfeiffer, A. F. H. and Weickert, M. O. 2024. Dietary and Lifestyle Strategies for Obesity. *Nutrients,* 16.https://doi.org/10.3390/nu16162714
Bassuk, S. S. and Manson, J. A. E. 2014. Physical Activity and Health in Women: A Review of the Epidemiologic Evidence. *American Journal of Lifestyle Medicine,* 8**,** 144-158. https://doi.org/10.1177/1559827613510870

Bauman, A. E., Fardy, H. J. and Harris, P. G. 2003. Getting It Right: Why Bother with Patient-Centred Care? *Medical Journal of Australia,* 179**,** 253-256. https://doi.org/10.5694/j.1326-5377.2003.tb05532.x

Baumeister, H., Hutter, N., Bengel, J. and Härter, M. 2011. Quality of Life in Medically Ill Persons with Comorbid Mental Disorders: A Systematic Review and Meta-Analysis. *Psychotherapy and Psychosomatics,* 80**,** 275-286.https://doi.org/10.1159/000323404

Beaufils, P., Dejour, D., Filardo, G., Monllau, J. C., Menetrey, J., Seil, R. and Becker, R. 2023. Esska Consensus Initiative: Why, When and How? *Journal of Experimental Orthopaedics,* 10.https://doi.org/10.1186/s40634-023-00664-2

Bell, E., Briffa, K., Mcloughlin, J. and Fary, R. 2025. Physiotherapy of the Trunk Related to Sitting Function after Stroke: A Delphi Study. *Clinical Rehabilitation,* 39**,** 524-535. https://doi.org/10.1177/02692155251322263

Beretta, V. 2021. Adopting Mixed Methods in Health Research: A Methodological Approach to Analyze Hta Development. *Contributions to Management Science.* https://doi.org/10.1007/978-3-030-70308-0_3

Blair, S. N., Cheng, Y. and Holder, J. S. 2001. Is Physical Activity or Physical Fitness More Important in Defining Health Benefits? *Medicine and Science in Sports and Exercise,* 33**,** S379-399; discussion S419-320. https://doi.org/10.1097/00005768-200106001-00007

Blonstein, A. C., Yank, V., Stafford, R. S., Wilson, S. R., Rosas, L. G. and Ma, J. 2013. Translating an Evidence-Based Lifestyle Intervention Program into Primary Care: Lessons Learned. *Health Promotion Practice,* 14**,** 491-497. https://doi.org/10.1177/1524839913481604

Bondesson, E., Larrosa Pardo, F., Stigmar, K., Ringqvist, Å., Petersson, I. F., Jöud, A. and Schelin, M. E. C. 2018. Comorbidity between Pain and Mental Illness – Evidence of a Bidirectional Relationship. *European Journal of Pain (United Kingdom),* 22**,** 1304-1311. https://doi.org/10.1002/ejp.1218

Borges, T. L., Miasso, A. I., Reisdofer, E., Dos Santos, M. A., Vedana, K. G. G. and Hegadoren, K. M. 2016. Common Mental Disorders in Primary Health Care Units: Associated Factors and Impact on Quality of Life. *Journal of the American Psychiatric Nurses Association,* 22**,** 378-386. https://doi.org/10.1177/1078390316655207

Bouma, S. E., Van Beek, J. F. E., Alma, M. A., Diercks, R. L., Van Der Woude, L. H. V., Van Den Akker-Scheek, I. and Stevens, M. 2022. What Affects the Implementation of Lifestyle Interventions in Patients with Osteoarthritis? A Multidisciplinary Focus Group Study among Healthcare Professionals. *Disability and Rehabilitation,* 44**,** 8283-8293. https://doi.org/10.1080/09638288.2021.2011438

Bradley, T., Campbell, E., Dray, J., Bartlem, K., Wye, P., Hanly, G., Gibson, L., Fehily, C., Bailey, J., Wynne, O., et al. 2022. Systematic Review of Lifestyle Interventions to Improve Weight, Physical Activity and Diet among People with a Mental Health Condition. *Systematic Reviews,* 11**,** 198. https://doi.org/10.1186/s13643-022-02067-3

Brandl, K., Rabadia, S. V., Chang, A. and Mandel, J. 2018. Benefit of Focus Group Discussion Beyond Online Survey in Course Evaluations by Medical Students in the United States: A Qualitative Study. *Journal of Educational Evaluation For Health Professions,* 15**,** 25. https://doi.org/10.3352/jeehp.2018.15.25

Brattmyr, M., Lindberg, M. S., Lundqvist, J., Solem, S., Hjemdal, O., Anyan, F. and Havnen, A. 2023. Symptoms and Prevalence of Common Mental Disorders in a Heterogenous Outpatient Sample: An Investigation of Clinical Characteristics and Latent Subgroups. *BMC Psychiatry,* 23.https://doi.org/10.1186/s12888-023-05314-6

Braun, V. and Clarke, V. 2006. Using Thematic Analysis in Psychology. *Qualitative Research in Psychology,* 3**,** 77-101.https://doi.org/10.1191/1478088706qp063oa

Bremner, J. D., Moazzami, K., Wittbrodt, M. T., Nye, J. A., Lima, B. B., Gillespie, C. F., Rapaport, M. H., Pearce, B. D., Shah, A. J. and Vaccarino, V. 2020. Diet, Stress and Mental Health. *Nutrients,* 12**,** 1-27.https://doi.org/10.3390/nu12082428

Brignardello-Petersen, R., Carrasco-Labra, A. and Guyatt, G. H. 2021. How to Interpret and Use a Clinical Practice Guideline or Recommendation: Users' Guides to the Medical Literature. *Journal of the American Medical Association,* 326**,** 1516-1523. https://doi.org/10.1001/jama.2021.15319

Briguglio, M., Vitale, J. A., Galentino, R., Banfi, G., Zanaboni Dina, C., Bona, A., Panzica, G., Porta, M., Dell'osso, B. and Glick, I. D. 2020. Healthy Eating, Physical Activity, and Sleep Hygiene (HEPAS) as the Winning Triad for Sustaining Physical and Mental Health in Patients at Risk for or with Neuropsychiatric Disorders: Considerations for Clinical Practice. *Neuropsychiatric Disease and Treatment,* 16**,** 55-70. https://doi.org/10.2147/NDT.S229206

Brunner, E., De Herdt, A., Minguet, P., Baldew, S. S. and Probst, M. 2013. Can Cognitive Behavioural Therapy Based Strategies Be Integrated into Physiotherapy for the Prevention of Chronic Low Back Pain? A Systematic Review. *Disability and Rehabilitation,* 35**,** 1-10.https://doi.org/10.3109/09638288.2012.683848

Buchanan-Barker, P. and Barker, P. 2024. The Tidal Model. *Palliative Care within Mental Health: Principles and Philosophy.*https://doi.org/10.1201/9781003579625-2

Bucher, J. 2021. Inductive Reasoning. *The Encyclopedia of Research Methods in Criminology and Criminal Justice: Volume II: Parts 5-8.* https://doi.org/10.1002/9781119111931.ch36

Budreviciute, A., Damiati, S., Sabir, D. K., Onder, K., Schuller-Goetzburg, P., Plakys, G., Katileviciute, A., Khoja, S. and Kodzius, R. 2020. Management and Prevention Strategies for Non-Communicable Diseases (NCDs) and Their Risk Factors. *Frontiers in Public Health,* 8**,** 574111. https://doi.org/10.3389/fpubh.2020.574111

Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., Carty, C., Chaput, J. P., Chastin, S., Chou, R., et al. 2020. World Health Organization 2020 Guidelines on Physical Activity and Sedentary Behaviour. *British Journal of Sports Medicine,* 54**,** 1451-1462.https://doi.org/10.1136/bjsports-2020-102955

Butterly, E. W., Hanlon, P., Shah, A. S. V., Hannigan, L. J., Mcintosh, E., Lewsey, J., Wild, S. H., Guthrie, B., Mair, F. S., Kent, D. M., et al. 2023. Comorbidity and Health-Related Quality of Life in People with a Chronic Medical Condition in Randomised Clinical Trials: An Individual Participant Data Meta-Analysis. *PLoS Medicine,* 20**,** e1004154. https://doi.org/10.1371/journal.pmed.1004154

Campagna, V. and Lee-Riley, L. 2025. Interprofessional Collaboration as a Best Practice across the Care Continuum. *Professional Case Management,* 30**,** 100-106. https://doi.org/10.1097/NCM.0000000000000793

Carcary, M. 2020. The Research Audit Trail: Methodological Guidance for Application in Practice. *Electronic Journal of Business Research Methods,* 18**,** 166-177. https://doi.org/10.34190/JBRM.18.2.008

Carlsen, B. and Glenton, C. 2011. What About N? A Methodological Study of Sample-Size Reporting in Focus Group Studies. *BMC Medical Research Methodology,* 11. https://doi.org/10.1186/1471-2288-11-26

Carraça, E. V., Rodrigues, B. and Sánchez-Oliva, D. 2024. A Healthier Movement Behavior Profile Is Associated with Body-Congruent Food Choices through Self-Determined Motivations to Exercise and Regulate Eating. *European Journal of Sport Science,* 24**,** 352-363. https://doi.org/10.1002/ejsc.12092

Caspersen, C. J., Powell, K. E. and Christenson, G. M. 1985. Physical Activity, Exercise, and Physical Fitness: Definitions and Distinctions for Health-Related Research. *Public Health Reports,* 100**,** 126

Castaldelli-Maia, J. M. and Bhugra, D. 2022. Analysis of Global Prevalence of Mental and Substance Use Disorders within Countries: Focus on Sociodemographic Characteristics and Income Levels. *International Review of Psychiatry,* 34**,** 6-15. https://doi.org/0.1080/09540261.2022.2040450

Cena, H., Vandoni, M., Magenes, V. C., Napoli, I. D., Marin, L., Baldassarre, P., Luzzi, A., De Pasquale, F., Zuccotti, G. and Calcaterra, V. 2022. Benefits of Exercise in Multidisciplinary Treatment of Binge Eating Disorder in Adolescents with Obesity. *International Journal Of Environmental Research And Public Health,* 19. https://doi.org/10.3390/ijerph19148300

Chalmers, J. and Armour, M. 2019. The Delphi Technique. *Handbook of Research Methods in Health Social Sciences.* https://doi.org/10.1007/978-981-10-5251-4_99

Chan, J. K. N., Correll, C. U., Wong, C. S. M., Chu, R. S. T., Fung, V. S. C., Wong, G. H. S., Lei, J. H. C. and Chang, W. C. 2023. Life Expectancy and Years of Potential Life Lost in People with Mental Disorders: A Systematic Review and Meta-Analysis. *eClinicalMedicine,* 65. https://doi.org/10.1016/j.eclinm.2023.102294

Chandler, J., Cumpston, M., Li, T., Page, M. J. and Welch, V. 2019. Cochrane Handbook for Systematic Reviews of Interventions. *Hoboken: Wiley,* 4**,** 14651858. https://doi.org.10.1002/9781119536604

Checkley, W., Ghannem, H., Irazola, V., Kimaiyo, S., Levitt, N. S., Miranda, J. J., Niessen, L., Prabhakaran, D., Rabadán-Diehl, C. and Ramirez-Zea, M. 2014.

Management of NCD in Low-and Middle-Income Countries. *Global Heart,* 9**,** 431-443. https://doi.org/10.1016/j.gheart.2014.11.003

Chen, T., Wang, J., Wang, Y. Q. and Chu, Y. X. 2022. Current Understanding of the Neural Circuitry in the Comorbidity of Chronic Pain and Anxiety. *Neural Plasticity*. https://doi.org/10.1155/2022/4217593

Christensen, M. A., Bettencourt, L., Kaye, L., Moturu, S. T., Nguyen, K. T., Olgin, J. E., Pletcher, M. J. and Marcus, G. M. 2016. Direct Measurements of Smartphone Screen-Time: Relationships with Demographics and Sleep. *PloS One,* 11. https://doi.org/10.1371/journal.pone.0165331

Chu, H., Ni, K., Zeng, L., Li, N., Fetters, M. D., Tao, L., Shi, Y., Zhang, H., Wang, X. and Zhao, Y. 2018. The Application of Mixed Methods Research in Real World Studies. *Chinese Journal of Evidence-Based Medicine,* 18**,** 1203-1206. https://doi.org/10.7507/1672-2531.201808035

Chu, J. and Mehrzad, R. 2020. Psychosocial Factors and Outcomes of Obesity. *Obesity: Global Impact and Epidemiology.* https://doi.org/10.1016/B978-0-12-818839-2.00007-7

Chwastiak, L., Vanderlip, E. and Katon, W. 2014. Treating Complexity: Collaborative Care for Multiple Chronic Conditions. *International Review of Psychiatry,* 26**,** 638-647. https://doi.org/10.3109/09540261.2014.969689

Clauw, D. J., Essex, M. N., Pitman, V. and Jones, K. D. 2019. Reframing Chronic Pain as a Disease, Not a Symptom: Rationale and Implications for Pain Management. *Postgraduate Medicine,* 131**,** 185-198. https://doi.org/10.1080/00325481.2019.1574403

Connaughton, J. and Gibson, W. 2016. Do Physiotherapists Have the Skill to Engage in the “Psychological” in the Bio-Psychosocial Approach? *Physiotherapy Canada,* 68**,** 377-382. https://doi.org/10.3138/ptc.2015-66

Conrad, S., Kaiser, L., Kallenbach, M., Meerpohl, J. and Morche, J. 2019. Grade: Evidence to Decision (Etd) Frameworks - a Systematic and Transparent Approach to Making Well Informed Healthcare Choices. 2: Clinical Guidelines. *Zeitschrift fur Evidenz, Fortbildung und Qualitat im Gesundheitswesen,* 140**,** 63-73. https://doi.org/10.1016/j.zefq.2019.02.006

Cooney, L. G., Milman, L. W., Hantsoo, L., Kornfield, S., Sammel, M. D., Allison, K. C., Epperson, C. N. and Dokras, A. 2018. Cognitive-Behavioral Therapy Improves Weight Loss and Quality of Life in Women with Polycystic Ovary Syndrome: A Pilot Randomized Clinical Trial. *Fertility and Sterility,* 110**,** 161 - 171.e161. https://doi.org/10.1016/j.fertnstert.2018.03.028

Cooper, N. a. M., Khan, K. S. and Clark, T. J. 2015. Evidence Quality in Clinical Guidelines: A Comparison of Two Methods. *Acta Obstetricia Et Gynecologica Scandinavica,* 94**,** 1283-1289. https://doi.org/10.1111/aogs.12759

Corsica, J. A. and Bradley, L. E. 2017. Stress Management. *In:* Kreutzer, J., Deluca, J. and Caplan, B. (eds.) *Encyclopedia of Clinical Neuropsychology.* Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-56782-2_429-3

Cortese, S., Faraone, S. V., Bernardi, S., Wang, S. and Blanco, C. 2016. Gender Differences in Adult Attention-Deficit/Hyperactivity Disorder: Results from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Journal of Clinical Psychiatry,* 77**,** e421-e428. https://doi.org/10.4088/JCP.14m09630

Craig, A., Rochat, T., Naicker, S. N., Mapanga, W., Mtintsilana, A., Dlamini, S. N., Ware, L. J., Du Toit, J., Draper, C. E., Richter, L., et al. 2022. The Prevalence of Probable Depression and Probable Anxiety, and Associations with Adverse Childhood Experiences and Socio-Demographics: A National Survey in South Africa. *Frontiers in Public Health,* 10**,** 986531.https://doi.org/10.3389/fpubh.2022.986531

Croatto, G., Vancampfort, D., Miola, A., Olivola, M., Fiedorowicz, J. G., Firth, J., Alexinschi, O., Gaina, M. A., Makkai, V., Soares, F. C., et al. 2023. The Impact of Pharmacological and Non-Pharmacological Interventions on Physical Health Outcomes in People with Mood Disorders across the Lifespan: An Umbrella Review of the Evidence from Randomised Controlled Trials. *Molecular Psychiatry,* 28**,** 369-390. https://doi.org/10.1038/s41380-022-01770-w

Croucher, S. M. 2024. Focus Groups. *Understanding Communication Research Methods: A Theoretical and Practical Approach, Fourth Edition.* Taylor and Francis. https://doi.org/10.4324/9781003432173-13

Culleton, B. 2015. Evidence-Based Decision-Making 4: Development and Limitations of Clinical Practice Guidelines. *Methods in Molecular Biology,* 1281**,** 443-453. https://doi.org/10.1007/978-1-4939-2428-8_26

Cura Della Redazione, A. 2014. Clinical Practice Guidelines: What They Are and How They Are Developed. *Assistenza Infermieristica E Ricerca : AIR,* 33**,** 214-218. https://doi.org/10.1702/1702.18562

Dannecker, C., Hummel, J. and Fritsche, L. 2020. Long-Term Effects of Diabetes Prevention Measures: Are There Effects Beyond Pure Diabetes Prevention? *Diabetologe,* 16**,** 215-219. https://doi.org/10.1007/s11428-020-00593-z

Dauwan, M., Begemann, M. J. H., Slot, M. I. E., Lee, E. H. M., Scheltens, P. and Sommer, I. E. C. 2021. Physical Exercise Improves Quality of Life, Depressive Symptoms, and Cognition across Chronic Brain Disorders: A Transdiagnostic

Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Journal of Neurology,* 268**,** 1222-1246. https://doi.org/10.1007/s00415-019-09493-9

De Biase, S., Milioli, G., Grassi, A., Lorenzut, S., Parrino, L. and Gigli, G. L. 2014. Sleep Hygiene. *Sleepiness and Human Impact Assessment.* https://doi.org/10.1007/978-88-470-5388-5_27

De Hert, M., Correll, C. U., Bobes, J., Cetkovich-Bakmas, M., Cohen, D., Asai, I., Detraux, J., Gautam, S., Möller, H.-J. and Ndetei, D. M. 2011. Physical Illness in Patients with Severe Mental Disorders. I. Prevalence, Impact of Medications and Disparities in Health Care. *World Psychiatry,* 10**,** 52-77. https://doi.org/10.1002/j.2051-5545.2011.tb00036.x

De Pasquale, C., El Kazzi, M., Sutherland, K., Shriane, A. E., Vincent, G. E., Cistulli, P. A. and Bin, Y. S. 2024. Sleep Hygiene - What Do We Mean? A Bibliographic Review. *Sleep Medicine Reviews,* 75**,** 101930. https://doi.org/10.1016/j.smrv.2024.101930

Derman, E., Patel, D., Nossel, C. and Schwellnus, M. 2008. Healthy Lifestyle Interventions in General Practice: Part 1: An Introduction to Lifestyle and Diseases of Lifestyle. *South African Family Practice,* 50**,** 6-12. https://doi.org/10.1080/20786204.2008.10873732

Devi, R., Kanitkar, K., Narendhar, R., Sehmi, K. and Subramaniam, K. 2020. A Narrative Review of the Patient Journey through the Lens of Non-Communicable Diseases in Low- and Middle-Income Countries. *Advances in Therapy,* 37**,** 4808-4830. https://doi.org/10.1007/s12325-020-01519-3

Dias, S. and Gama, A. 2018. The Potential of Focus Groups in Health Research: A Study on Immigrants' Access to and Utilization of Health Services. *Advances in Health and Disease.*

Dixon, L. B., Holoshitz, Y. and Nossel, I. 2016. Treatment Engagement of Individuals Experiencing Mental Illness: Review and Update. *World Psychiatry,* 15**,** 13-20. https://doi.org.10.1002/wps.20306

Docrat, S., Besada, D., Cleary, S., Daviaud, E. and Lund, C. 2019. Mental Health System Costs, Resources and Constraints in South Africa: A National Survey. *Health Policy and Planning,* 34**,** 706-719. https://doi.org/10.1093/heapol/czz085

Domaszewski, P., Rogowska, A. M. and Żylak, K. 2024. Examining Associations between Fasting Behavior, Orthorexia Nervosa, and Eating Disorders. *Nutrients,* 16. https://doi.org/10.3390/nu16244275

Doren, S., Schwab, S. M., Bigner, K., Calvelage, J., Preston, K., Laughlin, A., Drury, C., Tincher, B., Carl, D., Awosika, O. O., et al. 2023. Evaluating the Neural Underpinnings

of Motivation for Walking Exercise. *Physical therapy,* 104. https://doi.org/10.1093/ptj/pzad159

Dunn, A. L., Andersen, R. E. and Jakicic, J. M. 1998. Lifestyle Physical Activity Interventions. History, Short- and Long-Term Effects, and Recommendations. *American Journal of Preventive Medicine,* 15**,** 398-412. https://doi.org/10.1016/s0749-3797(98)00084-1

Eadie, J., Van De Water, A. T., Lonsdale, C., Tully, M. A., Van Mechelen, W., Boreham, C. A., Daly, L., McDonough, S. M. and Hurley, D. A. 2013. Physiotherapy for Sleep Disturbance in People with Chronic Low Back Pain: Results of a Feasibility Randomized Controlled Trial. *Archives of Physical Medicine and Rehabilitation,* 94**,** 2083-2092. https://doi.org/10.1016/j.apmr.2013.04.017

Ee, C., Lake, J., Firth, J., Hargraves, F., De Manincor, M., Meade, T., Marx, W. and Sarris, J. 2020. An Integrative Collaborative Care Model for People with Mental Illness and Physical Comorbidities. *International Journal of Mental Health Systems,* 14**,** 83. https://doi.org/10.1186/s13033-020-00410-6

Eibling, D., Fried, M., Blitzer, A. and Postma, G. 2014. Commentary on the Role of Expert Opinion in Developing Evidence-Based Guidelines. *Laryngoscope,* 124**,** 355-357. https://doi.org/10.1002/lary.24175

Fadipe, M. F., Aggarwal, S., Johnson, C. and Beauchamp, J. E. S. 2023. Effectiveness of Online Cognitive Behavioural Therapy on Quality of Life in Adults with Depression: A Systematic Review. *Journal of Psychiatry and Mental Health Nursing,* 30**,** 885-898. https://doi.org/10.1111/jpm.12924

Fan, Y., Fan, A., Yang, Z. and Fan, D. 2025. Global Burden of Mental Disorders in 204 Countries and Territories, 1990–2021: Results from the Global Burden of Disease Study 2021. *BMC Psychiatry,* 25. https://doi.org/10.1186/s12888-025-06932-y

Farhud, D. 2015. Impact of Lifestyle on Health. *Iranian Journal of Public Health,* 44**,** 1442-1444. https://doi.org/10.18502/ijph.v44i11.5299

Farris, S. G. and Abrantes, A. M. 2020. Mental Health Benefits from Lifestyle Physical Activity Interventions: A Systematic Review. *Bull Menninger Clin,* 84**,** 337-372. https://doi.org/10.1521/bumc.2020.84.4.337

Fenn, K. and Byrne, M. 2013. The Key Principles of Cognitive Behavioural Therapy. *InnovAiT,* 6**,** 579-585. https://doi.org/10.1177/1755738012471029

Fentie, D. and Derese, T. 2022. Prevalence and Associated Factors of Overweight/Obesity among Severely Ill Psychiatric Patients in Eastern Ethiopia: A Comparative Cross-Sectional Study. *PLOS ONE,* 17. 579–585. https://doi.org/10.1371/journal.pone.0264461

Fernandes, V., Rodrigues, F., Jacinto, M., Teixeira, D., Cid, L., Antunes, R., Matos, R., Reigal, R., Hernández-Mendo, A., Morales-Sánchez, V., et al. 2023. How Does the Level of Physical Activity Influence Eating Behavior? A Self-Determination Theory Approach. *Life,* 13. https://doi.org/10.3390/life13020298

Ferrari, A. J., Santomauro, D. F., Aali, A., Abate, Y. H., Abbafati, C., Abbastabar, H., Abd Elhafeez, S., Abdelmasseh, M., Abd-Elsalam, S. and Abdollahi, A. 2024. Global Incidence, Prevalence, Years Lived with Disability (YLDS), Disability-Adjusted Life-Years (DALYS), and Healthy Life Expectancy (HALE) for 371 Diseases and Injuries in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021. *The Lancet,* 403**,** 2133-2161
Fetters, M. D., Curry, L. A. and Creswell, J. W. 2013. Achieving Integration in Mixed Methods Designs-Principles and Practices. *Health Serv Res,* 48**,** 2134-2156. https://doi.org/10.1111/1475-6773.12117

Filipčić, I. and Filipčić, I. Š. 2020. Chronic Physical Illness, Multimorbidity and Their Effects on Psychiatric Treatment Outcomes. *European Psychiatry,* 63**,** S28-S28. https://doi.org/10.1016/j.eurpsy.2020.01.064

Fink, G. 2010. Stress: Definition and History. *Stress Science: Neuroendocrinology,* 3**,** 3-14. https://doi.org/10.1016/B978-008045046-9.00076-0

Firth, J., Siddiqi, N., Koyanagi, A., Siskind, D., Rosenbaum, S., Galletly, C., Allan, S., Caneo, C., Carney, R. and Carvalho, A. F. 2019. The Lancet Psychiatry Commission: A Blueprint for Protecting Physical Health in People with Mental Illness. *The Lancet Psychiatry,* 6**,** 675-712. https://doi.org/10.1016/S2215-0366(19)30132-430132-4)

Firth, J., Solmi, M., Wootton, R. E., Vancampfort, D., Schuch, F. B., Hoare, E., Gilbody, S., Torous, J., Teasdale, S. B. and Jackson, S. E. 2020. A Meta‐Review of "Lifestyle Psychiatry": The Role of Exercise, Smoking, Diet and Sleep in the Prevention and Treatment of Mental Disorders. *World Psychiatry,* 19**,** 360-380. https://doi.org/10.1002/wps.20773

Fisher, B., Dennison, E., McDonald, H., Rimmer, T. and Fallowfield, J. L. 2025. Can Healthcare Practitioners Deliver Health Behaviour Change to Patients with Musculoskeletal Injuries as Part of Routine Care?: A Feasibility Study. *Physiotherapy,* 127**,** 101461. https://doi.org/10.1016/j.physio.2024.101461

Folb, N., Timmerman, V., Levitt, N. S., Steyn, K., Bachmann, M. O., Lund, C., Bateman, E. D., Lombard, C., Gaziano, T. A., Zwarenstein, M., et al. 2015. Multimorbidity, Control and Treatment of Noncommunicable Diseases among Primary Healthcare Attenders in the Western Cape, South Africa. *South African Medical Journal,* 105**,** 642-647. https://doi.org/10.7196/samjnew.8794

Fordham, B., Sugavanam, T., Edwards, K., Hemming, K., Howick, J., Copsey, B., Lee, H., Kaidesoja, M., Kirtley, S., Hopewell, S., et al. 2021. Cognitive-Behavioural Therapy for a Variety of Conditions: An Overview of Systematic Reviews and Panoramic Meta-Analysis. *Health Technology Assessment,* 25**,** 1-378.https://doi.org/10.3310/hta25090

Frange, C., Franco, A. M., Brasil, E., Hirata, R. P., Lino, J. A., Mortari, D. M., Ykeda, D. S., Leocádio-Miguel, M. A., D'aurea, C. V. R., E Silva, L. O., et al. 2022. Practice Recommendations for the Role of Physiotherapy in the Management of Sleep Disorders: The 2022 Brazilian Sleep Association Guidelines. *Sleep Science,* 15**,** 515-573. https://doi.org/10.5935/1984-0063.20220083

Furness, J., Phillips, J., Canetti, E. and Kemp-Smith, K. 2025. Exploring Mental Health Approaches and Curriculum in Physiotherapy: An Australasian Perspective. *Physiotherapy Theory and Practice,* 41**,** 207-221. https://doi.org/10.1080/09593985.2024.2316308

Galanis, P. 2018. Data Analysis in Qualitative Research: Thematic Analysis. *Archives of Hellenic Medicine,* 35**,** 416-421

Galderisi, S., Heinz, A., Kastrup, M., Beezhold, J. and Sartorius, N. 2015. Toward a New Definition of Mental Health. *World Psychiatry,* 14**,** 231-233. https://doi.org/10.1002/wps.20231

Ganju, A., Goulart, A. C., Ray, A., Majumdar, A., Jeffers, B. W., Llamosa, G., Cañizares, H., Ramos-Cañizares, I. J., Fadhil, I., Subramaniam, K., et al. 2020. Systemic Solutions for Addressing Non-Communicable Diseases in Low-and Middle-Income Countries. *Journal of Multidisciplinary Healthcare* [Online], 13. https://doi.org/10.2147/JMDH.S252300

GBD 2019 Mental Disorders Collaborators. 2022. Global, Regional, and National Burden of 12 Mental Disorders in 204 Countries and Territories, 1990–2019: A Systematic Analysis for the Global Burden of Disease Study 2019. *The Lancet Psychiatry,* 9**,** 137-150. https://doi.org/10.1016/S2215-0366(21)00395-300395-3)

Goesling, J., Clauw, D. J. and Hassett, A. L. 2013. Pain and Depression: An Integrative Review of Neurobiological and Psychological Factors. *Current Psychiatry Reports,* 15**,** 1-8. https://doi.org/10.1007/s11920-013-0421-0

Gopalkrishnan, N. and Babacan, H. 2015. Cultural Diversity and Mental Health. *Australasian Psychiatry,* 23**,** 6-8. https://doi.org/10.1177/1039856215609769

Gorman, J. M. 2016. Combining Psychodynamic Psychotherapy and Pharmacotherapy. *Psychodynamic Psychiatry,* 44**,** 183-209. https://doi.org/10.1521/pdps.2016.44.2.183

GRADE Working Group.2013. GRADE Handbook. Aviailable at: https://gdt.gradepro.org/app/handbook/handbook.html. [Accessed 22 July 2025]

Granero, R. 2022. Role of Nutrition and Diet on Healthy Mental State. *Nutrients 14(4), 1-7.https://doi.org/10.3390/nu14040750*

Granholm, A., Al Duhailib, Z., Alhazzani, W., Oczkowski, S., Belley-Cote, E. and Møller, M. H. 2024. Grade Pearls and Pitfalls—Part 2: Clinical Practice Guidelines. *Acta Anaesthesiologica Scandinavica,* 68**,** 593-600 .https://doi.org/10.1111/aas.14384

Greene, M. C., Yangchen, T., Lehner, T., Sullivan, P. F., Pato, C. N., McIntosh, A., Walters, J., Gouveia, L. C., Msefula, C. L. and Fumo, W. 2021. The Epidemiology of Psychiatric Disorders in Africa: A Scoping Review. *The Lancet Psychiatry,* 8**,** 717-731. https://doi.org/10.1016/S2215-0366(21)00009-200009-2)

Greeson, J. M. and Chin, G. R. 2019. Mindfulness and Physical Disease: A Concise Review. *Current Opinion in Psychology,* 28**,** 204-210. https://doi.org/10.1016/j.copsyc.2018.12.014

Grimmer, K., Louw, Q., Dizon, J. M., Brown, S. M., Ernstzen, D. and Wiysonge, C. S. 2019. A South African Experience in Applying the Adopt-Contextualise-Adapt Framework to Stroke Rehabilitation Clinical Practice Guidelines. *Health Research Policy and Systems,* 17.https://doi.org/10.1186/s12961-019-0454-x

Grossman, P., Niemann, L., Schmidt, S. and Walach, H. 2004. Mindfulness-Based Stress Reduction and Health Benefits: A Meta-Analysis. *Journal of Psychosomatic Research,* 57**,** 35-43. https://doi.org/10.1016/S0022-3999(03)00573-7

Grunberg, V. A., McDermott, K. A., Manglani, H. R., Rush, C. L., Hooker, J. E., Jochimsen, K. N. and Vranceanu, A. M. 2024. Building Interdisciplinary Collaborations across Healthcare Settings. *Massachusetts General Hospital Handbook of General Hospital Psychiatry, 8th Edition.* https://doi.org/10.1016/B978-0-443-11895-1.00053-7

Guest, G., Namey, E., Taylor, J., Eley, N. and McKenna, K. 2017. Comparing Focus Groups and Individual Interviews: Findings from a Randomized Study. *International Journal of Social Research Methodology,* 20**,** 693-708. https://doi.org/10.1080/13645579.2017.1281601

Guyatt, G. H., Oxman, A. D., Kunz, R., Vist, G. E., Falck-Ytter, Y. and Schünemann, H. J. 2008a. What Is “Quality of Evidence” and Why Is It Important to Clinicians? *BMJ,* 336**,** 995-998. https://doi.org/10.1136/bmj.39490.551019.BE

Guyatt, G. H., Oxman, A. D., Vist, G. E., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P. and Schünemann, H. J. 2008b. Grade: An Emerging Consensus on Rating Quality of Evidence and Strength of Recommendations. *BMJ,* 336**,** 924-926. https://doi.org/10.1136/bmj.39489.470347.AD

Hachuła, M., Kosowski, M., Zielańska, K., Basiak, M. and Okopień, B. 2023. The Impact of Various Methods of Obesity Treatment on the Quality of Life and Mental Health—a

Narrative Review. *International Journal Of Environmental Research And Public Health,* 20. https://doi.org/10.3390/ijerph20032122

Hall, A., Richmond, H., Copsey, B., Hansen, Z., Williamson, E., Jones, G., Fordham, B., Cooper, Z. and Lamb, S. 2018. Physiotherapist-Delivered Cognitive-Behavioural Interventions Are Effective for Low Back Pain, but Can They Be Replicated in Clinical Practice? A Systematic Review. *Disability and Rehabilitation,* 40**,** 1-9. https://doi.org/10.1080/09638288.2016.1236155

Halstead, S., Sartorius, N., Every-Palmer, S., Siddiqi, N., De Girolamo, G., Siskind, D. and Warren, N. 2024. Physical Multimorbidity and Mental Illness: A Global Challenge. *Australian & New Zealand Journal of Psychiatry* https://doi.org/10.1177/00048674241235587

Hamdani, S. U., Zafar, S. W., Suleman, N., Waqas, A. and Rahman, A. 2022. Effectiveness of Relaxation Techniques 'as an Active Ingredient of Psychological Interventions' to Reduce Distress, Anxiety and Depression in Adolescents: A Systematic Review and Meta-Analysis. *International Journal of Mental Health Systems,* 16.https://doi.org/10.1186/s13033-022-00541-y

Hamilton, J. B. 2020. Rigor in Qualitative Methods: An Evaluation of Strategies among Underrepresented Rural Communities. *Qualitative Health Research,* 30**,** 196-204. https://doi.org/10.1177/1049732319860267

Hancock, M. E., Amankwaa, L., Revell, M. A. and Mueller, D. 2016. Focus Group Data Saturation: A New Approach to Data Analysis. *Qualitative Report,* 21**,** 2124-2130. https://doi.org/10.46743/2160-3715/2016.2330

Harris, M., Dennis, S. and Pillay, M. 2013. Multimorbidity: Negotiating Priorities and Making Progress. *Australian Family Physician,* 42**,** 850-854

Harris, P. A., Taylor, R., Minor, B. L., Elliott, V., Fernandez, M., O'neal, L., Mcleod, L., Delacqua, G., Delacqua, F. and Kirby, J. 2019. The Redcap Consortium: Building an International Community of Software Platform Partners. *Journal of Biomedical Informatics,* 95**,** 103208. https://doi.org/10.1016/j.jbi.2019.103208

Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N. and Conde, J. G. 2009. Research Electronic Data Capture (REDCap)—a Metadata-Driven Methodology and Workflow Process for Providing Translational Research Informatics Support. *Journal of Biomedical Informatics,* 42**,** 377-381. https://doi.org/10.1016/j.jbi.2008.08.010

Hassan, Y., Head, V., Jacob, D., Bachmann, M., Diu, S. and Ford, J. 2016. Lifestyle Interventions for Weight Loss in Adults with Severe Obesity: A Systematic Review. *Clinical Obesity*, 6 (6), 395–403. https://doi.org/10.1111/cob.12161

Hazlett-Stevens, H. 2018. Mindfulness-Based Stress Reduction in a Mental Health Outpatient Setting: Benefits Beyond Symptom Reduction. *Journal of Spirituality in Mental Health,* 20**,** 275-292.https://doi.org/10.1080/19349637.2017.1413963

Hazlett-Stevens, H., Singer, J. and Chong, A. 2019. Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy with Older Adults: A Qualitative Review of Randomized Controlled Outcome Research. *Clinical Gerontologist,* 42**,** 347-358. https://doi.org/10.1080/07317115.2018.1518282

Hemmings, L. and Soundy, A. 2020. Experiences of Physiotherapy in Mental Health: An Interpretative Phenomenological Analysis of Barriers and Facilitators to Care. *Physiotherapy,* 109**,** 94-101.https://doi.org/10.1016/j.physio.2020.01.001

Hennink, M. and Kaiser, B. N. 2022. Sample Sizes for Saturation in Qualitative Research: A Systematic Review of Empirical Tests. *Social Science and Medicine,* 292. https://doi.org/10.1016/j.socscimed.2021.114523

Hennink, M. M., Kaiser, B. N. and Weber, M. B. 2019. What Influences Saturation? Estimating Sample Sizes in Focus Group Research. *Qualitative Health Research,* 29**,** 1483-1496. https://doi.org/10.1177/1049732318821692

Herbert, C. 2022. Enhancing Mental Health, Well-Being and Active Lifestyles of University Students by Means of Physical Activity and Exercise Research Programs. *Frontiers in Public Health,* 10**,** 849093. https://doi.org/10.3389/fpubh.2022.849093

Herman, A. A., Stein, D. J., Seedat, S., Heeringa, S. G., Moomal, H. and Williams, D. R. 2009. The South African Stress and Health (SASH) Study: 12-Month and Lifetime Prevalence of Common Mental Disorders. *South African Medical Journal,* 99**,** 339-344. https://doi.org/10.10520/EJC69477

Heywood, S. E., Connaughton, J., Kinsella, R., Black, S., Bicchi, N. and Setchell, J. 2022. Physical Therapy and Mental Health: A Scoping Review. *Physical Therapy,* 102**,** pzac102. https://doi.org/10.1093/ptj/pzac102

Hodgson, M. H., McCulloch, H. P. and Fox, K. R. 2011. The Experiences of People with Severe and Enduring Mental Illness Engaged in a Physical Activity Programme Integrated into the Mental Health Service. *Mental Health and Physical Activity,* 4**,** 23-29

Hodgson, P., Hemmings, L., Stubbs, B., Vancampfort, D. and Byrd, E. 2025. Physiotherapy within Inpatient Mental Health Wards: Involvement, Diagnoses, and Lifestyle Characteristics. *Healthcare (Switzerland),* 13. https://doi.org/10.3390/healthcare13030279

Hoffmann-Eßer, W., Siering, U., Neugebauer, E. a. M., Brockhaus, A. C., Lampert, U. and Eikermann, M. 2017. Guideline Appraisal with Agree II: Systematic Review of the

Current Evidence on How Users Handle the 2 Overall Assessments. *PloS One,* 12. https://doi.org.10.1371/journal.pone.0174831

Hohmann, E., Beaufils, P., Beiderbeck, D., Chahla, J., Geeslin, A., Hasan, S., Humphrey-Murto, S., Hurley, E., Laprade, R., Martetschläger, F., et al. 2025. Guidelines for Designing and Conducting Delphi Consensus Studies: An Expert Consensus Delphi Study. *Arthroscopy - Journal of Arthroscopic and Related Surgery*. https://doi.org/10.1016/j.arthro.2025.03.038 (in press)

Holopainen, R., Vuoskoski, P., Piirainen, A., Karppinen, J. and O'sullivan, P. 2022. Patients' Conceptions of Undergoing Physiotherapy for Persistent Low Back Pain Delivered in Finnish Primary Healthcare by Physiotherapists Who Had Participated In brief Training in Cognitive Functional Therapy. *Disability and Rehabilitation,* 44**,** 3388-3399. https://doi.org/10.1080/09638288.2020.1861116

Hooblaul, M., Cobbing, S. and Daniels, K. J. 2020. The Knowledge, Attitudes and Perceptions of Physiotherapists in Kwazulu-Natal, South Africa, Towards Mental Health. *South African Journal of Physiotherapy,* 76**,** 1483. https://doi.org/10.4102/sajp.v76i1.1483

Hooblaul, M., Olagbegi, O. M. and Nadasan, T. 2024. Mental Health Content in the Physiotherapy Undergraduate Curriculum in South Africa. *South African Journal of Physiotherapy,* 80**,** 2061. https://doi.org/10.4102/sajp.v80i1.2061

HPCSA. 2024. *Health Professions Council of South Africa Annual Report 2023/2024* [Online]. Available: https://www.hpcsa.co.za/annual-reports [Accessed 10 June 2025 2025].

IDF. 2024. I*nternational Diabetes Federation - Africa: Diabetes Regional Report 2000 — 2050* [Online]. Available: https://diabetesatlas.org/data-by-location/region/africa/ [Accessed 9 June 2025].

Idris, I., Awotidebe, A. W., Mukhtar, N. B., Ativie, R. N., Nuhu, J. M., Muhammad, I. C., Danbatta, A. S., Adedoyin, R. A. and Mohammed, J. 2021. Expert Consensus on the Minimum Clinical Standards of Practice for Nigerian Physiotherapists Working in Intensive Care Units: A Modified Delphi Study. *African Journal of Thoracic and Critical Care Medicine,* 27**,** 84-96.https://doi.org/10.7196/AJTCCM.2021.v27i3.137

IHME. 2024. Institute for Health Metrics and Evaluation (IHME): Global Burden of Disease 2021. Findings from the GBD 2021 Study [Online]. Available: https://www.healthdata.org/research-analysis/library/global-burden-disease-2021-findings-gbd-2021-study [Accessed 9 June 2025 2025].

Institute for the Future, 2003. *Health and health care 2010: The forecast, the challenge*. 2nd ed. San Francisco: Jossey-Bass

IOPTMH. 2020. International Organization of Physical Therapists in Mental Health: Educational Standards: Describing Minimal Requirements of Mental Health Courses in

Physiotherapy Education [Online]. Available: https://www.ioptmh.org/resources Educational standards: describing minimal requirements of mental health courses in physiotherapy education [Accessed 26 June 2025].

Irish, L. A., Kline, C. E., Gunn, H. E., Buysse, D. J. and Hall, M. H. 2015. The Role of Sleep Hygiene in Promoting Public Health: A Review of Empirical Evidence. *Sleep Medicine Reviews,* 22**,** 23-36. https://doi.org/10.1016/j.smrv.2014.10.001

Ismail, G. and Taliep, N. 2023. The Delphi Method. *Handbook of Social Sciences and Global Public Health.*https://doi.org/10.1007/978-3-031-25110-8_66

Ivankova, N. V., Creswell, J. W. and Stick, S. L. 2006. Using Mixed-Methods Sequential Explanatory Design: From Theory to Practice. *Field Methods,* 18**,** 3-20. https://doi.org/10.1177/1525822X05282260

Ivanušić, J. 2019. Pain and Depression-Psychiatric Review. *Acta Medica Croatica,* 73**,** 35-43.

Jackson-Morris, A., Masyuko, S., Morrell, L., Kataria, I., Kocher, E. L. and Nugent, R. 2024. Tackling Syndemics by Integrating Infectious and Noncommunicable Diseases in Health Systems of Low-and Middle-Income Countries: A Narrative Systematic Review. *PLOS Global Public Health,* 4**,** e0003114. https://doi.org/10.1371/journal.pgph.0003114

Jacob, N. and Coetzee, D. 2018. Mental Illness in the Western Cape Province, South Africa: A Review of the Burden of Disease and Healthcare Interventions. *South African Medical Journal,* 108**,** 176-180.https://doi.org/10.7196/SAMJ.2018.v108i3.12904

Johnson, J. L., Adkins, D. and Chauvin, S. 2020. A Review of the Quality Indicators of Rigor in Qualitative Research. *American Journal of Pharmaceutical Education,* 84**,** 138-146. https://doi.org/10.5688/ajpe7120

Johnson, S. U., Ulvenes, P. G., Øktedalen, T. and Hoffart, A. 2019. Psychometric Properties of the General Anxiety Disorder 7-Item (GAD-7) Scale in a Heterogeneous Psychiatric Sample. *Frontiers in Psychology,* 10**,** 1713. https://doi.org/10.3389/fpsyg.2019.01713

Jünger, S., Payne, S. A., Brine, J., Radbruch, L. and Brearley, S. G. 2017. Guidance on Conducting and Reporting Delphi Studies (CREDES) in Palliative Care:Recommendations Based on a Methodological Systematic Review. *Palliative Medicine,* 31**,** 684-706. https://doi.org/10.1177/0269216317690685

Karachaliou, F., Simatos, G. and Simatou, A. 2020. The Challenges in the Development of Diabetes Prevention and Care Models in Low-Income Settings. *Frontiers in Endocrinology,* 11.https://doi.org/10.3389/fendo.2020.00518

Kaur, R. and Li, J. 2024. How to Conduct a Randomized Controlled Trial. *Respiratory Care,* 69**,** 128-138.https://doi.org/10.4187/respcare.11351

Kautzky, A., Heneis, K., Stengg, K., Fröhlich, S. and Kautzky-Willer, A. 2021. Short Term Caloric Restriction and Biofeedback Enhance Psychological Wellbeing and Reduce Overweight in Healthy Women. *Journal of Personalized Medicine,* 11. https://doi.org/10.3390/jpm11111096

Kelsall-Knight, L. and Stevens, R. 2024. Exploring the Implementation of Person-Centred Care in Nursing Practice. *Nursing Standard (Royal College of Nursing (Great Britain),* 39**,** 70-75.https://doi.org/10.7748/ns.2023.e12190

Kenny, D. T. 2014. Stress Management. *Cambridge Handbook of Psychology, Health and Medicine, Second Edition.* https://doi.org/10.1017/CBO9780511543579.089

Kezar, A. and Maxey, D. 2016. The Delphi Technique: An Untapped Approach of Participatory Research. *International Journal of Social Research Methodology,* 19**,** 143-160. https://doi.org/10.1080/13645579.2014.936737

Khalidi, H., Mohtadi, K., Msaad, R., Benalioua, N., Lebrazi, H., Kettani, A., Taki, H. and Saïle, R. 2022. The Association between Nutritional Knowledge and Eating Habits among a Representative Adult Population in Casablanca City, Morocco. *Nutrition Clinique et Metabolisme,* 36**,** 182-189.https://doi.org/10.1016/j.nupar.2022.04.002

Khoury, B., Sharma, M., Rush, S. E. and Fournier, C. 2015. Mindfulness-Based Stress Reduction for Healthy Individuals: A Meta-Analysis. *Journal of Psychosomatic Research,* 78**,** 519-528. https://doi.org/10.1016/j.jpsychores.2015.03.009

Kim, H. S. and Kim, E. J. 2018. Effects of Relaxation Therapy on Anxiety Disorders: A Systematic Review and Meta-Analysis. *Archives of Psychiatric Nursing,* 32**,** 278-284. https://doi.org/10.1016/j.apnu.2017.11.015

Kirk, L. M. 2020. Patient-Centeredness through Shared Decision-Making. *The Patient and Health Care System: Perspectives on High-Quality Care.* https://doi.org/10.1007/978-3-030-46567-4_13

Kisely, S., Chang, A., Crowe, J., Galletly, C., Jenkins, P., Loi, S., Looi, J. C., Macfarlane, M. D., Mcvie, N., Parker, S., et al. 2015. Getting Started in Research: Systematic Reviews and Meta-Analyses. *Australasian Psychiatry,* 23**,** 16-21. https://doi.org/10.1177/1039856214562077

Klainin-Yobas, P., Ignacio, J., He, H.-G., Lau, Y., Ngooi, B. X. and Koh, S. Q. D. 2016. Effects of a Stress-Management Program for Inpatients with Mental Disorders: A Feasibility Study. *Biological Research for Nursing,* 18**,** 213-220. https://doi.org/10.1177/1099800415602571

Knapen, J., Vancampfort, D., Moriën, Y. and Marchal, Y. 2015. Exercise Therapy Improves Both Mental and Physical Health in Patients with Major Depression. *Disability and Rehabilitation: An International, Multidisciplinary Journal,* 37**,** 1490-1495. https://doi.org/10.3109/09638288.2014.972579

Knaster, P., Karlsson, H., Estlander, A. M. and Kalso, E. 2012. Psychiatric Disorders as Assessed with Scid in Chronic Pain Patients: The Anxiety Disorders Precede the Onset of Pain. *General Hospital Psychiatry,* 34**,** 46-52. https://doi.org/10.1016/j.genhosppsych.2011.09.004

Knoll, T., Omar, M. I., Maclennan, S., Hernández, V., Canfield, S., Yuan, Y., Bruins, M., Marconi, L., Van Poppel, H., N'dow, J., et al. 2018. Key Steps in Conducting Systematic Reviews for Underpinning Clinical Practice Guidelines: Methodology of the European Association of Urology. *European Urology,* 73**,** 290-300. https://doi.org/10.1016/j.eururo.2017.08.016

Kok, G. and De Vries, N. K. 2015. Health Education and Health Promotion. *International Encyclopedia of the Social & Behavioral Sciences: Second Edition.* https://doi.org/10.1016/B978-0-08-097086-8.92055-5

Kredo, T., Cooper, S., Abrams, A., Muller, J., Volmink, J. and Atkins, S. 2018. Using the Behavior Change Wheel to Identify Barriers to and Potential Solutions for Primary Care Clinical Guideline Use in Four Provinces in South Africa. *Biomed Central Health Services Research,* 18. https://doi.org/10.1186/s12913-018-3778-2

Krogh, J., Hjorthøj, C., Speyer, H., Gluud, C. and Nordentoft, M. 2017. Exercise for Patients with Major Depression: A Systematic Review with Meta-Analysis and Trial Sequential Analysis. *BMJ Open,* 7. https:doi.org/10.1136/bmjopen-2016-014820

Kushner, R. F. and Mechanick, J. I. 2015. Lifestyle Medicine-an Emerging New Discipline. *US Endocrinology,* 11**,** 36-40. https://doi.org/10.17925/ee.2015.11.02.114

Kvam, S., Kleppe, C. L., Nordhus, I. H. and Hovland, A. 2016. Exercise as a Treatment for Depression: A Meta-Analysis. *Journal of Affective Disorders,* 202**,** 67-86. https://doi.org/10.1016/j.jad.2016.03.063

Langford, A. V., Bero, L., Lin, C. W. C., Blyth, F. M., Doctor, J. N., Holliday, S., Jeon, Y. H., Moullin, J. C., Murnion, B., Nielsen, S., et al. 2024. Context Matters: Using an Evidence to Decision (Etd) Framework to Develop and Encourage Uptake of Opioid Deprescribing Guideline Recommendations at the Point-of-Care. *Journal of Clinical Epidemiology,* 165. https://doi.org/10.1016/j.jclinepi.2023.10.020

Lasebikan, V. O. 2016. Cultural Aspects of Mental Health and Mental Health Service Delivery with a Focus on Nigeria within a Global Community. *Mental Health, Religion and Culture,* 19**,** 323-338.https://doi.org/10.1080/13674676.2016.1180672

Lederbogen, F., Schwarz, P., Häfner, S., Schweiger, U., Bohus, M. and Deuschle, M. 2015. Cardiac and Metabolic Risk Factors in Severe Mental Disorders: Task of a Prevention Manager. *Nervenarzt,* 86**,** 866-871. https://doi.org/10.1007/s00115-014-4232-2

Lee, S., Waters, F., Briffa, K. and Fary, R. E. 2017. Limited Interface between Physiotherapy Primary Care and People with Severe Mental Illness: A Qualitative Study. *Journal of Physiotherapy,* 63**,** 168-174. https://doi.org/10.1016/j.jphys.2017.05.014

Leese, C. J., Al-Zubaidi, H. and Smith, B. H. 2024. Delivery of Interventions for Multiple Lifestyle Factors in Primary Healthcare Settings: A Narrative Review Addressing Strategies for Effective Implementation. *Lifestyle Medicine,* 5. https://doi.org/10.1002/lim2.110

Lesh, S. G. and Thompson, C. R. 2024. Marketing Health and Wellness. *Prevention Practice and Health Promotion: A Health Care Professional's Guide to Health, Fitness, and Wellness, Second Edition.*https://doi.org/10.4324/9781003525882-19

Li, J., Pandian, V., Davidson, P. M., Song, Y., Chen, N. and Fong, D. Y. T. 2025. Burden and Attributable Risk Factors of Non-Communicable Diseases and Subtypes in 204 Countries and Territories, 1990-2021: A Systematic Analysis for the Global Burden of Disease Study 2021. *International Journal Of Surgery (London, England),* 111**,** 2385-2397.https://doi.org/10.1097/JS9.0000000000002260

Liang, C., Yin, G., Wang, Y., Liu, S., Gao, Y., Liu, P., Su, X. and Fei, Y. 2023. Application of Delphi Method in the Development and Revision of Clinical Practice Guidelines of Traditional Chinese Medicine： Process and Suggestions. *Medical Journal of Peking Union Medical College Hospital,* 14**,** 1084-1090. https://doi.org/10.12290/xhyxzz.2022-0649

Liao, Y. 2024. The Positive Effect of Physical Exercise Activities on Physical Fitness Improvement under the National Fitness Policy Environment. *American Journal of Health Behavior,* 48**,** 1480-1493. https://doi.org/10.5993/AJHB.48.6.1

Lincoln, Y. and Guba, E. 1985. *Naturalistic Inquiry.* Newbury Park, CA, Sage Publications

Linden, M., Linden, U. and Schwantes, U. 2015. Disability and Functional Burden of Disease Because of Mental in Comparison to Somatic Disorders in General Practice Patients. *European Psychiatry,* 30**,** 789-792. https://doi.org/10.1016/j.eurpsy.2015.04.004

Lobelo, F., Rohm Young, D., Sallis, R., Garber, M. D., Billinger, S. A., Duperly, J., Hutber, A., Pate, R. R., Thomas, R. J., Widlansky, M. E., et al. 2018. Routine

Assessment and Promotion of Physical Activity in Healthcare Settings: A Scientific Statement from the American Heart Association. *Circulation,* 137**,** e495-e522. https://doi.org/10.1161/CIR.0000000000000559

Loo, J. L. and Salmon, P. 2024. Mindfulness-Based Cognitive Therapy. *Tasman's Psychiatry, Fifth Edition.*https://doi.org/10.1007/978-3-030-51366-5_75

Looijmans, A., Stiekema, A. P. M., Bruggeman, R., Van Der Meer, L., Stolk, R. P., Schoevers, R. A., Jorg, F. and Corpeleijn, E. 2017. Changing the Obesogenic Environment to Improve Cardiometabolic Health in Residential Patients with a Severe Mental Illness: Cluster Randomised Controlled Trial. *British Journal of Psychiatry,* 211**,** 296-303. https://doi.org/10.1192/bjp.bp.117.199315

Lord, S., Naidoo, V. and Mostert, K. 2023. Lifestyle Interventions in Comorbid Mental and Physical Illness: A Systematic Review Protocol. *South African Journal of Physiotherapy,* 79**,** 1-6.https://doi.org/10.4102/sajp.v79i1.1848

Louw, Q., Grimmer, K., Dizon, J. M., Machingaidze, S., Parker, H. and Ernstzen, D. 2018. Building Capacity in Primary Care Rehabilitation Clinical Practice Guidelines: A South African Initiative. *Health Research Policy and Systems,* 16. https://doi.org/10.1186/s12961-018-0368-z

Lund, C., Petersen, I., Kleintjes, S. and Bhana, A. 2012. Mental Health Services in South Africa: Taking Stock. *African Journal of Psychiatry (South Africa),* 15**,** 402-405.https://doi.org/10.4314/ajpsy.v15i6.48

Ma, J., Yank, V., Xiao, L., Lavori, P. W., Wilson, S. R., Rosas, L. G. and Stafford, R. S. 2013. Translating the Diabetes Prevention Program Lifestyle Intervention for Weight Loss into Primary Care: A Randomized Trial. *Journal of American Medical Association: Internal Medicine,* 173**,** 113-121. https://doi.org/10.1001/2013.jamainternmed.987

Main, C. J., Ballengee, L. A. and Beneciuk, J. M. 2025. Psychological and Behavioural Interventions Delivered by Non-Psychologists. *Current Opinion in Psychology,* 63. https://doi.org/10.1016/j.copsyc.2025.102008

Malhi, G. S., Bell, E., Bassett, D., Boyce, P., Bryant, R., Hazell, P., Hopwood, M., Lyndon, B., Mulder, R., Porter, R., et al. 2021. The 2020 Royal Australian and New Zealand College of Psychiatrists Clinical Practice Guidelines for Mood Disorders. *Australian & New Zealand Journal of Psychiatry,* 55**,** 7-117. https:doi.org/10.1177/0004867420979353

Manger, S. 2019. Lifestyle Interventions for Mental Health. *Australian Journal Of General Practice,* 48**,** 670-673. https://doi.org/10.31128/AJGP-06-19-4964

Manuello, J., Vercelli, U., Nani, A., Costa, T. and Cauda, F. 2016. Mindfulness Meditation and Consciousness: An Integrative Neuroscientific Perspective. *Consciousness and Cognition,* 40**,** 67-78.https://doi.org/10.1016/j.concog.2015.12.005

Manwell, L. A., Barbic, S. P., Roberts, K., Durisko, Z., Lee, C., Ware, E. and Mckenzie, K. 2015. What Is Mental Health? Evidence Towards a New Definition from a Mixed Methods Multidisciplinary International Survey. *BMJ Open,* 5**,** e007079. https://doi.org/10.1136/bmjopen-2014-007079

Marchand, S. 2014. Neurophysiology of Pain. *Mental Health and Pain: Somatic and Psychiatric Components of Pain in Mental Health.*https://doi.org/10.1007/978-2-8178-0414-9_3

Martinez-Raga, J., Knecht, C., De Alvaro, R., Ferreros, A. and Szerman, N. 2015. Neurobiological Basis of Attention Deficit Hyperactivity Disorder (ADHD). Are Males Different? *Neurobiology of Men's Mental Health.* In: T.R. Rice and L. Sher, eds., *Neurobiology of men's mental health*. New York: Nova Science Publishers, pp.29–41

Martins, L. B., Monteze, N. M., Calarge, C., Ferreira, A. V. M. and Teixeira, A. L. 2019. Pathways Linking Obesity to Neuropsychiatric Disorders. *Nutrition,* 66**,** 16-21. https://doi.org/10.1016/j.nut.2019.03.017

Maseko, L. J., Adams, F. and Myezwa, H. 2024. Perceptions of Integrated Rehabilitation Service Delivery in a Metropolitan District. *African Journal of Primary Health Care and Family Medicine,* 16. https://doi.org/10.4102/PHCFM.V16I1.4069

Maurus, I., Wagner, S., Spaeth, J., Vogel, A., Muenz, S., Seitz, V., Von Philipsborn, P., Solmi, M., Firth, J., Stubbs, B., et al. 2024. EPA Guidance on Lifestyle Interventions for Adults with Severe Mental Illness: A Meta-Review of the Evidence. *European Psychiatry,* 67**,** e80.https://doi.org/10.1192/j.eurpsy.2024.1766

McCartney, C. R., Corrigan, M. D., Drake, M. T., El-Hajj Fuleihan, G., Korytkowski, M. T., Lash, R. W., Lieb, D. C., Mccall, A. L., Muniyappa, R., Piggott, T., et al. 2022. Enhancing the Trustworthiness of the Endocrine Society's Clinical Practice Guidelines. *Journal of Clinical Endocrinology and Metabolism,* 107**,** 2129-2138. https://doi.org/10.1210/clinem/dgac290

McCullough, L. 2009. The Case Manager: An Essential Link in Quality Care. *Creative Nursing,* 15**,** 124-126. https://doi.org/10.1891/1078-4535.15.3.124

McGinnis, P. Q., Wainwright, S. F., Hack, L. M., Nixon-Cave, K. and Michlovitz, S. 2010. Use of a Delphi Panel to Establish Consensus for Recommended Uses of Selected Balance Assessment Approaches. *Physiotherapy Theory and Practice,* 26**,** 358-373.https://doi.org/10.3109/09593980903219050

McGrath, J. J., Lim, C. C. W., Plana-Ripoll, O., Holtz, Y., Agerbo, E., Momen, N. C., Mortensen, P. B., Pedersen, C. B., Abdulmalik, J., Aguilar-Gaxiola, S., et al. 2020. Comorbidity within Mental Disorders: A Comprehensive Analysis Based on 145 990 Survey Respondents from 27 Countries. *Epidemiology and Psychiatric Sciences,* 29**,** e153. https://doi.org/10.1017/S2045796020000633

McKinnon, K. M., Alves-Bradford, J. M. and Cournos, F. 2021. Hiv and Serious Mental Illness. *Hiv Psychiatry: A Practical Guide for Clinicians.* https://doi.org/10.1007/978-3-030-80665-1_12

McLaughlin, K. R. 2023. Collecting Data from Networked Populations: Snowball and Respondent-Driven Sampling. *The Handbook of Teaching Qualitative and Mixed Research Methods: A Step-by-Step Guide for Instructors.* https://doi.org/10.4324/9781003213277-8

Mechanick, J. I. and Kushner, R. F. 2020. Translating Knowledge and Implementing a Successful Lifestyle Medicine Center. *Creating a Lifestyle Medicine Center: From Concept to Clinical Practice.* https://doi.org/10.1007/978-3-030-48088-2_3

Megheirkouni, M. and Moir, J. 2023. Simple but Effective Criteria: Rethinking Excellent Qualitative Research. *Qualitative Report,* 28**,** 848-864.https://doi.org/10.46743/2160-3715/2023.5845

Memon, M. A., Thurasamy, R., Ting, H. and Cheah, J. H. 2025. Purposive Sampling: A Review and Guidelines for Quantitative Research. *Journal of Applied Structural Equation Modeling,* 9**,** 1-23.https://doi.org/10.47263/JASEM.9(1)01

MHCA. 2002. *Republic of South Africa: Mental Health Care Act, 2002*. Government Gazette, 449(24024). Cape Town: Government Printer, 6 November

Meydan, C. H. and Akkaş, H. 2024. The Role of Triangulation in Qualitative Research: Converging Perspectives. *Principles of Conducting Qualitative Research in Multicultural Settings.* https://doi.org/10.4018/979-8-3693-3306-8.ch006

Mittelmark, M. B., Kickbusch, I., Rootman, I., Scriven, A. and Tones, K. 2016. Health Promotion. *International Encyclopedia of Public Health*.https://doi.org/10.1016/B978-0-12-803678-5.00192-2

Moberg, J., Oxman, A. D., Rosenbaum, S., Schünemann, H. J., Guyatt, G., Flottorp, S., Glenton, C., Lewin, S., Morelli, A., Rada, G., et al. 2018. The Grade Evidence to Decision (Etd) Framework for Health System and Public Health Decisions. *Health Research Policy and Systems,* 16. https://doi.org/10.1186/s12961-018-0320-2

Moitra, M., Owens, S., Hailemariam, M., Wilson, K. S., Mensa-Kwao, A., Gonese, G., Kamamia, C. K., White, B., Young, D. M. and Collins, P. Y. 2023. Global Mental Health:

Where We Are and Where We Are Going. *Current Psychiatry Reports,* 25**,** 301-311. https://doi.org/10.1007/s11920-023-01426-8

Moitra, M., Santomauro, D., Collins, P. Y., Vos, T., Whiteford, H., Saxena, S. and Ferrari, A. J. 2022. The Global Gap in Treatment Coverage for Major Depressive Disorder in 84 Countries from 2000–2019: A Systematic Review and Bayesian Meta-Regression Analysis. *PLoS Medicine,* 19**,** e1003901. https://doi.org/10.1371/journal.pmed.1003901

Morgan, A. J., Parker, A. G., Alvarez-Jimenez, M. and Jorm, A. F. 2013. Exercise and Mental Health: An Exercise and Sports Science Australia Commissioned Review. *Journal of Exercise Physiology Online,* 16**,** 64-73

Morres, I. D., Hatzigeorgiadis, A., Stathi, A., Comoutos, N., Arpin-Cribbie, C., Krommidas, C. and Theodorakis, Y. 2019. Aerobic Exercise for Adult Patients with Major Depressive Disorder in Mental Health Services: A Systematic Review and Meta-Analysis. *Depress Anxiety,* 36**,** 39-53.https://doi.org/10.1002/da.22842

Movsisyan, A., Melendez-Torres, G. J. and Montgomery, P. 2016. Users Identified Challenges in Applying Grade to Complex Interventions and Suggested an Extension to Grade. *Journal of Clinical Epidemiology,* 70**,** 191-199. https://doi.org/10.1016/j.jclinepi.2015.09.010

Mozelius, P., Clevelan-Innes, M., Lindqvist, M. H. and Jaldemark, J. Digging Deeper with Delphi - the Four Step Alberta Approach. Proceedings of the European Conference on Research Methods in Business and Management Studies, 2023. 133-138.

Müller, A. 2015. Why Do Obese Individuals Suffer More Often from Psychiatric Disorders? *PPmP Psychotherapie Psychosomatik Medizinische Psychologie,* 65**,** 36-38. https://doi.org/10.1055/s-0034-1394408

Munn, Z., Aromataris, E., Tufanaru, C., Stern, C., Porritt, K., Farrow, J., Lockwood, C., Stephenson, M., Moola, S. and Lizarondo, L. 2019. The Development of Software to Support Multiple Systematic Review Types: The Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI). *JBI Evidence Implementation,* 17**,** 36-43. https://doi.org/10.1097/XEB.0000000000000152

Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., McArthur, A. and Aromataris, E. 2018. Systematic Review or Scoping Review? Guidance for Authors When Choosing between a Systematic or Scoping Review Approach. *BMC Medical Research Methodology,* 18**,** 143.https://doi.org/10.1186/s12874-018-0611-x

Munn, Z., Tufanaru, C. and Aromataris, E. 2014. Data Extraction and Synthesis. *American Journal of Nursing,* 114**,** 49-54. https://doi.org/10.1097/01.NAJ.0000451683.66447.89

Nagarajan, V., Hussain, A., Srinivasan, A., Anantharaman, V. V. and Saranya, S. 2025. Impact of Screen Time and Sleep Duration on Adults' Body Mass Index in a University in Chengalpattu District – a Cross-Sectional Study. *National Journal of Community Medicine,* 16**,** 28-34.https://doi.org/10.55489/njcm.160120254749

Nair, S., Panhale, V. and Nair, N. 2021. Perceived Barriers to Evidence-Based Practice among Physiotherapy Students. *Journal of Education and Health Promotion,* 10. https://doi.org/10.4103/jehp.jehp_410_20

Nakayama, T. 2014. Clinical Practice Guidelines: International Trends and Perspectives. *Japanese Journal of Clinical Radiology,* 59**,** 373-378. https://doi.org/10.1055/s-0034-1394408

Narain, S. and Mathye, D. 2023. Strategies to Integrate Physiotherapists into Primary Health Care in South Africa. *South African Journal of Physiotherapy,* 79. https://doi.org/10.4102/sajp.v79i1.1796

NDOH. 2022. *National Department of Health: National Strategic Plan for the Prevention and Control of Non-Communicable Deases: 2022 -2027* [Online]. Available: https://www.health.gov.za/wp-content/uploads/2025/05/NCD-NSP-FINAL-VERSION-20-SEPT-22-1.pdf [Accessed 26 May 2025].

Neumann, I., Santesso, N., Akl, E. A., Rind, D. M., Vandvik, P. O., Alonso-Coello, P., Agoritsas, T., Mustafa, R. A., Alexander, P. E., Schünemann, H., et al. 2016. A Guide for Health Professionals to Interpret and Use Recommendations in Guidelines Developed with the Grade Approach. *Journal of Clinical Epidemiology,* 72**,** 45-55. https://doi.org/10.1016/j.jclinepi.2015.11.017

Ng, I. K. S. 2024. Physicians, Know Thy Patient. *Journal of the Royal College of Physicians of Edinburgh,* 54**,** 84-88.https://doi.org/10.1177/14782715241240510

Ng, K. H. and Peh, W. C. G. 2010. Writing a Systematic Review. *Singapore Medical Journal,* 51**,** 362-366

Ngeh, E. N., Lowe, A., Garcia, C. and Mclean, S. 2023. Physiotherapy-Led Health Promotion Strategies for People with or at Risk of Cardiovascular Diseases: A Scoping Review. *International Journal Of Environmental Research And Public Health,* 20. https://doi.org.10.3390/ijerph20227073

Ngo, V. K., Rubinstein, A., Ganju, V., Kanellis, P., Loza, N., Rabadan-Diehl, C. and Daar, A. S. 2013. Grand Challenges: Integrating Mental Health Care into the Non-Communicable Disease Agenda. *PLoS Medicine,* 10(5)**,** e1001443. https://doi.org/10.1371/journal.pmed.1001443

Niederberger, M. and Deckert, S. 2022. The Delphi Technique: Methodology, Variants and Usage Examples[Formula Presented]. *Zeitschrift fur Evidenz, Fortbildung und Qualitat im Gesundheitswesen,* 174**,** 11-19.https://doi.org/10.1016/j.zefq.2022.08.007

Nightingale, A. J. 2019. Triangulation. *International Encyclopedia of Human Geography, Second Edition.*https://doi.org/10.1016/B978-0-08-102295-5.10437-8

O'Sullivan, D., Gordon, B. R., Lyons, M., Meyer, J. D. and Herring, M. P. 2023. Effects of Resistance Exercise Training on Depressive Symptoms among Young Adults: A Randomized Controlled Trial. *Psychiatry Research,* 326**,** 115322. https://doi.org/10.1016/j.psychres.2023.115322

Ong, L., Linden, W. and Young, S. 2004. Stress Management: What Is It? *Journal of Psychosomatic Research,* 56**,** 133-137. https://doi.org/10.1016/S0022-3999(03)00128-4

Ortenburger, D., Rodziewicz-Gruhn, J., Wasik, J., Marfina, O. and Polina, N. 2017. Selected Problems of the Relation between Pain-Immunity and Depression. *Physical Activity Review,* 5**,** 74-77.https://doi.org/10.16926/par.2017.05.10

Östlund, U., Kidd, L., Wengström, Y. and Rowa-Dewar, N. 2011. Combining Qualitative and Quantitative Research within Mixed Method Research Designs: A Methodological Review. *International Journal of Nursing Studies,* 48**,** 369-383. https://doi.org/10.1016/j.ijnurstu.2010.10.005

Outcalt, S. D., Kroenke, K., Krebs, E. E., Chumbler, N. R., Wu, J., Yu, Z. and Bair, M. J. 2015. Chronic Pain and Comorbid Mental Health Conditions: Independent Associations of Posttraumatic Stress Disorder and Depression with Pain, Disability, and Quality of Life. *Journal of Behavioural Medicine,* 38**,** 535-543. https://doi.org/10.1007/s10865-015-9628-3

Owczarek, K. 2010. The Concept of Quality of Life. *Acta Neuropsychologica,* 8**,** 207-213
Ozertugrul, E. 2017. A Comparative Analysis: Heuristic Self-Search Inquiry as Self-Knowledge and Knowledge of Society. *Journal of Humanistic Psychology,* 57**,** 237-251.https://doi.org/10.1177/0022167815594966

Pacheco-Brousseau, L., Poitras, S. and Beaulé, P. E. 2024. Preoperative Physiotherapy in Arthroplasty: Supporting, Triaging, and Preparing Patients. *Fast Track Surgery in Hip and Knee Arthroplasty: New Standards.* https://doi.org.10.1007/978-3-031-57220-3_29

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A. and Brennan, S. E. 2021. The Prisma 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. *BMJ,* 372. https://doi.org/10.1136/bmj.n71

Palermo, T. M., Beals-Erickson, S., Bromberg, M., Law, E. and Chen, M. 2017. A Single Arm Pilot Trial of Brief Cognitive Behavioral Therapy for Insomnia in Adolescents with

Physical and Psychiatric Comorbidities. *Journal of Clinical Sleep Medicine* 13**,** 401-410. https://doi.org/10.5664/jcsm.6490

Palmer, E. O., Ker, S., Rentería, M. E., Carmody, T. and Rush, A. J. 2024. Psychometric Evaluation and Linking of the Phq-9, Qids-C, and Vqids-C in a Real-World Population with Major Depressive Disorder. *Neuropsychiatric Disease and Treatment***,** 671-687. https://doi.org/10.2147/NDT.S429979

Paolucci, E. M., Loukov, D., Bowdish, D. M. E. and Heisz, J. J. 2018. Exercise Reduces Depression and Inflammation but Intensity Matters. *Biological Psychology,* 133**,** 79-84. https://doi.org/10.1016/j.biopsycho.2018.01.015

Papatriantafyllou, E., Efthymiou, D., Zoumbaneas, E., Popescu, C. A. and Vassilopoulou, E. 2022. Sleep Deprivation: Effects on Weight Loss and Weight Loss Maintenance. *Nutrients,* 14. https://doi.org/10.3390/nu14081549

Park, H. Y. and Park, H. Y. 2024. Sex/Gender Differences in Depression and Anxiety Disorders. *Sex/Gender-Specific Medicine in Clinical Areas.* https://doi.org/10.1007/978-981-97-0130-8_21

Parry, G. D., Cooper, C. L., Moore, J. M., Yadegarfar, G., Campbell, M. J., Esmonde, L., Morice, A. H. and Hutchcroft, B. J. 2012. Cognitive Behavioural Intervention for Adults with Anxiety Complications of Asthma: Prospective Randomised Trial. *Respiratory Medicine,* 106**,** 802-810.https://dx.doi.org/10.1016/j.rmed.2012.02.006

Patel, V., Saxena, S., Lund, C., Thornicroft, G., Baingana, F., Bolton, P., Chisholm, D., Collins, P. Y., Cooper, J. L., Eaton, J., et al. 2018. The Lancet Commission on Global Mental Health and Sustainable Development. *The Lancet,* 392**,** 1553-1598. https://doi.org/10.1016/S0140-6736(18)31612-X

Pedersen, S. K., Platzer, O. J., Rathleff, M. S. and Hoegh, M. 2024. 'What Scientific Evidence Supports This?' How Do Physiotherapists in Private Practice Use Evidence-Based Practice and What Are the Main Challenges? A Convergent Parallel Mixed-Methods Study. *European Journal of Physiotherapy,* 26**,** 201-210. https://doi.org.10.1080/21679169.2023.2234404

Pedulla, T. 2017. The Mindfulness Perspective. *International Journal of Group Psychotherapy,* 67**,** S154-S163.https://doi.org/10.1080/00207284.2016.1218284

Piette, J. D., Richardson, C., Himle, J., Duffy, S., Torres, T., Vogel, M., Barber, K. and Valenstein, M. 2011. A Randomized Trial of Telephonic Counseling Plus Walking for Depressed Diabetes Patients. *Medical Care,* 49**,** 641-648. https://doi.org/10.1097/MLR.0b013e318215d0c9

Perez-Kast, R. C. and Camacho-Morales, A. 2025. Fasting the Brain for Mental Health. *Journal of Psychiatric Research,* 181**,** 215-224. https://doi.org/10.1016/j.jpsychires.2024.11.041

Peter, W. F., Hurkmans, E. J., Van Der Wees, P. J., Hendriks, E. J. M., Van Bodegom-Vos, L. and Vliet Vlieland, T. P. M. 2016. Healthcare Quality Indicators for Physiotherapy Management in Hip and Knee Osteoarthritis and Rheumatoid Arthritis: A Delphi Study. *Musculoskeletal Care,* 14**,** 219-232.https://doi.org/10.1002/msc.1133

Petersen, I., Bhana, A., Fairall, L. R., Selohilwe, O., Kathree, T., Baron, E. C., Rathod, S. D. and Lund, C. 2019. Evaluation of a Collaborative Care Model for Integrated Primary Care of Common Mental Disorders Comorbid with Chronic Conditions in South Africa. *BioMed Central Psychiatry,* 19**,** 1-11. https://doi.org/10.1186/s12888-019-2081-z

Petersen, I., Selohilwe, O., Georgeu-Pepper, D., Ras, C. J., Zani, B., Petrus, R., Anderson, L., Mntambo, N., Kathree, T., Bhana, A., et al. 2022. A Collaborative Care Package for Depression Comorbid with Chronic Physical Conditions in South Africa. *BioMed Central Health Services Research,* 22.https://doi.org/10.1186/s12913-022-08874-7

Phyo, A. Z. Z., Freak-Poli, R., Craig, H., Gasevic, D., Stocks, N. P., Gonzalez-Chica, D. A. and Ryan, J. 2020. Quality of Life and Mortality in the General Population: A Systematic Review and Meta-Analysis. *BMC Public Health,* 20**,** 1596. https://doi.org/10.1186/s12889-020-09639-9

Physiopedia. 2024. *Physiotherapy/Physical Therapy* [Online]. Available: https://www.physio-pedia.com/Physiotherapy_/_Physical_Therapy [Accessed 12 September 2024].

Platz, T. 2021. Methods for the Development of Healthcare Practice Recommendations Using Systematic Reviews and Meta-Analyses. *Frontiers in Neurology,* 12. https://doi.org/10.3389/fneur.2021.699968

Plummer, P. 2017. Focus Group Methodology. Part 2: Considerations for Analysis. *International Journal of Therapy and Rehabilitation,* 24**,** 345-351. https://doi.org/10.12968/ijtr.2017.24.8.345

Pope, C. 2009. Recovering Mind and Body: A Framework for the Role of Physiotherapy in Mental Health and Well-Being. *Journal of Public Mental Health,* 8**,** 36-39. https://doi.org/10.1108/17465729200900012

Powell, K. E., King, A. C., Buchner, D. M., Campbell, W. W., Dipietro, L., Erickson, K. I., Hillman, C. H., Jakicic, J. M., Janz, K. F., Katzmarzyk, P. T., et al. 2019. The Scientific Foundation for the Physical Activity Guidelines for Americans, 2nd Edition. *Journal of Physical Activity and Health,* 16**,** 1-11.https://doi.org/10.1123/jpah.2018-0618

Prasad, M. 2024. Introduction to the Grade Tool for Rating Certainty in Evidence and Recommendations. *Clinical Epidemiology and Global Health,* 25. https://doi.org/10.1016/j.cegh.2023.101484

Prefit, A. B. and Szentagotai-Tătar, A. 2018. Depression and Disordered Eating Behaviors: The Role of Emotion Regulation Difficulties. *Journal of Evidence-Based Psychotherapies,* 18**,** 95-106.https://doi.org/10.24193/jebp.2018.1.8

Puppis, M. 2019. Analyzing Talk and Text I: Qualitative Content Analysis. *The Palgrave Handbook of Methods for Media Policy Research.* https://doi.org/10.1007/978-3-030-16065-4_21

Quilodrán, C., Kirmayr, M., Valente, B., Pérez-Bracchiglione, J., Garegnani, L. and Franco, J. V. A. 2021. The Grade Approach, Part 2: Evidence to Decision Frameworks—Outlining Decision-Making in Health. *Medwave,* 21. https://doi.org/10.5867/medwave.2021.04.8182

Rao, K. D., Mehta, A., Kautsar, H., Kak, M., Karem, G., Misra, M., Joshi, H., Herbst, C. H. and Perry, H. B. 2023. Improving Quality of Non-Communicable Disease Services at Primary Care Facilities in Middle-Income Countries: A Scoping Review. *Social Science and Medicine,* 320.https://doi.org/10.1016/j.socscimed.2023.115679

Richmond, H., Hall, A. M., Hansen, Z., Williamson, E., Davies, D. and Lamb, S. E. 2018. Exploring Physiotherapists' Experiences of Implementing a Cognitive Behavioural Approach for Managing Low Back Pain and Identifying Barriers to Long-Term Implementation. *Physiotherapy (United Kingdom),* 104**,** 107-115. https://doi.org/10.1016/j.physio.2017.03.007

Risal, A. 2011. Common Mental Disorders. *Kathmandu University Medical Journal,* 9**,** 213-217.https://doi.org/10.3126/kumj.v9i3.6308

Romas, J. A. and Sharma, M. 2022. Chapter 3 - Relaxation. *In:* Romas, J. A. and Sharma, M. (eds.) *Practical Stress Management (Eighth Edition).* Academic Press.https://doi.org/10.1016/B978-0-323-98812-4.00001-2

Rosas, L. G., Azar, K. M. J., Lv, N., Xiao, L., Goldhaber-Fiebert, J. D., Snowden, M. B., Venditti, E. M., Lewis, M. M., Goldstein-Piekarski, A. N. and Ma, J. 2020. Effect of an Intervention for Obesity and Depression on Patient-Centered Outcomes: An RCT. *American Journal of Preventive Medicine,* 58**,** 496‐505. https://doi.org/10.1016/j.amepre.2019.11.005

Rosenbaum, S., Tiedemann, A., Stanton, R., Parker, A., Waterreus, A., Curtis, J. and Ward, P. B. 2016. Implementing Evidence-Based Physical Activity Interventions for People with Mental Illness: An Australian Perspective. *Australasian Psychiatry,* 24**,** 49-54. https://doi.org/10.1177/1039856215590252

Rushton, A., White, L., Heap, A., Calvert, M., Heneghan, N. and Goodwin, P. 2016. Development of an Optimised 1:1 Physiotherapy Intervention Post First-Time Lumbar Discectomy: A Mixed-Methods Study. *BMJ Open,* 6. https://doi.org/10.1136/bmjopen-2015-009409

Saleem, S. M. and Jan, S. S. 2024. A Cross-Sectional Study of Mental Health Effects of Excessive Screen Time and Social Media Use among Indian Adolescents and Young Adults. *Journal of Nature and Science of Medicine,* 7**,** 210-217. https://doi.org/10.4103/jnsm.jnsm_37_24

Sanchez, K. and Vilugron, M. V. 2024. Mental and Behavioral Health. *The Handbook of Health Behavior Change.* https://doi.org/10.1891/9780826142658.0017

Santomauro, D. F., Herrera, A. M. M., Shadid, J., Zheng, P., Ashbaugh, C., Pigott, D. M., Abbafati, C., Adolph, C., Amlag, J. O. and Aravkin, A. Y. 2021. Global Prevalence and Burden of Depressive and Anxiety Disorders in 204 Countries and Territories in 2020 Due to the COVID-19 Pandemic. *The Lancet,* 398**,** 1700-1712. https://doi.org/10.1016/S0140-6736(21)02143-7

Scheffler, R. M., Campbell, J., Cometto, G., Maeda, A., Liu, J., Bruckner, T. A., Arnold, D. R. and Evans, T. 2018. Forecasting Imbalances in the Global Health Labor Market and Devising Policy Responses. *Human Resources for Health,* 16. https://doi.org.10.1186/s12960-017-0264-6

Schillemans, C., Hoenders, H. J. R., Steffek, E., Albers, C. J., Booij, S. H. and Castelein, S. 2024. A Pilot Randomised Controlled Trial of a Multidomain Lifestyle Intervention for Outpatients with Chronic or Severe Mental Illness. *Psychiatry Research,* 342. https://doi.org/10.1016/j.psychres.2024.116227

Schmalz, U., Spinler, S. and Ringbeck, J. 2021. Lessons Learned from a Two-Round Delphi-Based Scenario Study. *MethodsX,* 8. https://doi.org/10.1016/j.mex.2020.101179

Schouler-Ocak, M. and Graef-Calliess, I. T. 2024. Culture-Related Issues in Assessment. *Tasman's Psychiatry, Fifth Edition.*https://doi.org/10.1007/978-3-030-51366-5_118

Schramme, T. (2023). Health as a Complete Well-being: The WHO Definition and Beyond. *Public Health Ethics* 16(3), 210-218

Schwartz, R. C., Lent, J. and Geihsler, J. 2011. Gender and Diagnosis of Mental Disorders: Implications for Mental Health Counseling. *Journal of Mental Health Counseling,* 33**,** 347-358

Shah, L. B. I., Klainin-Yobas, P., Torres, S. and Kannusamy, P. 2014. Efficacy of Psychoeducation and Relaxation Interventions on Stress-Related Variables in People

with Mental Disorders: A Literature Review. *Archives of Psychiatric Nursing,* 28**,** 94-101. https://doi.org/10.1016/j.apnu.2013.11.001

Shakya, N. R., Emén, A., Webb, G., Myezwa, H., Karmacharya, B. M. and Stensdotter, A. K. 2024. Barriers and Facilitators for Strengthening Physiotherapy Services in Nepal: Perspectives from Physiotherapists and Health Providers. *BMC Health Services Research,* 24.https://doi.org/10.1186/s12913-024-11272-w

Shang, Z. 2023. Use of Delphi in Health Sciences Research: A Narrative Review. *Medicine (United States),* 102**,** E32829.https://doi.org/10.1097/MD.0000000000032829

Sharma, S., Stansbury, R., Ramadan, J., Rojas, E., Finomore, V., Pham, C., Quan, S. F. and Wen, S. 2025. Sleep Well and Live Well: Impact of Sleep Hygiene Intervention on Sleep Duration in a Rural Community: A Randomized Controlled Trial (the Swell Study). *Journal of Rural Health,* 41. https://doi.org/10.1111/jrh.70002

Shaw, J. 2023. Guideline Development. *Translational Sports Medicine.* https://doi.org/10.1016/B978-0-323-91259-4.02010-5

Shelton, K., Haynes, C. A. and Creghan, K. A. 2022. Fundamentals of Delphi Research Methodology. *Research Anthology on Innovative Research Methodologies and Utilization across Multiple Disciplines.* https://doi.org/10.4018/978-1-6684-3881-7.ch024

Shenton, A. K. 2004. Strategies for Ensuring Trustworthiness in Qualitative Research Projects. *Education for Information,* 22**,** 63-75.https://doi.org/10.3233/EFI-2004-22201

Shi, W., Serafimovska, A. and Zhao, E. 2025. Psychological Interventions in Reducing Post-Traumatic Stress Disorder in Post-Myocardial Infarction Patients as an Understudied yet Critical Intersection of Physical and Mental Health for Patients at a Period of High Vulnerability and Risk of Developing Comorbidities: A Commentary. *European Journal of Cardiovascular Nursing*. https://doi.org/10.1093/eurjcn/zvaf013

Siengsukon, C. F., He, J., Miller, K. and Jewell, D. 2022. Application Accuracy of the Sleep Decision Tree to Standardized Patient Cases by Physiotherapists: An Observational Study. *Physiotherapy Theory and Practice,* 38**,** 2874-2883. https://doi.org/10.1080/09593985.2021.1926024

Slade, M., Amering, M., Farkas, M., Hamilton, B., O'hagan, M., Panther, G., Perkins, R., Shepherd, G., Tse, S. and Whitley, R. 2014. Uses and Abuses of Recovery: Implementing Recovery-Oriented Practices in Mental Health Systems. *World Psychiatry,* 13**,** 12-20.https://doi.org/10.1002/wps.20084

Smith, F. 2017. Focus Groups. *Pharmacy Practice: Second Edition.* https://doi.org/10.1201/b19093

Sobel, M. E. 2013. *Lifestyle and Social Structure: Concepts, Definitions, Analyses*, Elsevier. https://doi.org/10.1604/9780126542806

Soong, R. Y., Low, C. E., Ong, V., Sim, I., Lee, C., Lee, F., Chew, L., Yau, C. E., Lee, A. R. Y. B. and Chen, M. Z. 2025. Exercise Interventions for Depression, Anxiety, and Quality of Life in Older Adults with Cancer: A Systematic Review and Meta-Analysis. *Journal of the American Medical Association Network Open,* 8**,** e2457859-e2457859. https://doi.org/10.1001/jamanetworkopen.2024.57859

Sorsdahl, K., Petersen, I., Myers, B., Zingela, Z., Lund, C. and Van Der Westhuizen, C. 2023. A Reflection of the Current Status of the Mental Healthcare System in South Africa. *SSM - Mental Health,* 4.https://doi.org/10.1016/j.ssmmh.2023.100247

Spijkerman, M. P. J., Pots, W. T. M. and Bohlmeijer, E. T. 2016. Effectiveness of Online Mindfulness-Based Interventions in Improving Mental Health: A Review and Meta-Analysis of Randomised Controlled Trials. *Clinical Psychology Review,* 45**,** 102-114. https://doi.org/10.1016/j.cpr.2016.03.009

Stafford, A., Oduola, S. and Reeve, S. 2024. Sleep and Socio-Occupational Functioning in Adults with Serious Mental Illness: A Systematic Review. *Psychiatry Res,* 339**,** 116111. https://doi.org/10.1016/j.psychres.2024.116111

Stalmeijer, R. E., Brown, M. E. L. and O'brien, B. C. 2024. How to Discuss Transferability of Qualitative Research in Health Professions Education. *Clinical Teaching,* 21**,** e13762. https://doi.org/10.1111/tct.13762

Stander, J., Grimmer, K. and Brink, Y. 2020. A User-Friendly Clinical Practice Guideline Summary for Managing Low Back Pain in South Africa. *South African Journal of Physiotherapy,* 76.https://doi.org/10.4102/sajp.v76i1.1366

Stanton, R. 2018. Integration of the Exercise Professional within the Mental Health Multidisciplinary Team. *Exercise-Based Interventions for Mental Illness: Physical Activity as Part of Clinical Treatment.*https://doi.org/10.1016/B978-0-12-812605-9.00013-7

Starostina, E. G. 2025. Comorbidity between Severe Mental Disorders and Metabolic Disease. *Comorbidity between Mental and Physical Disorders: Identification, Management and Treatment.*https://doi.org.10.1007/978-3-031-81802-8_8

Stein, D. J., Benjet, C., Gureje, O., Lund, C., Scott, K. M., Poznyak, V. and Van Ommeren, M. 2019. Integrating Mental Health with Other Non-Communicable Diseases. *BMJ,* 364. https://doi.org/10.1136/bmj.l295

Stubbs, B., Soundy, A., Probst, M., De Hert, M., De Herdt, A. and Vancampfort, D. 2014. Understanding the Role of Physiotherapists in Schizophrenia: An International Perspective from Members of the International Organisation of Physical Therapists in

Mental Health (Ioptmh). *Journal of Mental Health,* 23**,** 125-129. https://doi.org/10.3109/09638237.2013.869574

Stubbs, B., Vancampfort, D., Rosenbaum, S., Firth, J., Cosco, T., Veronese, N., Salum, G. A. and Schuch, F. B. 2017. An Examination of the Anxiolytic Effects of Exercise for People with Anxiety and Stress-Related Disorders: A Meta-Analysis. *Psychiatry Research,* 249**,** 102-108. https://doi.org/10.1016/j.psychres.2016.12.020

Stucki, G., Zampolini, M., Juocevicius, A., Negrini, S. and Christodoulou, N. 2017. Practice, Science and Governance in Interaction: European Effort for the System-Wide Implementation of the International Classification of Functioning, Disability and Health (ICF) in Physical and Rehabilitation Medicine. *European Journal of Physical and Rehabilitation Medicine,* 53**,** 299-307.https://doi.org/10.23736/S1973-9087.16.04436-1

Suhrcke, M., Boluarte, T. A. and Niessen, L. 2012. A Systematic Review of Economic Evaluations of Interventions to Tackle Cardiovascular Disease in Low-and Middle-Income Countries. *BMC Public Health,* 12**,** 1-13. https://doi.org/10.1186/1471-2458-12-2

Tang, Y.-Y., Hölzel, B. K. and Posner, M. I. 2015. The Neuroscience of Mindfulness Meditation. *Nature Reviews Neuroscience,* 16**,** 213-225. https://doi.org/10.1038/nrn3916

Tariq, M. N. M., Stojanovska, L., Dhaheri, A. S. A., Cheikh Ismail, L., Apostolopoulos, V. and Ali, H. I. 2022. Lifestyle Interventions for Prevention and Management of Diet-Linked Non-Communicable Diseases among Adults in Arab Countries. Healthcare, 45.

Tatta, J., Nijs, J., Elma, Ö., Malfliet, A. and Magnusson, D. 2022a. The Critical Role of Nutrition Care to Improve Pain Management: A Global Call to Action for Physical Therapist Practice. *Physical Therapy,* 102. https://doi.org.10.1093/ptj/pzab296

Tatta, J., Willgens, A. M. and Palombaro, K. M. 2022b. Mindfulness and Acceptance-Based Interventions in Physical Therapist Practice: The Time Is Now. *Physical therapy,* 102. https://doi.org/10.1093/ptj/pzab293

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N. and Ryan, R. M. 2012. Exercise, Physical Activity, and Self-Determination Theory: A Systematic Review. *International Journal of Behavioral Nutrition and Physical Activity,* 9**,** 78. https://doi.org/10.1186/1479-5868-9-78

Teychenne, M., White, R. L., Richards, J., Schuch, F. B., Rosenbaum, S. and Bennie, J. A. 2020. Do We Need Physical Activity Guidelines for Mental Health: What Does the Evidence Tell Us? *Mental Health and Physical Activity,* 18**,** 100315. https://doi.org/10.1016/j.mhpa.2019.100315

Thomas, M. V., Van Ryckeghem, D. M. L., Schulz, A., Müller, R., Lambracht, K., Adermann, J. and Vögele, C. 2024. Mental Disorders in Chronic Pain Patients Seeking

Treatment at a Tertiary Pain Hospital: A Cross-Sectional Study. *European Journal of Health Psychology,* 31**,** 28-42. https://doi.org/10.1027/2512-8442/a000142

Thompson, D. P., Oldham, J. A. and Woby, S. R. 2016. Does Adding Cognitive-Behavioural Physiotherapy to Exercise Improve Outcome in Patients with Chronic Neck Pain? A Randomised Controlled Trial. *Physiotherapy (United Kingdom),* 102**,** 170-177. https://doi.org/10.1016/j.physio.2015.04.008

Tilford, S., King, R. and Hubley, J. 2025. Health Promotion. *Public Health: An Action Guide to Improving Health Locally and Globally, Third Edition.* https://doi.org.10.1093/oso/9780198855187.003.0011

Tonkin-Crine, S., Anthierens, S., Hood, K., Yardley, L., Cals, J. W. L., Francis, N. A., Coenen, S., Van Der Velden, A. W., Godycki-Cwirko, M., Llor, C., et al. 2016. Discrepancies between Qualitative and Quantitative Evaluation of Randomised Controlled Trial Results: Achieving Clarity through Mixed Methods Triangulation. *Implementation Science,* 11. https://doi.org/10.1186/s13012-016-0436-0

Tovote, K. A., Fleer, J., Snippe, E., Peeters, A. C. T. M., Emmelkamp, P. M. G., Sanderman, R., Links, T. P. and Schroevers, M. J. 2014. Individual Mindfulness-Based Cognitive Therapy and Cognitive Behavior Therapy for Treating Depressive Symptoms in Patients with Diabetes: Results of a Randomized Controlled Trial. *Diabetes care,* 37**,** 2427-2434. https://doi.org/10.2337/dc13-2918

Tufanaru, C., Munn, Z., Aromataris, E., Campbell, J., and Hopp, L. 2020. Chapter 3: Systematic Reviews of Effectiveness. *In:* (Eds.), I. E. a. Z. M. (ed.) *JBI Manual for Evidence Synthesis.* JBI. Available at: https://synthesismanual.jbi.global

Urbanová, L., Vňuková, M. S., Anders, M., Ptáček, R. and Bušková, J. 2023. The Updating and Individualizing of Sleep Hygiene Rules for Non-Clinical Adult Populations. *Prague Medical Report,* 124**,** 329-343. https://doi.org/10.14712/23362936.2023.26

Vambheim, S. M., Kyllo, T. M., Hegland, S. and Bystad, M. 2021. Relaxation Techniques as an Intervention for Chronic Pain: A Systematic Review of Randomized Controlled Trials. *Heliyon,* 7(8), e07837. https://doi.org/10.1016/j.heliyon.2021.e07837

Van Acker, V. 2016. Lifestyle and Modal Choices: Defining, Measuring and Using the 'Lifestyle'concept. *Transportation Research Record,* 2495**,** 74-82. https://doi.org/10.3141/2495-09

Van Den Heever, A. 2019. Country Report: South Africa. *The Law and Policy of Healthcare Financing: An International Comparison of Models and Outcomes.* https://doi.org/10.4337/9781788115926.00026

Van Der Heiden, W., Lacroix, J., Moll Van Charante, E. and Beune, E. 2022. GPs' Views on the Implementation of Combined Lifestyle Interventions in Primary Care in the

Netherlands: A Qualitative Study. *BMJ Open,* 12.https://doi.org/10.1136/bmjopen-2021-056451

Van Der Veen, S., Evans, N., Widdershoven, G. and Huisman, M. 2024. The Bigmove Intervention for People with Physical and Mental Health Conditions: A First Evaluation of Self-Perceived Health, Quality of Life, Coping and Mental and Social Functioning. *International Journal of Integrated Care,* 24**,** 12. https://doi.org/10.5334/ijic.8317

Van Der Wees, P. J., Moore, A. P., Powers, C. M., Stewart, A., Nijhuis-Van Der Sanden, M. W. and De Bie, R. A. 2011. Development of Clinical Guidelines in Physical Therapy: Perspective for International Collaboration. *Physical Therapy,* 91**,** 1551-1563. https://doi.org/10.2522/ptj.20100305

Van Ens, W., Sanches, S., Beverloo, L. and Swildens, W. E. 2024. Place-Based Fact: Treatment Outcomes and Patients' Experience with Integrated Neighborhood-Based Care. *Community Mental Health Journal,* 60**,** 1214-1227.https://doi.org/10.1007/s10597-024-01277-4

Van Vuuren, C. J. 2022. Impactful Educational Transitions: Crossroads for Physiotherapy Education in South Africa? *South African Journal of Physiotherapy,* 78. https://doi.org/10.4102/SAJP.V78I1.1638

Vancampfort, D., Byansi, P., Namutebi, H., Lillian, N., Kinyanda, E., Bbosa, R. S., Ward, P. B., Lukwata, H. and Mugisha, J. 2020. The Efficacy of Physical Activity Counseling in Ugandan Patients with Hiv and a Co-Morbid Mental Disorder: A Pilot Study. *AIDS Care,* 32**,** 758-761.https://doi.org/10.1080/09540121.2019.1640853

Vancampfort, D., Stubbs, B., Probst, M. and Mugisha, J. 2018. Physiotherapy for People with Mental Health Problems in Sub-Saharan African Countries: A Systematic Review. *Archives of Physiotherapy,* 8.https://doi.org/10.1186/s40945-018-0043-2

Vargus-Adams, J. N. and Majnemer, A. 2014. International Classification of Functioning, Disability and Health (ICF) as a Framework for Change: Revolutionizing Rehabilitation. *Journal of Child Neurology,* 29**,** 1030-1035.https://doi.org/10.1177/0883073814533595

Veillon, J., Preuilh, A. and Wormser, J. 2024. Cognitive Behavioural Interventions Led by a Physiotherapist in Chronic Non-Specific Low Back Pain: A Systematic Review and Meta-Analysis. *Journal of Bodywork and Movement Therapies,* 39**,** 635-644. https://doi.org/10.1016/j.jbmt.2024.03.057

Vermeulen, N., Le Clef, N., Veleva, Z., D'angelo, A. and Tilleman, K. 2019. European Recommendations for Good Practice in Addition to an Evidence-Based Guidelines Programme: Rationale and Method of Development. *BMJ Evidence-Based Medicine,* 24**,** 30-34.https://doi.org/10.1136/bmjebm-2018-111032

Volel, B. A., Petelin, D. S. and Rozhkov, D. O. 2019. Chronic Back Pain and Mental Disorders. *Nevrologiya, Neiropsikhiatriya, Psikhosomatika,* 11**,** 17-24. https://doi.org/10.14412/2074-2711-2019-2S-17-24

Vourdoumpa, A., Paltoglou, G., Manou, M., Mantzou, E., Kassari, P., Papadopoulou, M., Kolaitis, G. and Charmandari, E. 2024. Improvement in Symptoms of Depression and Anxiety and Cardiometabolic Risk Factors in Children and Adolescents with Overweight and Obesity Following the Implementation of a Multidisciplinary Personalized Lifestyle Intervention Program. *Nutrients,* 16. https://doi.org/10.3390/nu16213710

Wuthrich-Grossenbacher, U. (2024). The Need to Widen the Concept of Health and to Include the Spiritual Dimension. *International Journal of Public Health*

World Health Organization (WHO). 2012. *WHOQOL: Measuring Quality of Life*. [online] Available at: https://www.who.int/tools/whoqol [Accessed 22 Jul. 2025].

World Health Organization (WHO). 2018. *Management of Physical Health Conditions in Adults with Severe Mental Disorders World Health Organization Guidelines* [Online]. Available: https://www.who.int/publications/i/item/978-92-4-155038-3 [Accessed 14 April 2025].

World Health Organization (WHO). 2018a. Global Action Plan on Physical activity 2018-2030: More active people for a healthier world. Geneva, World Health Organization

World Health Organization (WHO). 2020a. *Mental Health Atlas 2020* [Online]. Available: www.who.int/publications/m/item/mental-health-atlas-2020-country-profile--south-africa [Accessed 11 August 2024].

World Health Organization (WHO). 2020b. *Guidelines on Physical Activity and Sedentary Behaviour.* [Online]. Available:https://www.who.int/publications/i/item/9789240015128 [Accessed 21 March 2025].

World Health Organization (WHO). 2021. *Nutrition, Overweight and Obesity: Factsheet on Sustainable Development Goals (Sdgs): Health Targets* [Online]. Available: https://www.euro.who.int//europe/publications/i/item/WHO-EURO-2021-2574-42330-58595 [Accessed 21 March 2025].

World Health Organization (WHO). 2023a. *Country Disease Outlook*.[Online]. Available: https://www.afro.who.int/publications/country-disease-outlook [Accessed 11 August 2024].

World Health Organization (WHO). 2023b. *Noncommunicable Diseases* [Online]. Available: https://www.who.int/news-room/fact sheets/detail/noncommunicable-diseases [Accessed 21 March 2025].

World Health Organization (WHO). 2024a. *Global Health Estimates: Leading Causes of Death* [Online].Available:https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates [Accessed 11 August 2024].

World Health Organization (WHO). 2024b. *World Health Organization (WHO) South Africa: Country Cooperation Strategy* [Online]. Available: https://www.who.int/docs/default-source/country-profiles/south-africa-ccsbrief_zaf_en.pdf [Accessed 11 August 2024 2024].

World Health Organization (WHO). 2024c. *World Health Organization (WHO) Tackling NCDs: Best Buys and Other Recommended Interventions for the Prevention and Control of Noncommunicable Diseases* [Online]. Available: https://www.who.int/publications/i/item/9789240091078 [Accessed 11 August 2024].

World Physiotherapy. 2024a. *International Organisation of Physiotherapy in Mental Health (IOPTMH)* [Online]. Available: https://world.physio/subgroups/mental-health [Accessed 12 December 2024].

World Physiotherapy. 2024b. *What Is Physiotherapy?* [Online]. Available: https://world.physio/resources/what-is-physiotherapy [Accessed 12 September 2024].

Yao, L., Ahmed, M. M., Guyatt, G. H., Yan, P., Hui, X., Wang, Q., Yang, K., Tian, J. and Djulbegovic, B. 2021. Discordant and Inappropriate Discordant Recommendations in Consensus and Evidence-Based Guidelines: Empirical Analysis. *The BMJ,* 375. https://doi.org/10.1136/bmj-2021-066045

Yi, T. W., Donnellan, S. and Levin, A. 2021. Evidence-Based Decision Making 4: Clinical Practice Guidelines. *Methods in Molecular Biology.* https://doi.org/10.1007/978-1-0716-1138-8_24

Yu, D. J., Recchia, F., Bernal, J. D. K., Yu, A. P., Fong, D. Y., Li, S. X., Chan, R. N. Y., Hu, X. and Siu, P. M. 2023. Effectiveness of Exercise, Cognitive Behavioral Therapy, and Pharmacotherapy on Improving Sleep in Adults with Chronic Insomnia: A Systematic Review and Network Meta-Analysis of Randomized Controlled Trials. *Healthcare,* 11**,** 2207

Zaman, R., Hankir, A. and Jemni, M. 2019. Lifestyle Factors and Mental Health. *Psychiatria Danubina,* 31**,** 217-220

Zergaw, A., Tadesse, S., Taju, A., Berheto, T. M., Agachew, M., Arja, A., Bitew, S., Tollera, G., Dheresa, M., Naghavi, M., et al. 2023. The Burden of Mental Disorders in Ethiopia, from 1990 to 2019: A Systematic Analysis of the Global Burden of Diseases Study 2019. *Ethiopian Journal of Health Development,* 37. https://doi.org/10.20372/ejhd.v37i2.5862

Zhang, D., Lee, E. K. P., Mak, E. C. W., Ho, C. Y. and Wong, S. Y. S. 2021. Mindfulness-Based Interventions: An Overall Review. *British Medical Bulletin,* 138**,** 41-57. https://doi.org/10.1093/bmb/ldab005

Scopus AI was utilised to assist in the literature search process, enabling the identification and selection of relevant peer-reviewed articles through advanced semantic and citation-based search capabilities**.**

APPENDICES

Appendix A: Ethics Waiver – Systematic Review

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research & Innovation)

28/03/2022

Ref: W-CBP-220328-01

TO WHOM IT MAY CONCERN

Waiver: This certifies that the following research does not require clearance from the Human Research Ethics Committee (Medical)

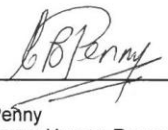
Investigator: Ms S Lord
Student No. (if appropriate): 99 0289 5E
Staff No. (if appropriate):

Supervisor: Dr V Naidoo

School: Clinical Medicine
Department: Physiotherapy
Medical School
University

Project title: *Lifestyle interventions for patients with co-morbid physical and mental health disorders: a systematic review*

Reason: Review of information in the public domain
No human participants will be involved in the study



Dr CB Penny
Chairperson: Human Research Ethics Committee (Medical)

Research Office Secretariat:
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Website:
https://www.wits.ac.za/research/researcher-support/research-ethics/ethics-committees/

Appendix B: Adapted search strategies for each database

1. CINAHL Ultimate 27.2.2024

(((("bipolar disorder"[MeSH Terms] OR ("bipolar"[All Fields] AND "disorder"[All Fields]) OR "bipolar disorder"[All Fields] OR ("depressed"[All Fields] OR "depression"[MeSH Terms] OR "depression"[All Fields] OR "depressions"[All Fields] OR "depression s"[All Fields] OR "depressive disorder"[MeSH Terms] OR ("depressive"[All Fields] AND "disorder"[All Fields]) OR "depressive disorder"[All Fields] OR "depressivity"[All Fields] OR "depressive"[All Fields] OR "depressively"[All Fields] OR "depressiveness"[All Fields] OR "depressives"[All Fields]) OR ("anxiety"[MeSH Terms] OR "anxiety"[All Fields] OR "anxieties"[All Fields] OR "anxiety s"[All Fields]) OR "anxiety disorders"[MeSH Terms]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms]) AND (("cardiovascular diseases"[MeSH Terms] OR ("cardiovascular"[All Fields] AND "diseases"[All Fields]) OR "cardiovascular diseases"[All Fields] OR ("respiratory tract diseases"[MeSH Terms] OR ("respiratory"[All Fields] AND "tract"[All Fields] AND "diseases"[All Fields]) OR "respiratory tract diseases"[All Fields]) OR ("metabolic syndrome"[MeSH Terms] OR ("metabolic"[All Fields] AND "syndrome"[All Fields]) OR "metabolic syndrome"[All Fields]) OR ("diabetes mellitus"[MeSH Terms] OR ("diabetes"[All Fields] AND "mellitus"[All Fields]) OR "diabetes mellitus"[All Fields]) OR ("musculoskeletal pain"[MeSH Terms] OR ("musculoskeletal"[All Fields] AND "pain"[All Fields]) OR "musculoskeletal pain"[All Fields]) OR "obesity"[MeSH Terms]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND ("quality of life"[MeSH Terms] AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND (("healthy lifestyle"[MeSH Terms] OR ("healthy"[All Fields] AND "lifestyle"[All Fields]) OR "healthy lifestyle"[All Fields] OR ("therapeutical"[All Fields] OR "therapeutically"[All Fields] OR "therapeuticals"[All Fields] OR "therapeutics"[MeSH Terms] OR "therapeutics"[All Fields] OR "therapeutic"[All Fields]) OR ("stress, psychological"[MeSH Terms] OR ("stress"[All Fields] AND "psychological"[All Fields]) OR "psychological stress"[All Fields] OR "stress psychological"[All Fields]) OR "behavior therapy"[MeSH Terms]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms] AND 2011/01/01:2022/12/31[Date - Publication])) OR (("cardiopulmonary diseases"[Text Word] OR "respiratory disorders"[Text Word] OR "diabetes"[Text Word] OR

"metabolic syndrome"[Text Word] OR "obesity"[Text Word] OR "asthma"[Text Word] OR ((("chronic"[All Fields] OR "chronical"[All Fields] OR "chronically"[All Fields] OR "chronicities"[All Fields] OR "chronicity"[All Fields] OR "chronicization"[All Fields] OR "chronics"[All Fields]) AND ("lung"[MeSH Terms] OR "lung"[All Fields] OR "pulmonary"[All Fields]) AND ("obstruct"[All Fields] OR "obstructed"[All Fields] OR "obstructing"[All Fields] OR "obstruction"[All Fields] OR "obstructions"[All Fields] OR "obstructive"[All Fields] OR "obstructs"[All Fields])) AND "disease or"[Text Word])) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms]) AND (("mental illness"[Text Word] OR "depression"[Text Word] OR "anxiety"[Text Word] OR "bipolar disorder"[Text Word]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND (("lifestyle intervention"[Text Word] OR "healthy lifestyle"[Text Word] OR "lifestyle modification"[Text Word] OR "exercise"[Text Word] OR "physical activity"[Text Word] OR "diet"[Text Word] OR "stress management"[Text Word] OR ("behavio*"[All Fields] AND "therapy"[Text Word])) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND (("quality of life"[Text Word] OR "health related quality of life"[Text Word]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms]))) AND ((randomizedcontrolledtrial[Filter]) AND (english[Filter]) AND (alladult[Filter]) AND (2011:2022[pdat]))

2. Pubmed 23.2.2024

(((("bipolar disorder"[MeSH Terms] OR ("bipolar"[All Fields] AND "disorder"[All Fields]) OR "bipolar disorder"[All Fields] OR ("depressed"[All Fields] OR "depression"[MeSH Terms] OR "depression"[All Fields] OR "depressions"[All Fields] OR "depression s"[All Fields] OR "depressive disorder"[MeSH Terms] OR ("depressive"[All Fields] AND "disorder"[All Fields]) OR "depressive disorder"[All Fields] OR "depressivity"[All Fields] OR "depressive"[All Fields] OR "depressively"[All Fields] OR "depressiveness"[All Fields] OR "depressives"[All Fields]) OR ("anxiety"[MeSH Terms] OR "anxiety"[All Fields] OR "anxieties"[All Fields] OR "anxiety s"[All Fields]) OR "anxiety disorders"[MeSH Terms]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms]) AND (("cardiovascular diseases"[MeSH Terms] OR ("cardiovascular"[All Fields] AND "diseases"[All Fields]) OR "cardiovascular diseases"[All Fields] OR ("respiratory tract

diseases"[MeSH Terms] OR ("respiratory"[All Fields] AND "tract"[All Fields] AND "diseases"[All Fields]) OR "respiratory tract diseases"[All Fields]) OR ("metabolic syndrome"[MeSH Terms] OR ("metabolic"[All Fields] AND "syndrome"[All Fields]) OR "metabolic syndrome"[All Fields]) OR ("diabetes mellitus"[MeSH Terms] OR ("diabetes"[All Fields] AND "mellitus"[All Fields]) OR "diabetes mellitus"[All Fields]) OR ("musculoskeletal pain"[MeSH Terms] OR ("musculoskeletal"[All Fields] AND "pain"[All Fields]) OR "musculoskeletal pain"[All Fields]) OR "obesity"[MeSH Terms]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND ("quality of life"[MeSH Terms] AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND (("healthy lifestyle"[MeSH Terms] OR ("healthy"[All Fields] AND "lifestyle"[All Fields]) OR "healthy lifestyle"[All Fields] OR ("therapeutical"[All Fields] OR "therapeutically"[All Fields] OR "therapeuticals"[All Fields] OR "therapeutics"[MeSH Terms] OR "therapeutics"[All Fields] OR "therapeutic"[All Fields]) OR ("stress, psychological"[MeSH Terms] OR ("stress"[All Fields] AND "psychological"[All Fields]) OR "psychological stress"[All Fields] OR "stress psychological"[All Fields]) OR "behavior therapy"[MeSH Terms]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms] AND 2011/01/01:2022/12/31[Date - Publication])) OR (("cardiopulmonary diseases"[Text Word] OR "respiratory disorders"[Text Word] OR "diabetes"[Text Word] OR "metabolic syndrome"[Text Word] OR "obesity"[Text Word] OR "asthma"[Text Word] OR ((("chronic"[All Fields] OR "chronical"[All Fields] OR "chronically"[All Fields] OR "chronicities"[All Fields] OR "chronicity"[All Fields] OR "chronicization"[All Fields] OR "chronics"[All Fields]) AND ("lung"[MeSH Terms] OR "lung"[All Fields] OR "pulmonary"[All Fields]) AND ("obstruct"[All Fields] OR "obstructed"[All Fields] OR "obstructing"[All Fields] OR "obstruction"[All Fields] OR "obstructions"[All Fields] OR "obstructive"[All Fields] OR "obstructs"[All Fields])) AND "disease or"[Text Word])) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms]) AND (("mental illness"[Text Word] OR "depression"[Text Word] OR "anxiety"[Text Word] OR "bipolar disorder"[Text Word]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND (("lifestyle

intervention"[Text Word] OR "healthy lifestyle"[Text Word] OR "lifestyle modification"[Text Word] OR "exercise"[Text Word] OR "physical activity"[Text Word] OR "diet"[Text Word] OR "stress management"[Text Word] OR ("behavio*"[All Fields] AND "therapy"[Text Word])) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND (("quality of life"[Text Word] OR "health related quality of life"[Text Word]) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms])) AND ("randomized controlled trial"[Publication Type] AND "adult"[MeSH Terms]))) AND ((randomizedcontrolledtrial[Filter]) AND (english[Filter]) AND (alladult[Filter]) AND (2011:2022[pdat]))

3. Cochrane

(((behav* or lifestyle) NEAR/3 (adapt* or modif* or intervention*)) or (physical* NEXT activ*) or exercis* or diet* or (Social* NEXT Integrat*) or (Community NEXT Participat*) or (cognitive NEXT behav* NEXT therap*) or (weight NEXT reduc*)) and ((psychological* NEXT distress*) or (mental NEXT disorder*) or depress* or anxiety or bipolar) and ("physical illness" or (physical NEXT disease*) or "physical health" or (cardiovascular NEXT disease*) or (respiratory NEXT disorder*) or (Respiratory NEXT Tract NEXT Disease*) diabet* or obes* or "metabolic syndrome" or "chronic pain" or "Musculoskeletal Pain" or (Physical NEXT Disorder*)) and (comorbid*) and ("Quality of Life") and (2011 –)

4. EBSCOhost platform databases:
   Academic Search Ultimate, APA PsycInfo, CINAHL with Full Text, MEDLINE

   (((behav* or lifestyle) n3 (adapt* or modif* or intervention*)) or "physical* activ*" or exercis* or diet* or "Social* Integrat*" or "Community Participat*" or "cognitive behav* therap*") and
   ("psychological* distress*" or "mental disorder*" or depress* or anxiety or bipolar) and
   ("physical illness" or "physical disease*" or "physical health" or "cardiovascular disease*" or "respiratory disorder*" or "Respiratory Tract Disease*" or diabet* or

obes* or "metabolic syndrome" or "chronic pain*" or "Musculoskeletal Pain*" or "Physical Disorder*") and
comorbid* and "Quality of Life" 2011 –

5. Scopus

(((behav* or lifestyle) W/3 (adapt* or modif* or intervention*)) or "physical* activ*" or exercis* or diet* or "Social* Integrat*" or "Community Participat*" or "cognitive behav* therap*") and ("psychological* distress*" or "mental disorder*" or depress* or anxiety or bipolar) and ("physical illness" or "physical disease*" or "physical health" or "cardiovascular disease*" or "respiratory disorder*" or "Respiratory Tract Disease*" or diabet* or obes* or "metabolic syndrome" or "chronic pain*" or "Musculoskeletal Pain*" or "Physical Disorder*") and comorbid* and "Quality of Life" 2011 –

Appendix C: Included studies following full text screening

Extracted from JBI SUMARI

Included studies

Parry GD, Cooper CL, Moore JM, Yadegarfar G, Campbell MJ, Esmonde L, et al. Cognitive behavioural intervention for adults with anxiety complications of asthma: prospective randomised trial. Respiratory Medicine [Internet]. 2012;106(6):802–10. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med9&NEWS=N&AN=22398158

Piette JD, Richardson C, Himle J, Duffy S, Torres T, Vogel M, et al. A randomized trial of telephonic counseling plus walking for depressed diabetes patients. Medical Care [Internet]. 2011;49(7):641–8. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-79959527501&doi=10.1097%2fMLR.0b013e318215d0c9&partnerID=40&md5=b3df5d54430dacabd44d0b34880bc6b4

Rosas LG, Azar KMJ, Lv N, Xiao L, Goldhaber-Fiebert JD, Snowden MB, et al. Effect of an Intervention for Obesity and Depression on Patient-Centered Outcomes: An RCT. American Journal of Preventive Medicine [Internet]. 2020;58(4):496–505. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85079527412&doi=10.1016%2fj.amepre.2019.11.005&partnerID=40&md5=d0bd8e9854976d5a7bea9c4a2f0a5e9e

Tovote KA, Fleer J, Snippe E, Peeters ACTM, Emmelkamp PMG, Sanderman R, et al. Individual mindfulness-based cognitive therapy and cognitive behavior therapy for treating depressive symptoms in patients with diabetes: Results of a randomized controlled trial. Diabetes Care [Internet]. 2014;37(9):2427–34. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-84904995705&doi=10.2337%2fdc13-2918&partnerID=40&md5=b514558ac8488a7703a3ab6b08ed607c

Excluded studies

Abbas Q, Latif S, Ayaz Habib H, Shahzad S, Sarwar U, Shahzadi M, et al. Cognitive behavior therapy for diabetes distress, depression, health anxiety, quality of life and treatment adherence among patients with type-II diabetes mellitus: a randomized control trial. BMC Psychiatry [Internet]. 2023;23(1). Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85147428843&doi=10.1186%2fs12888-023-04546-w&partnerID=40&md5=2ba0ab08cf81f8134372bb9cc51cf73b

Reason for exclusion: Ineligible date period

Ainsworth B, Stanescu S, Stuart B, Russell D, Liddiard M, Djukanovic R, et al. A feasibility trial of a digital mindfulness-based intervention to improve asthma-related quality of life for primary care patients with asthma. Journal of Behavioral Medicine [Internet]. 2022;45(1):133–47. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med20&NEWS=N&AN=34448986

Reason for exclusion: Ineligible participant characteristics

BenÃ-tez-Villa JL, Ortiz-HernÃ¡ndez L. Effectiveness of the motivational interviewing on cardiometabolic indicators of patients with bipolar disorder. Revista Mexicana de Trastornos Alimentarios [Internet]. 2023;13(2):145–55. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85166621260&doi=10.22201%2ffesi.20071523e.2023.2.741&partnerID=40&md5=90257728fdf029580358bcac7eafef0d

Reason for exclusion: Ineligible date period

Brautigam-Ewe M, Lydell M, Bergh H, Hildingh C, Baigi A, Mansson J. Two-year weight, risk and health factor outcomes of a weight-reduction intervention programme: Primary prevention for overweight in a multicentre primary healthcare setting. Scandinavian Journal of Primary Health Care [Internet]. 2020;38(2):192–200. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med17&NEWS=N&AN=32362238

Reason for exclusion: Ineligible participant characteristics

Buhrman M, Syk M, Burvall O, Hartig T, Gordh T, Andersson G. Individualized guided internet-delivered cognitive-behavior therapy for chronic pain patients with comorbid depression and anxiety: A randomized controlled trial. Clinical Journal of Pain [Internet]. 2015;31(6):504–16. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-84929513320&doi=10.1097%2fAJP.0000000000000176&partnerID=40&md5=31420f51768ae0ce3ecd8c8666262267

Reason for exclusion: Ineligible comparator

Burian H, BÃge K, Burian R, Burns A, Nguyen MH, Ohse L, et al. Acceptance and commitment-based therapy for patients with psychiatric and physical health conditions in routine general hospital care: Development, implementation and outcomes. Journal of Psychosomatic Research [Internet]. 2021;143. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85100493302&doi=10.1016%2fj.jpsychores.2021.110374&partnerID=40&md5=5171ae42ee646eb34e26bc751293d1f9

Reason for exclusion: Ineligible intervention

Chien C-L, Lee C-M, Wu Y-W, Wu Y-T. Home-based exercise improves the quality of life and physical function but not the psychological status of people with chronic heart failure: a randomised trial. Journal of Physiotherapy [Internet]. 2011;57(3):157–63. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med8&NEWS=N&AN=21843830

Reason for exclusion: Ineligible participant characteristics

Coventry P, Lovell K, Dickens C, Bower P, Chew-Graham C, McElvenny D, et al. Integrated primary care for patients with mental and physical multimorbidity: Cluster randomised controlled trial of collaborative care for patients with depression comorbid with diabetes or cardiovascular disease. BMJ (Online) [Internet]. 2015;350:1–11. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-

84923166562&doi=10.1136%2fbmj.h638&partnerID=40&md5=af56680326fce2159aee730f5b4636a1

Reason for exclusion: Ineligible intervention

De Groot M, Doyle T, Kushnick M, Shubrook J, Merrill J, Rabideau E, et al. Can lifestyle interventions do more than reduce diabetes risk? Treating depression in adults with type 2 diabetes with exercise and cognitive behavioral therapy. Current Diabetes Reports [Internet]. 2012;12(2):157–66. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-84861102199&doi=10.1007%2fs11892-012-0261-z&partnerID=40&md5=ee7c783a53ee702cfc49b3dd7ccb6ae1

Reason for exclusion: Ineligible intervention

De Jong M, Peeters F, Gard T, Ashih H, Doorley J, Walker R, et al. A randomized controlled pilot study on mindfulness-based cognitive therapy for unipolar depression in patients with chronic pain. Journal of Clinical Psychiatry [Internet]. 2018;79(1):26–34. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85046872149&doi=10.4088%2fJCP.15m10160&partnerID=40&md5=26454f606e140f3f73c6c88592f8da58

Reason for exclusion: Ineligible outcomes

Dindo L, Marchman J, Gindes H, Fiedorowicz JG. A brief behavioral intervention targeting mental health risk factors for vascular disease: a pilot study. Psychotherapy and Psychosomatics [Internet]. 2015;84(3):183–5. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med12&NEWS=N&AN=25832203

Reason for exclusion: Ineligible intervention

Effing T, Zielhuis G, Kerstjens H, van der Valk P, van der Palen J. Community based physiotherapeutic exercise in COPD self-management: a randomised controlled trial. Respiratory Medicine 2011 Mar;105(3):418-426. 2011;

Reason for exclusion: Ineligible participant characteristics

Fjorback LO, Arendt M, Ørnbøl E, Walach H, Rehfeld E, Schroder A, et al. Mindfulness therapy for somatization disorder and functional somatic syndromes - Randomized trial with one-year follow-up. Journal of Psychosomatic Research [Internet]. 2013;74(1):31–40. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-84871700234&doi=10.1016%2fj.jpsychores.2012.09.006&partnerID=40&md5=8b46b6bef6a636403b7b7cd0cc6a113c

Reason for exclusion: Ineligible participant characteristics

Gasslander N, Andersson G, Bostro¶m F, Brandelius L, Pelling L, Hamrin L, et al. Tailored internet-based cognitive behavioral therapy for individuals with chronic pain and comorbid psychological distress: a randomized controlled trial. Cognitive Behaviour Therapy [Internet]. 2022; Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85130181844&doi=10.1080%2f16506073.2022.2065528&partnerID=40&md5=3e6f52278749b9ad85f3e81db6fd4ce9

Reason for exclusion: Ineligible participant characteristics

Goldhaber-Fiebert JD, Prince L, Xiao L, Lv N, Rosas LG, Venditti EM, et al. First-Year Economic and Quality of Life Effects of the RAINBOW Intervention to Treat Comorbid Obesity and Depression. Obesity [Internet]. 2020;28(6):1031–9. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85084047620&doi=10.1002%2foby.22805&partnerID=40&md5=0cb77209dc22cf986649919bda70b13a

Reason for exclusion: Ineligible intervention

Heslop-Marshall K, Baker C, Carrick-Sen D, Newton J, Echevarria C, Stenton C, et al. Randomised controlled trial of cognitive behavioural therapy in COPD. ERJ Open Research [Internet]. 2018;4(4). Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85068437635&doi=10.1183%2f23120541.00094-2018&partnerID=40&md5=967ffb1e4df7ec2b7bab64901bc3eb4e

Reason for exclusion: Ineligible outcomes

Huang C-Y, Lai H-L, Chen C-I, Lu Y-C, Li S-C, Wang L-W, et al. Effects of motivational enhancement therapy plus cognitive behaviour therapy on depressive symptoms and health-related quality of life in adults with type II diabetes mellitus: a randomised controlled trial. Quality of life research: an international journal of quality of life aspects of treatment, care and rehabilitation [Internet]. 2016;25(5):1275–83. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med13&NEWS=N&AN=26497665

Reason for exclusion: Ineligible intervention

Jansons P, Robins L, O'Brien L, Haines T. Gym-based exercise and home-based exercise with telephone support have similar outcomes when used as maintenance programs in adults with chronic health conditions: a randomised trial [with consumer summary]. Journal of Physiotherapy 2017 Jul;63(3):154-160. 2017;

Reason for exclusion: Ineligible participant characteristics

Kilbourne AM, Barbaresso MM, Lai Z, Nord KM, Bramlet M, Goodrich DE, et al. Improving physical health in patients with chronic mental disorders: Twelve-month results from a randomized controlled collaborative care trial. Journal of Clinical Psychiatry [Internet]. 2017;78(1):129–37. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85012920966&doi=10.4088%2fJCP.15m10301&partnerID=40&md5=52319fd9f5b63ad767e6da703a73c344

Reason for exclusion: Ineligible intervention

Lee AL, Butler SJ, Varadi RG, Goldstein RS, Brooks D. The Impact of Pulmonary Rehabilitation on Chronic Pain in People with COPD. Copd: Journal of Chronic Obstructive Pulmonary Disease [Internet]. 2020;17(2):165–74. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85081263229&doi=10.1080%2f15412555.2020.1733952&partnerID=40&md5=de340a9b2352847383fe4555a4e9413b

Reason for exclusion: Ineligible participant characteristics

Lundgren JG, Dahlstrom O, Andersson G, Jaarsma T, Karner Kohler A, Johansson P.

The Effect of Guided Web-Based Cognitive Behavioral Therapy on Patients With Depressive Symptoms and Heart Failure: A Pilot Randomized Controlled Trial. Journal of Medical Internet Research [Internet]. 2016;18(8):e194. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med13&NEWS=N&AN=27489077

Reason for exclusion: Ineligible comparator

Mateu M, Alda O, Inda MDM, Margarit C, Ajo R, Morales D, et al. Randomized, controlled, crossover study of self-administered Jacobson relaxation in chronic, nonspecific, low-back pain. Alternative Therapies in Health and Medicine [Internet]. 2018;24(6):22–30. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85063026801&partnerID=40&md5=d1800ec50f13db05b81de2aa8b03788a

Reason for exclusion: Ineligible participant characteristics

Moraes ADS, Padovani RDC, La Scala Teixeira CV, Cuesta MGS, Gil SDS, de Paula B, et al. Cognitive Behavioral Approach to Treat Obesity: A Randomized Clinical Trial. Frontiers in nutrition [Internet]. 2021;8. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85102100198&doi=10.3389%2ffnut.2021.611217&partnerID=40&md5=ae76f2f5b0fb92c8ca719b6004585a26

Reason for exclusion: Ineligible intervention

Oerkild B, Frederiksen M, Hansen JF, Prescott E. Home-based cardiac rehabilitation is an attractive alternative to no cardiac rehabilitation for elderly patients with coronary heart disease: Results from a randomised clinical trial. BMJ Open [Internet]. 2012;2(6). Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-84873882547&doi=10.1136%2fbmjopen-2012-001820&partnerID=40&md5=3b32b692518abac15ebbc2243de60cc7

Reason for exclusion: Ineligible participant characteristics

Pourdowlat G, Hejrati R, Lookzadeh S. The effectiveness of relaxation training in the quality of life and anxiety of patients with asthma. Advances in Respiratory Medicine [Internet]. 2019;87(3):146–51. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med16&NEWS=N&AN=31282555

Reason for exclusion: Ineligible participant characteristics

Srivastava G, Buffington C. Early weight loss outcomes from a newly established hospital-affiliated specialized obesity care delivery model in Central Florida. International Journal of Obesity [Internet]. 2019;43(1):132–8. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85047358923&doi=10.1038%2fs41366-018-0092-3&partnerID=40&md5=525b6802ea8af28fcc6dd804047046fe

Reason for exclusion: Ineligible participant characteristics

Sun J, Buys N. A comparison between a Tai Chi program and a usual medical care program in chronic cardiovascular disease participants in quality of life, psychological health, resilience, blood pressure and body mass index. International Journal on Disability and Human Development [Internet]. 2014;13(1):113–20. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-84925624006&doi=10.1515%2fijdhd-2013-0024&partnerID=40&md5=69c0b00d64e17f2e1efe135bda75cfa5

Reason for exclusion: Ineligible study design

Teng H-C, Yeh M-L, Wang M-H. Walking with controlled breathing improves exercise tolerance, anxiety, and quality of life in heart failure patients: A randomized controlled trial. European Journal of Cardiovascular Nursing [Internet]. 2018;17(8):717–27. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med15&NEWS=N&AN=29775076

Reason for exclusion: Ineligible participant characteristics

Vancini RL, Rayes ABR, Lira CAB de, Sarro KJ, Andrade MS. Pilates and aerobic training improve levels of depression, anxiety and quality of life in overweight and obese individuals. Arquivos de Neuro-Psiquiatria [Internet]. 2017;75(12):850–7. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med14&NEWS=N&AN=29236887

Reason for exclusion: Ineligible study design

Świątkiewicz, I, Di Somma S, De Fazio L, Mazzilli V, Taub PR. Effectiveness of intensive cardiac rehabilitation in high-risk patients with cardiovascular disease in real-world practice. Nutrients [Internet]. 2021;13(11). Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85117900354&doi=10.3390%2fnu13113883&partnerID=40&md5=95ac7803c8c55da8bfedde5716fd4591

Reason for exclusion: Ineligible study design

Appendix D: Data supporting meta-analysis

Studies	Condition	Design & mode of analysis	Type of intervention	Comparator	Outcome measure	Duration of intervention	Intervention arm Mean	SD	N	Control Mean	SD	N
Physical aspect of quality of life												
Rosas et al., 2020	Obesity and depression	RCT Per protocol	Integrated collaborative care intervention	Usual care	SF-8	12 months	47.1	8.7	141	46.3	8.6	205
Piette et al., 2011	Diabetes & depression	RCT Intention-to-treat	Telephone Counselling (CBT) plus Walking	Routine care	SF-12	12 months	39.5	11.7	145	36.3	12.2	146
Mental aspect of quality of life												
Rosas et al., 2020	Obesity and depression	RCT Per protocol	Integrated collaborative care intervention	Usual care	SF-8	12 months	45.0	9.6	141	43.3	9.5	205
Piette et al., 2011	Diabetes & depression	RCT Intention-to-treat	Telephone Counselling (CBT) plus Walking	Routine care	SF-12	12 months	46.7	11.3	145	43.7	11.4	146

APPENDIX E: ETHICS CERTIFICATE – DELPHI STUDY

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R49 Ms S Lord

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M231008

NAME: Ms S Lord **DEGREE:** PhD
(Principal and Co-Investigators)

DEPARTMENT: School of Therapeutic Sciences
Department of Physiotherapy
Medical School
University

PROJECT TITLE: *Recommendations for physiotherapist-delivered lifestyle interventions for patients with co-morbid mental and physical health disorders*

DATE CONSIDERED: 27 October 2023

DECISION: Approved unconditionally

CONDITIONS:

NOTE: If contact information regarding student study participants is required, please contact the Registrar's office <Nicoleen.Potgieter@wits.ac.za>

SUPERVISOR: Dr V Naidoo and Professor K Mostert

APPROVED BY:
Professor P Ruff, Chairperson, HREC (Medical)

DATE OF APPROVAL: 20 February 2024 **EXPIRY DATE:** 19 February 2029

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

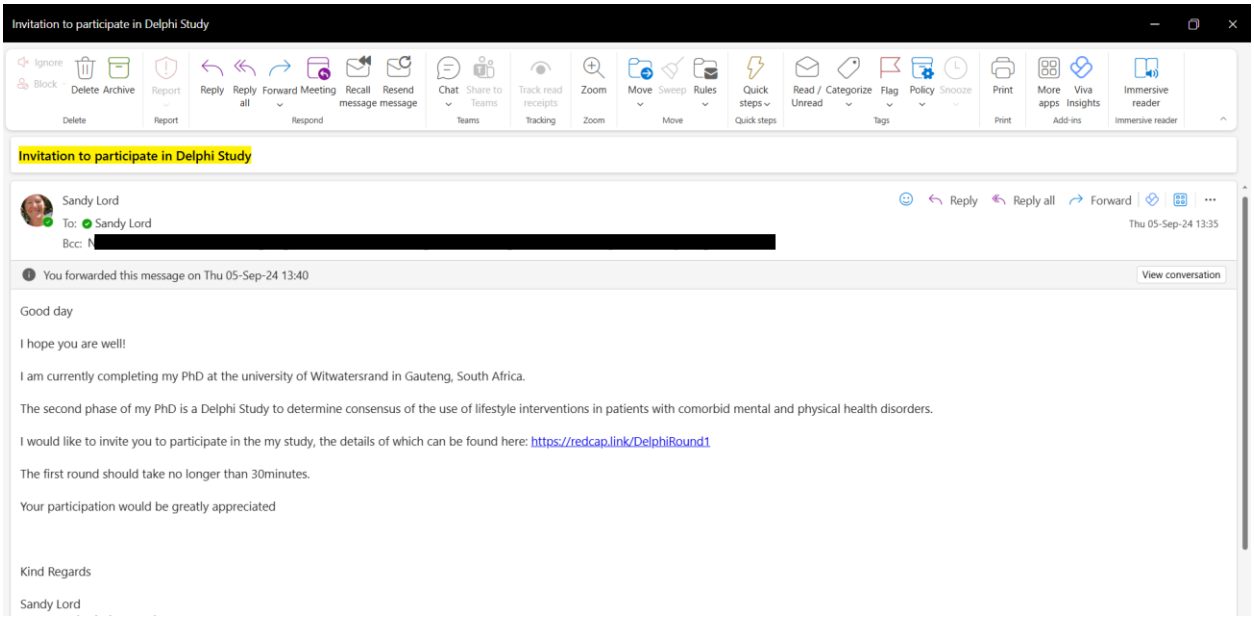
DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report** in the format available at https://wits.ac.za/research/researcher-support/research-ethics/ethics-committees/. This report is due annually, for the duration of the Clearance Certificate, beginning on the first anniversary of Date of Approval above. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator Date

APPENDIX F: EMAIL INVITATION SENT TO POTENTIAL PARTICIPANTS FOR DELPHI



The email invitation sent to potential participants stated:

Good day

I hope you are well.

I am currently completing my PhD at the University of Witwatersrand in Gauteng, South Africa.

The second phase of my PhD is a Delphi study to determine consensus on the use of lifestyle interventions in patients with comorbid mental and physical health disorders.

I would like to invite you to participate in my study, the details of which can be found here: https://redcap.link/DelphiRound1

The first round should take no longer than 30minutes.

Your participation would be greatly appreciated

APPENDIX G: DELPHI PARTICIPANT INFORMATION SHEET, CONSENT, SURVEY

Confidential

Consent

RECOMMENDATIONS FOR PHYSIOTHERAPIST-DELIVERED LIFESTYLE INTERVENTIONS FORPATIENTS WITH COMORBID MENTAL AND PHYSICAL HEALTH DISORDERS

Introduction - Delphi Group

Dear potential participant

My name is Sandy Lord. I am a PhD student at the University of the Witwatersrand, Johannesburg. My supervisors are Dr Vaneshveri Naidoo and Prof. Karien Mostert. I am conducting a research study about lifestyle interventions for the management of patients with co- occuring physical and mental health disorders. The study title is: 'Recommendations for physiotherapist-delivered lifestyle interventions for patients with comorbid mental and physical health disorders.' The overall aim of this research project is to develop evidence-based recommendations for the management of patients with co-occuring physical and mental health disorders in South Africa. To achieve this, expert consensus is required toformulate the recommendations.

As an expert in your field, I invite you to participate in a Delphi Study. Experts across all professions involved in mental health will be included. These include psychiatrists, psychologists, social workers, mental health nurses, physiotherapists, exercise physiologists, dieticians and occupational therapists. Your involvement will involve the completion of questionnaires to determine your view of the evidence and develop recommendations. Should you decide to participate, a link to Research and Electronic Capture (REDCap) is included in this email. It is envisaged that this study will take place over three rounds. If consensus is not reached after three rounds a fourth and final round may occur. Two weeks will be allowed for the completion of the initial questionnaire. In addition, a three-week period between rounds will allow for analysis of the results and for forwarding of the summary findings to you. Emailreminders will be sent a week before the next round is set to occur. The Delphi questionnaire will include demographic questions, followed by questions to establish agreement from all participants.

There are no risks involved in taking part in this study and there are no direct benefits to you as a panellist, but your valuable input may help improve and direct the management of patients with mental ill health and co-occuring chronic illness. Participation is voluntary, there are no consequences to refusal and you may withdraw at any time without providing a reason and any data collected will be destroyed unless you specifically consent to it being retained.Confidentiality:

Your information, as it pertains to this study, will be kept confidential and only available to me (Researcher) and my two supervisors. The only exceptions - and both of them are rare - would normally be:

1. personal information may be disclosed if required by law, "such as the Promotion of Access to Information Act"

2. the Human Research Ethics Committees of the University may exceptionally require personal data to respond to a formal complaint, or for a compliance audit.

The responses to the questionnaires will be confidential and anonymous. When I share the results of the research study, I will not include your name or anything else that could identify you. With your permission, other researchers may use the data collected from this research study, provided they are granted their own ethics clearance, but your name and any personal information will not be used or passed on. I will be pleased to provide a free results summary to any participant upon request. All data collected during the study will be securely retained for two (2) years, if a scientific publication arises from the study and six (6) years, if there is no publication. Thereafter, it will be destroyed accordingly.

Contact details of researcher/s:

Ms Sandy Lord (Researcher)
011 717 3715
sandy.lord@wits.ac.za

Dr Vaneshveri Naidoo (Supervisor)
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Prof. Karien Mostert (Supervisor)
012 356 3237
karien.mostert@up.ac.za

APPENDIX G (cont): DELPHI PARTICIPANT INFORMATION SHEET, CONSENT AND ROUND 1

Contact details of HREC administrator and chair:

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg ("Committee"). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.If you have any concerns over the way the study is being conducted, please contact the Chairperson of this Committee, Professor Paul Ruff, who may be contacted via any one member of the secretariat.

The telephone numbers for the Committee secretariat are:

011 717 2700/1234/2656/1252

and the e-mail addresses are: Zanele.Ndlovu@wits.ac.za,

Rhulani.Mukansi@wits.ac.za,

Mapula.Ramaila@wits.ac.za

Iain.Burns@wits.ac.za

Thank you for reading this Study Information Sheet.

---

1) I hereby agree to participate in the study as described to me in the participation information sheet in the survey instructions and as an attachment in the email.

I hereby agree to complete the required questionnaire for the study.

I am aware that there are no risks to partaking in the study and that I can withdraw from it at any time without any consequences to me. I understand that there will be no financial rewards for my participation and that participation is voluntary

◯ I do consent
◯ I do NOT consent

APPENDIX G (cont): DELPHI DEMOGRAPHIC INFORMATION

Confidential

Demographic Information

Please complete the survey below.

Thank you!

Demographic Information	
First Name	_____
Last name	_____
Gender	◯ Female ◯ Male ◯ Other
Email	_____
Profession	◯ Biokineticist ◯ Dietician ◯ Exercise Physiologist ◯ Mental Health Nurse ◯ Occupational Therapist ◯ Physiotherapist ◯ Psychiatrist ◯ Psychologist ◯ Social Worker
Do you work as a/an	☐ Academic ☐ Clinician ☐ Researcher
2) Years of experience in mental health	◯ 0-4 years ◯ 5-9 years ◯ 10-14 years ◯ 15-19 years ◯ 20-24 years ◯ 25-30 years ◯ 31 years and more
In which country do you practice?	_____

APPENDIX G (cont): ROUND 1 SURVEY

Confidential

Delphi Survey Round 1

Please complete the survey below.

Thank you!

Lifestyle interventions have been recommended in the management of patients with mental health disorders and co-occurring physical illnesses. They are effective in managing either mental health disorders or chronic illness, however little is known about their effectiveness in patients with BOTH conditions. Lifestyle interventions are both cost-effective and easy to implement by any member of the interprofessional team (Ee et al.; 2020)

Lifestyle interventions include:	☐ Nutrition ☐ Movement (physical activity and exercise) ☐ Sleep ☐ Stress management modalities (includes mindfulness, cognitive behavioural therapy, relaxation and breathing exercises) ☐ Substance cessation
Do you agree that lifestyle interventions should be implemented in patients with mental health disorders (depression and anxiety) and comorbid physical illness (cardiovascular disease, respiratory disorders, obesity, diabetes, metabolic syndrome and chronic musculoskeletal pain). Please explain your answer.	_____
Can any member of the interprofessional team provide lifestyle interventions for patients with comorbid mental health disorders and chronic illness?	◯ Yes ◯ No
Please explain why your answer:	_____
In your settings, are physiotherapists involved in the delivery of lifestyle interventions?	◯ Yes ◯ No
In your setting, which lifestyle interventions do physiotherapists deliver?	☐ Nutrition ☐ Movement (Physical activity and exercise) ☐ Sleep ☐ Stress management (includes mindfulness, Cognitive Behavioural Therapy, relaxation and breathing exercises ☐ Substance cessation

Physical Activity and Exercise

What are your recommendations for physical activity and exercise as a lifestyle intervention in patients with comorbid mental health disorders (depression and anxiety) and chronic illnesses (cardiovascular disease, respiratory disorders, obesity, diabetes, metabolic syndrome and chronic musculoskeletal pain)?

Sleep

What are your recommendations for sleep management/hygiene as a lifestyle intervention in patients with comorbid mental health disorders (depression and anxiety) and chronic illnesses (cardiovascular disease, respiratory disorders, obesity, diabetes, metabolic syndrome and chronic musculoskeletal pain)?

Nutrition

What are your recommendations for nutrition and weight management as a lifestyle intervention in patients with comorbid mental health disorders (depression and anxiety) and chronic illnesses (cardiovascular disease, respiratory disorders, obesity, diabetes, metabolic syndrome and chronic musculoskeletal pain)?

Stress Management

What are your recommendations for stress management interventions (mindfulness, Cognitive Behavioural Therapy, relaxation and deep breathing exercises) as a lifestyle intervention in patients with comorbid mental health disorders (depression and anxiety) and chronic illnesses (cardiovascular disease, respiratory disorders, obesity, diabetes, metabolic syndrome and chronic musculoskeletal pain)?

APPENDIX H: DELPHI ROUND 2 - SURVEY

Confidential

Delphi Round 2: Recommendations for lifestyle interventions for patients with comorbid mental and physical health disorders

Please complete the survey below.

A reminder that it is best to complete the survey in one sitting. You will be able to access the survey again but your responses may not have been saved

Thank you!

Dear Participant

Thank you for taking the time to participate in Round 2 of this Delphi study which aims to develop recommendations for lifestyle interventions for patients with comorbid mental and physical health disorders.

In Round 1, information was gathered to understand what healthcare professionals recommend regarding lifestyle interventions (e.g., nutrition and weight management, sleep, physical activity and exercise, and stress management) in the management of patients with comorbid mental and physical health disorders.

In Round 2, the information collected in Round 1 has been collated to obtain consensus. Please indicate your response by checking the most appropriate box. A text box is provided under each statement/recommendation for you to rephrase or add additional information should you wish to. (this box is not compulsory to complete)

It is recommended that you complete the survey in one sitting to ensure that you submit the responses within the allocated data collection period. Two weeks will be allowed for the completion of this round. In addition, a three-week period between rounds will allow for analysis of the results and for forwarding of the summary findings to you. Email reminders will be sent a week before the next round is set to occur.

There are no risks involved in taking part in this study and there are no direct benefits to you as a panellist, but your valuable input may help improve and direct the management of patients with mental ill health and co-occuring chronic illness. Participation is voluntary, there are no consequences to refusal and you may withdraw at any time without providing a reason and any data collected will be destroyed unless you specifically consent to it being retained.

Confidentiality:
There is no identifying information in this study. Your information, as it pertains to this study, will be kept confidential and will only be available to myself (Researcher) and my two supervisors. The only exceptions - and both of them are rare - would normally be:
1. personal information may be disclosed if required by law, "such as the Promotion of Access to Information Act"
2. the Human Research Ethics Committees of the University may exceptionally require personal data to respond to a formal complaint, or for a compliance audit.

The responses to the questionnaires will be confidential and anonymous. When I share the results of the research study, I will not include your name or anything else that could identify you. With your permission, other researchers may use the data collected from this research study, provided they are granted their own ethics clearance, but your name and any personal information will not be used or passed on. I will be pleased to provide a results summary to any participant upon request. All data collected during the study will be securely retained for two (2) years, if a scientific publication arises from the study and six (6) years, if there is no publication. Thereafter it will be destroyed accordingly.

Contact details of HREC administrator and chair
This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg ("Committee"). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concerns over the way the study is being conducted, please contact the Chairperson of this Committee, Professor Paul Ruff, who may be contacted via any one member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za, Rhulani.Mukansi@wits.ac.za, Mapula.Ramaila@wits.ac.za and Iain.Burns@wits.ac.za

Thank you

Sandy Lord (sandy.lord@wits.ac.za, 083 264 1804)

Supervisors:

Dr Vaneshveri Naidoo: 011 717 3702, vaneshveri.naidoo@wits.ac.za and
Prof Karien Mostert: 012 354 1353, karien.mostert@up.ac.za

I have read the information sheet and hereby consent to participate in this study	◯ Yes ◯ No

GENERAL RECOMMENDATIONS	
Lifestyle interventions should be included as a preventative strategy in patients with comorbid mental and physical health disorders.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
A thorough assessment of the patient's lifestyle factors (eating habits, physical activity and exercise, sleeping patterns) should be included in the management plan	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
Lifestyle interventions should be offered as 'first-line' management for patients with comorbid mental and physical health disorders.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
Delivery of lifestyle interventions to patients with comorbid mental and physical health disorders should be an interprofessional approach	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
All members of the interprofessional team should be able to provide health promotion strategies, including lifestyle advice and education about lifestyle factors.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
Lifestyle interventions should be delivered by healthcare professionals, within their scope of practice.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
Referral to a healthcare professional with more extensive knowledge and training should be considered for more in-depth management.	◯ Yes ◯ Maybe ◯ No

Comment or rephrase here:	_____
To have one leading healthcare professional coordinating or leading the delivery of all lifestyle interventions is beneficial.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase:	_____
Lifestyle interventions should be patient-centred and align with the patient's goals and needs.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Consideration should be given to the specific patient context and available resources within that context	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
The role of the dietician in the delivery of lifestyle interventions for patients with comorbid mental and physical health disorders is:	_____
The role of the exercise physiologist in the delivery of lifestyle interventions for patients with comorbid mental and physical health disorders is:	_____
The role of the mental health nurse in the delivery of lifestyle interventions for patients with comorbid mental and physical health disorders is:	_____
The role of the physiotherapist in the delivery of lifestyle interventions for patients with comorbid mental and physical health disorders is:	_____
The role of the psychiatrist in the delivery of lifestyle interventions for patients with comorbid mental and physical health disorders is:	_____
The role of the psychologist in the delivery of lifestyle interventions for patients with comorbid mental and physical health disorders is	_____

Sleep Recommendations	
Physical factors affecting sleep should be evaluated and managed as appropriate	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Sleep should be monitored and interventions to help track sleep should be made available to patients	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Sleep hygiene is important in the management of patients with comorbid mental and physical health disorders	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
General information and education about sleep include (delivered by any healthcare professional):	◯ Relaxation activities, such as yoga self-awareness ◯ Consistent sleep routine ◯ Adequate sun exposure throughout the day ◯ Limited device use and screen time just before bed
Comment or rephrase here:	_____
Medication can be used to assist sleep if sleep disturbances are severe	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Sleep disorders can be identified by any healthcare professional	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Patients with comorbid mental and physical health disorders should be referred to appropriate resources and health care professionals if they are still waking feeling tired	◯ Yes ◯ Maybe ◯ No

Comment or rephrase here:

Physical Activity and Exercise

A healthcare professional with knowledge of both the physical and mental health of the patient should have a role in overseeing the exercise interventions	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
A lifestyle physical activity programme aims to decrease sedentary time and increase movement	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
The guidelines for physical activity and exercise should be adhered to when prescribing an exercise programme (150 minutes of moderate exercise a week on at least three to five days a week	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
At least 30 minutes of daily exercise is important for patients with comorbid mental and physical health disorders	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
Regular, frequent and consistent exercise is more important than exercise intensity/exertion	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
Exercise should be tailored to the lifestyle of the patient with an emphasis on lifestyle physical activity programmes	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	
Lifestyle physical activity programmes are more beneficial than structured exercise programmes in patients with comorbid mental and physical health disorders	◯ Yes ◯ Maybe ◯ No

Comment or rephrase here:	
Physical activity and exercise programmes should be supervised in patients with comorbid mental and physical health disorders	◯ Yes ◯ Maybe ◯ **N**o
Comment or rephrase here:	
Group exercise programmes are better than individual exercise programmes	◯ Yes ◯ Maybe ◯ **N**o
Comment or rephrase here:	
Exercise programmes should include aerobic exercise	◯ Yes ◯ Maybe ◯ **N**o
Comment or rephrase here:	
Exercise programmes should include strength training	◯ Yes ◯ Maybe ◯ **N**o
Comment or rephrase here:	
A combination of structured and lifestyle physical activity programmes are better suited to patients with comorbid mental and physical health disorders	◯ Yes ◯ Maybe ◯ **N**o
Comment or rephrase here:	
Passive exercises are recommended for patients with comorbid mental and physical health disorders	◯ Yes ◯ Maybe ◯ **N**o
Comment or rephrase here:	

SLEEP RECOMMENDATIONS	
A thorough assessment should include the patient's knowledge of nutrition and current eating patterns and behaviours, sleeping patterns, physical activity levels and emotional regulation as these impact eating patterns and behaviours	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Healthy eating and weight management should be done in conjunction with physical activity and exercise.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Healthy eating and weight management should be done in conjunction with stress management interventions.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Nutritional interventions are best delivered in a group setting.	◯ Yes ◯ Maybe ◯ No
Dieticians or other suitably trained healthcare professionals are experts in providing nutrition interventions for weight management, however, every member of the interprofessional team can provide general information	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
General advice/information for nutrition and weight management includes:	☐ Eating a variety of foods, proteins, whole grains. ☐ Limit processed food, sugar and alcohol ☐ Keep hydrated
Comment or rephrase here:	_____
Refer to the appropriate healthcare professional if a more in-depth intervention is needed e.g GP or dietician	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____

STRESS MANAGEMENT

Deep breathing exercises are a useful adjunct to supporting depression and anxiety as well as physical health disorders, such as chronic pain and respiratory conditions.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Stress management should be targeted to the specific goals identified by the patient.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Stress management modalities are used to support the mental and physical health of the patient within a biopsychosocial framework	◯ Yes ◯ Maybe ◯ No
Education and information advice about stress management modalities should be provided to all patients with comorbid mental and physical health disorders.	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____
Stress management interventions should include:	☐ Mindfulness ☐ Cognitive behavioural therapy ☐ Dialectical behavioural therapy ☐ Yoga ☐ Breathwork/breathing exercise ☐ Journalling
Comment or rephrase here:	_____
Stress management modalities should be delivered in a group setting.	☐ Yes ☐ Maybe ☐ No
Comment or rephrase here:	_____
Cognitive behavioural therapy (CBT) is an important stress management modality and can be delivered by any member of the interprofessional team	◯ Yes ◯ Maybe ◯ No
Comment or rephrase here:	_____

APPENDIX I: ITEM NUMBERS AND CORRESPONDING STATEMENTS

Item	Statement
1	Lifestyle interventions should be included as a preventative strategy in patients with comorbid mental and physical health disorders.
2	A thorough assessment of the patient's lifestyle factors (eating habits, physical activity and exercise, sleeping patterns) should be included in the management plan
3	Lifestyle interventions should be offered as 'first-line' management for patients with comorbid mental and physical health disorders.
4	Delivery of lifestyle interventions to patients with comorbid mental and physical health disorders should be an interprofessional approach
5	All members of the interprofessional team should be able to provide health promotion strategies, including lifestyle advice and education about lifestyle factors
6	Lifestyle interventions should be delivered by healthcare professionals within their scope of practice.
7	Referral to a healthcare professional with more extensive knowledge and training should be considered for more in-depth management.
8	To have one leading healthcare professional coordinating or leading the delivery of all lifestyle interventions is beneficial
9	Lifestyle interventions should be patient-centred and align with the patient's goals and needs.
10	Consideration should be given to the specific patient context and available resources within that context
11	Physical factors affecting sleep should be evaluated and managed as appropriate
12	Sleep should be monitored and interventions to help track sleep should be made available to patients
13	Sleep hygiene is important in the management of patients with comorbid mental and physical health disorders
14	MCQ: General information and education about sleep includes:
15	Medication can be used to assist sleep if sleep disturbances are severe
16	Sleep disorders can be identified by any healthcare professional
17	Patients with comorbid mental and physical health disorders should be referred to appropriate resources and health care professionals if they are still waking feeling tired
18	A healthcare professional with knowledge of both the physical and mental health of the patient should have a role in overseeing the exercise interventions
19	A lifestyle physical activity programme aims to decrease sedentary time and increase movement
20	The guidelines for physical activity and exercise should be adhered to when prescribing an exercise programme (150 minutes of moderate exercise a week on at least three to five days a week
21	At least 30 minutes of daily exercise is important for patients with comorbid mental and physical health disorders
22	Regular, frequent and consistent exercise is more important than exercise intensity/exertion
23	Exercise should be tailored to the lifestyle of the patient with an emphasis on lifestyle physical activity programmes
24	Lifestyle physical activity programmes are more beneficial than structured exercise programmes in patients with comorbid mental and physical health disorders

Item	Statement
25	Physical activity and exercise programmes should be supervised in patients with comorbid mental and physical health disorders
26	Group exercise programmes are better than individual exercise programmes
27	Exercise programmes should include aerobic exercise
28	Exercise programmes should include strength training
29	A combination of structured and lifestyle physical activity programmes are better suited to patients with comorbid mental and physical health disorders
30	Passive exercises are recommended for patients with comorbid mental and physical health disorders
31	A thorough assessment should include the patient's knowledge of nutrition and current eating patterns and behaviours, sleeping patterns, physical activity levels and emotional regulation as these impact eating patterns and behaviours
32	Healthy eating and weight management should be done in conjunction with physical activity and exercise.
33	Healthy eating and weight management should be done in conjunction with stress management interventions.
34	Nutritional interventions are best delivered in a group setting
35	Dieticians or other suitably trained healthcare professionals are experts in providing nutrition interventions for weight management, however, every member of the interprofessional team can provide general information
36	MCQ: General advice/information about nutrition and weight management includes:
37	Refer to the appropriate healthcare professional if a more in-depth intervention is needed e.g. GP or dietician
38	Deep breathing exercises are a useful adjunct to supporting depression and anxiety as well as physical health disorders, such as chronic pain and respiratory conditions
39	Stress management should be targeted to the specific goals identified by the patient.
40	Stress management modalities are used to support the mental and physical health of the patient within a biopsychosocial framework
41	Education and information advice about stress management modalities should be provided to all patients with comorbid mental and physical health disorders.
42	MCQ: Stress management interventions should include
43	Stress management modalities should be delivered in a group setting
44	Cognitive behavioural therapy (CBT) is an important stress management modality and can be delivered by any member of the interprofessional team

Appendix J: Round 3 Delphi

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Delphi Expert Consensus Round 3

Please complete the survey below.

Thank you!

Participant Information Sheet

Dear Participant

Thank you for taking the time to participate in Round 3 of this Delphi study which aims to develop recommendations for lifestyle interventions for patients with comorbid mental and physical health disorders.

In **round 1**, information was gathered to understand what healthcare professionals recommend regarding lifestyle interventions (e.g., nutrition and weight management, sleep, physical activity and exercise, and stress management) in the management of patients with comorbid mental and physical health disorders. In **round 2**, the information was collated to obtain consensus.

In **round 3**, the statements from round 1 and round 2 have been collated into recommendations for the management of patients with comorbid mental and physical health disorders.

In **round 3,** please indicate your agreement (or disagreement) by checking the most appropriate box.
It is recommended that you complete the survey in one sitting to ensure that you submit the responses within the allocated data collection period. Two weeks will be allowed for the completion of this round. It is envisaged that this will be the final round, provided 80% consensus is achieved.

There are no risks involved in taking part in this study and there are no direct benefits to you as a panellist, but your valuable input may help improve and direct the management of patients with mental ill health and co-occuring chronic illness. Participation is voluntary, there are no consequences to refusal, and you may withdraw at any time without providing a reason and any data collected will be destroyed unless you specifically consent to it being retained.

Confidentiality:
Your information, as it pertains to this study, will be kept confidential and will only be available to myself (Researcher) and my two supervisors. The only exceptions - and both of them are rare - would normally be:

1. personal information may be disclosed if required by law, "such as the Promotion of Access to Information Act"
2. the Human Research Ethics Committees of the University may exceptionally require personal data to respond to a formal complaint, or for a compliance audit.

The responses to the questionnaires will be confidential and anonymous. When I share the results of the research study, I will not include your name or anything else that could identify you. With your permission (please add this to the Consent Sheet), other researchers may use the data collected from this research study, provided they are granted their own ethics clearance, but your name and any personal information will not be used or passed on. I will be pleased to provide a free results summary to any participant on request. All data collected during the study will be securely retained for two (2) years, if a scientific publication arises from the study and six (6) years, if there is no publication. Thereafter it will be destroyed accordingly.

Contact details of HREC administrator and chair

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg ("Committee"). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Paul Ruff, who may be contacted via any one member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za, Rhulani.Mukansi@wits.ac.za, Mapula.Ramaila@wits.ac.za and Iain.Burns@wits.ac.za

Thank you

Sandy Lord (sandy.lord@wits.ac.za, 083 264 1804)

Supervisors:
Dr Vaneshveri Naidoo: 011 717 3702, vaneshveri.naidoo@wits.ac.za and
Prof Karien Mostert: 012 354 1353, karien.mostert@up.ac.za

I confirm that I have read the participant information sheet and consent to participate in this study

○ Yes
○ No

Demographic Information

Profession	◯ Biokineticist ◯ Dietician ◯ Exercise Physiologist ◯ Mental Health Nurse ◯ Occupational Therapist ◯ Physiotherapist ◯ Psychiatrist ◯ Psychologist ◯ Social Worker
Which country do you practice in?	_____

Section A: Accepted Statements

The following statements all reached 80% consensus in the previous two rounds

General recommendations

1. Lifestyle interventions should be included as a preventative strategy in patients with comorbid mental and physical health disorders
2. An assessment of the patient's lifestyle factors (eating habits, physical activity and exercise, sleeping patterns) to identify relevant factors should be included in the management plan
3. Delivery of lifestyle interventions to patients with comorbid mental and physical health disorders should be an interprofessional approach, within the scope of practice of the healthcare professional
4. A case manager should coordinate the delivery of lifestyle interventions to prevent overlapping or duplication of services
5. All members of the interprofessional team should be able to provide basic health promotion strategies, including lifestyle advice and education about lifestyle factors (physical activity and exercise, nutrition and weight management, stress management interventions, and sleep hygiene)
6. Referral to a specific healthcare professional with more extensive knowledge and training in a particular lifestyle intervention should be considered for more in-depth management
7. Lifestyle interventions should be patient-centred and align with the patient's goals and needs and consideration should be given to the specific context of the patient and the available resources within that context
8. Lifestyle interventions are more effective when used in combination to address specific health and lifestyle factors identified by patients (e.g physical activity, psychological strategies and diet in the management of obesity and depression)

Sleep

1. Physical factors affecting sleep should be evaluated and managed as appropriate Sleep should monitored and interventions to help track sleep should be made available to patients if a sleep problem is suspected

Physical activity and exercise

1. A healthcare professional with knowledge of both the physical and mental health of the patient should have a role in overseeing the exercise interventions.
2. A lifestyle physical activity programme aims to decrease sedentary time and increase movement.
3. Regular, frequent and consistent exercise is more important than exercise intensity/exertion
4. A combination of structured and lifestyle physical activity programmes are better suited to patients with comorbid mental and physical health disorders.

Nutrition and weight management

1. A thorough assessment should include the patient's knowledge of nutrition and current eating patterns and behaviours, sleeping patterns, physical activity levels and emotional regulation as these impact eating patterns and behaviours
2. Healthy eating and weight management should be done in conjunction with physical activity and exercise, as well as stress management interventions

Stress management

1. Stress management should be targeted to the specific goals identified by the patient
2. Stress management modalities are used to support the mental and physical health of the patient within a biopsychosocial framework
3. Education, information and advice about stress management modalities should be provided to all patients with comorbid mental and physical health disorders

Are there any aspects of the above-accepted statements that you feel should be changed or adapted?

_____

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Section B: Survey Questions

General Recommendations

Lifestyle interventions should be offered as 'first-line' management in patients with comorbid mental and physical disorders	○ Agree ○ Disagree
Lifestyle interventions are used as an adjunctive therapy in patients with comorbid mental and physical health disorders	○ Agree ○ Disagree

Sleep	
Screening for quality and quantity of sleep, or a sleep disorder can be done by any member of the interprofessional team, but sleep disorders can only be diagnosed by a trained healthcare professional	◯ Agree ◯ Disagree
If a sleep disorder is diagnosed, a sleep hygiene programme is important in the management of patients with comorbid mental and physical health disorders	◯ Agree ◯ Disagree
If patients are still waking feeling tired, they should be referred to appropriate resources (including online resources) and healthcare professionals for management	◯ Agree ◯ Disagree
Medication may be used to assist sleep, but only if the sleep disturbance is severe	◯ Agree ◯ Disagree
Medication should be used judiciously avoiding substances which may be addictive and should only be used in the short term and only prescribed by a trained healthcare provider (physician or psychiatrist)	◯ Agree ◯ Disagree

Physical Activity and Exercise	
Exercise should be a tailored approach depending on patient preferences, lifestyle and current health status	◯ Agree ◯ Disagree
Lifestyle physical activity programmes are more beneficial than structured exercise programmes in patients with comorbid mental and physical health disorders Definitions: Lifestyle physical activity - "The daily accumulation of at least 30 minutes of self-selected activities, which includes all leisure, occupational, or household activities that are at least moderate or vigorous in their intensity and could be planned or unplanned activities that are part of everyday life" (Dunn et al, 1998 p. 399) Structured exercise: Physical activity that is planned, structured, repetitive, and designed to improve or maintain physical fitness, physical performance, or health. Exercise encompasses all intensities	◯ Agree ◯ Disagree
Exercise programmes should be supervised in patients with comorbid mental and physical health disorders	◯ Agree ◯ Disagree
Exercise programmes should include a variety of exercise types, in a format (group or individual) preferred by the patient	◯ Agree ◯ Disagree

Nutrition and Weight Management

All members of the interprofessional team can provide basic information related to diet and healthy eating but should refer to a trained healthcare professional should a more in-depth assessment and intervention be needed	◯ Agree ◯ Disagree

Stress Management

Stress management interventions should be targeted to the specific needs of the patient and should be delivered within a biopsychosocial framework	◯ Agree ◯ Disagree
Cognitive behavioural therapy (CBT) is an important stress management modality and can be delivered by any member of the interprofessional team with appropriate training and expertise. It can be used in conjunction with other lifestyle interventions to affect behaviour change	◯ Agree ◯ Disagree

Section C

Roles of the interprofessional team members

The role of interprofessional team in the management of patients with comorbid mental and physical health disorders.

Below are the main roles identified in Round 2

The role of the dietician:

1. Prevent the onset of metabolic illnesses, cardiovascular diseases, stroke and death
2. Weight case management (guidance on nutrition, healthy habits, tracking and monitoring weight)
3. Education and individualised nutrition support considering their health needs and history
4. Supporting patients to make healthy lifestyle decisions regarding their diet, behaviour change interventions for healthier food choices and habits
5. Screening for specific dietary needs
6. Supporting other members of the MDT

The role of the exercise physiologist:

1. Assisting consumers in the facilitation of exercise interventions including the most appropriate programmes, tailored to the patient's needs
2. Lifestyle changes within exercise and if there is a physiological problem that might intervene with the result
3. Education and individualised support to the patient in terms of increasing physical activity and reducing sedentary behaviour
4. Supporting the client to make healthy lifestyle decisions regarding movements and behaviour change
5. Supporting other members of the MDT

The role of the mental health nurse:

1. Baseline check-ups, information and guidance
2. Referral to other healthcare professionals
3. Assist in the coordination and education of lifestyle interventions
4. Monitoring and screening of comorbidities which impact health

The role of the physiotherapist:

1. Improving physical health management
2. Sleep management, stress management, cardiovascular and strength training for weight management
3. Lifestyle guidance, exercise and education
4. Optimisation and coordination of exercise interventions
5. Education and individualised support about general lifestyle interventions especially physical activity and movement
6. Supporting the client to make healthy lifestyle decisions
7. Screening for specific physical health conditions
8. Supporting other members of the MDT

The role of the psychiatrist:

1. Leading role in patient care, treatment and rehabilitation
2. Facilitating access to support for patients
3. Diagnosing conditions, medication management
4. Assist in coordinating and educating of lifestyle interventions generally

The role of the psychologist:

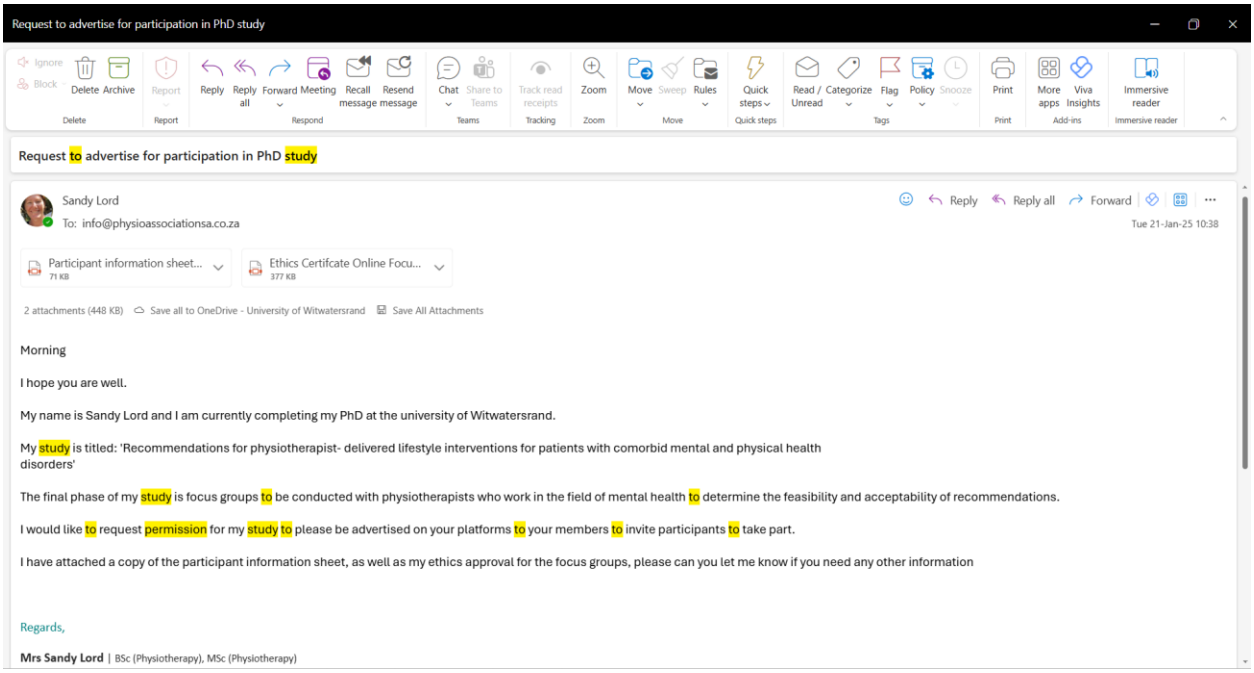
1. Provide therapy/CBT to assist with sleep, disordered eating, substance misuse
2. Dealing with issues related to mental health disorders
3. Assist with psychotherapy-based interventions and counselling
4. Psychoeducation and stress management

Please provide any additional comments or roles that you feel are important to note _____

The role of the occupational therapist in the management of patients with comorbid mental and physical health disorders is _____

The role of the biokineticst in the management of patients with comorbid mental and physical health disorders _____

APPENDIX K: EMAIL SENT TO PHYSIOTHERAPY SOCIETY



Request to advertise for participation in PhD study

Request to advertise for participation in PhD study

Sandy Lord
To: info@physioassociationsa.co.za

Reply | Reply all | Forward
Tue 21-Jan-25 10:38

Participant information sheet... 71 KB
Ethics Certifcate Online Focu... 377 KB

2 attachments (448 KB) Save all to OneDrive - University of Witwatersrand Save All Attachments

Morning

I hope you are well.

My name is Sandy Lord and I am currently completing my PhD at the university of Witwatersrand.

My study is titled: 'Recommendations for physiotherapist- delivered lifestyle interventions for patients with comorbid mental and physical health disorders'

The final phase of my study is focus groups to be conducted with physiotherapists who work in the field of mental health to determine the feasibility and acceptability of recommendations.

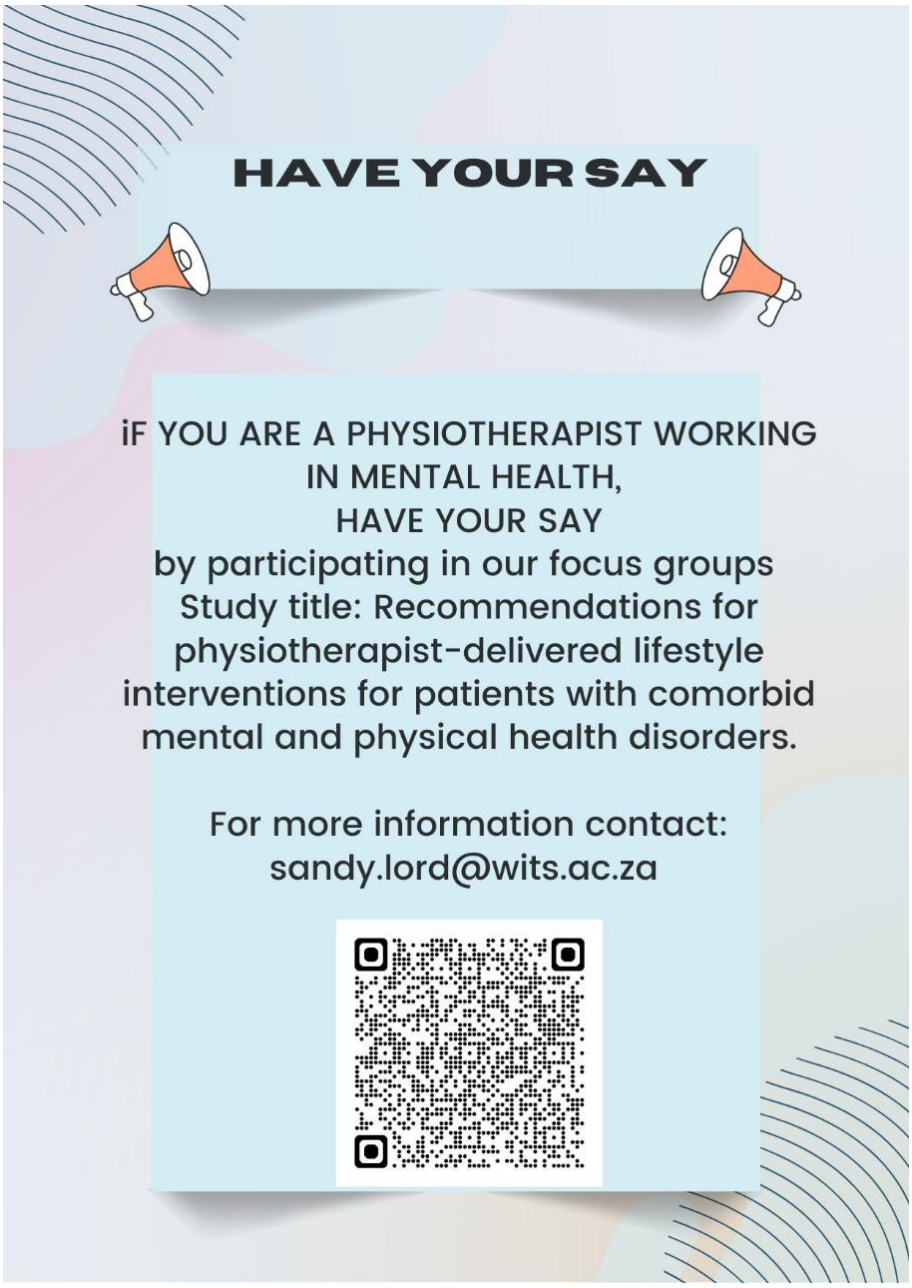
I would like to request permission for my study to please be advertised on your platforms to your members to invite participants to take part.

I have attached a copy of the participant information sheet, as well as my ethics approval for the focus groups, please can you let me know if you need any other information

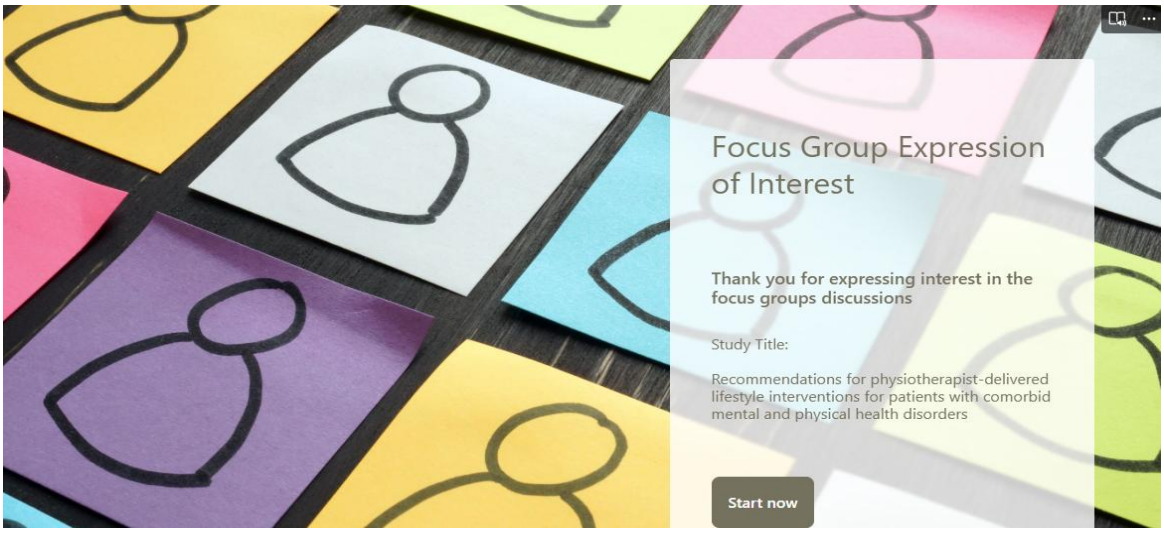
Regards,

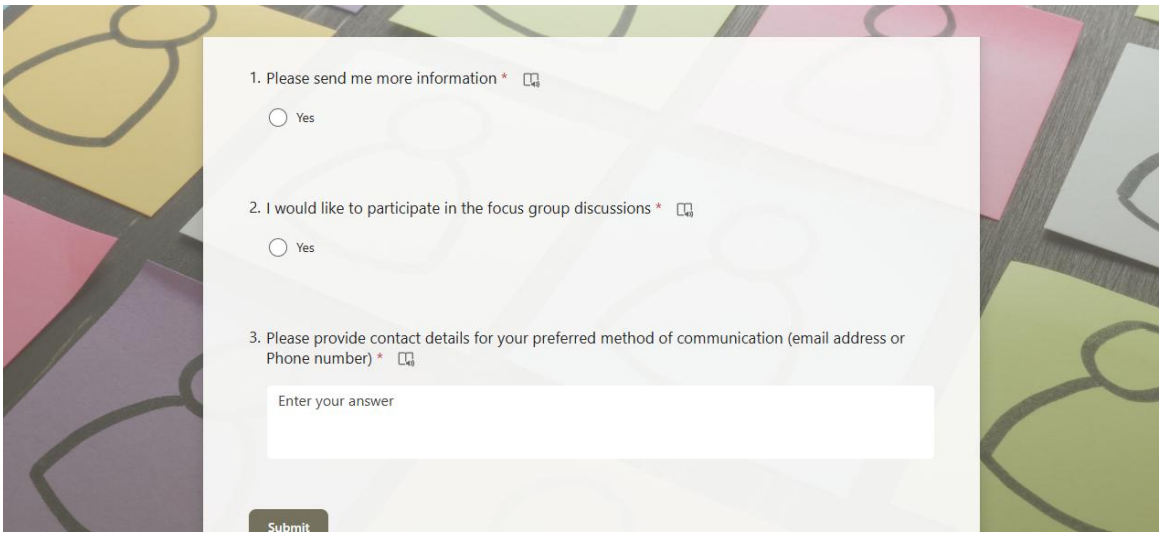
Mrs Sandy Lord | BSc (Physiotherapy), MSc (Physiotherapy)

APPENDIX L: RECRUITMENT POSTER FOR FOCUS GROUPS



APPENDIX M: EXPRESSION OF INTEREST FORM – FOCUS GROUPS





APPENDIX N: PARTICIPANT INFORMATION SHEET – FOCUS GROUPS

Participant Information Sheet: Focus Groups

Dear potential participant.

My name is Sandy Lord. I am a PhD student at the University of Witwatersrand, Johannesburg. My supervisors are Dr Vaneshveri Naidoo and Prof Karien Mostert. I am conducting a research study about lifestyle interventions for the management of patients with co-occurring physical and mental health disorders. The study title is: 'Recommendations for physiotherapist-delivered lifestyle interventions for patients with comorbid mental and physical health disorders.'

The overall aim of this research project is to develop evidence-based recommendations for the management of patients with co-occurring physical and mental health disorders in South Africa. To achieve this, expert consensus is required to formulate the recommendations.

I am inviting you, as an expert in your field, to take part in a focus group. Physiotherapists who work in the mental health field will be invited to participate. Your involvement will include participation in a focus group to determine your view of the evidence and the development of recommendations. If you decide to take part, once I have received your consent form, a date will be set for the focus group, which will take place online (using the MS Teams platform) at a time and date suitable for participants. It is envisaged that the focus groups will take place in February and March 2025 and will last approximately one and a half hours.

There are no risks involved in taking part in this study and there are no direct benefits to you as a participant, but your valuable input will help improve and direct the management of patients with mental health disorders and co-occurring chronic illness. Participation is voluntary, and you may withdraw at any time without providing a reason, and any data collected will be destroyed unless you specifically consent to it being retained. With your permission, I would like to audio/video record the focus group. This data will be stored in a password-protected folder saved onto the cloud for two years if the results are published and six years if not. Once the period has elapsed, all your data will be deleted. Only the researcher, observer and supervisors will have access to the data.

Confidentiality:
During the focus group, anonymity cannot be guaranteed as there will be at least 6-8 participants in a group. However, when I share the results of the research study, I will not include your name or anything else that could identify you. Your personal information will be kept confidential and will only be available to me (Researcher) and my two supervisors. The only exceptions - and all of them are rare - would normally be:

1. Personal information may be disclosed if required by law, such as the “Promotion of Access to Information Act”
2. The Human Research Ethics Committees of the University may exceptionally require personal data to respond to a formal complaint or for a compliance audit.

When I share the results of the research study, I will not include your name or anything else that could identify you. With your permission, other researchers may use the data collected from this research study, but your name and any personal information will not be used or passed on and only if future studies have ethical approval. All data collected during the study will be securely retained for two (2) years, if a scientific publication arises from the study and six (6) years, if there is no publication. Thereafter, it will be destroyed accordingly.

Contact details of researcher/s:

	Name	Phone number	Email address
Researcher	Sandy Lord	083 264 1804	Sandy.lord@wits.ac.za
Supervisor	Dr Vaneshveri Naidoo	011 717 3702	Vaneshveri.naidoo@wits.ac.za
Supervisor	Prof Karien Mostert	012 354 1353	Karien.mostert@up.ac.za

Contact details of HREC administrator and chair

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg (“Committee”). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have concerns over the way the study is being conducted, please contact the Chairperson of this Committee, Professor Paul Ruff, who may be contacted via any **one** member of the secretariat. The telephone numbers for the committee secretariat are 011 717 2700/1234/2656/1252, and the email addresses are: Zanele.ndlovu@wits.ac.za; Rhulani.mukansi@wits.ac.za; mapule.ramaila@wits.ac.za; and Iain.burns@wits.ac.za

Thank you for reading this study information sheet.

APPENDIX O: CONSENT FORM FOCUS GROUP

PARTICIPANT CONSENT SHEET (Focus Group Study)

Project Title: Recommendations for physiotherapist-delivered lifestyle interventions for patients with comorbid mental and physical health disorders

I hereby consent to participating in the study and confirm:

- I have been given a Participant Information Sheet which explains the nature and processes involved in this study, which is attached hereto;
- I was given time to read it and ask questions I wanted to and found any answers given to me to be reasonable and satisfactory;
- I believe I fully understand why the study is being conducted and what the intended outcomes will be;
- I understand that there will be no immediate benefit to me, should I agree to participate, nor will I receive any payment; conversely, participation will not cost me anything but my time;
- I understand that, even if I initially consent to take part in the study, I may subsequently withdraw at any time and would not be required to give any reasons; if that happens, any data collected about me for the purposes of the study would immediately be destroyed, unless I give consent for it to be retained;
- *In accordance with the provisions of the Protection of Personal Information Act 4 of 2013 (as amended), I hereby consent:*
    - *To my personal information (hereinafter 'data') being collected, processed, shared and stored in accordance with the research protocol/proposal as approved by the Wits HREC (Medical)*
    - *To my anonymised data being shared, processed, and transferred by third parties and between third parties, and where relevant beyond the jurisdictional borders of South Africa;*
    - *To all findings and results flowing from my anonymised data being broadly shared and published at the conclusion of the research.*

- I have been given a range of contact details, listed below. If I require further information or become concerned about any aspect of this study, I am free to speak to any of these contacts.

Contact details:

Sandy Lord, Principal Investigator, telephone no. 011 717 3715, or by e-mail at sandy.lord@wits.ac.za,

Dr Vaneshveri Naidoo, Supervisor, on telephone no. 011 717 3702, or by e-mail at Vaneshveri.naidoo@wits.ac.za

Prof Karien Mostert, Supervisor, telephone no. 012 354 3237

Professor Paul Ruff, Chairperson of the Human Research Ethics Committee (Medical) at the University of Witwatersrand, on telephone no. 011 717 2301, or by e-mail at Paul.Ruff@wits.ac.za.

Ms. Z Ndlovu or Mr Rhulani Mkansi, Committee Secretariat, telephone nos.: 011 717 2700 or 1234, or by e-mail at: Zanele.Ndlovu@wits.ac.za or Rhulani.Mkansi@wits.ac.za

NAME OF PARTICIPANT:

SIGNATURE:

DATE:

PLACE:

APPENDIX P: CONSENT FORM FOR AUDIO AND VISUAL RECORDING

Consent Form for Video/Audio Recording

Title of the Study: Recommendations for physiotherapist-delivered lifestyle interventions for patients with comorbid mental and physical health disorders

Principal Investigator: Sandy Lord

Procedures: You are being asked to participate in an online meeting that will be recorded using video and/or audio. The recordings will be used to transcribe the discussions for analysis following the discussion

Confidentiality: The recordings will be stored securely and only accessible to the research team. They will be kept for a minimum of two years, if the results are published or six years if not and then destroyed. Your identity will be kept confidential, and any identifying information will be removed from the transcripts.

Voluntary Participation: Your participation in this study is voluntary. You have the right to refuse to be recorded or to withdraw from the study at any time without penalty.

Consent: Please indicate your consent to be recorded by selecting one of the options below:

- I consent to video recording: Yes ___No
- I consent to audio recording: Yes ___No

Signature:

Date:

APPENDIX Q: DEMOGRAPHIC QUESTIONNAIRE – FOCUS GROUPS

Demographic Questionnaire – Focus Groups

Study code:	
Age	
Gender	Male: Female: Other:
Years working as a physiotherapist	0- 4 years 5-9 years 10-14 years 15-19 years 20 – 25 years 25+ years
Years working in mental health	0- 4 years 5-9 years 10-14 years 15-19 years 20 -25 years 25+ years
Highest qualification:	Please specify:
Province working in	Gauteng Limpopo Western Cape Eastern Cape Northern Cape North West Free State Kwa-Zulu Natal Mpumalanga
Working environment	Public Private Hospital Mental Health Care Facility Outpatient Other

APPENDIX R: FOCUS GROUP SCRIPT

Focus Group Script and Questions

Thank you for agreeing to participate in this focus group. I appreciate your taking time out of your busy schedule to participate in my research.

Just a reminder of a few important points before we begin…

As stated in the participant information sheet, confidentiality and anonymity cannot be guaranteed due to the nature of a focus group; however, I request that the comments and discussions made in this focus group be respected and not shared with anyone outside of the group. The findings from the focus group discussions will be shared with you after all focus groups have taken place for your final review. The findings will then be shared in the form of an academic article and conference presentations.

Before we begin, I would like us to go around and introduce ourselves. (Go around the room and introduce yourself).

Now that we know who each other is, let's get started.

In South Africa, physiotherapy in mental health is a relatively new field. While there is a growing body of evidence related to this in the international context, very little research has been conducted in South Africa, which has a unique set of contexts, challenges and enablers.

The process for developing recommendations is usually to systematically review the evidence, assessing the certainty or quality of the evidence, and groups are convened to determine the recommendations based on the available evidence and considering contextual factors.

In our search of the evidence, multiple systematic reviews and umbrella reviews investigate lifestyle interventions in mental disorders or chronic illness separately, but none could be found that consider when mental disorders and chronic illnesses, including chronic pain, co-occur. As such, we conducted a systematic review and meta-analysis. Because there was only one systematic review, a Delphi consensus study was done to gather expert consensus from an international multidisciplinary panel of experts who have expertise in mental health; these included psychiatrists, physiotherapists, occupational therapists and mental health nurses. Statements were included in the recommendations if they received 80% consensus.

As we are trying to develop these recommendations for South African physiotherapists, we need to determine the acceptability and feasibility of these recommendations in our unique context and patient populations, which is the reason for these focus groups.

The findings from the systematic review and the recommendations from the Delphi study were emailed to you before this meeting. Now that you have had a chance to go over them, let's start with questions -

Question 1

What are your thoughts on integrating lifestyle interventions into routine physiotherapy sessions for patients with comorbid mental and physical health disorders?

Question2

How do you feel about the recommendations developed from the Delphi

(Prompts: Is there anything you would change (further prompt: add or remove)

Question 3

What suggestions do you have for improving the feasibility of these interventions in the South African context?

(Prompts: Can you explain? Can you elaborate? Resources – human, financial, education, support)

APPENDIX S: ETHICS – FOCUS GROUPS

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

REC-250208-004 Mrs Sandy Lord M240805

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M240805

NAME: (Principal Investigator)	Mrs Sandy Lord
DEGREE:	PhD
DEPARTMENT:	Physiotherapy
STUDY SITE(S):	Online focus groups
TITLE:	Recommendations for physiotherapist lifestyle interventions for patients with comorbid mental and physical health disorders'
DATE CONSIDERED:	23/10/2024
DECISION:	Approved unconditionally
CONDITIONS:	
NOTE:	Original Application Number MED24-07-630. Subsequent Online Application Number M241025-B-0001.
SUPERVISOR:	Dr V Naidoo and Prof K Mostert
APPROVED BY:	Professor P. Ruff, Chairperson, HREC (Medical)
DATE OF APPROVAL:	23/10/2024 **EXPIRY DATE:** 22/10/2029

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATOR(S)

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report** in the month date of convened meeting each year until study is closed. Failure to submit annual report will result in ethics clearance certificate suspension. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. Unreported changes to the application may invalidate the clearance given by the HREC (Medical). Email a signed copy of ethics clearance certificate to HREC-Medical.ResearchOffice@wits.ac.za.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX T: DOCUMENT ONE – FINDINGS FROM SYSTEMATIC REVIEW

Document 1: Summary of findings from Systematic Review

Title: Lifestyle Interventions for patients with comorbid mental and physical illness: a systematic review and meta-analysis

1. Background

Patients with mental disorders have higher rates of chronic illness comorbidity. This leads to an increased burden of disease, poorer treatment outcomes and decreased quality of life.

Lifestyle interventions refer to the deliberate changes people make in their everyday behaviours, habits, and choices to improve their overall health and well-being (Kushner and Mechanick, 2015; Derman et al., 2008).

Our review aimed to evaluate the impact of lifestyle interventions on the quality of life in patients with comorbid mental and physical health disorders, as currently there are no systematic reviews which investigate the effect of lifestyle interventions on patients with both a mental disorder and a chronic illness.

2. Methodology

A systematic review and meta-analysis were performed using the JBI methodology for systematic reviews of effectiveness.

Inclusion criteria for the systematic review included:

Studies that were published in English, from January 2011 to December 2022, were included in our review.

Participants: adults 18 years and older, who had comorbid mental and physical health disorders. The mental disorders of interest were *depression, anxiety and bipolar disorder*, whereas *schizophrenia and psychosis* were also excluded. The chronic illnesses included *diabetes, obesity, cardiovascular diseases, respiratory disorders (chronic obstructive pulmonary disorders, and asthma), metabolic disorders and chronic musculoskeletal pain.*

Studies with participants with cancer, neurological conditions (e.g. stroke, dementia and cognitive decline), pregnancy-related conditions such as gestational diabetes and pre-eclampsia, coronavirus disease 2019 (COVID-19), acute hospitalisations (e.g. surgery, acute coronary syndrome), human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) were excluded.

Interventions: Lifestyle interventions aimed at individuals were included in this review. These included physical activity and exercise, nutrition, sleep hygiene, stress management (cognitive behavioural therapy, mindfulness, relaxation and breathing exercises) and substance cessation.

Outcomes: The outcome of interest was health-related quality of life

3. Results

A total of four studies met the inclusion criteria:

Rosas, L. G., Azar, K. M. J., Lv, N., Xiao, L., Goldhaber-Fiebert, J. D., Snowden, M. B., Venditti, E. M., Lewis, M. M., Goldstein-Piekarski, A. N., & Ma, J. (2020). Effect of an Intervention for Obesity and Depression on Patient-Centered Outcomes: an RCT [Journal article]. *American journal of preventive medicine*, *58*(4), 496-505. https://doi.org/10.1016/j.amepre.2019.11.005

Tovote, K. A., Fleer, J., Snippe, E., Peeters, A. C. T. M., Emmelkamp, P. M. G., Sanderman, R., Links, T. P., & Schroevers, M. J. (2014). Individual mindfulness-based cognitive therapy and cognitive behavior therapy for treating depressive symptoms in patients with diabetes: results of a randomized controlled trial. *Diabetes care*, *37*(9), 2427-2434. https://doi.org/10.2337/dc13-2918

Parry, G. D., Cooper, C. L., Moore, J. M., Yadegarfar, G., Campbell, M. J., Esmonde, L., Morice, A. H., & Hutchcroft, B. J. (2012). Cognitive behavioural intervention for adults with anxiety complications of asthma: prospective randomised trial. *Respiratory Medicine*, *106*(6), 802-810. https://doi.org/https://dx.doi.org/10.1016/j.rmed.2012.02.006

Piette, J. D., Richardson, C., Himle, J., Duffy, S., Torres, T., Vogel, M., Barber, K. & Valenstein, M. 2011. A Randomized Trial of Telephonic Counseling Plus Walking for Depressed Diabetes Patients. *Medical Care,* 49**,** 641 648.10.1097/MLR.0b013e318215d0c9

Two studies were included in a meta-analysis: (Piette et al., 2011; Rosas et al., 2020)

4. Conclusion

The findings of this review indicate small effect sizes at the 12-month follow-up on the physical and mental aspects of quality of life. Combined lifestyle interventions, which include a psychological behavioural change component and moderate-intensity physical activity, may be appropriate in the management of patients with comorbid mental and physical health disorders. There is, however, a need for ongoing maintenance to ensure the positive effects last. The certainty of evidence is of low quality, and as such, further studies are needed with larger samples to show the true effect of the lifestyle interventions in the management of patients with comorbid mental and physical health disorders.

APPENDIX U: DOCUMENT TWO – RECOMMENDATIONS FROM DELPHI STUDY

DOCUMENT 2: FINAL RECOMMENDATIONS FOLLOWING INTERNATIONAL MULTIDISCIPLINARY DELPHI STUDY

Section A: General recommendations for lifestyle interventions for patients with comorbid mental and physical health disorders

1. Lifestyle interventions should be included as a preventative strategy in patients with comorbid mental and physical health disorders
2. Lifestyle interventions should be offered as 'first-line' management in patients with comorbid mental and physical health disorders
3. Lifestyle interventions are used as an adjunctive therapy in patients with comorbid mental and physical health disorders
4. An assessment of the patient's lifestyle factors (eating habits, physical activity and exercise, sleeping patterns) to identify relevant factors should be included in the management plan
5. Delivery of lifestyle interventions to patients with comorbid mental and physical health disorders should be an interprofessional approach, within the scope of practice of the healthcare professional
6. A case manager should coordinate the delivery of lifestyle interventions to prevent overlapping or duplication of services
7. All members of the interprofessional team should be able to provide basic health promotion strategies, including lifestyle advice and education about lifestyle factors (physical activity and exercise, nutrition and weight management, stress management interventions, and sleep hygiene)
8. Referral to a specific healthcare professional with more extensive knowledge and training in a particular lifestyle intervention should be considered for more in-depth management
9. Lifestyle interventions should be patient-centred and align with the patient's goals and needs and consideration should be given to the specific context of the patient and the available resources within that context
10. Lifestyle interventions are more effective when used in combination to address specific health and lifestyle factors identified by patients (e.g. physical activity, psychological strategies and diet in the management of obesity and depression)

Section B: Recommendations for Sleep interventions for patients with comorbid mental and physical health disorders

1. Physical factors affecting sleep should be evaluated and managed as appropriate
2. Sleep should be monitored, and interventions to help track sleep should be made available to patients if a sleep problem is suspected
3. Screening for quality and quantity of sleep, or a sleep disorder, can be done by any member of the interprofessional team, but sleep disorders can only be diagnosed by trained healthcare professional
4. If a sleep disorder is diagnosed, a sleep hygiene programme is important in the management of patients with comorbid mental and physical health disorders
5. If patients are still waking feeling tired, they should be referred to appropriate resources (including online resources) and healthcare professionals for management
6. Medication can be used to assist sleep, but only if the sleep disturbance is severe
7. Medication should be used judiciously, avoiding substances which may be addictive and should only be used in the short term and only prescribed by a trained healthcare provider (physician or psychiatrist)

Section C: Recommendations for Physical activity and exercise for patients with comorbid mental and physical health disorders

1. A healthcare professional with knowledge of both the physical and mental health of the patient should have a role in overseeing the exercise interventions.
2. A lifestyle physical activity programme aims to decrease sedentary time and increase movement.
3. Regular, frequent and consistent exercise is more important than exercise intensity/exertion
4. A combination of structured and lifestyle physical activity programmes are better suited to patients with comorbid mental and physical health disorders.
5. Exercise should be a tailored approach depending on patient preferences, lifestyle and current health status
6. Exercise programmes should be supervised in patients with comorbid mental and physical health disorders
7. Exercise programmes should include a variety of exercise types in a format (group or individual) preferred by the patient

Section D: Recommendations for nutrition and weight management interventions for patients with comorbid mental and physical disorders

1. A thorough assessment should include the patient's knowledge of nutrition and current eating patterns and behaviours, sleeping patterns, physical activity levels and emotional regulation as these impact eating patterns and behaviours
2. Healthy eating and weight management should be done in conjunction with physical activity and exercise, as well as stress management interventions
3. All members of the interprofessional team can provide basic information related to diet and healthy eating, but should refer to a trained healthcare professional should a more in-depth assessment and intervention be needed

Section E: Recommendations for stress management interventions for patients with comorbid mental and physical health disorders

1. Stress management should be targeted to the specific goals identified by the patient
2. Stress management modalities are used to support the mental and physical health of the patient within a biopsychosocial framework
3. Education and information advice about stress management modalities should be provided to all patients with comorbid mental and physical health disorders
4. Stress management interventions should be targeted to the specific needs of the patient and should be delivered within a biopsychosocial framework
5. Cognitive behavioural therapy (CBT) is an important stress management modality and can be delivered by any member of the interprofessional team with appropriate training and expertise. It can be used in conjunction with other lifestyle interventions to affect behaviour change

APPENDIX V: PLAGIARISM DECLARATION



PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I Sandy Lord (Student number: 9902895e) am a student registered for the degree of Doctor of Philosphy in the academic year 2025.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: Lord Date: 23 July 2025

APPENDIX W: TURNITIN REPORT

PhD

ORIGINALITY REPORT

12%	10%	11%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	wiredspace.wits.ac.za Internet Source	2%
2	discovery.researcher.life Internet Source	1%
3	www.ncbi.nlm.nih.gov Internet Source	1%
4	Lord, Sandy. "Perceptions of Physiotherapists Regarding Their Role in the Management of Patients With Mental Health Disorders", University of the Witwatersrand, Johannesburg (South Africa), 2025 Publication	<1%
5	worldwidescience.org Internet Source	<1%
6	Al-Hosniyah, Fatma Saif Said. "Symptoms and the Quality of Life Among Patients with Selected Chronic Diseases in Acute-Care Settings in Oman", Sultan Qaboos University (Oman) Publication	<1%

7	core.ac.uk Internet Source	<1 %
8	"Lifestyle Medicine", Springer Science and Business Media LLC, 2025 Publication	<1 %
9	Comley-White, Nicolette. "The Physical Sequelae of Perinatally Acquired HIV in Adolescents", University of the Witwatersrand, Johannesburg (South Africa), 2025 Publication	<1 %
10	Michael A. Pizzi, Mark Amir. "Interprofessional Perspectives for Community Practice - Promoting Health, Well-Being, and Quality of Life", Routledge, 2024 Publication	<1 %
11	dt.athabascau.ca Internet Source	<1 %
12	eprints.nottingham.ac.uk Internet Source	<1 %
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