# Adapting an online screening tool for Major Depressive Disorder in South Africa

Tasneem Hassem

University of the Witwatersrand

## Abstract

Depression has become a global concern as 300 million people are estimated to suffer from depression globally. In South Africa, the life-time prevalence of depression is estimated at 9.7%. As a result of the severity of depression in South Africa and the lack of accessible and accurate depression screening instruments, the study followed a sequential exploratory mixed method design which was conducted as a phased approach in order to adapt an online depression screening tool which is easy to use and culturally appropriate for the South African public. Phases One and Two utilised a systematic review methodology in order to determine the availability of online depression screening tools for the general public of South Africa and to explore the ethical considerations associated with online psychological screening tools. The results obtained from Phase One and two were used to inform Phase Three which consisted of the tool adaptation. The Center for Epidemiological Studies Depression Scale-Revised (CESD-R) was deemed the most appropriate depression screening for adaptation. Items of the CEDS-R were adapted in terms of language used; some items were removed and items specific to the South African context were added. The adapted screening tool was placed on an open access depression screening website (mddsa.co.za). The final phases of this study involved assessing the validity and reliability of the tool. A purposive sample of 50 healthcare professionals assessed the content validity using the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) method. These results were used to further refine the online adapted tool in terms of the relevance and comprehensiveness. In order to determine the content validity ratios of the online adapted CESD-R, 21 experts in the field were approached to rate each item on the tool. Overall, content validity ratios indicate good content validity for all 19 items. Criterion validity was assessed using a sample of 86 individuals from the general public and 21

patients diagnosed with MDD. Using the Receiver Operating characteristic Curve (ROC) procedure, the sensitivity and specificity of the tool was determined. A sensitivity score of 90.48% and a specificity score of 47.67% were obtained for the tool. In addition, the tool evidenced an Area Under the Curve (AUC) of 0.78, indicating the tool is fairly accurate. In conclusion, online mental health screening tools have the possibility to facilitate mental health care and access. In addition, the online adapted CESD-R can be used as an adjunct tool in the healthcare sector as a first step in helping individuals identify their symptoms and actively seek help. The instant feedback received on the completion of the tool can be viewed as the first step in the individual actively seeking formal treatment and care.

*Keywords:* Online depression screening tool, CESD-R, reliability, South Africa, Validity, Mddsa.co.za

## Declaration

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Doctor of Philosophy at the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

Tasneem Hassem

T. Hassem (Ms)

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## 1.1 Introduction

An alarming global increase in depression prevalence rates by 16% from 1990 to 2019 has resulted in depression being ranked as the 13th leading cause of the global burden of Disability Adjusted Life Years (DALYS) in 2019 (Vos et al., 2020). In sub-Saharan Africa, the total DALYs evidenced a 112.3% increase from 1990 to 2017 (Gouda et al., 2019). In South Africa, the life-time prevalence rate of depression is 9.47% (Tomlinson et al., 2009).

In South Africa, it is estimated that a R232 billion loss in productivity can be attributed to depression (Ellis, 2017). Further, depression has devastating implications for both the family and the individual. Living with a family member who suffers from depression alters the family dynamic (Kessler & Bromet, 2013; Skundberg-Kletthagen et al., 2014; Stapley et al., 2016). Parents who have children who are diagnosed with depression often experience feelings of guilt, self-blame and question their parenting skills (Stapley et al., 2016). The entire family unit is faced with a challenging task of adjusting its daily routine to accommodate the depressed individual. In addition, family members may feel that they "walk on eggshells" (Stapley et al., 2016; Skundberg-Kletthagen et al., 2014) around the depressed family member.

## 1.2 Statement of the problem

Access to mental health care facilities in South Africa is limited to 4.33 beds per 100 000 population in general hospitals, and 16.56 beds per 100 000 in mental health hospitals (World Health Organisation [WHO], 2017). In 2019, the public sector reported having 0.97 psychologists and 0.31 psychiatrists per 100 000 population (Docrat et al., 2019).

As a consequence of the limited or lack of mental health care resources in South Africa (Burns 2011; Lund et al., 2010; Matsea et al., 2018), mental illnesses, such as depression, often go un-diagnosed and treated (Nglazi et al., 2016). Depression treatment is further compromised due the social stigma attached to the treatment and diagnosis as well as the inaccuracy of depression screening tools (WHO, 2017).

Common screening tools, such as the Beck Depression Inventory II (BDI-II), Center for Epidemiology Studies Depression Scale (CES-D) and Patient Health Questionnaire-9 (PHQ-9), utilise the DSM-IV definition of depression as a criterion for diagnosing depression (Beck et al., 1996; Kroenke & Spitzer, 2002; Radloff, 1977). The field has since moved to the DSM-5 (American Psychiatric Association [APA], 2013). The DSM-IV definition of depression is based on westernised cultural assumptions and does not adequately accommodate cultural expressions of the disorder, for example, "thinking too much" being a symptom of depression (Andersen et al., 2015; Ellis, 2003), the over emphasis of somatic symptoms, (Andersen et al., 2015; Mosotho et al., 2008) or the lack of recognition of the disorder in some cultures (Ellis, 2003; Patel, 2001) therefore, questioning the universal applicability of these screening tools.

### 1.3 Research aims

Given the limited access South Africans have to mental health care and their increasing access to the internet, this study aimed to identify and adapt an existing depression screening tool which would be culturally fair for online usage among the general South African population. Additionally, the study aimed to make such a tool openly accessible to the population along with self-help information for depression.

### 1.4 Objectives

- Identify and adapt an existing depression tool for online usage which will be accessible online at no cost to the general public to screen for depression
- Provide relevant information regarding depression that can be easily understood
- Provide appropriate referrals for those who need it.

### 1.5 Research questions

1. Are there any appropriate depression screening tools which could be adapted for the general South African population?
2. What are the ethical guidelines involved in designing an online depression screening tool?
3. What is the efficacy of the selected online adapted depression screening tool in terms of content validity?
4. Is the instant feedback provided after completion of the tool appropriate?
5. Does the online adapted depression screening tool display good psychometric properties in terms of reliability and criterion validity (sensitivity and specificity)?
6. Is the website that hosts the adapted online depression screening tool user friendly?

Note: Research questions 1 and 2 inform the screening tool adaptation process which is a step in the research process that is located between research questions 2 and 3. For the screening tool adaptation process, there are no specific research questions, however, the process is described and discussed in Chapter 6.

### 1.6 Significance of the study

The worldwide severity of depression has become of increased concern resulting in the prioritisation of depression by the World Health Organisation (WHO, 2020). According

to the WHO Global Health estimates for 2020, thus far, it has been estimated that more than 264 million individuals suffer from depression globally (WHO, 2020). These figures increased from 2005 to 2015 by more than 18%, making depression the leading cause of disability and ill health globally. Rates of depression are higher for females than males by 1.5% and highest in females in the African region with a rate of 5.4% of the 9% of individuals diagnosed with depression in Africa (WHO, 2017).

According to the South African Stress and Health Survey (SASH) (Tomlinson et al., 2009) conducted in 2003–2004, the prevalence of a major depressive episode was estimated at 9.7% per lifetime. The South African Depression and Anxiety Group (SADAG, 2016) estimated that 20% of South Africans will experience at least one depressive episode during their lifetime. In addition, deaths due to suicides are estimated to account for 8 000 deaths per year in South Africa (SADAG, 2016). Research suggests that these rates are likely to increase as a result of the COVID-19 pandemic (Rajkumar, 2020; Salari et al., 2020).

As a result of the devastating impact of depression, it has been considered as a priority condition and thus listed in the WHO's Mental Health Gap Action Plan (mhGAP). A majority of the population that experience depression symptoms cannot access care and treatment as a result of a lack of resources, a lack of trained health care professionals, the social stigma attached to the treatment as well as the inaccuracy of depression diagnostic instruments (Ali et al., 2016; WHO, 2017). In addition, the training of non-mental healthcare workers to detect mental illnesses, such as depression, campaign by the mhGAP has evidenced negligible results in detecting depression. Reynolds and Patel (2017) suggest screening tools for depression be utilised in primary health care facilities which can be accessed remotely through electronic devices. Depression screening tools, which are commonly utilised in South Africa, do not capture the unique cultural idioms and symptoms of depression

experienced by South Africans (Andersen et al., 2015; Ellis, 2003; Mosotho et al., 2008) thus highlighting the need for a culturally appropriate tool that is cost effective and can be easily accessed.

In order to overcome the barriers stated above in a country like South Africa, this study capitalised on the increasingly growing recourse of internet access and adapted an existing depression screening tool, which is easy to use and culturally appropriate for the South African public, for online usage.

### 1.7 Overview of the structure of the thesis

**Chapter One: Conceptualising the adaptation of an online screening instrument for depression**

Chapter One introduces the research topic of depression by highlighting the prevalence rates of depression and their devastating implications on the community, families and individuals. The significance of the current study is foregrounded in the lack of mental health services available to South Africans. This is followed by the specific objectives and research questions of the study. Lastly, an overview of the structure of the thesis is provided .

**Chapter Two: Literature review**

The literature review chapter provides a critical overview of depression in relation to the history of the term “depression”, the diagnostic criteria and the viewing of depression through a Biopsychosocial-spiritual (BPSS) lens. Through the BPSS lens, the experiences of depression amongst South Africans are discussed. This is followed by a critical discussion of the current research conducted on or with commonly utilised depression screening tools in the South African context. Lastly, the relevance and importance of using the internet to screen for depression is highlighted in the discussion of the mental health services available in South

Africa.

**Chapter Three: Methods**

This chapter highlights the sequential exploratory mixed method design employed in this study. The method consisted of five distinct phases. Phases One and Two employed qualitative systematic reviews, Phase Three entailed the tool adaptation and website development, Phase Four resulted in the establishment of the content validity of the adapted tool and the final phase employed a pilot study of the adapted tool. The methods and analyses utilised in each phase are further described in this chapter. In addition, a detailed description of the instruments utilised in Phases Four and Five are provided. The chapter concludes with a discussion on the various ethical principles considered in the study.

**Chapter Four: A systematic review of online depression screening tools for use in the South African context**

Chapter Four presents the first of the papers from this study. The paper provides a systematic review of online depression screening tools used for the general population which are valid and reliable. Through the review, I was able to determine which online depression screening tools were appropriate for adaptation for the South African context. Thus, the results of this article formed the ground work for the tool adaptation process.

**Chapter Five: The ethics of online screening for mental health in South Africa: A systematic review**

In order to adapt an online depression screening tool, various factors needed to be considered, one of which includes the ethical considerations of designing and using an online mental health screening tool. Therefore, this article refers to the second phase undertaken during this study. Based on the results of a systematic review, an ethical guideline document

for online mental health screening was developed. These guidelines were utilised in order to ensure the adapted online depression screening tool and the website on which the tool is hosted conform to the required ethical standards.

**Chapter Six: The online adaptation of the CESD-R and website development**

Informed by the results of the two systematic reviews conducted, this chapter describes the tool adaptation process. The tool adaptation process was divided into three key processes, namely, the test adaptation process, developing the adapted tool for online usage and development of the website on which the tool is located. The final tool described in this chapter draws on the chapters to follow.

**Chapter Seven: Establishing the content validity of an online depression screening tool for South Africa**

Once the tool and website were ready, the content validity of the tool was determined. In order to assess content validity, two distinct studies were conducted: 1) a qualitative study where open-ended questions were informed by the Consensus-based Standards of Health Management Instruments (COSMIN); and 2) a quantitative study utilising closed-ended questions in order to determine the various content validity ratios of the tool. These studies formed the basis for the article included in this chapter. In Study 1, 50 experts commented on the appropriateness of the tool instructions, items, response format, and feedback. The results of this study were used to further refine and adapt the tool. For Study 2, content validity of the tool was explored using Content Validity Ratios, Item-Content Validity Index as well as the Kappa Statistic. Based on the results of this study, the online adapted CESD-R, consisting of 19 items, was piloted as described in the chapter to follow.

**Chapter Eight: Evaluating the efficacy of an online depression screening tool in South Africa**

Informed by the results of Chapter Six, the online adapted CESD-R, which consisted of 19 items, was hosted on www.MDDSA.co.za. The pilot study was conducted in order to assess the reliability and criterion validity of the online adapted CESD-R in order to determine if the tool measures the construct of depression. A sample of 21 individuals diagnosed with depression and 86 individuals with no mental health disorders completed the tool online. The Cronbach Alpha coefficient and McDonald's Omega coefficient were used to determine the reliability. Sensitivity, specificity, positive predictive values and negative predictive values were utilised to determine the criterion validity of the tool. Results indicated that the tool had a good internal consistency and reliability, and that it demonstrated good criterion validity.

**Chapter Nine: Discussion**

Chapters Four to Eight, highlight the distinct phases employed in order to achieve the aim of the study, therefore this chapter discusses the phases as a whole and reflects on the findings with regards to the online adapted CESD-R in relation to local and international literature on the screening of depression and online mental health. Firstly, the findings highlight the identification of an existing depression screening tool, and ethical guidelines for online mental health screening. Furthermore, the discussion of the findings focuses on the tool adaptation and the psychometric properties of the online adapted CESD-R. Based on the discussion of the findings, the strengths and limitations of the study are identified and overall implications for future research, in relation to online depression screening tools, ethical guidelines for online mental health screening as well as methodologies employed in the study, are discussed. Drawing on the discussion of findings, strengths and limitations and implications, I make various recommendations for future research. The chapter closes with an

overall conclusion of the study which highlights the knowledge contributions made by the study in reference to online psychological screening tools and methodologies utilised in the study.

# Chapter Two: Literature review

## 2.1 Introduction

Depression rates are likely to have increased globally as a result of the COVID-19 pandemic which has devastating implications for individuals, families, society as well as the country ((Rajkumar, 2020; Salari et al., 2020). Research has highlighted the lack of recourses and access to mental health care in South Africa (Burns, 2011; Lund et al., 2010; Matsea et al., 2018) and the manner in which technology can be utilised in order to facilitate better access to mental health care. With this in mind, this study focused on adapting an online depression screening tool for the general public of South Africa.

In the literature review to follow, a brief history of the term "depression" is presented, followed by the criteria for diagnosing depression. The theoretical framework underlying the study is discussed in relation to the understandings of depression. This is followed by a critical discussion of the various diagnostic instruments utilised by health professionals. The literature review concludes with a brief discussion of the screening tools which are available and have been adapted and/or used in the South African context.

## 2.2 Brief history of the term "Depression"

During the third century, the word "melancholy" was used by the Greeks to classify disorders of nervous conduct, sorrow and fear. The Christian Church then shaped the term "melancholy" to depict feelings of sluggishness, non-caring as well as torpor. In addition, emotions related to despair and sadness were also associated with the term "melancholy" (Jackson, 1986). As a result of the emergence of the humoral theory during the 5$^{th}$ century, melancholy was classified as a disorder of excessive black bile by Hippocrates. The term melancholy retained the associated emotions as noted during the 4$^{th}$ and 5$^{th}$ centuries. From

the writings on melancholy during both the medieval and Renaissance periods, it is evident that work regarding melancholy did not undergo any significant change. Only in the 17th century was the word "depression" used (see Figure 1 for a historical timeline of the term "depression").

The word "depression" originated from the Greek word "deprimere" (to press down). It was only during the 18th century when the word "depression" found its place in discussions regarding melancholia/melancholy. During the late 19th century, mental depression or depression was referred to as a clinical syndrome of melancholia (Gruenberg et al., 2005).

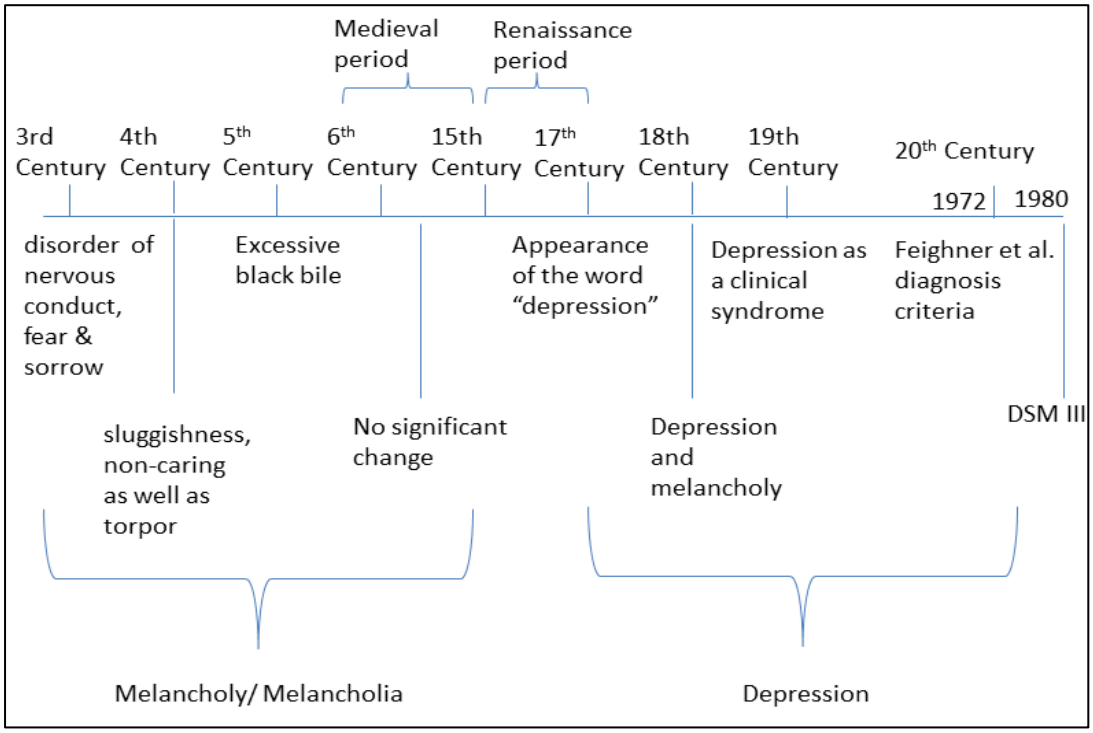
In 1952, the Diagnostic and Statistical Manual I (DSM I) (APA, 1952) was published. The DSM I classified depression as subgroups of personality, psychotic and psychoneurosis disorders. Psychoneurotic disorders included neurotic depressive reactions as well as manic depressive reactions and psychotic depressive reactions. Lastly, a clyclothymic personality with a subtype of depression was included under personality disorders. The diagnosis of depression in the DSM I was not significantly changed in the DSM II (APA, 1968; Goldstein & Anthony, 1988).

Feighner et al. (1972) formulated a depression diagnosis according to three criteria: 1) presence of dysphoric mood; 2) at least five symptoms that were needed out of a potential of eight symptoms; and 3) a psychiatric illness lasting at least one month. In 1980, the Diagnostic and Statistical Manual (3rd edition) (DSM III) (APA, 1980) was published which fundamentally changed the understanding of depression. Depression was classified under Major Affective Disorders as a Major Depressive Disorder (MDD). Dysphoric mood, loss of pleasure or loss of interest in everyday activities were essential features to be diagnosed with MDD. The list of specific symptoms in the DSM III highlights the influence of Feighner et

al.'s (1972) work (Goldstein & Anthony, 1988; Horwitz et al., 2016). The DSM III classification of depression also highlighted the distinction between unipolar and bipolar depression.

**Figure 1**

*Historical Timeline of the Term Depression*




The DSM III was revised and, in 1987, the DSM III-R was published. One of the major revisions was that atypical depression was replaced with depressive disorder (Goldstein & Anthony, 1988). The category of depression was divided into two larger groups, Bipolar Disorder and Depressive Disorder (Goldstein & Anthony, 1988). Depressive disorders included: major depression (MDD), dysthymia (depression neurosis) and depression disorders not otherwise specified.

Subsequent to the DSM III-R were the DSM IV, DSM IV-TR and the DSM 5. In the

DSM IV (APA, 1994), a mood episode category was created and a major depressive episode fell into this category. With the revision of the DSM IV, the DSM IV-TR (APA, 2000), a major depressive episode, specifically, a single episode and a recurrent episode, fell under the MDD category. In the current version of the DSM, the DSM-5 (APA, 2013), two new depressive disorders have been added, namely, disruptive mood dysregulation disorder and premenstrual dysphoric disorder. The categories of a single and recurrent depressive episode have been removed, as well as the symptom of bereavement.

A parallel classification system to the DSM is the International Statistical Classification of Disease (ICD) (Sadock & Sadock, 2015). During 1948, the World Health Organisation adopted the ICD (WHO, 2017). However, it was only in the ICD 6 that a mental disorder category was created (Gruenberg et al., 2005). The diagnosis for depression in the ICDs 6 and 7 was similar to the approach used in the DSM I and II. Due to the dissatisfaction among psychiatrists, the ICD-8 and 9 depression diagnoses were closely aligned with the DSM III. The latest publication of the ICD-10 adopts a similar depression diagnosis to that of the DSM 5 (Gruenberg et al., 2005). It should be noted that the ICD 10 usage in South Africa is merely used as a coding system to capture diagnoses for data capturing purposes and also as a means for Psychiatrists and Psychologists to claim consultation fees from Medical aid companies (South African ICD-10 Technical User Guide, 2014).

### 2.3 Criteria for diagnosing depression in the DSM and ICD

The DSM 5 (APA, 2013) classifies major depressive disorder (MDD) under the umbrella of depressive disorders. According to the DSM 5, an individual would be diagnosed with a major depressive disorder if he/she presents with five or more of the following symptoms: depressed mood, diminished pleasure or interest in all or most activities,

significant weight gain or loss when not on diet or eating plan, hypersomnia or insomnia, psychomotor agitation, loss of energy/fatigue, feelings of worthlessness/inappropriate guilt, decreased ability to concentrate and recurrent thoughts of death. These symptoms must present for a period of two consecutive weeks and highlight a change from previous functioning. The individual should have at least one symptom of either being depressed or loss of interest or pleasure. These symptoms displayed or presented should result in clinically significant distress in important functional areas of the individual's life. The episode cannot be attributed to the effects of substances and cannot be described, attributed to or explained by schizoaffect disorders. With regards to a response to a significant loss, the criteria stipulate that this decision should be based on clinical judgement through individual history as well as the consideration of the cultural norms regarding loss (APA, 2013). The classification of depression, according to ICD-10 (WHO, 2010), is divided into mild moderate and severe categories of depression.

For a mild depressive episode, the individual should present with the following symptoms: depressed mood, loss of enjoyment and interest as well as reduced energy. In a moderate depressive episode, the individual presents with the same symptoms as a mild episode and at least three additional symptoms. In order for a severe depressive episode diagnosis, the criteria for both a mild and a moderate depressive episode have to be met, with an addition of four symptoms. All the symptoms experienced have to be rated as severe. The ICD-10 classification of depressive episodes is in line with that of the DSM 5 in terms of symptoms as well as duration (WHO, 2010).

The DSM 5 and ICD 10 criteria for MDD diagnosis do not specifically have items which assess cultural manifestations or symptoms of MDD. The DSM 5 notes that cultural differences cause a discrepancy in the 12-month prevalence of MDD. However, mean age

onset and female-male ratios are consistent across cultures. Thus, it is acknowledged that, despite having substantial cultural differences, the DSM diagnosis does not allow for the likelihood of specific symptoms (APA, 2013).

The DSM 5 does provide clinicians with a Cultural Formulation Interview (CFI) to aid the clinician in making a culturally fair diagnosis. The CFI is a semi-structured interview consisting of 16 questions, based on a person-centred approach. It has been designed to assess an individual's cultural identity, cultural conceptions of distress, cultural features of vulnerability, cultural characteristics of the patient-clinician relationship as well as an overall cultural assessment. There are two versions of the CFI, for the patient and for an informant. The ICD-10 mentions that there are possible cultural variations of depressive symptoms but does not highlight these differences nor does it describe how the clinician should proceed.

The definition of culture by the DSM 5 includes spirituality but there is no mention in the MDD diagnosis regarding spiritual and/or cultural considerations. The DSM and ICD criteria for depression are often criticised for being based on a Western set of cultural assumptions. These assumptions include the autonomy and uniqueness of each individual, the focus on the intrapersonal rather than interpersonal symptoms and the emphasis on emotional symptoms as a classification for depression. These Western cultural norms are not universal as various cultures view individuals as being interdependent and the mind and body are not viewed as distinct entities but are rather mutually constitutive (Chentsova-Dutton & Tsai, 2009). Both the DSM 5 and ICD-10 classifications are based on a dichotomous approach when it comes to MDD diagnosis but this approach is unclear. For example, what level of guilt should an individual have in order for this symptom to be checked (Yeung & Kam, 2008)? As a result of this, depression can either be over or underdiagnosed.

The DSM 5 adopted a biopsychosocial (BPS) approach. The BPS model states that the biological (genetic predisposition), psychological (lifestyle, beliefs, explanatory styles) and social (relationships, support systems, status, etc.) aspects of an individual influence disease/illness treatment (Engel, 1977; Hatala, 2013). Despite the increase in the acknowledgement rate of the BPS model, a systematic review conducted by Suls and Rothman (2004) highlight the dominance of the bio-medical usage in health research. In their review of studies conducted from 1974 to 2001, a Medline search highlights a 9:1 (Bio-medical: BPS) ratio of model usage. When assessing the importance given to each component of the BPS model, Suls and Rothman (2004) studied articles appearing in the *Journal of Health Psychology*. Out of the 70 studies included, they found that only 55.7% of studies included a social and biological measure while 94% of studies measured a psychological component. This study highlights the lack of integration or linkage of all three components within research. Hatala (2012) suggests that the inclusion of culture will strengthen the interconnectedness of the components of the BPS model. Sulmasy (2002) proposes a holistic biopsychosocial-spiritual model as:

> A human person is a being in relationship—biologically, psychologically, socially, and transcendentally. Illness disrupts all of the dimensions of a relationship that constitute the patient as a human person (p. 32).

**2.4 Biopsychosocial-Spiritual Model (BPSS)**

The BPSS model provides a multifactorial causation of mental illness as a result of the biological, psychological, social and spiritual components being intertwined (Malmgren, 2005; Sulsmay, 2002). This study utilised the BPSS model in a manner which acknowledges the interconnectedness between BPS and culture and highlights the importance of spirituality

within this model specifically for the South African context, as depicted in Figure 2 (Hatala, 2013, p. 269).

The biological component of the BPSS model highlights the following risk factors in developing depression: genetic predisposition, biological sex and the individual's medical history (medications, previous illnesses) (Hatala, 2013; Labaka et al., 2018; Schotte et al., 2006). In twin studies conducted by Kendler et al. (2002), and Kendler and Gardner (2014), it is also evident that genetic predisposition for depression may be increased by various environmental factors.

The psychological component refers to the individual's personal growth and development. In a review study on depression in the elderly, Blazer (2003) highlights the association of behavioural responses (learned helplessness) to traumatic events, such as child neglect and emotional abuse, as being associated with the increased likelihood of depression. In addition, cognitive distortion has also been associated with an increased likelihood of depression amongst the elderly. From the abovementioned studies, it is evident that the interaction between the psychological and biological is bidirectional.

With regards to the social component of the BPSS model, an individual's environmental situation has an impact on depression. Ramchandani et al. (2009) report societal stress as the greatest risk factor for post-natal depression in South Africa. Unemployment in women is more common among those diagnosed with depression compared to women who are not depressed (Baron et al., 2017; Kagee et al., 2014). Women who are depressed are more likely to be divorced or widowed (Baron et al., 2017; Kagee et al., 2014).

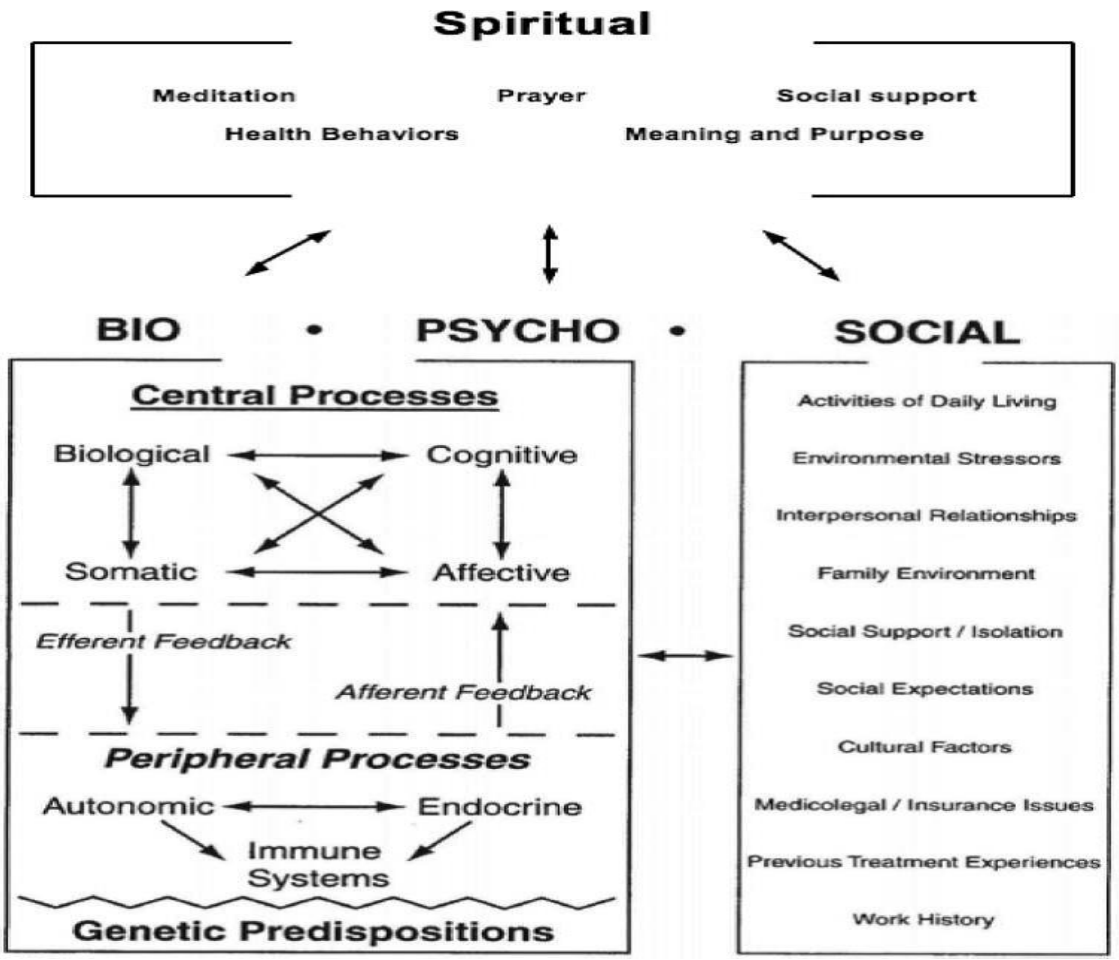
Research highlights that economic factors, such as increased income inequalities,

decreased household income, feelings regarding lack of work and unemployment, increase an individual's chances of experiencing depression symptoms (Burns et al., 2017; Gibbs et al., 2016; Mashaba et al., 2021). In addition, factors, such as loneliness, poor perceived social support, stealing as a result of hunger and hunger, were found to increase depression symptoms (Gibbs et al., 2016; Wang et al., 2018).

Aside from the social aspects identified above, it is essential to recognise that culture plays a crucial role within the social component of the BPSS model, therefore culture and its relation to depression will be reviewed prior to the discussion of spirituality in the BPSS model.

**Figure 2**

*Biopsychosocial-Spiritual Model*




*Note:* From A.R. Hatala (2013), *Towards a biopsychosocial-Spiritual Approach in health psychology: Exploring theoretical orientations and future directions* (p. 269). Copyright 2013 by Taylor & Francis Group, LLC.

### 2.5 Culture and depression

Neglecting the importance of culture in health results in poor health and an increase in intellectual, financial and humanitarian costs (Suls & Rothman, 2004). The operationalisation of culture in health research studies is often crude, superficial and employs simplistic measures (race, language, income and stereotypical beliefs) (Singer et al., 2016). These

obstacles prevent the understanding of how culture informs behaviour and ultimately health (Singer et al., 2016). A systematic review conducted by Hruschka (2009) found that only half of the studies which investigated the effect of culture on health provided a pathway of cultural impact. These barriers to studying the relationship between culture and health can be attributed to the fact that there is no universal definition of culture.

The National Institutes of Health: Office of Behavioral and Social Science Research (OBSSR) recruited a panel of experts to develop a concise definition of culture through a four-phased Delphi method (see Singer et al., 2016). As such, this study adopted the following definition and conceptualisation of culture:

> Culture is an internalized and shared schema or framework that is used by group (or subgroup) members as a refracted lens to "see" reality, and in which both the individual and the collective experience the world (Singer et al., 2016, p.6).

Culture is a multi-level process and dimension which is constantly undergoing change (Singer et al., 2016). Culture allows individuals to interpret the world through attitudes, beliefs, practices as well as emotional and spiritual reasoning. Singer et al. (2016) suggest that the study or research of culture requires the selection of a specific domain or construct of culture as this would aid in the operationalisation. Therefore, for the purpose of this study, the spiritual component of culture will be highlighted as this links best to cultural understandings of health and illness as rooted in an indigenous model.

### 2.6 Depression: A South African perspective

Eighty percent of the South African population identifies as being Black African. Christianity is the most dominant religion (43,423,717 adherents) in South Africa. Of the individuals of Christian faith, a majority (32%) is affiliated with the African Initiated

Churches (AICs) (see Figure 3) (Statistics South Africa, 2016). According to Ntombana (2015), members from AICs as well as mainline churches practise African rituals and customs. Traditional African beliefs are not an institutionalised religion but rather help individuals to develop a relationship of trust with their ancestors (Denis, 2006). These customs or rituals are usually practised at home (Denis, 2006). Hence issues of spirituality would be as relevant as the biological, psychological and social components of the BPSS when adapting a depression screening tool for the general public of South Africa.

**Figure 3**

*Distribution of Christian denomination in South Africa*

| Christian denomination | Number |
|---|---|
| African independent church/African initiated church | 14 158 454 |
| Pentecostal/Evangelistic | 8 483 677 |
| Other | 3 845 638 |
| Catholic | 3 778 332 |
| Methodist | 2 777 937 |
| Just a Christian/non-denominational | 2 501 383 |
| Reformed church | 2 350 853 |
| Anglican/Episcopalian | 1 765 287 |
| Baptist | 1 061 683 |
| Lutheran | 946 086 |
| Presbyterian | 621 065 |
| Jehovah's Witness | 476 687 |
| Seventh-Day Adventist | 311 269 |
| Do not know | 227 585 |
| Mormon | 114 807 |
| **Total** | **43 420 741** |

*Excluding unspecified (2 976)*

*Note:* From Community Survey Brief Report (Statistics South Africa, 2016, p.41). Copyright in the public domain.

Defining the term "spirituality" is complex as there is no single universal definition that can be attributed to the change in the definition of spirituality over time (Swinton, 2001). When looking at the literature, common themes in defining spirituality arise which include:

value, hope, meaning, purpose, as well as God. Sulmasy (2002), a proponent of the BPSS, defines spirituality as the relationship a person has with the sacred which can be constructed in various ways. The sacred is defined as those events or objects which are set apart from the ordinary and viewed with great respect. The sacred is found to be the common thread in both spirituality and religion (Hill & Pargament, 2008; Pargament, 1999).

According to Kasambala (2005), African spirituality should be viewed from a hierarchical perspective as an individual's view of life is hierarchical and deeply rooted in relationships. An individual is viewed as secondary to the community and family (Meyer et al., 2003). Spirituality can be categorised into an upper and lower level (Kasambala, 2005). God, the spirits and the ancestors are said to occupy the upper level, while human beings and nature occupy the lower level. God is critical to the upper level and the ancestors and spirits act as intermediaries between God and humans (Kasambala, 2005). Mental health is said to be located within the relationship between the ancestors or spirits and human beings (Meyer et al., 2003). Human beings strive towards God through their beliefs, attitudes and practices and exist within relationships with nature, spirits or ancestors as well as God (Kasambala, 2005).

Traditional African practices do not conceptualise depression as being a mental disorder (Crawford & Lipsedge, 2004) instead, symptoms of depression are attributed to witchcraft and stress ("thinking too much") (Sorsdhal et al., 2010). Symptoms of depression, such as loss of appetite, poor concentration and loss of enthusiasm, are a result of "Umeqo" (stepping over illness). In "Umeqo", a perpetrator places an illness in the path of his/her victim and when the victims walks over this, he/she will fall ill and display the symptoms mentioned above (Crawford & Lipsedge, 2004).

As a consequence of the traditional African conceptualisation of depression, there is no equivalent term for depression but rather words or idioms that approximate “depression” (Ellis, 2003; Nel et al., 2015; Patel, 2001; Stafford et al., 2008). For example, in the isiZulu language “Khathele/ukukhathala” (sense of worry and also conveys peace), “Dangala” (worn out of body and mind or dejected), “Kubuhlungu inhliziyo” (I have pain in my heart) (Ngcobo & Pillay, 2008) and “Ukukhathazeha” (conveys grief, worry, hurt, sadness as well as heartache) are equated to the term “depression” (Ellis, 2003). In the isiXhosa language, the term “Ukukhathazeha” (conveys grief, worry, hurt, sadness as well as heartache) is utilised (Ellis, 2003). Nel at al. (2015) report that, in the Venda, Pedi and Tsonga languages, there is no one word to describe depression. Lastly, the common idiom of distress “thinking too much” has been used to describe the term depression (Davies et al., 2016).

“Thinking too much” has been viewed as both a symptom of depression as well as a precursor to depression (Andersen et al., 2015; Backe et al., 2021; Davies et al., 2016; Hertog et al., 2016; Kaiser et al., 2015; Sorsdhal et al., 2010). As a symptom, “thinking too much” is viewed as a cognitive symptom and is associated with negative emotional perceptions of the self (such as sadness, loneliness, losing self-worth) (Andersen et al., 2015; Ellis, 2003; Hertog et al., 2016). According to traditional healers “thinking too much” results in the symptoms associated with depression (Sorsdhal et al., 2010).

When reporting depression symptoms, there is an emphasis placed on the somatic instead of the cognitive symptoms. Chronic fatigue, sleep disturbances, body pain and headaches are amongst the somatic symptoms reported ().  In the primary health care setting, the emphasis placed on somatic symptoms compromises the diagnosis of depression (Mosotho et al., 2008). In addition, to the somatic symptoms, loneliness and “not feeling like myself” were reported by Andersen et al. (2015). Research has highlighted that a symptom of

depression, such as crying, is viewed as being culturally inappropriate in the African cultures as men are expected to be strong and crying or expressing emotions of sadness and grief shows weakness (Mosotho et al., 2008, Nel et al., 2015). Lastly, items, which assess suicide ideation and libido, are viewed as culturally inappropriate as these subjects are taboo. For example, suicide is seen as committing a sin (Nel et al., 2015).

It is evident from the above that illness presentation in African cultures is bound to traditional religious beliefs, social relations as well as the cosmology (Crawford & Lipsedge, 2004). The importance of the relationship with the transcendent is not only common to African spirituality and Christianity but also to other religions, namely, Hinduism, Judaism and Islam (see Flanagan & O'Sullivan, 2012; Laher, 2014; Meyer et al., 2003; Van Rensburg et al., 2015; Waines, 2003). This recognition is vital due to the diverse South African population (see Figure 4). Despite being a spiritually and culturally diverse population, screening tools for depression have not been adapted to account for these unique cultural and spiritual presentations of depression. It is vital to consider the influence culture and spirituality has on depression diagnosis within the South African context. Hence this study was anchored by the BPSS theoretical framework.

**Figure 4**

*Religious Belief Distribution in South Africa*

| Religious belief | Number |
|---|---|
| Christianity | 43 423 717 |
| Islam | 892 685 |
| Traditional African religion | 2 454 887 |
| Hinduism | 561 268 |
| Buddhism | 24 808 |
| Bahaism | 6 881 |
| Judaism | 49 470 |
| Atheism | 52 598 |
| Agnosticism | 32 944 |
| No religious affiliation/belief | 5 964 892 |
| Other | 1 482 210 |
| Do not know | 704 358 |
| **Total** | **55 650 716** |

*Excluding unspecified (2 938)*

*Note:* From the Community survey brief report (Statistics South Africa, 2016, p.40). Copyright in the public domain.

### 2.7 Diagnostic screening tools for depression

Raffle and Gray (2007) define screening for depression as the use of questions pertaining to depression used in order to identify individuals who have not been previously diagnosed with depression or have sought depression treatment. Screening tests are a way of motivating individuals to seek profession help, where a qualified health professional is able to determine if treatment is warranted (Morahan-Martin, 2004).

The majority of depression screenings are first made in primary care facilities, where accurate diagnosis of depression in patients only occurs in less than half of the patients (Kerr & Kerr, 2001). This inaccuracy is often attributed to the lack of resources available in these facilities, time constraints, a lack of training as well as screening tool bias (Ali et al., 2016). Primary health care providers often want to use screening tools which require the least amount of training and time to administer and interpret and therefore the most commonly

used depression screening tools are Beck Depression Inventory II (BDI-II), Center for Epidemiology Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS) and Patient Health Questionnaire-9 (PHQ-9) (Smarr & Keefer, 2011). For the purpose of this study, the HADS and the GDS were not explored as the HADS assesses both anxiety and depression and the GDS is used to assess depression amongst the elderly.

The BDI-II was published in 1996 as a revision of the BDI developed in 1961 in order to correlate with the symptoms of depression as specified by the DSM-IV. The instrument consists of 21 self-report items (Beck et al., 1996). The instrument was validated on adolescent psychiatric outpatients, adult psychiatric patients and college students. A high reliability score of 0.88 to0.95 was obtained for the instrument. According to Kagee et al. (2014), the BDI-II is a reliable screening tool amongst HIV positive patients in South Africa. The study reported a Cronbach's alpha of 0.90 however the authors have not specified the language in which the instrument was administered even though they acknowledge that participants needed to understand English or Afrikaans. In addition, the instrument's specificity and sensitivity was not mentioned. In a longitudinal study conducted on 909 university students in South Africa, Makhubela and Mashegoane (2016) reported an internal consistency reliability score of 0.84 at time one and 0.90 at time two on the BDI-II. The time lag was noted at two weeks. The study also highlights good convergent and discriminant validity for the BDI-II on a South African sample. While the BDI-II has evidenced good reliability and validity scores in South Africa, Nel et al. (2015) cautions against the use of the BDI-II among Tsonga, Pedi and Venda individuals as items are seen as culturally in appropriate.

The CES-D was developed in 1977 by Radloff (1977). There are three versions of this

instrument, namely, CES-D, CES-D 10 and CESD-R. The CES-D is a 20 item self-report measure designed for measuring depression in the general population and not for the evaluation of illness severity and clinical diagnostic intake. The depressive symptomatology for this instrument is based on items from previously validated depression instruments and clinical literature. The reliability for the instrument ranges from 0.85 in the general population to0.95 in the patient population and a moderate test-retest reliability (0.45 to0.70) (Radloff, 1977). In a meta-analytic study of the CES-D (English, Spanish, Chinese, German, and Dutch translations) in samples of the general population, ranging from adolescents to the elderly, the authors found specificity and sensitivity values of 87% and 70%, 83% and 78%, and 79% and 80% respectively (Vilagut et al., 2016).

Of the South African studies which utilised the CES-D (Nduna et al., 2010; Smit et al., 2006; Myer et al., 2008), only the article conducted by Smit et al. (2006) provided psychometric properties of the CES-D. Smit et al. (2008) investigated the prevalence of mental health disorders among HIV positive individuals. In the sample, the CES-D has a sensitivity of 79% and a specificity of 61% however the authors have not noted the cut-off scores for this. It is evident that both the sensitivity and specificity for this instrument is lowered in the South African sample when compared to the pooled analysis at all cut-off scores. This could be due to the sample used in each population as well as the impact of cultural idioms of distress in South Africa.

The CES-D10 was utilised in the national income dynamics survey and reported an internal reliability score of 0.75 (Tomita et al., 2014). In a study conducted by Baron et al. (2017), the CES-D 10 was translated into isiZulu, isiXhosa and Afrikaans and administered to 944 individuals. Each language group had a minimum of 300 participants with the exception of the Afrikaans language group (n=289). The study reported an inter-rater reliability of 0.69

to0.89 amongst the translated versions of the instrument. Sensitivity of 71.4% and specificity of 72.6% were reported and 72.6% of individuals in the sample were correctly identified. In a sample of HIV positive South African individuals, the CESD-R administered on an electronic device (hand-held tablet) evidenced an internal consistency reliability score of 0.95, a sensitivity of 0.81 and specificity of 0.82 (Kagee et al., 2020).

The authors report that the positive affect items did not fit well in the tool which could be attributed to the structure of the scale. After answering negative affect items, individuals could be confused upon suddenly having to answer positive affect items. The cut-offs scores for the instruments differed by language of the scale therefore the generalisability across languages in South Africa is not possible. This difference could be attributed to the cultural differences in the experience of depression (Tomita et al., 2014). Baron et al. (2017) reported a higher than 0.5 concurrent validity of the CES-D10 when compared to the PHQ 9.

Compared to the CES-D, the PHQ 9 definition of depression is based on the DSM-IV classification of major depressive disorder (Fann et al., 2009). PHQ-9 was developed from the Primary Care Evaluation of Mental Disorders (PRIME-MD) scale, designed for clinical use. The PHQ 9 consists of nine items which specifically assess depression in terms of provisional diagnosis and severity (Kroenke & Spitzer, 2002).

In a meta-analytic study conducted on the validation on the PHQ 9, a pooled analysis of sensitivity at a cut off score of 10 was 85% and specificity was 89%. Of the studies included in this analysis, a majority of the samples was recruited from primary care facilities. In addition, the study highlighted that the translation of the PHQ 9 (into Portuguese, German, Dutch, Thai, Kankani and Malay) did not have any effect on the diagnostic performance of the tool (Manea et al., 2012). However, when translated into various African languages, either

the sensitivity or specificity at a cut off score of 10 decreases (Bhana et al., 2015; Cholera et al., 2014; Gelaye et al., 2013).

In the study conducted on an Ethiopian clinical sample, in the Amharic translated version of the PHQ 9, the sensitivity (86.2%) and specificity (67.3%) was decreased (Gelaye et al., 2013). When translated into Setswana, one of the 11 official languages of South Africa, large discrepancies in validity were observed (Bhana et al., 2015; Cholera et al., 2014). Cholera et al. (2014) report a sensitivity of 78.77% and a specificity of 83.4% at a cut off score of ⩾ 10, whereas Bhana et al. (2015) report a sensitivity of 41.6% and a specificity of 96.5%. This discrepancy could be accounted for by the fact that the results reported by Cholera et al. (2014) were combined for various translated versions of the PHQ 9 utilised by the authors (isiZulu, isiXhosa, seSotho and seTswana). Bhana et al. (2015) have adapted the PHQ 9 by changing the following: several days, half of the days and nearly every day to 1–7 days, 8–11 days and 12–14 days respectively. This was done so that the PHQ 9 could be easily understood.

In South Africa, there is a lack of research of the PHQ 9 validity on the general population. Adewuya et al. (2006) conducted a PHQ 9 validity study on a sample of Nigerian college students and reported a sensitivity of 85% and a specificity of 99% at a cut off score of ⩾ 10. In addition, the tool was not translated and therefore it is evident that the validity reported is in line with the meta-analysis conducted by Manea et al. (2012). Given the discrepancies observed, Cholera et al. (2014) recommend quality research to be conducted to optimise and adapt the PHQ 9 to ensure the tool is well understood.

The above-mentioned screening tools assess depression based on the DSM-IV classification of depression (Nabbe et al., 2017; Smarr & Keefer, 2011). Further, the cultural

fairness of these tools has been questioned. Translation of these tools decreases the specificity of the tool and thereby decreases the predictive power. In addition, individual perceptions of emotional terms differ which can result in over or under diagnosis (Kerr & Kerr, 2001). The majority of the studies mentioned above have been conducted on patient populations in South Africa and not on the general population. In addition, one needs to be cognisant of the fact that English has been ranked as the 6$^{th}$ most common language spoken in South African homes (8.1%) and ranked as the second most common language spoken outside South African homes (16.6%; spoken by 8.1% of individuals) (Statistics South Africa, 2018). Given that most South Africans are not English first language speakers, there is a need for a depression screening tool free of psychological jargon.

Despite the wealth of literature available on the unique cultural and spiritual presentation of depression in South Africa (Andersen et al., 2015; Crawford & Lipsedge, 2004; Ellis, 2003; Mosotho et al., 2008; Nel et al., 2015; Ngcobo & Pillay, 2008; Patel, 2001; Sorsdhal et al., 2010; Stafford et al., 2008), no study has adapted or developed a depression screening tool which factors in these unique presentations. Therefore, there is a need for a depression screening tool that has been specifically developed or adapted for the South African population. The tool should also be easily accessible and cost effective as a majority of the population have inequitable access to health care facilities (Harris et al., 2011; McIntyre & Ataguba, n.d.).

### 2.8 Web-based screening for depression

With the increased growth in internet usage, the internet has become the first source for individuals to search for information (Estabrook et al., 2007). Researchers have suggested that the use of digital technologies, such as the internet, portable electronic devices and

mobile applications, should be used to overcome barriers to mental health access and care (Aguilera, 2015; Cortelyou-Ward et al., 2018; Lal & Adair, 2014; Naslund et al., 2017; Patel et al., 2018).

Information found on the internet with regards to medical conditions is often updated with expert information (Morahan-Martin, 2004) making it the largest medical library worldwide. The benefits of accessing medical information include the convenience as expert information is accessed at little or no cost and privacy. Since individuals access information online, they can do this in their own private spaces and not be victim to the stigma placed on mental illness in society (Barney et al., 2009; Naslund et al., 2017). In addition to the benefits listed above, online mental health screening allows for early detection of individuals at risk for a mental health disorder such as depression (Austin et al., 2006; Barak & Buchanan, 2004; Donker et al., 2010; Lal & Adair, 2014; Passchier et al., 2019; Patel et al., 2018).

Sixty-three percent of South African households have at least one member who has access to the internet and 58.7% of individuals in South Africans has mobile internet access (Statistics South Africa, 2019). The potential benefits of online mental health screening together with the access to benefits of online mental health screening suggest that online mental health resources could provide access to mental health services where they are limited and often inaccessible.

While there are multiple benefits of using the internet, the wealth of information is often overwhelming for many. Morahan-Martin (2004) conducted a Google search using the phrase “mental disorder test”. The results indicated 244 000 pages were available. The researcher’s personal search for the study using the phrase “depression screening tool” yielded 170 000 pages of information on a Google search. These numbers suggest that there

is a great demand for such tests by the general public.

Of all the screening instruments mentioned above, the CES-D and the PHQ can be accessed online by the general population. Cuijpers et al. (2008) conducted a validation study on the Dutch version of CES-D for online usage among a Dutch adolescent sample. Results indicate that the online Dutch version of the CES-D shows good validity, reliability, specificity and sensitivity. It should be noted that the authors used a CES-D version that was specifically adapted for the country's population whereas, in South Africa, no depression screening tool has been specifically adapted for the population. The online version of the PHQ has yet to be validated. From a literature review, it is evident that validation studies of online depression screening tools are limited, thus highlighting the need for a validated online depression screening tool.

From the evidence provided in the literature review it is evident that depression can be detrimental and thus early detection of depression symptoms are vital. Thus, this study adapted a depression screening tool for online usage by the general South African population. This adaptation of the tool seeks to address the various limitations highlighted in the literature review, such as a lack of access to mental health care, existing screening tools that do not capture the unique distress symptoms of depression experienced by South Africans, a lack of recognition of depression as well as the stigma attached to mental disorders such as depression. By placing the adapted depression screening tool on the online environment, the researcher hopes to capitalise on the increasing rate of internet access amongst South Africans to facilitate easy access to care, symptom recognition as well as reduced stigma.

With this in mind, the study aimed to answer the following research questions:

1. Are there any appropriate depression screening tools which could be adapted for the

general South African population?

2. What are the ethical guidelines involved in designing an online depression screening tool?
3. What is the efficacy of the online adapted depression screening tool in terms of the content validity?
4. Is the instant feedback provided after completion of the tool appropriate?
5. Does the online adapted depression screening tool display good psychometric properties in terms of reliability and criterion validity (sensitivity and specificity)?
6. Is the website that hosts the adapted online depression screening tool user friendly?

*Note:* Research questions 1 and 2 inform the screening tool adaptation process which is a step in the research process that is located between research questions 2 and 3. For the screening tool adaptation process, there are no specific research questions but the process is described and discussed in Chapter Six.

## 2.9 Conclusion

The literature review provided in this chapter draws on international and local literature in order to substantiate the argument made for the pressing need for a depression screening tool to be adapted to incorporate the unique depression symptoms experienced by South Africans. In addition, it is evident that the mental health services in South Africa is limited and, by capitalising on the increasing rate of internet access amongst the South African population, a depression screening tool can be made easily available and accessible to the population. Therefore, this study aimed to adapt an online depression screening tool for the South African population. The research questions identified in this chapter are operationalised in the chapter to follow.

# Chapter Three: Methods

## 3.1 Introduction

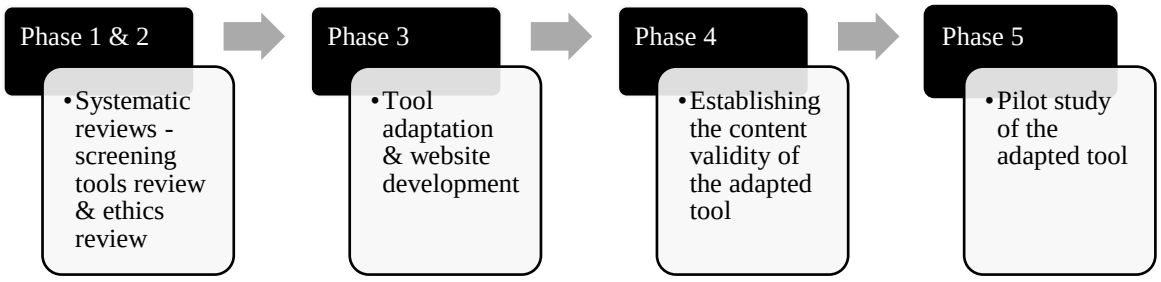
In South Africa, there is a need for an accessible depression screening tool that will assess symptoms of depression as understood by accepted classification systems such as the DSM and ICD but also as understood and experienced within the local South African context. Therefore, this study aimed to adapted an existing depression screening tool for the South African population. The research methods utilised in order to address the aim of this research are described in this chapter. As a result of the nature of the overall study design, a phased approach was utilised. This approach allowed for the results of a previous phase to inform the phases to follow. This chapter details each phase in terms of specific research questions, research design and analysis. The chapter concludes with a description of the ethical considerations with regards to the different phases of the study.

## 3.2 Research design

Overall, the study followed a sequential exploratory mixed method design (Creswell et al., 2003) that is a mixed method design which is conducted as a phased approach. Firstly, qualitative data collection and analysis occurs which is followed by quantitative data collection and analysis (see Figure 5). This design is commonly used in the development and testing of an instrument (Creswell et al., 2003). For the purpose of this study, a five-phase design approach was utilised. The study was completed by publication (i.e., four out the five-phases were written up for publication).

**Figure 5**

*Sequential Exploratory Design Utilised for the Study*




### 3.3 Five phase design

- Phase One: Systematic review of online depression screening tools for the public
- Phase Two: Systematic review exploring the ethical issues to be considered for online psychological screening tools
- Phase Three: Tool adaptation and website development
- Phase Four: Establishing the content validity of the screening tool and the feedback provided
- Phase Five: Piloting the adapted online CESD-R and the website

Each phase is discussed hereunder in terms of the research questions, research design, and analysis. For the last two phases, namely, Phases Four and Five, the instruments section is combined and described after the analysis provided for Phase Five.

#### 3.3.1 Phase One: Systematic review of online depression screening tools

This first phase involved the identification of an online depression screening tool for

the general public. In addition, the psychometric properties of identified tools were assessed in order to determine whether an existing tool can be adapted for the South African context.

*Research Question: Are there any appropriate depression screening tools which could be adapted for the general South African population?*

This question was further examined by the following secondary questions:

1. Which MDD screening tools are available online?
2. What are the psychometric properties of these screening tools?
3. Have any of these screening tools been used in the South African context?
4. Which tool(s) can be adapted for the South African population if none have been used or adapted before?

***Research design***

This phase utilised a qualitative systematic review of both qualitative and quantitative studies. A systematic review can be defined as the collation of empirical evidence which serves to answer a specific research question, based on a pre-defined eligibility criterion (Green et al., 2011; Oxman & Guyatt, 1993; Ungvarsky, 2017). Bias is reduced through identifying, appraising and synthesising studies included in the review (Green et al., 2011; Oxman & Guyatt, 1993; Ungvarsky, 2017). Results obtained from a systematic review can be utilised to influence policy guidelines concerning the use of diagnostic tests and treatments. A systematic review allows researchers to recognise and avoid possible pitfalls when conducting their own research and aids in the identification, refinement and justification of a given hypothesis or research question (Mulrow, 1994). Prior to the analysis of the selected articles, all included articles were subjected to a quality appraisal assessment using the Critical Appraisal Skills Programme (CASP, 2018). Results were analysed using a content analysis which consisted of three stages (Elo & Kyngas, 2008). During stage one, the

description of the instruments, the sample section and instrument validation results were selected as units of analysis. Stage two involved the organisation of the data through the use of free coding, category creation and abstraction. Lastly, data were organised in relation to the categories produced in stage two.

This phase was published as follows:

Hassem, T., & Laher, S. (2019). A systematic review of online depression screening tools for use in the South African context. *South African Journal of Psychiatry, 25*(1), 1–8. http://dx.doi.org/10.4102/sajpsychiatry.v25i0.1373

### 3.3.2 Phase Two: Exploring ethical guidelines for online psychological screening tools

This phase aimed to determine the ethical guidelines associated with online mental health screening tools.

*Research Question: What are the ethical guidelines involved in designing an online mental health screening tool?*

#### *Research Design*

A qualitative systematic review, as described in Phase One, was used for the ethics of an online screening study. The systematic review was exploratory in nature and included only theoretical articles. A critical appraisal tool for qualitative studies was adapted to assess the quality of theoretical articles included in this study. A thematic analysis was the chosen method of analysis (Braun & Clarke, 2006).

The ethical guidelines paper can be accessed at:

Hassem, T., & Laher, S. (2020). The ethics of online screening for mental health in South

Africa: A systematic review. *International Journal of Mental Health*, 1–17. https://doi.org/10.1080/00207411.2020.1802693

### 3.3.3 Phase Three: Tool adaptation and website development

Through the systematic review conducted in Phase One, the BDI-II, PHQ-9 and the CESD were identified as depression screening tools that could be adapted as they displayed the best psychometric properties and were the most commonly utilised in the online environment. The Revised version of the CESD (CESD-R) was the selected depression screening tool that was adapted to capture the unique distress symptoms of depression experienced by South Africans and for the online environment. The first three stages of designing a psychological measure, proposed by Foxcroft (2018) and the International Test Commission Guidelines for Translating and Adapting tests (International Test Commission [ITC], 2017), informed the adaptation of an existing depression screening tool for online usage by the general public of South Africa (see Appendix A for steps in designing a psychological measure proposed by Foxcroft, 2018). Prior to the test adaptation, the Pre-Condition stipulated by the ITC (2017) was employed. This was followed by the stages proposed by Foxcroft (2018) for developing a psychological measure. Stage one involved planning which places emphasis on developing a testing-development team, specification of the test aim, target population, the nature of the test as well as the content being measured by the test. Item development is the second stage. The third stage involves the assembling and pre-testing of the test. These stages drew on Test Development guidelines highlighted by the ITC (2017). In addition, a website was developed in order to host the adapted screening tool. The website development process was a collaboration between the web-developers and the researcher. The process of adaptation and website development is discussed in Chapter Six.

### 3.3.4 Phase Four: Establishing the content validity of the screening tool and the feedback provided

#### *Research aims*

Phase Four aimed to determine whether the online adapted CESD-R was a culturally appropriate measure of depression and would be easily understood by the South Africa population. In addition, the tool instructions, feedback and response format were assessed.

#### *Research Design*

This phase utilised a sequential exploratory mixed method design (Creswell et al., 2003). Qualitative data collection occurred where experts were asked to comment on the adapted items of the CESD-R as well as the feedback and instructions that would accompany the tool. The qualitative results were utilised to further adapt the tool. This was followed-up with a quantitative design where another group of experts were asked to rate the items on the tool.

#### *Data analysis*

The qualitative stage of this phase involved a thematic analysis (Braun & Clarke, 2006) to analyse open-ended questions which were structured in accordance with the Consensus-based Standards of Health Management Instruments (COSMIN) (Terwee et al., 2018). For the quantitative stage, the following content validity ratios were calculated: Content validity ratio, Item-Content Validation Index, Scale-Content Validation Index and the Kappa Statistic (Polit et al., 2007).

### 3.3.5 Phase Five: Piloting the adapted online CESD-R and the website

#### *Research aim*

The final phase of this study aimed to determine the psychometric properties of the online adapted CESD-R in terms of reliability and criterion validity. Criterion validity was established on a group of individuals who had been formally diagnosed with depression and a group of individuals who had no history of depressive episodes. Lastly, the appropriateness of the instant feedback and the user-friendliness of the website and the tool were evaluated.

#### *Research Design*

The final phase of the study followed a non-experimental, cross-sectional quantitative research design (Rosenthal & Rosnow, 1991). Two groups of participants, namely, individuals diagnosed with depression and individuals with no history of a depressive episode completed the online adapted CESD-R via the website MDDSA.co.za and answered four close-ended questions and two open-ended questions.

#### *Data analysis*

Data were analysed using the Cronbach alpha coefficient and the McDonald's Omega coefficient to determine the internal consistency reliability. Validity was assessed using a positive and negative predictive values sensitivity and specificity. In addition, frequencies and percentages were utilised to analyse closed-ended questions.

#### *Instruments used in Phase Four and Phase Five*

#### Participant information sheet

A participant information sheet, which detailed the purpose of the study and what was

required from the various participant sample groups (experts, individuals diagnosed with depression, and individuals with no history of a mental health disorder), was provided to each participant prior to participation in the study (Appendices B and C).

## Consent

An email was circulated to various experts in the field explaining the nature of the study and also a link to participate in the study. Therefore, consent to participate in the study was taken when experts accessed the link. With regards to the individuals diagnosed with depression and individuals with no history of a mental health disorder, consent was obtained by selecting a box stating "I consent to participate in this study". This ensured that participants understood the nature of the study and provided the researcher with consent to use the information provided for research purposes (Appendix C).

## Questionnaires

### *Brief demographic questionnaire for experts in the content validity study 1 and 2*

The demographic questions were the same for both expert groups (see Appendix D). The questionnaire collected the following demographic data from the experts: occupation, number of years practising, gender, population group, religious affiliation and home language. In addition, experts were asked to indicate how often they diagnose depression, and if they utilised a depression screening tool. If they indicated that they utilised a depression screening tool, they were requested to provide the name or names of the screening tool.

### *Review questionnaire for experts in the content validity study 1*

Experts were presented with the adapted instructions, the initial 20 items adapted from the CESD-R, feedback and scoring (see Appendix E). Experts were asked 12 questions

which addressed the content and face validity, and the appropriateness of the online depression screening tool. Questions had a yes/no response format as well as a comment box for elaboration.

***Brief questionnaire for experts in the content validity study 2***

Experts were asked to rate 21 items for appropriateness using a 3-point rating scale of 1= item is not essential; 2= item is useful but not necessary; and 3= item is necessary for diagnosing depression. In addition, experts were asked to comment on the response format of the tool (see Appendix F).

***Brief demographic questionnaire for the pilot sample (participants with no history of mental illness and participants who have been diagnosed with depression)***

The questionnaire collected demographic data which included: age, gender, religious affiliation, home language, rating of proficiency, comprehension and reading skills in English, and history of mental and physical illness. Participants, who indicated that they were diagnosed with depression, were asked three additional questions. These questions collected information regarding date of diagnosis, who made the depression diagnosis and occurrence of last depressive episode (see Appendix G).

***Online adapted CESD-R and tool review***

The participants in the pilot sample were presented with the online adapted CESD-R, which is described in Chapter Six of this thesis. After the instant feedback provided, participants were asked six questions with a yes/no response format and a comment box for further elaboration. These questions assessed the usefulness of the instant feedback, user friendliness of the website and the tool as well as the appropriateness of the items (see

Appendix H).

### 3.4 Ethical considerations

This study was approved by Medical Human Research Ethics Committee (HREC) of the University of The Witwatersrand (Protocol number: M180402).[1] In order to ensure the research was scientifically, ethically and legally valid, the General Ethical Guidelines for Health Researcher (Health Professions Council of South Africa [HPCSA], 2008) were adhered to. These guidelines ensured participants' rights were protected for the duration of the study.

An initial application made to the HREC was approved to conduct a pilot study with patients who had been formally diagnosed with depression at three hospitals in the Gauteng, Johannesburg region (Charlotte Maxeke Johannesburg Academic Hospital, Helen Joseph Hospital and Tara Psychiatric Hospital). As a result of the COVID-19 Pandemic, I was unfortunately unable to gain access to the hospitals stipulated on the original proposal to collect data. Hence, an amendment was made to the initial application to approach General Practitioners, Psychologists and Psychiatrists to assist in circulating the information about the study to their patients who had been diagnosed with depression.

All questionnaires were administered online and thus no personal information or identifying information was requested from any of the samples. A participant information sheet detailing the research process was provided. Participants were approached to volunteer to participate in the study. The information sheet provided participants with a national free

[1] See Appendix I for the Ethical clearance certificate for the study

counselling services number to contact if they feel vulnerable after completion of the questionnaire (South African Depression and Anxiety Group [SADAG]-0800 567 567 (toll free)). Participants had the right to confidentiality.

Data collected were anonymous and stored electronically via cloud storage for five years. These data files will be only be made accessible to the project supervisor and the researcher.

### 3.5 Conclusion

This chapter detailed the five-phased sequential exploratory design employed in this study. Phases One and Two employed a qualitative systematic review methodology in order to identify existing online depression screening tools and ethical guidelines that pertain to online mental health screening. The results of these phases informed Phase Three, which resulted in the adaptation of the CESD-R. Phase Four employed a mixed method design in order to determine the content validity of the adapted tool. For Phase Five, a quantitative design was utilised to determine the psychometric properties of the adapted tool. Lastly, this chapter looked at the various ethical considerations with regards to the study in order to ensure the protection of participants' rights. The chapters to follow elaborate on each phase discussed in this chapter.

# Chapter Four: A systematic review of online depression screening tools for use in the South African context

## 4.1 Introduction

The first phase of the study required that existing online depression screening tools utilised by a general population be identified, therefore this article provides the foundation work for the test adaptation process. The identification of existing online depression screening tools was done using a systematic review and in order to the first research question:

*Are there any appropriate depression screening tools which could be adapted for the general South African population?*

This paper highlights the online depression screening tools currently used through a systematic review. The systematic review followed the eight-step procedure proposed by Uman (2011) and data collection adhered to the steps outline in the PRISMA statement (Moher et al., 2009). The paper discusses the online psychometric properties of the tools identified and recommends three commonly utilised depression screening tools which can be adapted for the South African context, namely, BDI-II, CESD and the PHQ-9. Results of this phase highlight the good or excellent psychometric properties displayed by the tools identified, however the tools have not been assessed for linguistic and cultural appropriateness. In addition, the psychometric properties of the online versions of these tools have not been evaluated for the general public of South Africa.

From the literature review provided in chapter two, it is evident that the commonly utilised tools identified through the systematic review are also commonly utilised amongst South Africa literature cited. Hence the South African literature reviewed in Chapter Two provided further evidence for one of the above-mentioned tools to be adapted to meet the

specific objective of the study, adapting an online depression screening tool for the general public of South Africa.

This paper was published and is referenced as follows:

Hassem, T., & Laher, S. (2019). A systematic review of online depression screening tools for use in the South African context. *South African Journal of Psychiatry*, *25*(1), 1-8.[2]

[2] See Appendix J.

**A systematic review of online depression screening tools for use in the South African context**

Hassem, T. & Laher, S.

**Abstract**

**Background:** According to the World Health Organisation, the alarming increase in rates of depression globally has become a serious concern. In 2010 the prevalence rate of depression in South Africa was 4.6 %. Given the context of South Africa where majority of the population have limited access to health care facilities and 59.3% of the population have access to the internet, an online depression screening tool would have much to offer.

**Methods:** This study presents a systematic review of online depression screening tools to determine whether one would be suitable for use in South Africa. Articles were accessed from seven electronic databases from 1970- 2018. All articles included in the review were critically appraised.

**Results:** A total of 17 articles met the inclusion criteria. From the results, there was only one screening tool available on an open access platform for use by the general population. The most common depression online screening tools were the Beck Depression Inventory-II (BDI-II), Center for Epidemiology Studies Depression Scale (CES-D) and Patient Health Questionnaire (PHQ-9). It was also evident that there were negligible differences in the psychometric properties of online versus paper versions of the online screening tools. Further there were very few studies that considered the African or South African population and no online screening tools for Major Depressive Disorder (MDD) developed in these contexts.

**Conclusion:** There appears to be a need for a depression screening tool to be adapted for online usage in South Africa. It is recommended that the online screening tool be adapted from the three commonly used online depression screening tools: PHQ-9, CES-D as well as the BDI-II.**Keywords:** BDI-II; CES-D; depression; major depressive disorder; PHQ-9; screening tool

## Introduction

A worldwide increase in depression prevalence rates by more than 18% from 2005 to 2015 has listed depression as the leading cause of disability and ill health.[1] According to the global burden of disease study in 2010, 5.0% of the Southern Sub-Saharan African population was diagnosed as having major depressive disorder (MDD)[1].[2] In South Africa, the MDD prevalence rate in 2010 was 4.6%.[2] The majority of depression screenings are first made in primary care facilities, where accurate diagnosis of depression in patients only occurs in less than half of the patients.[3] This inaccuracy is often attributed to the lack of resources available in these facilities, time constraints, lack of training as well as screening tool bias.[4] Primary health care providers often want to use screening tools which require the least amount of training and time to administer and interpret. [5]

[1] MDD and depression are used interchangeably in the literature. However, the researchers have ensured that research cited and used is focused on MDD even if the term depression is used in the study.

Majority of the paper based depression screening tools are based on the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV or DSM-IV-TR classification of MDD.[5,6] This classification was revised in the DSM 5 [7] where the categories of a single and recurrent depressive episode, as well as the symptom of bereavement were removed. Further the DSM criteria for depression are often criticised for being based on a Western set of cultural assumptions. These assumptions include the autonomy and uniqueness of each individual, the focus on the intrapersonal rather than interpersonal symptoms and the emphasis on emotional symptoms as a classification for depression. These Western cultural norms are not universal as various cultures view individuals as being interdependent and the mind and body are not viewed as distinct entities rather as mutually constitutive.[8] The DSM classification is based on a dichotomous approach when it comes to MDD diagnosis but this approach is unclear. As a result of this, depression can either be over or underdiagnosed and should be utilised with extreme caution when utilised in non-western based societies. Hence the applicability of the tools designed using these criteria must be explored.[3]

Illness presentation in African cultures is bound to traditional religious beliefs, social relations as well as the cosmology.[9] While spirituality and culture are relevant across the diverse spectrum of the South African population, screening tools for depression have not been adapted to account for these unique cultural and spiritual presentations of depression.

South African research on MDD screening has considered the paper versions of the Patient Health Questionnaire 9 (PHQ-9), Center for Epidemiological Studies Depression Scale (CES-D) and Beck Depression Inventory II (BDI-II). [10–13] Smit et al. [10] reported lower sensitivity and specificity scores for the South African HIV positive sample when compared to the pooled analysis for the CES-D. Kagee et al. [11] found that the BDI-II was a reliable screening tool amongst HIV positive patients in South Africa. Baron et al. [12] used the isiZulu, isiXhosa and Afrikaans versions of the CES-D-10 with a sample from the general population and reported a sensitivity of 71.4% with 72.6% of individuals in the sample being correctly identified.

Makhubela et al.[13] reported good reliability as well as good convergent and discriminant validity for the BDI-II in the general population. There have been no studies considering the online screening of MDD in South Africa.

Using the internet to screen for a psychological disorder is becoming more common. With the increase growth in internet usage, the internet has become the first source for individuals to search for information.[14] Information found on the internet with regards to medical conditions is often updated with expert information making it the largest medical library worldwide.[15] The benefits of accessing medical information include: the convenience, expert information is accessed at little or no cost and privacy. Stigma against mental illness is still very prevalent in societies, where people with depression are viewed as undesirable to be around as they are seen to be responsible for their own condition. Individuals fear to seek professional help due to the response they will get from community members.[16] The internet offers protection from such stigma.

While there are multiple benefits of using the internet, the wealth of information is often overwhelming for many. Morahan-Martin [15] conducted a Google search using the phrase “mental disorder test”. The results indicated 244 000 pages were available. The

researcher's personal search for this study using the phrase "depression screening tool" yielded 170 000 pages of information on a Google search. These numbers suggest that there is a great demand for such tests by the general public**.** According to the General Household Survey 2016, 59.3% of households in South Africa had at least one member who had access to the internet and 53.9% of South Africans had mobile internet access.[17] These figures suggest the possibility of online screening tools providing access to information in South Africa where mental health resources are limited and often inaccessible. [18]

In a scoping review and evaluation of 32 web-based intervention programs for depression [19], the authors found that majority of the programs targeted an adult population (n=19), while only two studies had a specific target population. Users of these programs were required to complete a depression assessment either prior to registration, independent of the program or during the program, where results were received immediately upon completion. Of the 32 programs the authors report only 17 programs to have used a validated depression screening tool such as the PHQ-9, BDI or the CES-D. However, it has not been stated if these tools were validated for online usage.

Concerns have been raised with regards to the effectiveness of online tests.[20] Buchanan asserts that the psychometric properties of online tests differ when compared to pencil and paper versions of the test, therefore these properties must be considered despite the online version of the test being a direct translation of the pen-and-paper instrument .[20] Of the psychological tests available online many of them have not been developed by a professional and therefore do not have established psychometric properties. [20]

Therefore, this study used the method of systematic review to establish if there were any appropriate online depression screening tools for use in the South African context. Hence the specific questions for this study were:

5. Which MDD screening tools are available online?
6. What are the psychometric properties of these screening tools?
7. Have any of these screening tools been used in the South African context?
8. Which tool/s can be adapted for the South African population if none have been used/ adapted before?

## Methods

### Research Design

A qualitative systematic review was the chosen method for this study, as a qualitative analysis was conducted on both quantitative and qualitative studies which were included in this study.[21] The eight stage procedure for conducting systematic reviews recommended by Uman[22] was followed. Stages 1 to 4 required the researcher to formulate the review questions, define inclusion and exclusion criteria and develop a search strategy and lastly to select studies. During stages 5 and 6 the researcher needed to extract the data from included studies and critically appraise the included studies. Finally, during stages 7 and 8 the researcher was required to analyse and interpret the extracted data and disseminate the findings.

### Search process

The steps outlined in the PRISMA statement were followed for data collection.[23] Articles were accessed from the Academic Search Complete, EBSCO Host: Psychology and Behavioural Science Collection, Sabinet, Academic Search Premier, PsychInfo, ProQuest Psychology journals and the PubMed electronic databases. These databases were selected as they provide international and African focused multi and interdisciplinary scholarly literature. Reference lists of selected articles were screened for any additional eligible articles. The following keywords were used: “Online depression screening tools”, “internet depression screening tools”, “using the internet to screen for depression”, “web-based depression tools”, “web-based depression assessments”, “screening for depression on the internet” as well as “depression assessments on the internet”. All articles search results were saved to Zotero (referencing software). Articles were screened using three phases; title screening, abstract screening and full-text screening. Article titles and abstracts were screened by the first author as well as an independent researcher.

**Study eligibility**

In order to be included in the sample, the following inclusion criteria was used: 1) Articles needed to be written in English; 2) Only articles published from 1970 to 2017 were considered as the first large scale online testing and interpretation of psychological assessments occurred in the early 1970s[24] 3) the study must be conducted on adults from the general public (18 years and older); 4) the study must contain a description of the MDD screening instrument that must have been specifically designed/adapted for an online environment. Articles were excluded if the screening tool was used on patient (including medical and psychiatric) samples as this study focused on reviewing articles on a screening tool that could be used on the general population, not on those already diagnosed with MDD. Articles where the depression instrument was combined with another screening instrument were also excluded as psychometric properties reported were unclear for subscales of the tools. Grey literature was also excluded from the search as the authors deemed peer reviewed research to be more rigorous.

**Data analysis, extraction and quality assessment**

Data was analysed using content analysis, which proceeded in three phases.[25] In the first phase units of analysis were selected such as the instruments description section, sample section as well as the results section where instruments were validated. The second phase used an inductive approach were data was organized in terms of free coding, creating categories and abstraction. Lastly, data was reported in terms of the codes determined through phase two. Included articles were assessed using the criteria proposed in the Critical Appraisal Skills Programme (CASP)[26]. Quantitative studies were scored out of 11, a score between 11-8 was considered strong, 7-4 moderate and 3-0 was considered weak. All studies received a score of 9, 10 or 11 with the exception of the study by Harvey et al. [27] The qualitative study received a score of 5 out of 6, which represented a strong appraisal score. [28] (See Table 1).

## Ethics

Articles obtained for analysis in the review were all available in the public domain; as a result, no special ethical considerations were required.

## Results

Through the various database searches and additional reference list searches a total of 4777 articles were identified. After removing duplicates 2957 article titles were screened. Total articles excluded based on titles and abstracts amounted to 2748 and 187 respectively. Seventeen articles were identified for possible inclusion in the study. As such all 17 articles were used for the review – see Figure 1.

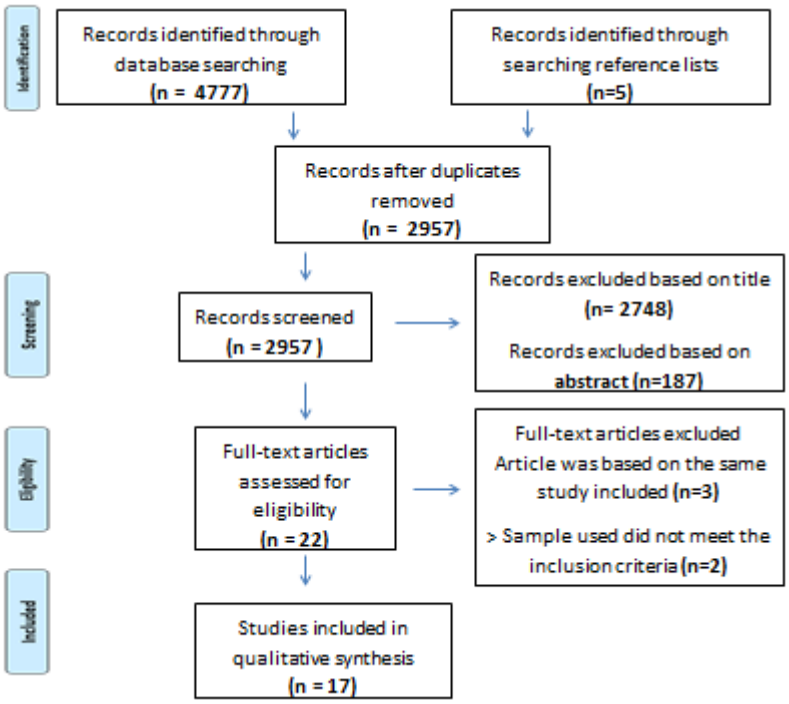



*Figure 1 PRISMA flow Diagram of article inclusion and exclusion*

## Description of included articles

Table 1 provides a brief descriptive overview of the articles. Of the 17 studies, 5 of the articles looked at the association of depression and another psychological measure, 4 articles assessed the psychometric properties of an online screening tool for depression, 3 articles did a direct comparison of a paper versus internet version of a depression tool[29–31], 3 articles were a feasibility study of an intervention that utilised a depression screening tool [32,33], 1 article was based on an intervention study and 1 article was qualitative descriptive article. The qualitative descriptive article, obtained data on the experience of an online depression screening tool from general practitioners. [33]

Sample sizes obtained in each study ranged from 87-24965 individuals with the exception of the qualitative study. The qualitative study conducted by Krog et al. [33] interviewed nine general practitioners. Majority of the participants in the study samples were female [15], with the exception of the studies conducted by Krog et al.[33] Lee et al.[34] and Du et al. [35] All study samples included participants over the age of 18 years, with an age range between 18-92 years. Samples recruited in the studies were representative of very specific target populations, with the majority of the studies recruiting US citizens. The only study open to a global sample was that by Leykin et al.[36], where anyone who had access to the internet could participate. Of the sample obtained for a follow up screening the following countries were represented: United Kingdom, India and South Africa (n=150). No other studies were conducted in Africa or South Africa.

### Tools available online

The following screening tools were used in the studies: PHQ-9, CES-D, BDI-II, Edinburgh Depression Scale (EDS), Single Item Depression Scale (SID) (Dutch version), electronic Major Depressive Inventory (eMDI) (Dutch version), Major Depressive Episode Screener (MDI), Internet-Based Self-Assessment Program for Depression (ISP-D), Kessler Psychological Distress Scale (K10) and the Montgomery Asberg Depression Rating Scale (MADRS) (Table 3). The PHQ 9 was utilised by the majority (n=7) of the studies, followed

by the CES-D (n=3) and BDI-II (n= 3). The remainder of the depression screening tools were only utilised once by their respective studies.

**Psychometric properties of tools**

Despite being used in the majority of studies, only one of the studies reported on validity and reliability of the PHQ-9 tool. The study conducted by Du et al. Utilised the Chinese version of the PHQ-9 and reported a Cronbach Alpha of 0.8, test retest reliability for a two-week period of 0.78 and inter item correlations of 0.54-0.69. Three studies [32, 33, 42] made mention of psychometric properties of the paper version of the PHQ-9 (see table 2).

Of the three studies that utilised the CES-D, only one study did not report psychometric properties for the online version of the instrument – see Lup et al.[37] Herrero et al.[31] showed that the reliability for the paper and online versions of the CES-D were virtually equal (0.83 and 0.82 respectively). A relatively higher reliability value for the online CES-D of 0.92 was obtained by Donker et al.[38] It should be noted though that these authors utilised the Dutch version of the CES-D. With regards to the sensitivity and specificity of the CES-D, Donker et al. [38] report a sensitivity of 0.94 and specificity of 0.62 at a cut off of 22. The authors highlight a higher sensitivity and lower specificity of the online version of the CES-D when compared to the paper-based version of the tool.

*Table 1: Descriptive data of included articles*

| Authors | Type of study | | | | Sample demographic | | Sample age | | Sample gender | | Critical Appraisal Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intervention | Comparison of paper VS internet test | Internet test validation | Other | Size | Country | Range | Mean | Female | Male | |
| Lin et al. [39] Lin et al. [40] | | | X | | 579 | Taiwan | 18-52 | 26.5 | 72.7% | 27.3% | 11 |
| Donker et al. [38] | | | X | | 502 | Netherlands | 18-80 | 43 | 57% | 43% | 11 |
| Harvey et al. [27] | | | | X Association study | 3401 of which 1161 completed depression screening tool | UK telecommunications company | Not provided | Not provided | Not provided | Not provided | 5 |
| Krog et al. [28] | | | | X qualitative study | 9 General Practitioners | Denmark | 44-67 | Not provided | 3 | 6 | 5 (total of 6) |
| Leykin et al. [36] Gill et al. [41] | | | X | | 24965 Monthly screening: 1371 | United Kingdom (n = 384), followed by India (n = 244) and South Africa (n = 150); 15.2% of participants reported being born in a country other | 18-92 | 32.1 | 63.8% | 31.7% | 9 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | than the country of their current residence (consenting for the follow up) | | | | | |

| Authors | Type of study | | | | Sample demographic | | Sample age | | Sample gender | | Critical Appraisal Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intervention | Comparison of paper VS internet test | Internet test validation | Other | Sample size | Country | Range | Mean | Female | Male | |
| Spek et al. [29] | | X | | | 407 | | Not provided | 55 | 64% | 34% | 11 |
| Williams et al. [32] | | | | X feasibility study | 972 | (USA) college students Massachusetts | Not Provided | | 71% | 29% | 9 |
| Garlow et al. [43] | X | | | | 729 | America | College students | Not provided | 71.7% | 28.3% | 10 |
| Jeong Youn et al. [33] | | | | X Feasibility study | 259 | 5 US colleges (California, Massachusetts | Not provided | | 77.4% | 22.6% | 9 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | and Pennsylvania | | | | | |
| Holländare et al. [30] | | X | | | 87 | Sweden | 20-72 | 41.1 | 65.5% | 34.5% | 11 |
| Herrero et al.[31] | | X | | | 530 | Open University of Catalonia | | 29.1 | 66% | 44% | 10 |
| Monero et al. [42] | | | | X Association study | 215 | College students in the USA two universities | 18-20 | 18.8 | 54% | 46% | 11 |

*Table 2 Description of online Depression Screening Tools*



| Authors | MDD tool used | Depression diagnosis criteria | Reliability information | Validity information |
|---|---|---|---|---|
| Lin et al. [39]<br>Lin et al. [40] | ISP-D | DSM IV | test retest (184 participants):<br>➢2 weeks: 0.830<br>➢ 2-4 weeks: 0.449<br>➢ longer than 4 weeks: 0.499 | Sensitivity: 76.4%, specificity: 81.8% (55 participants) |
| Donker et al. [38] | ➢ SID (Dutch version)<br>➢ CES-D (Dutch version)<br>➢ K10 (Dutch version) | CES-D: previously validated depression scales (BDI) | ➢ CES-D: α=0. 92<br>➢ K10: α=0.90.<br>➢ SID consists of only one item Cronbach's α could not be calculated | ➢ Correlations among the three measures ranged from 0.68 of the SID with the CES-D and with the K10 (both P<0.001) to 0.84 of the CES-D with the K10 (P<0.001)<br>➢SID: cut off score 5: sensitivity: 0.87; specificity: 0.51<br>➢ CES-D: cut off score 22: sensitivity:0.94; specificity: 0.62<br>➢ K10: cut-off score 29, 31, 32: sensitivity: 0.69–0.81; specificity: 0.67–0.79 |
| Krog et al. [28] | eMDI (Dutch version) | ICD 10 | Previous experience with the MDI paper made the eMDI easier to interpret and use. eMDI made proce ss of documenting patient scores easier and efficient. However, the login takes long | |
| Spek et al. [29] | EDS | | The internet-administered EDS has good internal consistency: comparable to that of the paper and pencil EDS α=0.87 | The internet-administered EDS correlated significantly with the internet-administered BDI (r=.75; p<.001). The positive predictive values were comparable to those found in previous paper and pencil studies |

| | | | |
|---|---|---|---|
| Leykin et al. [36]<br>Gill et al. [41] | MDI | DSM IV | Good agreement with PRIME-MD and with clinician-administered diagnostic interviews. Checked references and none done online. Authors also note this in limitations however provided a study that shows there are few if any difference to paper version |

| | | | | |
|---|---|---|---|---|
| Moreno et al. [44] | PHQ 9 | DSM IV | None provided | |
| Harvey et al. [27] | PHQ-9 | DSM IV | Not provided | Not provided |
| Williams et al. [32] | PHQ 9 | DSM IV | Describe validity of a PHQ that was paper based. | |
| Moreno et al. [42] | PHQ 9 | DSM IV | State it has been previously validated, however this reference was not for online PHQ 9 | |
| Du et al. [35] | PHQ 9 Chinese version | DSM IV | Cronbach alpha: 0.8 two-week test retest: 0.78 item correlations: 0.54-0.69 | Cut-off score of greater or equal to 10 sensitivity: 0.74 and specificity=0.85 Likelihood ratio of 5.08. No major difficulties in the administration. Students were satisfied with the scale however on the satisfaction rating comprehension was judged negatively |
| Garlow et al. [43] | PHQ 9 | DSM IV | Not provided | |

| Authors | MDD tool used | Depression diagnosis criteria | Reliability information | Validity information |
|---|---|---|---|---|
| Jeong Youn et al. [33] | PHQ 9 | DSM IV | Provide reference to the paper version psychometrics | |
| Lee et al. [34] | BDI Korean version | DSM IV | Report previous Alphas and test-retest for the paper-based test for both Psychiatric and non-psychiatric patients | |
| Holländare et al. [30] | MADR-S & BDI | ➢ BDI: DSM IV<br>➢ MADR-S: Comprehensive Psychopathological rating scale (1979 scale was developed) | ➢ Cronbach alpha levels for the MADRS-S for the online version of the test ranged from 0.73-0.81 and the paper version was 0.81<br>➢ For the BDI-II Cronbach alpha levels for the online version of the test ranged between 0.87-0.89 and the paper version was between 0.89-0.90. | ➢ Correlations between the internet and paper versions of all MADRS-S items were significant. (r=0.84 and 0.79 for suicide item)<br>➢ Correlation between the BDI-II total scores from the internet administration and the paper administration was high, *r* = .89 and 0.80 for the suicidal item |
| Herrero et al. [31] | CES-D | Previously validated tests (BDI) | CES-D (seven items) scale virtually equalled as for both conditions; internet α= 0.82 and paper α=0.83 | Confirmatory factor analysis showed that both the internet and paper version of the CES-D loaded in a single factor |
| Lup et al. [37] | CES-D | Previously validated tests (BDI) | Report paper-based properties | |

| | | | |
|---|---|---|---|
| Liu et al.[45] | MDE Chinese version | | Report paper-based properties |

Two studies utilised the BDI-II as an online depression screening tool. The study conducted by Holländare et al.[30] compared the paper- and online psychometric properties of the BDI-II. Authors reported the Cronbach alpha levels were similar with the online version ranging from 0.87- 0.89 and the paper version ranging from 0.89-0.90. The participants were required to be fluent in Swedish, therefore suggesting that the BDI-II was translated. Lee et al.[34] utilised the Korean version of the BDI-II but have not reported any online psychometric properties, but rather made reference to past studies which were paper-based psychometric properties.

Studies which utilised less common depression screening tools, have reported some psychometric properties of these tools, with the exception of studies conducted by Krog et al.[30], Leykin et al.[33] and Liu et al.[37] Lin et al.[39] provided a test re-test reliability for the ISP-D of 0.83 for a 2 week period, 0.45 for a period of 2-4 weeks and lastly, 0.50 for a period longer than four weeks. In addition, the authors report a sensitivity of 76.4% and specificity of 81.8% for 55 participants.

For the Dutch version of the SID, Donker et al.[38] report a sensitivity of 0.87 and specificity of 0.51 at a cut-off score of 5, as well as a 0.90 reliability for the K10 and a sensitivity of 0.69- 0.81 and specificity of 0.67- 0.79 for cut-off scores of 29, 31 and 32 for the K10. When looking at the online version reliability of the MADR-S, Holländare et al. [30] report the Cronbach alpha of the online version was similar to that of the paper version.

The EDS evidenced a good internal consistency ($\alpha$=0.87) and displayed a significant correlation when compared to the online version of the BDI-II. [29]

**Applicability for South African population**

Based on the review there were no studies of online MDD screening tools targeting the South African population. It should be acknowledged that a small proportion of the sample reached by the study conducted by Leykin et al. [36] reported being South African upon follow up assessments. Of the tools and studies identified, majority of the tools [13] were based on the DSM-IV classification of depression. The only tools that the researcher

managed to locate in the South African context were two online questionnaires currently available on an NGO website (see http://sadag.org/images/pdf/sphere_questionnaire.pdf and http://sadag.org/index.php?option=com_content&view=article&id=1877&Itemid=142). The NGO uses the SPHERE questionnaire (Somatic and Psychological Health Report Questionnaire) and the Zung Self-Rating Depression Scale. There are no published psychometric properties for either instrument for the South African population.

**Discussion**

This systematic review aimed to determine if there is an appropriate online depression screening tool for use in the South African context either in the primary healthcare sector or by the general public. Of the 17 articles included in the study only 7 articles reported psychometric properties for an online based depression screening tool. In addition, only one article out of the 17 articles targeted a global internet population when screening for depression. The remainder of the studies targeted very specific populations (college students, primary care patients as well as individuals diagnosed with depression).

The most commonly used online depression screening tools were the PHQ-9, CES-D and the BDI-II. These results are in concordance with the most common paper-based depression screening tools as noted by Smarr and Keefer. [5] In addition, despite being one of the most commonly used paper and online depression screening tool, only one article reported psychometric properties for the PHQ-9 on the general population.

The CES-D and BDI-II have been validated and compared to the paper-based version of the tool. As described by Buchanan [20], it cannot be taken for granted that the properties for the online and paper versions of an assessment tool are the same. However, contradictory to Buchanan [20], reliability properties comparison of results of the CES-D and the BDI-II online versus paper versions of these tools highlight very similar if not the same psychometric properties. However, when looking at the validity properties of the CES-D, it should be noted that the sensitivity is elevated and the specificity values are lowered

significantly for the online version of the tool [31] when compared to the paper based version. [10] These results could possibly be attributed to authors having selected a very specific target population when validating these screening tools, therefore highlighting a need for an online depression screening to be designed with a specific target population in mind.

The screening tools which were not among the commonly utilised depression screening tools showed relatively high psychometric properties, however, one should again be mindful of the fact that these tests were targeted to a very specific population and these results cannot be generalised to the general population. Finally, all of the screening tools utilised were based on the DSM IV criteria and the articles included no discussion on the cross-cultural utility of the instruments.

**Conclusion**

Based on these results, it is evident that a space exists for an online depression screening tool specifically for the South African context. Given the more than adequate psychometric properties exhibited by the tools, it is recommended that the online screening tool be adapted from the three most commonly used tools: PHQ-9, CES-D as well as the BDI-II. The items in these tools will have to be assessed for cross cultural applicability and linguistic appropriateness. Further the ethics of online screening for MDD will have to be further explored together with issues around the accuracy and privacy of individual outcomes on online MDD screening. Given the accessibility of such tools to a global population, there will be a need to clearly state the intended target population for the screening tool.

**References**

1. World Health Organisation. (2017). Depression: Fact sheet. Retrieved July 06, 2017, from: http://apps.who.int/iris/bitstream/10665/254610/1/WHO-MSD-MER-2017.2-eng.pdf.
2. Ferrari AJ, Charlson FJ, Norman RE, Patten SB, Freedman G, Murray CJL, et al. Burden of Depressive Disorders by Country, Sex, Age, and Year: Findings from the Global Burden of Disease Study 2010. PLOS Med. 2013 Nov 5;10(11):e1001547.
3. Kerr LK, Kerr LD. Screening tools for depression in primary care. West J Med. 2001 Nov;175(5):349–52.
4. Ali G-C, Ryan G, Silva MJD. Validated Screening Tools for Common Mental Disorders in Low and Middle Income Countries: A Systematic Review. PLOS ONE. 2016 Jun 16;11(6):e0156939.
5. Smarr KL, Keefer AL. Measures of depression and depressive symptoms: Beck Depression Inventory-II (BDI-II), Center for Epidemiologic Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire-9 (PHQ-9). Arthritis Care Res. 2011 Nov 1;63(S11):S454–66.
6. Nabbe P, Reste JYL, Guillou-Landreat M, Perez MAM, Argyriadou S, Claveria A, et al. Which DSM validated tools for diagnosing depression are usable in primary care research? A systematic literature review. Eur Psychiatry. 2017 Jan 1;39:99–105.
7. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders [Internet]. Fifth Edition. American Psychiatric Association; 2013 [cited

2019 Jan 3]. Available from: https://psychiatryonline.org/doi/book/10.1176/appi.books.9780890425596

8. Gotlib IH, Hammen CL. Handbook of Depression, Second Edition. Guilford Press; 2008. 721 p.
9. Crawford TA, Lipsedge M. Seeking help for psychological distress: The interface of Zulu traditional healing and Western biomedicine. Ment Health Relig Cult. 2004;7(2):131–48.
10. Smit J, Myer L, Middelkoop K, Seedat S, Wood R, Bekker L-G, et al. Mental health and sexual risk behaviours in a South African township: A community-based cross-sectional study. Public Health. 2006 Jun;120(6):534–42.
11. Kagee A, Nel A, Saal W. Factor structure of the Beck Depression Inventory-II among South Africans receiving antiretroviral therapy. AIDS Care. 2014 Feb 1;26(2):257–62.
12. Baron EC, Davies T, Lund C. Validation of the 10-item Centre for Epidemiological Studies Depression Scale (CES-D-10) in Zulu, Xhosa and Afrikaans populations in South Africa. BMC Psychiatry. 2017 Jan 9;17(1):6.
13. Makhubela M., Mashegoane S. Validation of the Beck Depression Inventory–II in South Africa: factorial validity and longitudinal measurement invariance in university students. South Afr J Psychol. 2016 Jun 1;46(2):203–17.
14. NW 1615 L. St, Washington S 800, Inquiries D 20036 U-419-4300 | M-419-4349 | F-419-4372 | M. Information Searches That Solve Problems | Pew Research Center [Internet]. 2007 [cited 2018 Nov 13]. Available from: http://www.pewinternet.org/2007/12/30/information-searches-that-solve-problems/

15. Morahan-Martin JM. How Internet Users Find, Evaluate, and Use Online Health Information: A Cross-Cultural Review. Cyberpsychol Behav. 2004 Oct 1;7(5):497–510.

16. Barney LJ, Griffiths KM, Christensen H, Jorm AF. Exploring the nature of stigmatising beliefs about depression and help-seeking: Implications for reducing stigma. BMC Public Health. 2009 Feb 20;9(1):61.

17. Africa SS. General Household Survey, 2016 | Statistics South Africa [Internet]. [cited 2018 Nov 13]. Available from: http://www.statssa.gov.za/?p=9922

18. the MHaPP Research Programme Consortium, Lund C, Kleintjes S, Kakuma R, Flisher AJ. Public sector mental health systems in South Africa: inter-provincial comparisons and policy implications. Soc Psychiatry Psychiatr Epidemiol. 2010 Mar;45(3):393–404.

19. Renton T, Tang H, Ennis N, Cusimano MD, Bhalerao S, Schweizer TA, et al. Web-based intervention programs for depression: a scoping review and evaluation. J Med Internet Res. 2014 Sep 23;16(9):e209.

20. Buchanan T. Internet-based Questionnaire Assessment: Appropriate Use in Clinical Contexts. Cogn Behav Ther. 2003 Jan;32(3):100–9.

21. Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies: A typology of reviews, *Maria J. Grant & Andrew Booth*. Health Inf Libr J. 2009 Jun;26(2):91–108.

22. Uman LS. Systematic Reviews and Meta-Analyses. J Can Acad Child Adolesc Psychiatry. 2011 Feb;20(1):57–9.

23. Moher D, Liberati A, Tetzlaff J, Altman DG, Group TP. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLOS Med. 2009 Jul 21;6(7):e1000097.

24. Fowler, R. D. (1985). Landmarks in computer-assisted... - Google Scholar [Internet]. [cited 2019 Jan 3]. Available from: https://scholar.google.co.za/scholar?hl=en&as_sdt=0%2C5&q=Fowler%2C+R.+D.+%281985%29.+Landmarks+in+computer-assisted+psychological+assessment.+Journal+of+Consulting+and+Clinical+Psychology%2C+53%286%29%2C+748.&btnG=

25. Elo S, Kyngäs H. The qualitative content analysis process. J Adv Nurs. 2008;62(1):107–115.

26. casp. CASP Checklists [Internet]. CASP - Critical Appraisal Skills Programme. [cited 2018 Nov 13]. Available from: https://casp-uk.net/casp-tools-checklists/

27. Harvey SB, Glozier N, Henderson M, Allaway S, Litchfield P, Holland-Elliott K, et al. Depression and work performance: an ecological study using web-based screening. Occup Med Oxf Engl. 2011 May;61(3):209–11.

28. Krog MD, Nielsen MG, Le JV, Bro F, Christensen KS, Mygind A. Barriers and facilitators to using a web-based tool for diagnosis and monitoring of patients with depression: a qualitative study among Danish general practitioners. BMC Health Serv Res. 2018 Jun 27;18(1):503–503.

29. Spek V, Nyklíček I, Cuijpers P, Pop V. Internet administration of the Edinburgh Depression Scale. J Affect Disord. 2008 Mar;106(3):301–5.

30. Holländare F, Andersson G, Engström I. A Comparison of Psychometric Properties Between Internet and Paper Versions of Two Depression Instruments (BDI-II and MADRS-S) Administered to Clinic Patients. J Med Internet Res [Internet]. 2010 Dec 19 [cited 2018 Oct 31];12(5). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3057311/

31. Herrero J, Meneses J. Short Web-based versions of the perceived stress (PSS) and Center for Epidemiological Studies-Depression (CESD) Scales: a comparison to pencil and paper responses among Internet users. Comput Hum Behav. 2006 Sep;22(5):830–46.

32. Williams A, Larocca R, Chang T, Trinh N-H, Fava M, Kvedar J, et al. Web-based depression screening and psychiatric consultation for college students: a feasibility and acceptability study. Int J Telemed Appl. 2014 Jan 1;2014:580786–580786.

33. Jeong Youn S, Trinh N-H, Shyu I, Chang T, Fava M, Kvedar J, et al. Using online social media, Facebook, in screening for major depressive disorder among college students. Int J Clin Health Psychol [Internet]. 2013 [cited 2018 Oct 31];13(1). Available from: http://www.redalyc.org/resumen.oa?id=33725623009

34. Lee J-S, Jeong B. Having mentors and campus social networks moderates the impact of worries and video gaming on depressive symptoms: a moderated mediation analysis. BMC Public Health. 2014 May 5;14:426–426.

35. Du N, Yu K, Ye Y, Chen S. Validity study of Patient Health Questionnaire-9 items for Internet screening in depression among Chinese university students. Asia-Pac Psychiatry Off J Pac Rim Coll Psychiatr. 2017 Sep;9(3).

36. Leykin Y, Muñoz RF, Contreras O. Are Consumers of Internet Health Information "Cyberchondriacs"? Characteristics of 24,965 Users of a Depression Screening Site. Depress Anxiety 1091-4269. 2012 Jan;29(1):71–7.

37. Lup K, Trub L, Rosenthal L. Instagram #instasad?: exploring associations among instagram use, depressive symptoms, negative social comparison, and strangers followed. Cyberpsychology Behav Soc Netw. 2015 May;18(5):247–52.

38. Donker T, van Straten A, Marks I, Cuijpers P. Brief self-rated screening for depression on the Internet. J Affect Disord. 2010 May;122(3):253–9.

39. Lin C-C, Bai Y-M, Liu C-Y, Hsiao M-C, Chen J-Y, Tsai S-J, et al. Web-based tools can be used reliably to detect patients with major depressive disorder and subsyndromal depressive symptoms. BMC Psychiatry [Internet]. 2007 Dec [cited 2018 Sep 29];7(1). Available from: http://bmcpsychiatry.biomedcentral.com/articles/10.1186/1471-244X-7-12

40. Lin CC, Li YC, Bai YM, Tsai SJ, Hsiao MC, Wu CH, et al. The validity of an Internet-based Self-assessment Program for Depression. AMIA Annu Symp Proc AMIA Symp. 2003;911–911.

41. Gill S, Contreras O, Muñoz RF, Leykin Y. Participant retention in an automated online monthly depression rescreening program: patterns and predictors. Internet Interv Appl Inf Technol Ment Behav Health. 2014 Mar;1(1):20–5.

42. Moreno MA, Christakis DA, Egan KG, Jelenchick LA, Cox E, Young H, et al. A Pilot Evaluation of Associations Between Displayed Depression References on Facebook and Self-reported Depression Using a Clinical Scale. J Behav Health Serv Res. 2012 Jul 1;39(3):295–304.

43. Garlow SJ, Rosenberg J, Moore JD, Haas AP, Koestner B, Hendin H, et al. Depression, desperation, and suicidal ideation in college students: results from the American Foundation for Suicide Prevention College Screening Project at Emory University. Depress Anxiety. 2008 Jun 1;25(6):482–8.

44. Moreno MA, Jelenchick L, Koff R, Eickhoff J. Depression and internet use among older adolescents: An experience sampling approach. Psychology. 2012 Sep;3(9A):743–8.

45. Liu NH, Contreras O, Muñoz RF, Leykin Y. Assessing suicide attempts and depression among Chinese speakers over the Internet. Crisis. 2014;35(5):322–9.

# Chapter Five: The ethics of online screening for mental health in South Africa: A systematic review

## 5.1 Introduction

Prior to adapting an online depression screening tool, I considered the various ethical principles associated with placing a mental health screening tool in the online environment. Hence, the second phase of the study set out to answer the following research question:

*What are the ethical guidelines involved in designing an online depression screening tool?*

Through a systematic review, as described in this article, it was evident that online mental health screening involves various risks to the end-user and thus a psychological screening tool would need ethical guidelines. The article highlights the lack of a formal document that can be utilised as a guideline for individuals developing an online psychological screening tool in South Africa.

Results from this paper were used to develop a formal set of ethical guidelines for online mental health screening tools (see Appendix G). The guidelines were used to ensure that the online adaptation of the tool and the website adhered to the various ethical guidelines described in the article (see Chapter Six for a detailed description of the tool and website development). With regards to the screening tool, items were free from any psychological jargon, suicide items were removed and the instant feedback provided was phrased in a manner that encourages self-help seeking behaviour. In addition, the instant feedback provides the individuals with a risk assessment and contact information to seek further help. The website adhered to the following ethical principles developed: minimal harm to participants and data security.

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**The ethics of online screening for mental health in South Africa: A systematic review**

T. Hassem* & S. Laher

Abstract

Mental health care in many low to middle-income countries like South Africa is often under resourced. Many individuals in these countries have access to the internet and often use this as a first source to search for information. Hence the possibility for online screening of mental illnesses holds the promise of early detection and intervention. However, there are no clear guidelines for the ethics of online screening for mental illnesses. This study aims to explore the literature in an attempt to explore existing guidelines on online screening with a view to formulating recommendations for a more universally applicable standard for online screening of mental illness. A systematic review method was used to explore the literature. Articles were obtained from six electronic databases from 1970-2019. Through the use of the PRISMA method twelve articles met the inclusion criteria. There was only one article that made specific reference to ethical considerations regarding online screening instruments, whilst the remaining 11 made reference to some pertinent ethical considerations for online screening of mental illness. Using a thematic analysis, six core themes were identified across the articles which covered online screening, namely modes of tests, psychometric properties of the tool, issues of consent, accuracy of results, feedback and test security. These were aspects that needed to be addressed over those already in place

[3] See Appendix K.

for pen-and-paper screening tools. The results are used to provide recommendations for ethical guidelines for the online screening of mental illnesses.

**Keywords:** Assessment, ethics, mental health, online assessment, psychological testing, screening

## Background Literature

According to the Global Burden of Disease (GBD) Study in 2017, for over 3 decades mental disorders accounted for over 14% of the years lost due to disability (YLDs). Prevalence rates for mental disorders are over 10% in all GBD regions (GBD 2017 DALYs and HALE Collaborators, 2018). In South Africa the lifetime prevalence of a mental disorder was 30. 3% in 2009 (Herman et al., 2009). Mental healthcare in South Africa is limited as a result of a shortage of practising mental health professionals and limited mental health facilities and finance (Burns, 2011; Lund, Petersen, Kleintjes, & Bhana, 2012). In a country like South Africa where access to mental health care and resources are limited (Lund, Kleintjes, Kakuma, Flisher, & the MHaPP Research Programme Consortium, 2010) and internet access is on the rise, it would be sensible to explore opportunities for using online media to promote mental health.

The penetration of the World Wide Web has increased substantially in the last decade and South Africa is no exception. In 2017, 61.8% of households in South Africa had at least one family member who had access to the internet and 56.9% of South Africans had mobile internet access (*Statistical release*, 2017). These statistics highlight one of the ways that an online medium may be used in this context of decreasing resources is for mental health screening. The possibility for online screening of mental illnesses holds the promise of early

detection and intervention. However, this shifts the typical face-to-face interaction between the trained professional and client to an online environment where a trained professional may not be physically present. Given this, it is vital that the ethical considerations associated with this new space be explored. The literature review that follows presents clarity on the terms used in the field and delineates the boundaries used for the systematic review. This study proceeded with a systematic review to explore the literature for guidance in terms of the online screening for mental health.

**Distinguishing between psychological testing, assessment and screening and computerised versus online assessments**

According to the International Test Commission (ITC) (Barak & Buchanan, 2004) (ITC, 2005), there is no single definition for a psychological test. A psychological test is inclusive of any procedures which involve educational, occupational and psychological assessment as well as the measurement of dysfunctional (abnormal) or normal behaviours. These procedures are designed to be administered under standardised or controlled conditions and have a standardised scoring protocol. The procedures allow for inferences to be drawn based on sample behaviours which act as performance measures. Psychological assessment refers to integration and administration of psychological measures (tests and screening tools) as well as other information for the purpose of making a decision or reaching conclusions (Foxcroft & Roodt, 2018). Computerised psychological tests are both administered and scored using a computer (Davies, Foxcroft, Griessel & Tredoux, 2013). Online psychological tests refer to a psychological test that is delivered on the internet where the test administration is located on a server found on the internet and not the computer (Tredoux, 2013). The test-taker submits their responses via a click of a button and feedback can either be sent directly

to the test-taker or to a registered psychologist (Barak & Buchanan, 2004). This study focusses on online screening tests. Online screening refers to a test or instrument (usually a questionnaire) which has been validated in certain populations to screen for the possible presence of a specific mental health condition, administered online. Online screening tests are low stakes tests which comprise of personality tests, intelligence tests, screening tests (for example anxiety or depression) as well as career interest tests (Barak & Buchanan, 2004; Naglieri et al., 2004, 2008).

**The pros and cons of online assessments**

The rapid growth in the use of online assessments can be attributed to the many advantages of this testing modality. The tests are convenient to administer as the test-taker can take the test in the comfort of their homes at a time that is convenient to them. These tests are low costing which increases the accessibility of the tests (rural areas). Human errors in scoring online psychological tests are no longer a factor and thus increase the accuracy of test scores and interpretation. Scores are also saved and can be accessed for research or clinical purposes at any given time (Barak & Buchanan, 2004; Barak & English, 2002; Naglieri et al., 2004). Lastly, when comparing online versus pen-and-paper psychological tests on psychometric properties and the role of the mode of administration in facilitating faking, negligible differences have been observed (Grieve & de Groot; 2011; Hassem & Laher, 2019; Bagby, Ayearst, Morariu, Watters & Taylor, 2014).

Despite the multiple benefits of online psychological testing, concerns have been raised regarding the disadvantages of this test modality. The convenience of taking a psychological test presents with a major disadvantage relating to the standardised environment of test-taking (Buchanan, 2002). In addition, the test-taker authentication is also

questionable and opens the room for cheating to occur (Buchanan, 2002). Testing online is not regulated. The online testing environment is unique in that there is no face-to-face contact with the practitioner and feedback is often not possible (Buchanan, 2002).

**The South African landscape/context**

The disadvantages indicated are exacerbated given the unique history of psychological testing in South Africa which leaves a sizeable number of the South African population not trusting assessments (see Laher & Cockcroft, 2014). This is coupled with mental health information and resources on the internet not always being developed by professionals in the field. Hence there is a pressing need for online psychological tests to meet various ethical standards set by local as well as internationally recognised institutions. Currently in South Africa ethical codes of conduct for psychological tests and assessments have been established by the Health Professions Council of South Africa (HPCSA), the Health Professions Act No. 56 of 1974 (Chipise, Wassenaar, & Wilkinson, 2018; Evans, 2018), as well as the Employment Equity Act No. 55 of 1998. Only the Health Professions Act makes mention of internet testing in section 44 (7) and section 46 (6 a and b). These sections state:

> Section 44. (7)
> "When such assessments are used, the practitioner must declare this and appropriately limit the nature and extent of his or her findings."
> Section 46 (6)
> "This is relevant to the use of all computerised assessments and computer-generated reports."
> "Informed consent must be obtained for automated and internet-based testing, even when this testing is done for the purpose of a job application."

In an attempt to develop ethical guidelines for online psychology in South Africa, two

key recommendations need to be noted (Chipise et al., 2018; Evans, 2018). Evans (2018) provides a brief set of guidelines for telepsychology in South Africa, whereas the guidelines developed by Chipise et al. (2018) have been specifically adapted for online therapy. Both guidelines were adapted and developed from internationally recognised bodies, namely, the American Psychological Association and the Australian Psychological society. Both recommendations only briefly mention online psychological assessments. Evans (2018) makes mention of psychological assessment in terms of maintaining the integrity of the test as well as the risks associated with online testing. Chipise et al. (2018) makes mention of online assessment under the guidelines for informed consent as well as a statement on a psychologists' using a reliable and valid online assessment.

From the studies conducted by Chipise et al. (2018) and Evans (2018), it can be assumed that an online psychological screening test would be included in "assessment". However, there is no specific information provided in these guidelines which separate screening and assessments conducted online. There is also no reference to interpersonal elements (or lack thereof) associated with providing a mental health assessment screening result online using a self-administered instrument. Thus, this study seeks to explore the literature to determine whether any guidelines are available for the online screening of mental health, the nature of these guidelines and if any recommendations can be made for the online screening of mental health.

## Methods

A systematic review was the chosen method of enquiry of qualitative, quantitative as well as theoretical papers for this study. This method reduces the chances of a biased synthesis of literature on a specific topic. This is achieved through a detailed account of the plan and

search strategy utilised prior to the research being conducted (Uman, 2011). This study utilised the eight step procedure recommended by Uman (2011) for conducting the systematic review. Stages one to three will highlight the systematic review methodology; formulating the research question, defining the inclusion and exclusion criteria and developing a search strategy. Stages four to eight relate to the results of the systematic review; study selection, data extraction, study quality assessment, analysis and interpretation of the results and lastly dissemination of the findings.

**Inclusion and exclusion criteria:**

Literature was included for analysis if it met the following criteria:

Ethical considerations for online screening or assessments were discussed in relation to screening or diagnosis;

Articles needed to be written in English;

Articles were published from 1970 to 2019. This timeframe was chosen as the first large scale online testing and interpretation of psychological assessments can be traced back to the early 1970s (see Fowler, 1985);

Articles which discussed online psychological intervention but made no reference to online testing, screening or assessment as well as articles which discussed computerised assessment or telepsychology without the mention of online/internet tests or assessments were excluded from the study. In addition, articles which provided guidelines which made reference to another source with regards to online screening, assessments or tests were excluded. The original source was obtained and examined for relevant information on the ethics of online screening of mental health.

**Locating the literature**

The following search engines were selected as they provide international and African focused multi and interdisciplinary scholarly literature: EBSCOHost: Academic Search Ultimate, Psychological and Behavioural Sciences Collection, PsychInfo, PubMed as well as Sabinet.

**Search strategy**

An initial search was conducted utilising specific boolean functions on the various databases (see table 1). Once articles were located, reference lists of the articles were screened to search for relevant literature. Grey literature particularly ethical guidelines or codes developed by research or professional institutions were also examined.

Table 1: Search terms utilised

| | |
|---|---|
| **Initial search terms** | Ethics of online psychological screening, Ethics of psychological assessment, Internet ethics of psychological assessment, Internet psychological assessment ethical principles, and Online psychological assessment ethical consideration |
| **Search terms with specific boonlean functions** | Ethic* OR “Ethical Principles” OR “Ethical considerations” |
| | AND |
| | “online” OR “Internet” OR “Web-based” |
| | AND |
| | “Screening” OR “Assessment” |
| | AND |
| | “Mental Health” OR “Mental Illness” OR “Psychopathology” OR “Psychological” |

All twelve articles located for the study were theoretical. In order to critically appraise the included articles a critical appraisal tool was developed for theoretical papers as a tool

could not be located. The tool was adapted from the Critical Appraisal Skills Programme (CASP) checklist for qualitative studies (Critical Appraisal Skills Programme, 2017). The tool comprised of the following six questions:

(1) Was it a theoretical paper?

(2) Was there a clear statement of aims for the paper?

(3) Did the paper appropriately address the research aims?

(4) Was appropriate literature cited or drawn on to answer the research aims?

(5) Were experts in the field consulted or internationally recognised bodies cited?

(6) Is there a clear statement of findings?

All twelve articles included in the study received a maximum appraisal score of six.

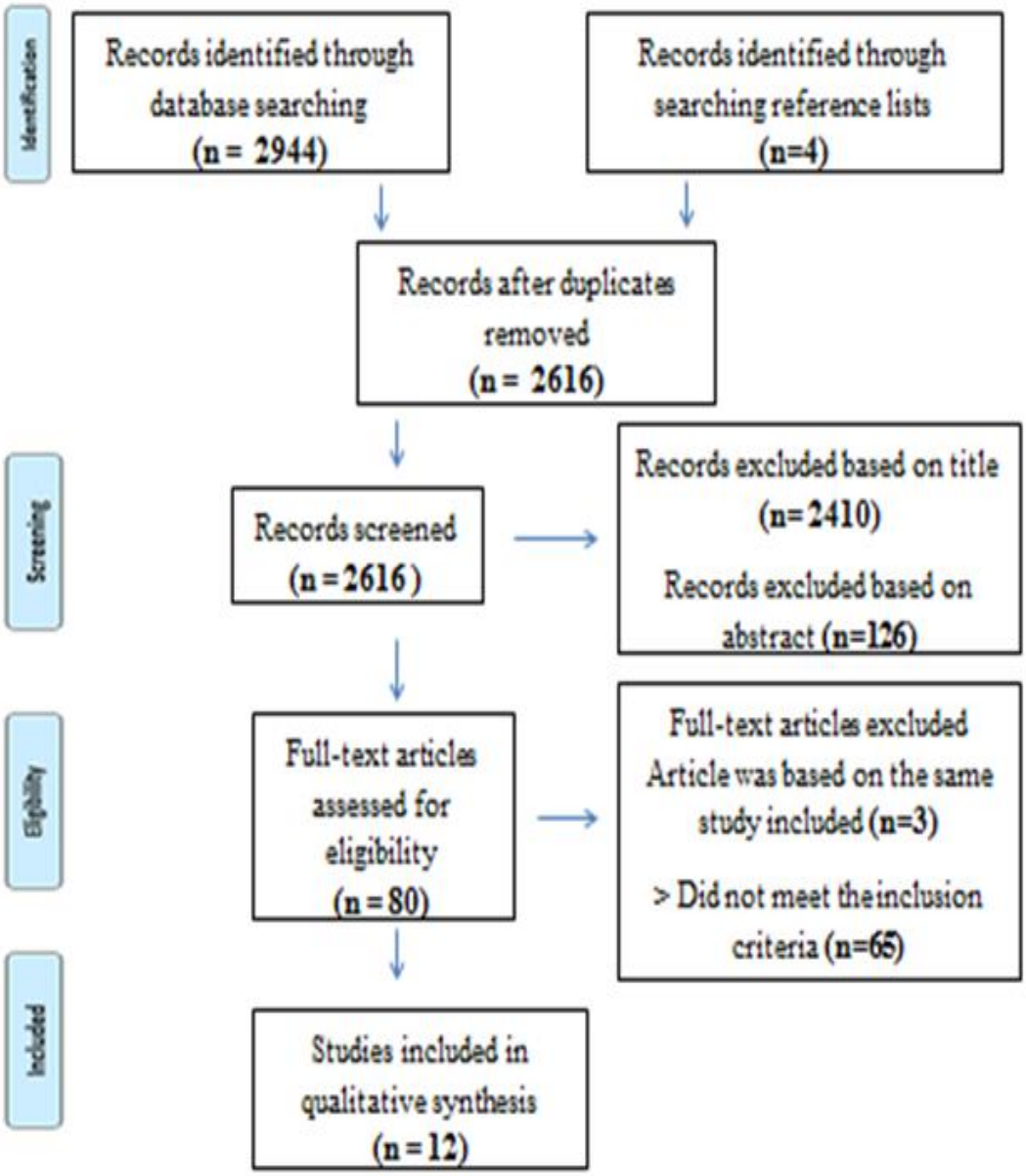
**Analysis**

Both authors were actively involved in the data analysis by using the six steps of thematic analysis as described by Braun and Clarke (2006). Authors first familiarised themselves with the extracted data, which was then coded. Initial themes were developed together by both authors. Each theme was reviewed, defined and named as a collective exercise by both authors. Coding was guided by the need to thematically represent and authenticate the data through a cyclic process of coding, adjusting and re-coding which was conducted by both researchers.

## Results

The PRISMA statement of guidelines for conducting and reporting systematic reviews was adhered to for the article selection process (Moher, Liberati, Tetzlaff, Altman, & Group, 2009). A total of 2948 articles were identified from the databases, reference lists as well as

grey literature searches. After the removal of duplicate articles, a total of 2616 article were screened. 2410 articles were excluded based on title screening and 126 were excluded based on abstract screening using the specified inclusion and exclusion criteria. 80 articles were eligible for inclusion in the study. Of the 80 full-texted articles screened, a total of 12 articles




were included for analysis as per the inclusion criteria (See figure 1.).

Figure 2: PRISMA flow diagram for articles included and excluded

Table 2: Article description

| Author | Date of publication | Title |
|---|---|---|
| Australian Psychological Society | 2018 | Online psychological testing |
| Barak & Buchanan | 2004 | Internet-based psychological testing and assessment |
| Bartram | 2006 | The internationalization of testing and new models of testing delivery on the internet |
| Buchanan | 2002 | Online assessment: Desirable or dangerous? |
| Butcher, Perry & Hahn; Butcher | 2003, 2004 | Computers in clinical assessment: historical developments, present status, and future challenges |
| Evans | 2018 | |
| Fisher & Fried | 2003, 2008 | Internet-mediated psychological services and the APA ethics code |
| International test commission | 2005 | ITC guidelines on computer-based and internet delivered testing |
| Joint task force for the development of technology guidelines for psychologists | 2013 | Guidelines for the practice of telepsychology |
| Kier & Molinari | 2004 | Do-It-Yourself testing for mental illness: Ethical issues, concerns and recommendations |
| Luxton, Pruitt & Osenbach | 2016 | Best practices for remote psychological assessment via telehealth technologies |
| Naglieri et al. | 2004, 2008 | Psychological testing on the internet |

Of the twelve articles which met the inclusion criteria, three articles provided guidelines for internet testing (APS, 2018; Evans, 2018; ITC, 2005), whereas the remaining nine articles (Barak & Buchanan, 2004; Bartram, 2006; Buchanan, 2002; Butcher et al., 2004;

Fisher & Fried, 2003, 2008; Joint Task Force, 2013; Kier & Molinari, 2004; Luxton et al., 2016; Naglieri et al., 2004, 2008) highlighted ethical considerations which need to be taken into account when testing on the internet. It should be noted that all articles included referred to the term's psychological "assessment" or "testing". Keir and Molinari (2004) were the only authors who specifically focussed on "screening" tests. Papers written by Barak and Buchanan (2004); ITC (2005) and the Joint Task Force (2013) made mention of the availability of screening tests online but no further explanation was given.

All authors suggest that psychological guidelines developed for normal pen-paper tests should be adhered to and highlighted additional guidelines and considerations unique to internet testing. Barak and Buchanan (2004), Butcher et al. (2004), Kier and Molinari (2004), Luxton et al. (2016), as well as Naglieri et al. (2004, 2008) highlight that online psychological testing currently does not adhere to the all guidelines for psychological testing and therefore called for the development of formal guidelines specific to internet testing.

Through a thematic analysis of the twelve included articles, six core themes emerged, namely, modes of tests, psychometric properties of the tool, consent, accuracy of test results, feedback, and test security.

**Modes of tests**

Modes of tests were only specifically mentioned in the ITC guidelines (2005), the APS online testing guidelines (2018) and the article by Bartram (2006). Modes of tests are set characteristics that distinguish various types of psychological tests on the internet and can be one of four types, namely; open, controlled, supervised as well as managed mode.

An open test is available to any individual surfing the internet, requires no supervision and therefore the environmental condition of testing cannot be standardised or guaranteed. A controlled test is available to tests–takers which are known, therefore requiring a unique

username and login details. However, there is no supervision required. Supervised tests require an administrator to login the test-taker and confirm that test administration requirements were met. Therefore, allowing the test-taking conditions to be controlled through some level of direct supervision. Lastly, the identity of the test-taker can be validated. Managed tests are mostly administered in testing centres where a high level of supervision and control over the test taking conditions is required.

The remainder of articles have not explicitly mentioned modes of tests but do make reference to the test mode characteristics described above (see Barak & Buchanan, 2004; Evans, 2018; Fisher & Fried, 2003, 2008; Joint Task Force, 2013; Kier & Molinari, 2004; Luxton et al., 2016; Naglieri et al., 2004, 2008;). Barak and Buchanan (2004), Butcher et al. (2004), Joint Task Force (2013) and Naglieri et al. (2004, 2008) mention test items security; however, the level of test security is dependent on the mode of test.

Articles written by Barak and Buchanan (2003), Evans (2018), Fisher and Fried (2003, 2008), Joint Task Force (2013), Luxton et al. (2016) and Naglieri et al. (2004, 2008) all make reference to the adherence of the test administration procedures; however, these are dependent on the specified mode of test. In addition, phrases used such as “remote administration”, (Luxton et al., 2016, p.28) “nonproctored assessment situations”, (Barak and Buchanan, 2004, p.228)” unproctored fashion”, (APS, 2018) “proctored test environments” (Naglieri et al., 2004, p. 158) all highlight the level of control or supervision of the testing environment.

It is therefore necessary for the mode of test to be described prior to developing an online psychological test. Screening instruments as defined in this study would be described as open tests. Hence ethical guidelines pertaining to open tests are addressed in this paper.

**Psychometric properties of the test**

The theme of psychometric properties is evident all articles with the exception of the article written by Bartram (2006). All the recommendations made place emphasis on online tests demonstrating properties of reliability and validity prior to being placed online for usage and screening tools are no exception. Hence ethically establishing the psychometric properties of the screening tool would be a core requirement.

As a result of the impersonal nature for taking an online psychological test, the conditions in which the test is taken plays a significant role in maintaining the integrity of the psychometric properties of the test (Barak & Buchanan, 2004; Joint Task Force, 2013; Luxton et al., 2016) as well as the interpretation of results (Fisher & Fried, 2003, 2008). Hence environmental distractions such as cell-phones, friends or family, pets in the same room, loud noises as well as assistance should be minimal in order to preserve the test administration conditions (APS, 2018; ITC, 2005; Joint Task Force, 2013; Luxton, et al., 2016). Luxton et al. (2016), Joint Task Force (2013), Naglieri et al. (2004, 2008) and Evans (2018) recommend that a statement regarding optimal testing conditions should be provided to the test taker in order to ensure minimal distractions.

ITC (2005), Butcher et al. (2004) and the Joint Task Force (2013) highlight the need for establishing norms that are specific to the online test administration. However, with regards to screening tests individual scores are compared to established cut-off scores derived from the development of the instrument and not to population norms. The test developers need to be aware of the diverse population on the internet and therefore specifically state if the test is country specific or an internationally applicable test (Buchanan, 2002; Joint Task Force, 2013; ITC, 2005; Luxton et al., 2016).

**Informed consent and user authentication**

Five articles make specific mention of informed consent with regards to testing (APS, 2018; Fisher & Fried, 2003, 2008, Kier & Molinari, 2004; Naglieri et al., 2004, 2008). As a result of the impersonal nature of online testing, obtaining informed consent is especially difficult for the open mode of testing (Bartram, 2006; Naglieri et al., 2004, 2008). With regards to the open test mode, an individual could pose as 18 years and older and provide consent when in fact he or she is a minor. In addition, one cannot be guaranteed that the individual taking the test is in fact the individual who has provided informed consent (Fisher & Fried, 2003, 2008; Bartram, 2006; Naglieri et al., 2004, 2008).

It has been recommended when obtaining informed consent, the test user is provided with all information regarding the purpose of the test as well as the risks to confidentiality (Fisher & Fried, 2003, 2008; Naglieri et al, 2004, 2008). This information should be provided in a language that is simple and easily understood (Fisher & Fried, 2003, 2008; Kier & Molinari, 2004). Kier and Molinari (2004) mention that fact that test jargon should be avoided, they specifically mention that the term "screening" needs to be clearly explained.

The ITC (2005) guidelines, APS (2018) as well as Bartram (2006) make specific mention to user authentication in relation to modes of test. Control over user authentication can be obtained in all modes of testing except in an open test (ITC,2005; Bartram, 2006). User authentication ensures that cheating on the test does not occur. However, in the context of mental health screening, cheating is not an issue.

**Feedback and accuracy of results**

Screening tests as indicated in this paper would require immediate scoring and feedback. The feedback provided needs to be valid and reliable (Fisher & Fried, 2003, 2008) and therefore is dependent on the accuracy of the results. The accuracy of the test results cannot typically

be separated from the testing conditions as well as the target population of the test (Barak & Buchanan, 2004; Fisher & Fried, 2003, 2008; Joint Task Force, 2013; ICT 2005; Naglieri et al., 2004, 2008). This adds further to the importance of establishing the psychometric properties of the online instrument.

Additionally the online format of psychological testing is impersonal. Therefore providing feedback should be approached with caution as it relates to minimising harm (Barak & Buchanan, 2004; Kier & Molinari, 2004; ITC, 2005; Naglieri et al., 2004, 2008). Positive feedback may lead to the test-taker searching the internet for more information regarding the illness resulting in the possibility of inaccurate information being identified (Kier & Molinari, 2004). As a result of not being able to determine the mental or emotional state of the test-taker negative feedback could exacerbate the situation (Buchanan, 2002; ITC, 2005; Naglieri et al, 2004, 2008).

Naglieri et al. (2004, 2008) and Kier and Molinari (2004) suggest when feedback is made available via the internet it should be minimal. The feedback should direct the test-taker to reliable psychological services (contact numbers and website links) for seeking help and further information (Kier & Molinari, 2004; ITC, 2005; Naglieri et al., 2004, 2008). Kier and Molinari (2004) suggest that a statement be made that a false-positive result can be obtained on the test as a result of an existing illness.

**Security**

Test security was identified in all articles with the exception of APS (2014), Luxton et al. (2016) and Fisher and Fried (2003, 2008). Test security was divided into two categories namely, test material as well as results (data). Security with regards to test material was

mentioned by Naglieri et al. (2004, 2008), Evans (2018), ITC (2005), Joint Task Force (2013), Bartram (2006). However, this is not a consideration for an open access screening instrument.

With regards to security of the test results or data obtained, test developers need to ensure that the site is secure and there is minimum risk to hacking of data (Barak & Buchanan, 2004; ITC, 2005 Kier & Molinari, 2004; Naglieri et al.,2004, 2008). Barak and Buchanan (2004) do highlight threats to security, however they suggest that the threat of a hacking is potentially low but do highlight that this is under researched.

**Discussion**

From the results it is evident that there are very few documents that speak specifically to ethical guidelines for online screening of mental health especially as it pertains to developing countries like South Africa. Across the sources located that discuss the ethics of online screening, it was possible to identify the core principles to consider with regards to the ethics of online screening of mental health. These are outlined hereunder.

Informed consent needs to be addressed**.** In the case of a webpage written consent cannot be obtained – consent is valid by virtue of checking a box at the end of the web page with information about the process preceding it. Consent may also be obtained by completion of several checkboxes to show understanding of informed consent. Failure to do so would ensure that an individual cannot continue onto the next page.

Information provided for consent purposes should state the nature/purpose of the test, specify who the target populations of the test are (country specific or international, age, if gender specific), the manner in which results will be obtained (see section for information specific to the test mode), the open access nature of the screening as well as the limitations of the screening. In relation to limitations, the test-taker should be aware that screening is not

fool proof; that screening is not diagnosis and confirmation can only be done by an appropriately trained healthcare professional. It is recommended that the time it will take for the test to be completed be specified, the manner in which responses should be completed as well as a statement regarding the adherence to instructions in order to ensure the most reliable and accurate test results and feedback. The possibility of false positives must also be clearly explained. If there are risks to confidentiality in terms of the test data, results and feedback, these should be explained as well as the steps taken by the developers to prevent this from occurring. The information provided should be free from field specific jargon.

The screening instrument needs to have followed a rigorous procedure for development supported by relevant psychometric information pertaining to the reliability and validity of the instrument. The populations for which the instrument is valid should be discussed as well as any limitations of the instrument. In addition, the user interface needs to be optimised for usage via various devices in order to ensure accuracy of results and feedback.

Feedback for online screening instruments should be informative but minimal and limited so that the potential negative effects of receiving a result pertaining to mental health are somewhat controlled. There is always the possibility of self-harm by individuals completing the screening. In the absence of identification, an individual who is potentially suicidal cannot be helped aside from details for a call centre. Ethical guidelines need to consider whether intervention beyond a call centre is possible and if so, what forms this can take. Typically, feedback should refer the test taker to various psychological services that would be accessible to them and which have been established to be reliable. The referral should be accompanied with contact numbers as well as website addresses. In cases where the screening instrument does detect a great potential for self-harm, individuals could be

asked to leave a number where s/he can be reached and informed that a self-help service will contact him/her. In such cases it does become paramount to specify the location for the website hosting the screening instrument. There are no international services that can do follow up calls as yet.

In order to ensure data security, the website should be secure to minimise the possibility of hacking. Generally screening instruments are anonymous, hence there is no user information collected other than location, search terms, IP addresses, etc that are routinely collected on the back end of a website. However, the website needs to keep this information safe and confidential. Routine backups should be done on the server.

There are other aspects identified in the literature pertaining to the ethics of online screening which are recommended in the literature but not necessary for screening instruments. As per the literature, there needs to be a clear statement regarding the type and mode of the test. Hence the open mode of the screening instrument should be clarified, that is, that the instrument is available to any individual on the internet and requires no supervision.

A detailed description of the ideal test taking conditions need to presented to the test taker. Typically this includes: the appropriate time for taking the test, the conditions under which the test should be taken (for example a quiet room that is well lit and also free from distractions such as friends, family, pets, loud noises, phones), if the test taker should be accompanied by someone when taking the test, time it will take for the test to be completing, manner in which responses should be completed as well as a statement regarding the adherence to instructions in order to ensure the most reliable and accurate test results and feedback.

However as screening instruments are open access with no comparison to population norms, the testing conditions do not have to be adhered to the at the same level as controlled tests. There is no need for strict standardised conditions.

**Conclusion**

This study utilised a systematic review method to determine whether any guidelines are available for the online mental health screening. Results obtained from this study revealed that currently there are no formal and specific guidelines for online mental health screening. Therefore, it is necessary given the global accessibility to mental health screening tools, that a formal set of guidelines for online screening to be developed. This review provides clear guidelines for issues to be addressed in ethical guidelines for online screening of mental health and marks an important first step towards making online screening of mental health responsible and ethical.

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**Reference list**

Australian Psychological Society (2018). *Online Psychological testing*. Retrieved 22 January, 2019, from https://www.psychology.org.au/APS/media/Resource-Finder/Testing/Online-psychological-testing.pdf

Bagby, R. M., Ayearst, L. E., Morariu, R. A., Watters, C., & Taylor, G. J. (2014). The Internet administration version of the 20-item Toronto Alexithymia Scale. *Psychological Assessment*, *26*(1), 16.

Barak, A., & Buchanan, T. (2004). Internet-based psychological testing and assessment. In R. Kraus, J. S. Zack, & G. Stricker (Eds.), *Online counseling: A handbook for mental health professionals.* (pp. 217–239). New York, NY: Elsevier Science. (2004-00189-011).

Barak, A., & English, N. (2002). Prospects and Limitations of Psychological Testing on the Internet. *Journal of Technology in Human Services*, *19*(2–3), 65–89. https://doi.org/10.1300/J017v19n02_06

Bartram, D. (2006). The Internationalization of Testing and New Models of Test Delivery on the Internet. *International Journal of Testing*, *6*(2), 121–131. https://doi.org/10.1207/s15327574ijt0602_2

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101.

Buchanan, T. (2002). Online assessment: Desirable or dangerous? *Professional Psychology: Research and Practice*, *33*(2), 148–154. https://doi.org/10.1037/0735-7028.33.2.148

Burns, J. K. (2011). *THE MENTAL HEALTH GAP IN SOUTH AFRICA – A HUMAN RIGHTS ISSUE*. 16.

Butcher, J. N., Perry, J., & Hahn, J. (2004). Computers in clinical assessment: Historical developments, present status, and future challenges. *Journal of Clinical Psychology*, *60*(3), 331–345. https://doi.org/10.1002/jclp.10267

Chipise, E., Wassenaar, D., & Wilkinson, A. (2018). Towards new ethics guidelines: The ethics of online therapy in South Africa. *South African Journal of Psychology*, 008124631881156. https://doi.org/10.1177/0081246318811562

Critical Appraisal Skills Programme. (2017). *CASP Qualitative Checklist.* Retrieved from http://www.casp-uk.net/checklists

Davies, C., Foxcroft, C., Griessel, L., & Tredoux. N. (2013). Computer-based and internet-delivered assessment. In C. Foxcroft, & G. Roodt (Eds.), *Introduction to psychological assessment in the South African context. (4th Edition). Cape Town: Oxford University Press. (ISBN 978-0-1990-4473-3)*.

DALY, G., & Collaborators, H. A. L. E. (2018). Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*, *392*(10159), 1859.

Department of Health (1974). Genreg 197(c): Rules of conduct pertaining specifically to the profession of psychology. *Health Professions Act No. 56*. Pretoria: Government of the Republic of South Africa.

Evans, D. J. (2018). Some guidelines for telepsychology in South Africa. *South African Journal of Psychology*, *48*(2), 166–170. https://doi.org/10.1177/0081246318757943

Fisher, C. B., & Fried, A. L. (2003). Internet-mediated psychological services and the American Psychological Association Ethics Code. *Psychotherapy: Theory, Research, Practice, Training*, *40*(1–2), 103–111. https://doi.org/10.1037/0033-3204.40.1-2.103

Fisher, C. B., & Fried, A. L. (2008). Internet-mediated psychological services and the American Psychological Association Ethics Code. In D. N. Bersoff (Ed.), *Ethical conflicts in psychology., 4th ed.* (pp. 376–383). Washington, DC: American Psychological Association. (2008-05541-084).

Fowler, R. D. (1985). Landmarks in computer-assisted psychological assessment. *Journal of Consulting and Clinical Psychology*, *53*(6), 748.

Foxcroft, C., & Roodt, G. (Gert. (2013). *FOXCROFT, C. & ROODT, G. (eds.) (2013). Introduction to psychological assessment in the South African context. (4th Edition). Cape Town: Oxford University Press. (ISBN 978-0-1990-4473-3)*.

Grieve, R., & De Groot, H. T. (2011). Does online psychological test administration facilitate faking?. *Computers in Human Behavior*, *27*(6), 2386-2391.

Hassem, T., & Laher, S. (2019). A systematic review of online depression screening tools for use in the South African context. *South African Journal of Psychiatry*, *25*(1), 1-8.

Health Professions Council of South Africa. (2008). *Guidelines for good practice in the health care professions: General ethical guidelines for health researchers.* Retrieved January 2, 2014, from http://www.hpcsa.co.za

Herman, A. A., Stein, D. J., Seedat, S., Heeringa, S. G., Moomal, H., & Williams, D. R. (2009). The South African Stress and Health (SASH) study: 12- month and lifetime prevalence of common mental disorders. *Anxiety Disorders*, *99*(5), 6.

International Test Commission (2005). International guidelines on computer-based and internet delivered testing. International Journal of Testing, 6(2), 143-172. Retrieved 22 January, 2019, from http://www.intestcom.org/files/guideline_computer_based_testing.pdf

Joint Task Force for the Development of Telepsychology Guidelines for Psychologists. (2013). Guidelines for the practice of telepsychology. *American Psychologist*, *68*(9), 791–800. https://doi.org/10.1037/a0035001

Kier, F. J., & Molinari, V. (2004). Do-It-Yourself Testing for Mental Illness: Ethical Issues, Concerns, and Recommendations. *Professional Psychology: Research and Practice*, *35*(3), 261. https://doi.org/10.1037/0735-7028.35.3.261

Laher, S., & Cockcroft, K. (2014). Psychological assessment in post-apartheid South Africa: The way forward. *South African Journal of Psychology*, *44*(3), 303-314.

Lund, C., Petersen, I., Kleintjes, S., & Bhana, A. (2012). Mental Health Services in South Africa: Taking stock. *African Journal of Psychiatry*, *15*(6), 402-405–405. https://doi.org/10.4314/ajpsy.v15i6.48

Lund, C., Kleintjes, S., Kakuma, R., Flisher, A. J., & the MHaPP Research Programme Consortium. (2010). Public sector mental health systems in South Africa: Inter-provincial comparisons and policy implications. *Social Psychiatry and Psychiatric Epidemiology*, *45*(3), 393–404. https://doi.org/10.1007/s00127-009-0078-5

Luxton, D. D., Nelson, E.-L., & Maheu, M. M. (2016). Conducting psychological assessments during telemental health. In *A practitioner's guide to telemental health: How to conduct legal, ethical, and evidence-based telepractice.* (pp. 85–95). https://doi.org/10.1037/14938-008

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Group, T. P. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA

Statement. *PLOS Medicine*, *6*(7), e1000097. https://doi.org/10.1371/journal.pmed.1000097

Naglieri, J. A., Drasgow, F., Schmit, M., Handler, L., Prifitera, A., Margolis, A., & Velasquez, R. (2004). Psychological Testing on the Internet: New Problems, Old Issues. *American Psychologist, 59*(3), 150–162. https://doi.org/10.1037/0003-066X.59.3.150

Naglieri, J. A., Drasgow, F., Schmit, M., Handler, L., Prifitera, A., Margolis, A., & Velasquez, R. (2008). Psychological testing on the Internet: New problems, old issues. In D. N. Bersoff (Ed.), *Ethical conflicts in psychology., 4th ed.* (pp. 306–312). Washington, DC: American Psychological Association. (2008-05541-067).

Statistics South Africa. (2017). *General Household Survey*. Retrieved from http://www.statssa.gov.za/publications/p03182016.pdf

Tredoux, N. (2013). Using computerised and internet-based testing in South Africa. In S. Laher, & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (pp. 424-442). Johannesburg: Wits University Press.

Uman, L. S. (2011). Systematic reviews and meta-analyses. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *20*(1), 57.

# Chapter Six: The online adaptation of the CESD-R and website development

## 6.1 Adapting the CESD-R

In Phase One, three depression screening tools (PHQ-9, CES-D and BDI-II) were identified for adaptation, as explained in this chapter the CESD-R was selected for adaptation. The adaptation of the CESD-R involved two distinct phases, namely, adaptation on the tool as well as adapting the tool for an online environment in accordance with the ethical guidelines obtained from the systematic review (Hassem & Laher, 2020). Test adaptation utilises many if not all the initial test development procedures (Iliescu, 2017) thus the tool adaptation followed the instrument design process proposed by Foxcroft (2018) which recognises the importance of developing tests for multicultural and multilingual settings. In conjunction with the instrument design process proposed by Foxcroft (2018), the ITC Guidelines for Translating and Adapting Tests (2017) was utilised. The discussion on the test adaptation is framed by the three steps in test development proposed by Foxcroft (see Figure 6).

### 6.1.1 The Planning Phase

As indicated in Figure 6, the first step is the planning phase. This involves establishing a test team, the aim of the measure, the target population, the nature of the test, stipulating the content of the tool and developing the test plan. The ITC precondition guidelines for adapting a test were utilised in conjunction with the planning phase proposed by Foxcroft (2018). The precondition guidelines ensured that key decisions were made prior to the adaptation such as obtaining permissions, evaluation of the test against the target population and ensuring that cultural and linguistic influences on the test are minimised (ITC,

2017).

**Figure 6**

*Steps in Developing a Psychological Measure*

| PHASE | SPECIFIC STEPS |
|---|---|
| Planning | • Specify the aim of the measure<br>• Define the content of the measure<br>• Develop the test plan |
| Item writing | • Write the items<br>• Review the items |
| Assembling and pretesting the experimental version of the measure | • Arrange the items<br>• Finalise length<br>• Answer protocols<br>• Develop administration instructions<br>• Pre-test the experimental version of the measure |
| Item analysis | • Determine item difficulty values<br>• Determine item discrimination values<br>• Investigate item bias<br>• Identify items for final pool |
| Revising and standardising the final version of the measure | • Revise test and item content<br>• Select the items for the standardisation version<br>• Revise and standardise administration and scoring procedures<br>• Compile the final version<br>• Administer the final version to a representative sample of the target population |
| Technical evaluation and establishing norms | • Establish validity and reliability<br>• Devise norm tables, setting performance standards or cut-points |
| Publishing and ongoing refinement | • Compile the test manual<br>• Submit the measure for classification<br>• Publish and market the measure<br>• Refine and update continuously |

*Note:* From C. Foxcroft & G. Roodt (2018). I*ntroduction to psychological assessment in the South African context* (p. 84). Copyright by Oxford University Press Southern Africa (Pty) Ltd 2018.

***Establishing a test-development team***

Due to the fact that the depression screening tool was being adapted, the item writing involved a core team of two individuals, namely, the principal researcher of this study (myself) and my supervisor. I have a background in psychometrics as well as a master's degree in research psychology. My supervisor holds a PhD in Psychology specialising in psychological assessment. Relevant specialist in the field were consulted during the content validation phases of the study. Lastly, due to the online nature of the tool, the web-development was outsourced.

***Specifying the aim, target population and nature of the test***

The aim of the tool is to determine the symptom risk level for depression amongst the general adult population (individuals 18 years and older) of South Africa. The tool can be utilised by multilingual English-speaking South Africans. The tool is not intended for diagnosis purposes but merely for screening purposes.

***The tool is meant for individual administration and is an open mode test***

Open mode tests can be accessed by any individual who has internet access and require no direct supervision (Bartram, 2006). Lastly, the tool is classified as a criterion-referenced measure (Foxcroft, 2018).

***Defining the content of the measure***

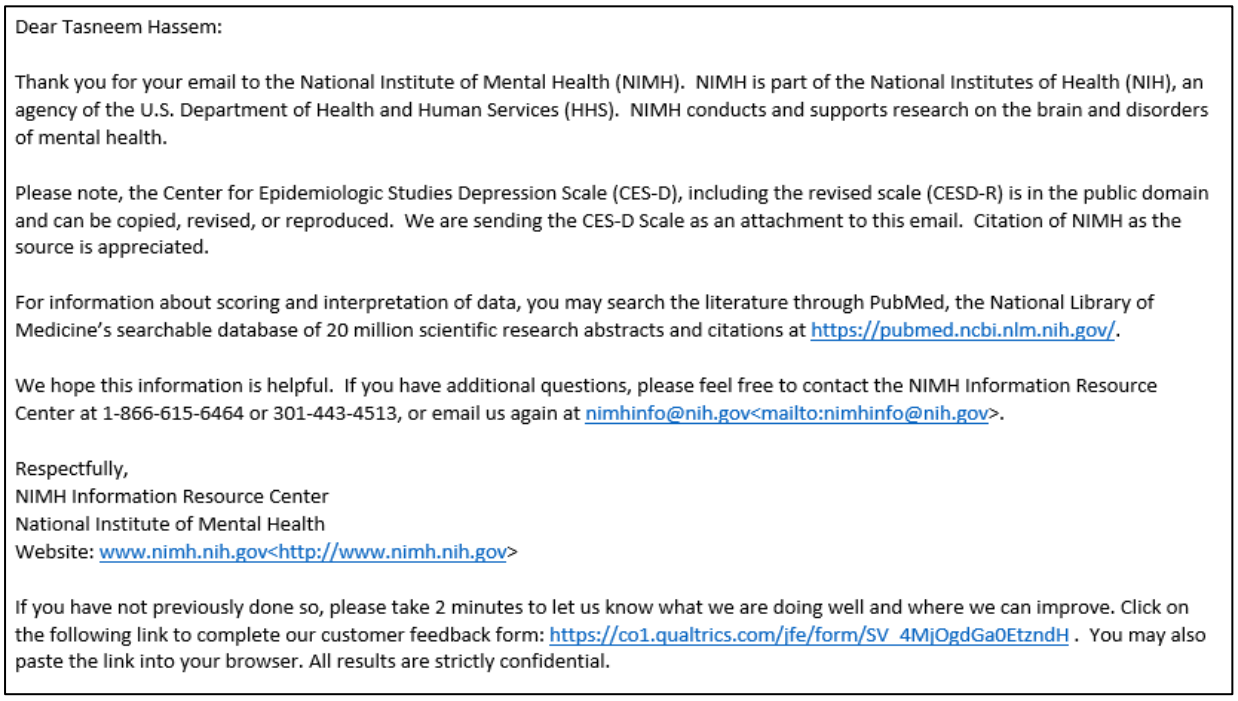
In terms of stipulating the content, the results obtained from the systematic review of available online depression screening tools and South African literature indicated that the BDI-II, CESD and the PHQ-9 were commonly utilised and would be best suited for

adaptation. In order to select the most appropriate tool for adaptation, the following factors were considered: depression classification criteria that informed the tool, application in the South African context, and the copyright licences associated with the adapting the tool. As evident in Table 1, the CESD-R is the revised version of the CESD and aligns with the latest version of the DSM (DSM-5), whereas the BDI-II and the PHQ-9 assess symptoms based on the DSM-IV criteria for MDD. It is apparent from the literature provided in Chapter Two that all the tools are being utilised in the South African context and have been translated into various South African languages; however, only the CESD was used on a general sample. The other two instruments have primarily been used with HIV positive samples. All three depression screening tools are available online; however, the BDI-II is not available as open access. The CESD-R and the PHQ-9 are available for open access use and allow individuals to complete the tool with instant feedback being provided in terms of their depression symptom risk. Ultimately, the CESD-R was selected for adaptation as it is the most recently developed tool that incorporates the DSM 5 symptom classification; it has been utilised on a general population in the South African context; it appears in the public domain; and is available as an open access tool.

In accordance with the ITC (2017) adaptation guidelines, the precondition guidelines were met as the CESD-R is available in the public domain, is open access, and the website provides a statement noting the tool is free to use in research. In addition, permission by the National Institute of Mental Health (NIMH) was obtained to adapt the tool (see Figure 7).

**Figure 7**

*Email confirmation from the NIMH*



Dear Tasneem Hassem:

Thank you for your email to the National Institute of Mental Health (NIMH). NIMH is part of the National Institutes of Health (NIH), an agency of the U.S. Department of Health and Human Services (HHS). NIMH conducts and supports research on the brain and disorders of mental health.

Please note, the Center for Epidemiologic Studies Depression Scale (CES-D), including the revised scale (CESD-R) is in the public domain and can be copied, revised, or reproduced. We are sending the CES-D Scale as an attachment to this email. Citation of NIMH as the source is appreciated.

For information about scoring and interpretation of data, you may search the literature through PubMed, the National Library of Medicine's searchable database of 20 million scientific research abstracts and citations at https://pubmed.ncbi.nlm.nih.gov/.

We hope this information is helpful. If you have additional questions, please feel free to contact the NIMH Information Resource Center at 1-866-615-6464 or 301-443-4513, or email us again at nimhinfo@nih.gov<mailto:nimhinfo@nih.gov>.

Respectfully,
NIMH Information Resource Center
National Institute of Mental Health
Website: www.nimh.nih.gov<http://www.nimh.nih.gov>

If you have not previously done so, please take 2 minutes to let us know what we are doing well and where we can improve. Click on the following link to complete our customer feedback form: https://co1.qualtrics.com/jfe/form/SV_4MjOgdGa0EtzndH . You may also paste the link into your browser. All results are strictly confidential.

The CESD-R consisted of 20 items, assessed symptoms over a two-week period and had a 5-point Likert scale response format ("Not at all" or "less than 2 days" to "Nearly every day for 2 weeks"). As evident in the literature review provided in Chapter Two, the CESD-R does not acknowledge the unique symptoms of depression experienced by South Africans and includes suicide ideation items which are viewed as taboo amongst various South African cultural groups. In addition, the language utilised in the CESD-R includes idioms such as "Shake off the blues" that would not be easily understand by second, third or fourth language English speakers. The evaluation of the items, in relation to the applicability in the South African context, attest to the precondition of pre-evaluating differences as proposed in the ITC guidelines (ITC, 2017).

For the adapted CESD-R, the number of items, time period and response format were

not decided upfront as part of adapting the instrument involved, exploring the content validity of the adapted items and the relevance of the response format, and the time period of symptom assessment. In terms of the response format, it would still follow a Likert type scale. Lastly, the test would not have a time limit for completion and would not exceed 20 items.

**Table 1**

*Applicability of the common depression screening tools in South Africa*

| Screening tool | BDI II | CES-D | PHQ 9 |
|---|---|---|---|
| Classification Criteria | DSM-IV | Previously validated depression instruments and clinical literature | DSM-IV |
| Application in South Africa | HIV patients & university students | HIV patients, general population | Clinical samples |
| Translations | N/A | isiZulu, isiXhosa and Afrikaans | isiZulu, isiXhosa, seSotho and seTswana |
| Psychometric properties in S.A | Cronbach Alpha: 0.84–0.90 | Cronbach Alpha: 0.60–0.89 | Sensitivity of 78.77% and a specificity of 83.4% |
| Online availability | Purchasable online | Revised version CESD-R available on www.CESD-R.com | Available on various websites |

### 6.1.2 Item development

***Item development and review***

The item development and pre-experimental phases document the test development guidelines as noted by the ITC (2017) which includes providing evidence for the applicability of the adapted tool. Initial items were sourced from the CESD-R. Each item was assessed for vocabulary and cultural appropriateness. Items specific to the South African context were

included in the initial item pool. Items screening for suicidality were removed from the tool in order to adhere to the ethical guidelines formulated from the results of the systematic review on ethical guidelines. The removal of items screening for suicidality was further motivated as suicide is seen as a taboo topic in many African cultures (Nel et al., 2015). The initial item adaptation is evident in Table 2.

| CESD-R items | Items presented to experts in round one | Final items included in the tool |
|---|---|---|
| My appetite was poor. | I am not eating as much as I normally eat. | My eating has changed (eating less than normal/ more than normal). |
| I could not shake off the blues. | I cannot get rid of this sad feeling. | I could not get rid of this sad feeling. |
| I felt depressed. | I feel sad. | I have been feeling sad or down. |
| I felt sad. | | |
| My sleep was restless. | I do not sleep well. | My sleep has changed (having trouble sleeping or sleeping more than usual). |
| I had a lot of trouble getting to sleep. | I have a lot of trouble going to sleep. | |
| I slept much more than usual. | I sleep much more than usual. | |
| I could not get going. | I cannot do things that I always do. | I could not do things that I always do. |
| Nothing made me happy. | Nothing makes me happy. | Nothing has made me happy. |
| I felt like a bad person. | I feel like a bad person. | I felt that most things are my fault. |
| I lost interest in my usual activities. | I have lost interest in my usual activities. | I have lost interest in my usual activities. |
| I felt like I was moving too slowly. | I feel like I am moving too slowly. | I felt like I am moving slowly. |
| I felt fidgety. | I have the need to play with my fingers or move around for no reason. | I could not make a decision about simple things. |
| I was tired all the time. | I feel tired all the time. | I have been feeling tired. |
| I did not like myself. | I do not like myself. | I have not liked myself. |
| I lost a lot of weight without trying to. | I lost a lot of weight without trying to. | My weight has changed without me trying (lost weight or gained weight). |
| I could not focus on the important things. | I cannot focus on the important things. | I could not focus on important things. |
| I had trouble keeping my mind on what I was doing. | I have trouble keeping my mind on what I am doing. | I have trouble keeping my mind on what I am doing. |
| I wished I were dead. Item removed | | |
| I wanted to hurt myself. Item removed | | |
| Items added to the screening tool based on South African literature | | |
| | I feel bewitched almost all of the time. | Item removed. |
| | I am experiencing more body aches and pains lately. | I have been experiencing more body aches and pains (e.g. Headaches, neck pain or back pain). |
| | I am thinking too much. | I have been thinking too much. |
| | | I have been feeling alone. |

| | |
|---|---|
| | I have not felt like myself. |

**Table 2**
*Item adaptation*

The review of items involved two rounds of expert comments, which are detailed in Chapter Seven. The insight from experts on the adapted tool ensured the suitability of the tool for the South African context. During the first round of expert review, the adapted online depression screening tool was emailed to a sample of experts to comment on the content validity of the tool. This was assessed using an open-ended questionnaire (Appendix E). Data collected from the open-ended questionnaire were analysed using thematic analysis, a flexible method that is used to analyse, identify and find patterns within a data set (Braun & Clarke, 2006). The results obtained were used to further revise or re-write items. A final review of items was conducted in order to determine content validity ratios. This process forms the basis of a separate publication and appears as Chapter Seven in this thesis.

### 6.1.3 Assembling and pretesting the experimental version of the tool

#### *Assembling the items of the tool*

After establishing the content validity of the tool, the items were arranged in a logical manner, the length of the tool was finalised and the answering protocols and tool administration instructions were established. The item arrangement changed in comparison to the CESD-R, for example, items assessing sadness were not all grouped together. The final tool consisted of 19 items which would take approximately 10 minutes to complete. Lastly, the answer protocol for the adapted tool was changed in terms of the response format as well as the time-period of symptom presentation in accordance with the results of the second round of expert views. The time-periodwas adapted as experts felt that symptoms experienced could be a consequence of a traumatic event and thus a two-month period would rule out traumatic events. Lastly, the tool instructions were adapted to adhere to the ethical principles such as easy-to-understand instructions (unambiguous, clear and free from

psychological jargon), provision of details of the ideal testing conditions and what is required of the test-taker (see Appendix L).

The online CESD-R provides the user with instant feedback based on a specific scoring criterion (see www.CESD-R.com); however, as a result of the items being adapted, the scoring criteria had to be adapted. With regards to the scoring criteria, a two-tiered scoring system was utilised and the total score of the tool was 57. The manner in which scores are calculated on the online adapted CESD-R follows the following logic: symptoms associated with anhedonia or dysphoria must be present most of the time or all the time in individuals who present with possible depression symptoms. Hence, these symptoms were considered as risk factors such that, if endorsed, the individual received at least a medium risk result with a recommendation to seek professional assistance. The scoring criteria are further detailed in Chapter Seven of this thesis and Appendix M. The scoring categories based on the total scores were adapted as the CESD-R alludes to a diagnosis, for example, "meets criteria for major depressive episode" (CESD-R, n.d.), whereas the online adapted CESD-R places individuals into risk categories such as high risk, medium risk and low risk. The adaptation of the scoring categories were governed by the ethical guidelines which state that the feedback should be tentative and reduce the potential negative effects of receiving the test results. Hence, the tool does not provide a diagnosis.

The instant feedback provided was adapted in order to adhere to the ethical principles. The instant feedback provided the user with a clear indication of depression risk in term of both a visual and written indication of depression symptom risk. In addition, the feedback encouraged the user to seek support by providing contact details of various psychological support services (see Appendix N).

***Pre-testing the experimental version of the tool***

Part of pre-testing the tool involved analysing the appropriateness of the items and the assessment of the psychometric properties of the tool. This was achieved by administering the complete online depression screening tool to two sample groups (individuals diagnosed with depression and individuals who had no history of mental illnesses). Participants accessed the screening tool via the MDDSA website. It should be noted that the ideal sample size, as proposed by Foxcroft (2018), is 400 to 500 individuals, whereas the ITC guidelines (2017) proposed a modest sample of 100. The sample for the pilot study was 107 individuals of which 21 had a formal diagnosis of depression, thus results need to be interpreted with caution.

The piloting of the adapted online CESD-R forms the basis of a separate publication and thus is further discussed in Chapter Eight of this thesis. Results obtained from the two sample groups described above were analysed using Cronbach reliability coefficients and the McDonald Omega coefficient. Briefly, item analysis was conducted using both the qualitative and quantitative data collected. Specificity and sensitivity were also calculated for the instrument and are detailed in Chapter Eight of this thesis. An in-depth item analysis, as proposed by Foxcroft (2018) and the ITC (2017), could not be achieved due to the pilot sample size and thus step four is recommended for future research. Steps five to seven, described by Foxcroft (2018) that involve revising and standardising the final tool, establishing a technical evaluation of the measure as well as publishing the tool and the confirmation guidelines proposed by the ITC (2017) fall out of the scope of this study but will be pursued for future research.

The final tool consisted of 19 items as per the content validation and psychometric

studies conducted on the tool. See Table 3 for the final version of the online adapted CESD-R.

**Table 3**

*Final items included in the online adapted CESD-R*

| Online adapted CESD-R items |
|---|
| 1. I have been experiencing more body aches and pains (e.g. headaches, neck pain or back pain). |
| 2. I have been thinking too much. |
| 3. I have been feeling sad or down. |
| 4. I had trouble keeping my mind on what I was doing. |
| 5. My weight has changed without me trying (lost weight or increased weight). |
| 6. I felt like I have been moving too slowly. |
| 7. I could not make a decision about simple things. |
| 8. I could not get rid of this sad feeling. |
| 9. I have lost interest in my usual activities. |
| 10. I felt that most things are my fault. |
| 11. I have been feeling happy |
| 12. I have not liked myself. |
| 13. My sleep has changed (having trouble sleeping or sleeping more than usual). |
| 14. I could not do things that I have always done. |
| 15. I have been feeling tired. |
| 16. I could not focus on important things. |
| 17. My eating has changed (eating less than normal or more than normal). |
| 18. I have been feeling alone. |
| 19. I have not felt like myself. |

### 6.1.4 Website development

Once the instructions, items, scoring and feedback of the tool were finalised, the website that would host the test needed to be developed. In order to develop the website, various factors, such as the hardware and software requirements as well as the presentation of the information and the screening tool, were considered. Due to the lack of website guidelines available for mental health screening websites, the Black Dog Institution (BDI) website and the ethical guidelines, as developed within this project, were utilised for the website development. The BDI website is a well-developed mental health website which screens for

10 mental illnesses of which depression screening forms one component. Therefore, the following page on the site was used as an exemplar: https://www.blackdoginstitute.org.au/resources-support/digital-tools-apps/depression-self-test/.

With regards to the software and hardware requirements, various web publishing services, such as WordPress and Wix, were considered. These services provide the user with various templates to create a website for beginners. However, due to the complex nature of the scoring system and instant feedback functionality required for the screening tool, it became apparent that the website development needed to be outsourced to a professional web-developer. This resulted in various consultations with web-developers in order to ensure that the most optimal and user-friendly design was obtained.

The hardware required for the website was provided and maintained by Xneelo which ensures minimal down-time and pro-active monitoring. The website-developer utilised WordPress in order to ensure that the researcher could make content changes. The researcher worked closely with the web-developer, which resulted in the researcher developing and providing the web-developer with all the information that needed to be displayed on each page of the website.

This resulted in a back-and-forth consultation between the web-developer and the researcher to ensure that the website was user friendly and would result in minimal data costs. The user friendliness of the website was governed by the ethical principle of ensuring minimal risk to an individual. This resulted in the scrutiny of fonts, colours, website title/logo, images, user-interface and test appearance as well as the user-interface.

With regards to the fonts that were utilised, the researcher opted for a simple font to

be used throughout the website to ensure ease of readability. In order to destigmatise depression and encourage help-seeking behaviour, certain phrases on the home page were displayed in a large font and were placed in the centre of the page (See Figure 6). The colour was strategically placed on the page banners to avoid distraction for the main text of each page. In addition, the colour palette used (green) is commonly associated with health websites.

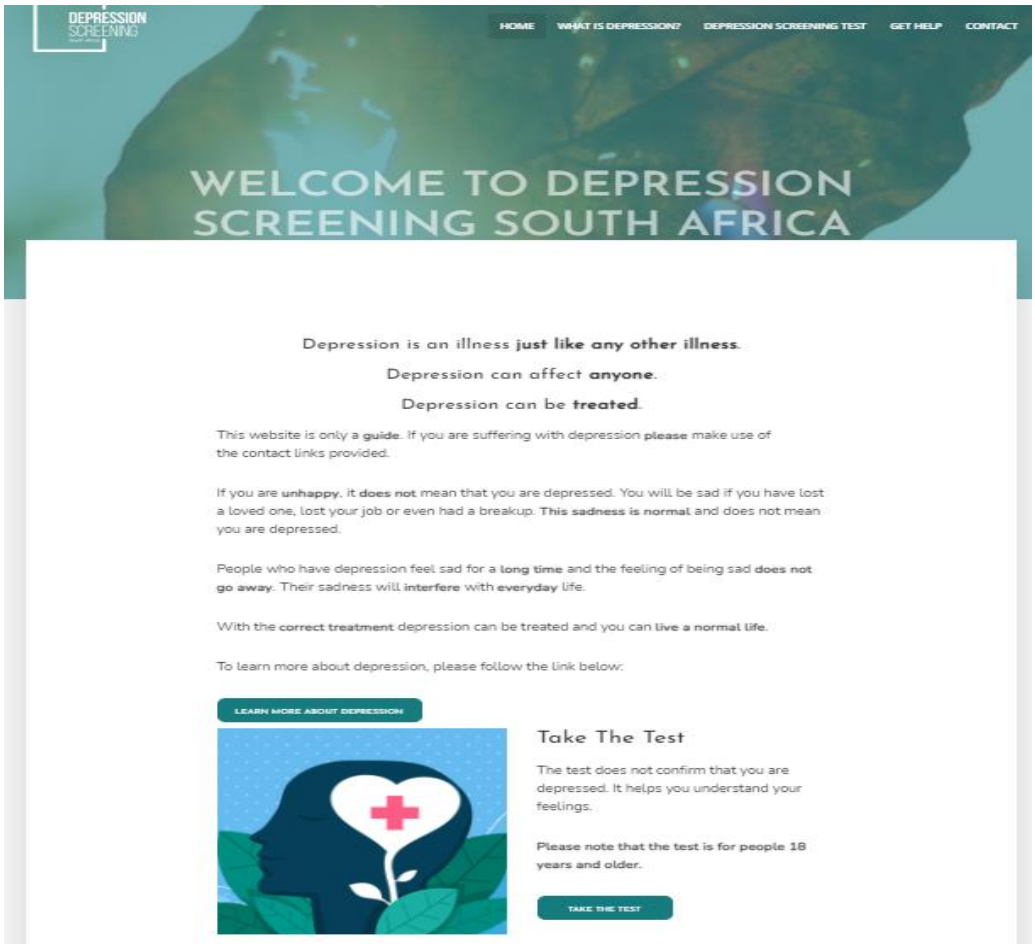
The website logo or title “Depression Screening South Africa” was selected in order to alert the user to the purpose of the website and highlight the target audience. Three images were utilised on the entire website in order to minimise data usage and increase accessibility to the website. The user-face is adaptive in order to allow customised displays on multiple screen sizes (mobile phone versus a laptop). Lastly, the test appearance was carefully selected so that users who do not have prior exposure to a Likert type response format can easily answer the statements.

Once the website was designed, the researcher assessed the content for accuracy, website and tool functionality. In addition, the website and tool functionality were piloted on a group of 20 individuals; any errors identified were reported to the web-developer and resolved prior to the pilot study.

The website consists of various pages as follows: 1) home page; 2) what is depression page; 3) depression screening test page; and 4) get help page. With regards to the homepage of the website (see Figure 8), the researchers ensured that information provided on depression would reduce the stigma associated with depression and encourage help-seeking behaviour through phrases such as “Depression is an illness, just like any other illness”, “Depression can affect anyone” as well as “Depression can be treated”.

**Figure 8**

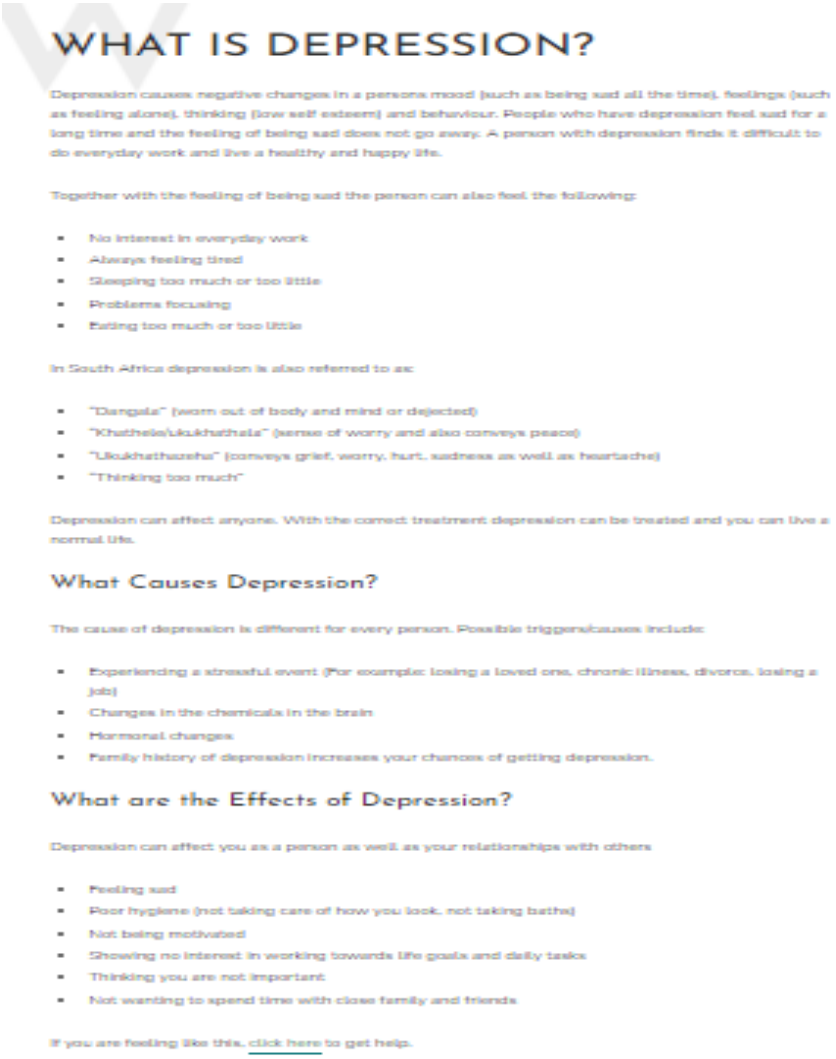
*MDDSA website home page*




The second page "what is depression?" (see Figure 9) provides the reader with an easy-to-understand definition of depression, South African expressions commonly used to explain depression and the possible causes and effects of depression. This information was provided in order to create symptom awareness amongst individuals.

**Figure 9**

*MDDSA "What is Depression?" page*



# WHAT IS DEPRESSION?

Depression causes negative changes in a persons mood (such as being sad all the time), feelings (such as feeling alone), thinking (low self esteem) and behaviour. People who have depression feel sad for a long time and the feeling of being sad does not go away. A person with depression finds it difficult to do everyday work and live a healthy and happy life.

Together with the feeling of being sad the person can also feel the following:

- No interest in everyday work
- Always feeling tired
- Sleeping too much or too little
- Problems focusing
- Eating too much or too little

In South Africa depression is also referred to as:

- "Dangala" (worn out of body and mind or dejected)
- "Khathele/ukukhathala" (sense of worry and also conveys peace)
- "Ukukhathazeka" (conveys grief, worry, hurt, sadness as well as heartache)
- "Thinking too much"

Depression can affect anyone. With the correct treatment depression can be treated and you can live a normal life.

## What Causes Depression?

The cause of depression is different for every person. Possible triggers/causes include:

- Experiencing a stressful event (For example: losing a loved one, chronic illness, divorce, losing a job)
- Changes in the chemicals in the brain
- Hormonal changes
- Family history of depression increases your chances of getting depression.

## What are the Effects of Depression?

Depression can affect you as a person as well as your relationships with others

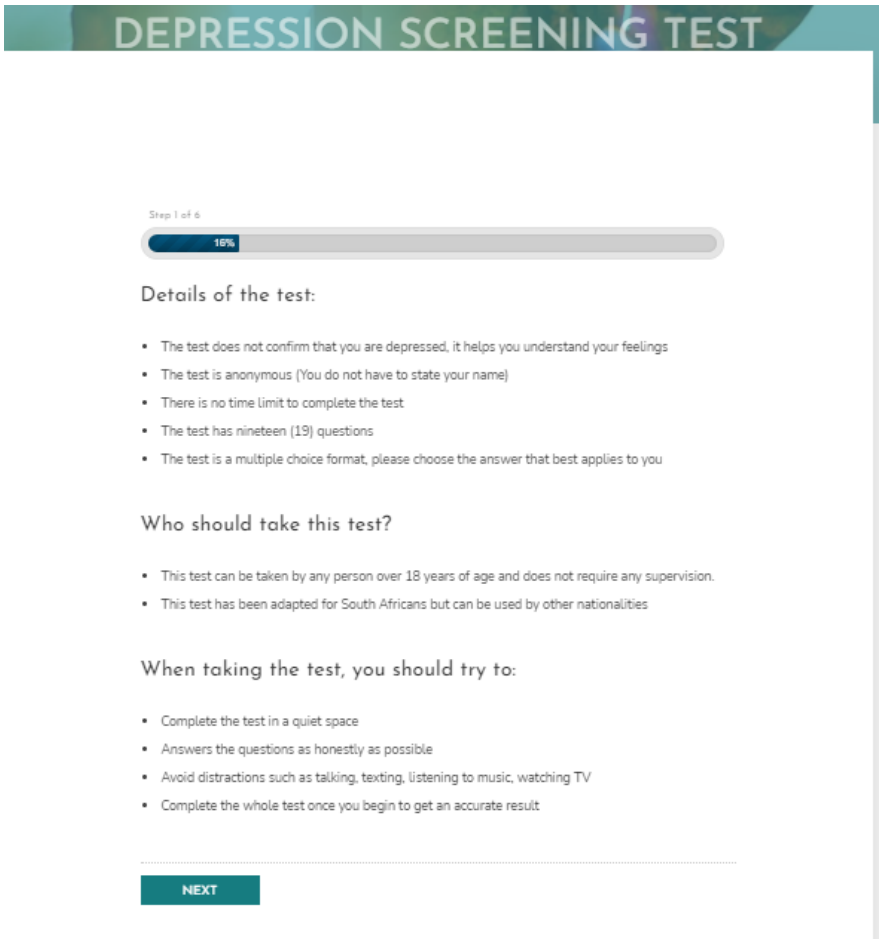
- Feeling sad
- Poor hygiene (not taking care of how you look, not taking baths)
- Not being motivated
- Showing no interest in working towards life goals and daily tasks
- Thinking you are not important
- Not wanting to spend time with close family and friends

If you are feeling like this, click here to get help.

The depression screening test page highlights the details of the test, whom the test is meant for as well as the requirements of taking the test as per the ethical guidelines highlighted in Chapter Five (see figure 10). The page also has a progress bar in order alert the user to progression towards completing the test. The ease reading score of 5$^{th}$ grade highlights that the information about the test is easy to understand and adheres to the ethical guidelines provided in Chapter Five.

**Figure 10**

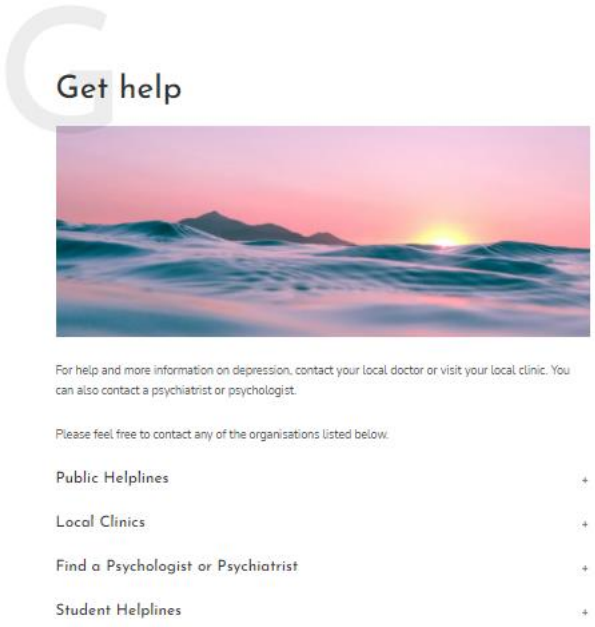
*MDDSA "Depression Screening Test" Page*




The get help page (see Figure 11) provides users with a range of freely accessible psychological services, such as public helplines, local clinics, locating psychologists or psychiatrists as well as student helplines. Psychological services were provided for individuals to seek help if they experienced any form of distress. See www.MDDSA.co.za.

**Figure 11**

*MDDSA "Get Help" Page*




## 6.2 Conclusion

This chapter provided an account of the tool adaptation process in relation to the three out of the seven phases processed by Foxcroft (2018) for test development. These stages include the planning, item writing and assembling and pretesting the experimental version of the measure. The collaborative approach to the website development highlighted in the chapter ensured minimal risk to the website users. Factors which influenced the website development, such as the hardware and software requirements and presentation of the website and screening tool, have been discussed in this chapter. The chapters to follow further discuss the content validation and pilot phases of the online adapted CESD-R briefly alluded to in this chapter.

# Chapter Seven: Establishing the content validity of an online depression screening tool for South Africa

## 7.1 Introduction

Content validity forms an important part of the adaptation process. As items were added, it was imperative that these items assess the construct of depression. Content validity influences other psychometric properties of a tool such as the reliability and validity (Terwee et al., 2018). Content validity of psychological instruments is often overlooked and there is no agreement as to which method should be utilised to assess it. Thus, this phase utilised two key methods, Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) and content validity ratios in order to ensure that the adapted items measured depression and were appropriate for the South African population thus addressing the following research questions:

*What is the efficacy of the online adapted depression screening tool in terms of the content validity?*

*Is the perception of the efficacy of feedback provided after completion of the tool appropriate?*

This article details the item adaptation phases for the CESD-R in order to provide a contextual background; however, the focus of the article is on the process of content validation. The initial adapted items were assessed by a panel of experts utilising a qualitative method in order to obtain in-depth input on the appropriateness of the items, the instructions, the scoring as well as the instant feedback. Results from this phase were used to further revise and adapt the items. Following this, a second study was conducted that assessed the content validity of the tool using more objective methods. Hence the following methods were used for assessing content validity and efficacy: the COSMIN method, the Content Validity Ratios,

Item-Content Validity Index as well as the Kappa Statistic. Experts were also asked to comment on the instructions and feedback provided for the tool.

Based on the results of the content validity study, the online adapted CESD-R consisted of 19 items with a 4-point Likert type response format. As evidenced in the articles, the instructions, items and feedback provided were appropriate and thus a pilot study to assess the psychometric properties of the tool was conducted as the final phase of this project.

This paper was accepted and is referenced as follows:

Hassem, T. Establishing the content validity of an online depression screening tool for South Africa. Sage open. *Manuscript under review*.[4]

[4] See Appendix O.

**Establishing the content validity of an online depression screening tool for South Africa**


## Abstract

Depression is a global concern  with an estimated 300 million individuals worldwide experiencing depression. In South Africa, the prevalence rate of depression is estimated at 9.7% of the population. With the increase in mobile internet usage in South Africa, an online depression screening tool could provide opportunities for the screening of depression symptoms aiding access to mental health interventions. This project identified an open access tool for screening depression, the Center for Epidemiologic Studies Depression Scale – Revised (CESD-R), and adapted it for online use by the adult South African population. This study followed on from the adaptation phase on the CESD-R and aimed to determine the content validity of the adapted CESD-R for online use in South Africa using the COSMIN methodology. The study followed a two-phased design. Study one utilised a qualitative approach, where 50 experts commented on the content validity of the tool. The results were used to further adapt the tool which resulted in a 20-item depression screening tool. Study two followed a quantitative design in order to establish the content validity in terms of determining the Content Validity Ratios, Item-Content Validity Index as well as the Kappa Statistic of the 20 items. Based on these statistics, 19 of the 20 items were retained. Overall, the adapted online depression screening tool displays good content validity and holds potential as a screening tool where access to mental health may be limited.


**Keywords:** CESD-R, Content validity, Online depression screening tool, South Africa

### Literature review

According to the World Health Organization's (WHO, 2017) Global Health estimates for 2017, an estimated 300 million individuals have depression globally, accounting for 4.4%

of the world's population (WHO, 2017). Nine percent of individuals on the African continent suffer with depression (WHO, 2017). In South Africa, a prevalence rate of 9.7% was attributed to major depression (Tomlinson et al., 2009). The association between mental health and non-communicable diseases has been highlighted by the WHO world mental health surveys (Leentjens, 2010). Depression is one of the mental health illnesses that has been found to be comorbid with non-communicable diseases, such as cancer and diabetes, and respiratory and cardiovascular diseases, therefore interventions for depression are vital in controlling non-communicable diseases (Caruso et al., 2017; Leentjens, 2010; Stein et al., 2019).

The treatment of depression in South Africa is often met with many obstacles, such as stigmas, the lack of mental health facilities, the lack of depression screening and under-resourced hospital settings. In 2017, mental health facilities in South Africa were limited with 4.33 beds per 100 000 population in general hospitals, and 16.56 beds per 100 000 in mental health hospitals (WHO, 2017). In 2019, South Africa reported having 0.31 psychiatrists and 0.97 psychologists in the public sector per 100 000 population (Docrat et al., 2019). As a result of the lack of or limited mental health resources in South Africa, mental illnesses, such as depression, are often under-diagnosed and under-treated (Nglazi et al., 2016).

In an attempt to overcome the barriers to mental health access and care, researchers propose the use of digital technologies such as the internet, portable electronic devices and mobile applications (Aguilera, 2015; Cortelyou-Ward et al., 2018; Lal & Adair, 2014; Patel et al., 2018). Online mental health screening provides easy and wide access; it is economically and time-efficient and allows for early detection of people at risk of depression (Austin et al., 2006; Buchanan, 2003; Donker et al., 2010; Lal & Adair, 2014; Patel et al., 2018). In South Africa, 58.7% of individuals have mobile internet access and 63.0% of households have at

least one member who has access to internet either at work, at home, a place of study or through an internet café (Statistics South Africa, 2019).The potential benefits of online mental health screening together with the access to benefits of online mental health screening suggest that online mental health resources could provide access to mental health services where they are limited and often inaccessible.

This study focused on adapting a depression screening tool for online usage. As part of the study, a systematic review was conducted to identify any existing, psychometrically sound, online depression screening tools for the general public of South Africa. Results indicated that the Beck Depression Inventory-II (BDI-II), the Center for Epidemiology Studies Depression Scale (CESD) and the Patient Health Questionnaire (PHQ-9) were the most commonly utilised online depression screening tools but only one depression screening tool was specifically designed for use by the general public. There were no screening tools specifically designed for the diverse groups in South Africa (Hassem & Laher, 2019).

Based on the results of the systematic review, it was decided to adapt the CESD. The revised version of the CESD (CESD-R) is the most recent version of the CESD which was revised to reflect depression symptoms in accordance with the DSM-IV (Eaton et al., 2004). The CESD-R website (The Center for Epidemiologic Studies Depression Scale Revised, n.d.) confirms that the symptoms as assessed are in accordance with symptoms of MDE in the DSM 5. In addition, the CESD-R is the most recently developed depression screening tool of the three commonly utilised depression screening tools (BDI-II, CESD and PHQ-9) and is available as an open access resource (The Center for Epidemiologic Studies Depression Scale Revised, n.d.).

The adaptation of the CESD-R was grounded in the biopsychosocial-spiritual (BPSS) model. The BPSS model recognises the biological, psychological, social and spiritual as

distinct dimensions which cannot be separated from the whole as the components are intertwined allowing for multifactorial understandings of mental illness aetiology (Van Rensburg et al., 2015; Sulmasy, 2002). The BPSS is particularly salient to African contexts where mental health is said to be located in the relationship between the ancestors or spirits and human beings (Meyer et al., 2002; Mufamadi & Sodi, 2010).

While spirituality and culture are relevant across the diverse South African population, screening tools for depression have not been adapted to account for these unique cultural and spiritual presentations of depression. The South Africa population is made up of individuals from various ethnic and religious groups as well as being a multilingual country with 11 official languages. Defining or translating the term "depression" in African cultures is complex because it is not recognised within traditional African practices (Ellis, 2003; Patel, 2001; Stafford et al., 2008). For example, in the isiZulu language, the following terms are used to approximate depression: "*Dangala*" (worn out of body and mind or dejected), "*Khathele/ukukhathala*" (sense of worry and also conveys peace) and "*Ukukhathazeha*" (conveys grief, worry, hurt, sadness as well as heartache). "*Ukukhathazeha*" is also used in the *isiXhosa* language and has the same meaning as in the *isiZulu* language (Ellis, 2003).

The distress idiom called "thinking too much" is also often associated with depression or as a symptom of depression (Kaiser et al., 2015). In a study conducted in a small Khwe community in Kimberley, South Africa, "thinking too much" was associated with negative behavioural, emotional, social and somatic complaints (Hertog et al., 2016). "Thinking too much" is viewed by traditional healers as well as a sample of HIV positive women as a symptom of depression (Andersen et al., 2015; Ellis, 2003).

When reporting depression symptoms, studies have shown that individuals in African cultures tend to report more somatic than cognitive symptoms (Anderson et al., 2015;

Mosotho et al., 2008). This emphasis on somatic symptoms often compromises the diagnosis of depression in many primary care settings (Mosotho et al., 2008). In studies conducted in South Africa, women tended to have a higher prevalence rate of depression but this could be attributed to gendered cultural beliefs. In the Sesotho culture, for example, men are viewed as "*Monna ke nlu ha alle*", which implies that men should not display emotions of grief, sadness and depression (Mosotho et al., 2008; Tomlinson et al., 2009).

In addition to cultural factors, English language proficiency needs to be considered. According to the General Household Survey (Statistics South Africa, 2018), English has been ranked as the 6$^{th}$ most common language spoken in South African homes (8.1%) and ranked as the second most common language spoken outside South African homes (16.6%; spoken by 8.1% of individuals). Given that most South Africans are not English first language speakers, there is a need for a depression screening tool free of psychological jargon. Hence this was taken into account when adapting the CESD-R for South Africa.

The unique context of the online psychological assessment screening environment, where the typical face-to-face interaction is removed, provides for a number of ethical issues to be considered. Draft ethical guidelines recommended by Hassem and Laher (2018) were utilised to ensure that the online screening tool was adapted accordingly. For example, the inclusion of suicide items should have designated resources available to contact individuals who are at risk of self-harm (Hassem & Laher, 2018). Unfortunately, these resources are limited in South Africa and, in order for these resources to be effective, various stakeholders would need to be involved in ensuring the effective use of such services. Ethically, the risk is too high for an individual completing an online screening (not diagnostic) tool to include an item assessing suicidality. Hence this was excluded.

The aim of this study was to determine the content validity of the adapted CESD-R for online depression screening for diverse groups in South Africa. Content validity refers to the extent to which items on a scale accurately measure a construct based on the conceptual definition of the construct (Grahn & Gard, 2008; Lenz, 2010). Based on the literature, establishing content validity is typically done qualitatively with little consensus as to which method should be followed. The Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) were developed in part to create more rigorous, standardised guidelines for establishing content validity (Terwee et al., 2018). The COSMIN guidelines for content validation of a Patient-Reported Outcome Measure (PROM) informed the design of this study (Terwee et al., 2018). According to the COSMIN guidelines, for a tool to display content validity, three broad domains need to be assessed. They are relevance (items are relevant for the measured construct as well as the context or specific population), comprehensiveness (all aspects of the construct being measured are included) as well as comprehensibility (all items can be easily understood by the target population) (Terwee et al., 2018). Thus, this study aimed to: (1) determine if the adapted online depression screening tool measures depression; (2) determine if the items of the tool are easily understood and are culturally appropriate for South Africans; and (3) determine whether the instructions, response format and instant feedback provided are appropriate.

## Methods

Two studies were carried out in order to determine the content validation of the online depression screening tool. Study one followed a qualitative research design, whereas study two followed a quantitative research design. The study was approved by the Human Research Ethics Committee, Medical (HRECM) of the University of the Witwatersrand (Ethics protocol number: M180402). All participants had the right to decline participation. Participation was

anonymous and completely confidential as no identifying information was requested. All participants had the right to stop participation at any point and also had the right not to answer any of the questions. There were no potential risks or benefits to participation in the study.

**Study one**

**Test adaptation**

The initial step of study one involved the adaptation of the CESD-R items. This step followed the first three stages of the test development guidelines proposed by Foxcroft (2018) and the International Test Commission Guidelines for Translating and Adapting Tests (ITC, 2017). Table 1 highlights the adaptation of the CESD-R items during studies one and two. For study one, CESD-R items were either rephrased or removed from the tool. Three items were removed from the CESD-R, which included the two items which assessed suicide ideation. Guided by the South African literature regarding depression (Anderson et al., 2015; Hertog et al., 2016; Kaiser et al., 2015; Mosotho et al., 2008), three items were added to the tool (Table 2). The online adapted CESD-R for study one consisted of 20 items, which were free of psychological jargon. The response format (Not at all, 1 to 2 days, 3 to 4 days, 5 to 7 days and nearly every day for 14 days) and time period (two weeks) that symptoms are experienced were not changed from the CESD-R.

*Table 1: Item adaptation for study one and study two*

| CESD-R items | Study one items | Study two items |
|---|---|---|
| My appetite was poor | I am not eating as much as I normally eat | My eating has changed (eating less than normal/ more than normal) |
| I could not shake off the blues. | I cannot get rid of this sad feeling | I could not get rid of this sad feeling |
| I felt depressed | I feel sad | I have been feeling sad or down |
| I felt sad | | I have been feeling happy |
| My sleep was restless | I do not sleep well | My sleep has changed (having trouble sleeping or sleeping more than usual) |
| I had a lot of trouble getting to sleep. | I have a lot of trouble going to sleep | |
| I slept much more than usual. | I sleep much more than usual | |
| I could not get going. | I cannot do things that I always do | I could not do things that I always do |
| Nothing made me happy. | Nothing makes me happy | Nothing has made me happy |
| I felt like a bad person | I feel like a bad person | I felt that most things are my fault |
| I lost interest in my usual activities | I have lost interest in my usual activities | I have lost interest in my usual activities |
| I felt like I was moving too slowly. | I feel like I am moving too slowly | I felt like I am moving slowly |
| I felt fidgety. | I have the need to play with my fingers or move around for no reason | I could not make a decision about simple things |
| I was tired all the time. | I feel tired all the time | I have been feeling tired |
| I did not like myself | I do not like myself | I have not liked myself |
| I lost a lot of weight without trying to. | I lost a lot of weight without trying to | My weight has changed without me trying (lost weight or gained weight) |
| I could not focus on the important things. | I cannot focus on the important things. | I could not focus on important things |
| I had trouble keeping my mind on what I was doing | I have trouble keeping my mind on what I am doing | I have trouble keeping my mind on what I am doing |
| I wished I were dead. Item removed | | |
| I wanted to hurt myself. Item removed | | |
| | Items added to the screening tool based on South African literature | |

| | | |
|---|---|---|
| | I feel bewitched almost all of the time | Item removed |
| | I am experiencing more body aches and pains lately | I have been experiencing more body aches and pains (e.g. Headaches, neck pain or back pain) |
| | I am thinking too much | I have been thinking too much |
| | | I have been feeling alone |
| | | I have not felt like myself |

**Participants**

Individuals were invited to participate in the study based on their expertise the field of depression screening and depression. A non-probability, purposive sample of 50 mental health care personnel participated in the study (Patton, 1990). Table 2 highlights the participant demographics for study one. The majority of the sample was psychiatrists (n=15), followed by psychologists (research, clinical and counselling psychologists) (n=14) and Psychology Honours[5] students enrolled for a psychological assessment module (n=13). Seven of the participants described their occupations as "other" with nurses, religious leaders, a pediatrician and a campus coordinator being specified. The majority of the participants stated that they had been practising in their respective fields for more than 10 years (n=19), followed by 14 participants practising for less than 10 years. Females made up the majority of the participants (n=43). Half of the participants identified as belonging to the White population group (n=25). Most participants identified as being Christian (n=24), followed by Muslim and no religious affiliation (n=13 and n=8 respectively). Thirty-six participants identified English as being their home language while Afrikaans was spoken by eight individuals and an African language (isiZulu, Ndebele, Sepedi, Setswana & Swati) was spoken by six of the participants as a home language (Table 2).

[1] The honours degree in South Africa is a postgraduate qualification that follows on from an undergraduate degree and precedes a Master's degree.

*Table 2: Demographic characteristics of study one and study two*

| | Study one | Study two |
|---|---|---|
| Variable | Frequency | Frequency |
| Occupation | (n=49) | (n=21) |
| Psychologist | 14 | 16 |
| Psychiatrist | 15 | 2 |
| Health science/ Psychology student | 13 | 3 |
| Other | 7 | |
| Number of years practising | (n=33) | (n=17) |
| Less than 10 years | 14 | 1 |
| 10-20years | 12 | 10 |
| 21-30 years | 4 | 4 |
| 31-40 years | 3 | 2 |
| Gender | (n=50) | (n=21) |
| Male | 7 | 4 |
| Female | 43 | 17 |
| Population group | (n=50) | (n=20) |
| Black | 6 | 3 |
| Coloured[6] | 3 | 2 |
| Indian | 15 | 3 |
| White | 25 | 11 |
| Other | 1 | 1 |
| Religious affiliation | (n=48) | (n=21) |
| Islam | 13 | 2 |
| Christianity | 24 | 11 |
| Hinduism | 2 | 2 |
| Judaism | 1 | 1 |
| No Religious Affiliation | 8 | 5 |
| Home Language | (n=50) | (n=21) |
| English | 36 | 16 |
| Afrikaans | 8 | 2 |
| African Language | 6 | 2 |
| Other | | 1 |
| Frequency of diagnosing depression | (n=49) | (n=21) |
| Never | 23 | 8 |
| Weekly | 17 | 6 |
| Once a month | 6 | 1 |
| Once in 6 months | 1 | 3 |
| Once a year | 2 | 3 |
| Utilisation of a depression screening tool | (n=49) | (n=21) |
| Yes | 20 | 15 |
| No | 29 | 6 |

[1]The Coloured population group in South Africa refers to individuals of mixed-race ancestry

Just over half of the sample (n=26) diagnosed depression[7] in their capacity as a psychologist or psychiatrist, with the majority diagnosing depression at least weekly (n=17). Interesting to note was that, out of the 26 individuals who stated that they diagnose depression, only 16 of these individuals had utilised a depression screening tool (Table 2). The most cited screening tool utilised was the BDI-II, followed by the PHQ, and the Hamilton-D (HAM-D).

**Instruments**

Participants were required to complete a brief demographic questionnaire requesting information on occupation, number of years practising, gender, population group, religious affiliation, home language, frequency in diagnosing depression as well as previous experience using a depression screening tool. Once the demographic questions were completed, participants were presented with a page detailing the content validation instructions. Participants were required to only read the instructions, items, scoring as well as feedback of the adapted CESD-R, not to complete the tool. This was followed by 10 (yes or no response format) questions which were informed by the COSMIN evaluation of content validity of a PROM. Participants were given the choice to provide additional comments in relation to the 10 questions. Given the unique nature of the tool where instant feedback would be provided to the individual, two specific questions assessing the appropriateness of the scoring and feedback of the tool were included.

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[2] Depression in South Africa is diagnosed by clinical, educational and counseling psychologists, general practitioners as well as psychiatrists.

### Procedure

Once items were finalised, an email was circulated to various South African health care professionals listed above (Table 3) inviting them to participate in the study. Experts were identified based on their clinical and psychometric experience in the field of mental health and depression. The email described the nature of participation and contained a web link to the actual tool and content validation questions. Once participants clicked on the link (generated from SurveyMonkey), a participant information sheet appeared detailing the nature of the study. The survey was anonymous and, on average, took between 10 and 15 minutes to complete. Data collection took place electronically between July and October 2019 through an online survey tool.

### Data analysis

Data were downloaded from the online tool and coded for analysis. Demographic variables and yes/no response options were analysed using frequencies on SPSS Version 25 (IBM Corp, 2017) and qualitative data were analysed using thematic analysis as specified by Braun and Clarke (2006).

### Results of Study One

Results are discussed in terms of the three broad themes recommended in the COSMIN guidelines that are relevance and comprehensiveness, comprehensibility, and scoring and feedback.

*Table 3: Questions provided to participants and the frequencies of responses in study one*

| | Question | Frequency | |
|---|---|---|---|
| | | Yes | No |
| 1. | Are the instructions provided appropriate? | 47 | 3 |
| 2. | Would you recommend any changes to the instructions provided? | 18 | 32 |
| 3. | Does the tool appear to measure depression? | 46 | 4 |
| 4. | Will the statements be easily understood by the general public? | 49 | 1 |
| 5. | Based on your experience with the culturally diverse population of South Africa, are there any items which need to be changed or added to the tool? | 17 | 31 |
| 6. | The diagnostic and statistical manual-5 is often criticised for being based on Western assumptions of the self which tend to be individualistic, would you recommend changing the "I" in the following statements to "my family and friends have noticed" | | |
| | 6a. I am not eating as much as I normally eat | 8 | 27 |
| | 6b. I lost a lot of weight without trying | 17 | 26 |
| | 6c. I have trouble keeping my mind on what I am doing | 10 | 33 |
| | 6d. I cannot do things that I always do | 13 | 29 |
| | 6e. I am thinking too much recently | 5 | 38 |
| | 6f. I have the need to play with my fingers or move around for no reason | 19 | 24 |
| 7. | Is the scoring provided appropriate for the tool? | 41 | 7 |
| 8. | Is the feedback provided appropriate for the tool? | 35 | 8 |

**Relevance and comprehensiveness**

Due to the open-ended nature of the questions, various themes regarding the relevance of the tool emerged, namely, depression according to the DSM criteria, appropriateness of the items, time period, response format as well as the cultural applicability of the items.

**Depression according to the DSM criteria**

The majority of the participants indicated that the tool does appear to measure depression (n=46) (Table 3), which is echoed through the following comment made by participant 40: "*It definitely does measure depression according to the DSM 5 framework*." Two participants noted that the items provided on the tool measured depression according to the DSM 5 criteria for depression, while three participants stated that not all the DSM symptoms of depression were measured by the tool. One participant specifically commented that the DSM criteria do not include local idioms of distress or depression while two

participants indicated that suicide ideation had not been included in the tool. It was noted by one participant that the tool measured depression similar to the K10 (Kessler Psychological Distress Scale) and CESD (original version of the online adapted CESD-R). One participant specifically cautioned against using the tool as a diagnostic measure.

**Appropriateness of items**

As evident in Table 3, the majority (n=31) of the participants felt the items were appropriate for the South African context. In order to accommodate the African view of the self, participants were asked if items need to be rephrased to "My family and friends". Results indicate that the majority (n=24) of the participants suggested that items do not need to be rephrased (Table 3). Item appropriateness can be divided into three sub-themes, namely, items to be added, items to be removed and items to be rephrased or re-considered (see Table 3).

***Items to be added***

Five participants noted that weight gain and increased appetite are symptoms of depression that are commonly overlooked. Therefore, participants recommended that these two items should be added to the tool. Participant 9 expressed this as follows: "*Some patients eat less and lose weight whilst others eat more and gain weight (this is not dependent on depression type). Asking if there has been a change in weight can be very helpful in distinguishing depression severity.*" Four participants felt that an item targeting indecisiveness should be added as it is a common cognitive symptom of depressed patients. In addition, suicide ideation items were recommended to be included by five participants as they are symptom criteria for depression, according to the DSM.

***Items to be removed***

Two participants suggested removing the items: "I feel like I am moving too slow" and "I have the need to play with my fingers or move around for no reason" (psychomotor agitation)

(Table 2), as this is less common in depressed adults. One participant felt item 18 was unclear and another stated that item 17 was unclear but they did not suggest removing these items. Two participants suggested that there were too many sleep items and some should be removed or replaced with another item. Item 20 ("I feel bewitched almost all of the time") was viewed as being the most inappropriate item (n=11), implying that the item should be removed.

***Items that need to be reconsidered or rephrased***

Participants felt that items needed to be rephrased so that the tenses would be consistent throughout the tool. A suggestion was made that the items need to be edited for grammatical accuracy.

**Cultural applicability of the tool**

This theme is closely related to the theme of item appropriateness as the item, "I feel bewitched almost all of the time", was the most commonly cited item that was inappropriate. This was because the term "bewitched" is not culturally appropriate and the term was not clearly understood. Participants suggested that the item questions the cultural etiology of depression in a tool which needs to relate to the experience of depression. In addition, participants suggested that the term "bewitched" can have both negative and positive connotations. Participants suggested that if a culturally fair item is to be added, it should have follow-up questions.

**Time period**

With regards to the time frame of "two weeks", three participants noted that the time frame needed to be reconsidered as the symptoms experienced could be a result of life changes or a traumatic event, as indicated by Participant 1: "*Two weeks is a problematic time period. A person could have undergone a life change or trauma and may not have Major Depressive*

*Disorder (MDD) but would meet the criteria based on the last two weeks. This could result in an implied misdiagnosis*."

In addition to the change in the time frame of the symptoms experienced, the attribution of symptoms to life changes were also found in the narratives of four other participants. These participants highlighted that symptoms could be attributed to various medical conditions (chronic conditions or stomach bugs) as well as the lifestyle the individual leads (symptoms of sleep attributed to exhaustion). Therefore, these suggestions showed the need for a statement ruling out medical conditions, lifestyle, as well as life changes causing the symptoms experienced.

**Response format**

Although no specific questions targeted the response format, six participants made comments which related to it. One participant specifically suggested that it might not be understood by the general public while four participants suggested that the response format did not match well with the items, recommending that either the items be rephrased or the response format be changed for specific items. One participant felt that placing a time-frame in the response format was inappropriate.

Lastly, two participants suggested that the responses can yield many false positives or negatives or be easily faked. The use of reverse scoring as well as a control question was suggested in order to prevent faking.

**Comprehensibility**

Comprehensibility of the tool is discussed in terms of appropriateness of the instructions, effectiveness of the language used, length of the tool and item order.

**Appropriateness of instructions provided**

As evidenced in Table 3, a majority of the participants (n=47) felt that the instructions provided were appropriate. Five participants recommended specific changes to the instructions, while one participant suggested that the last statement in the instructions ("Ask a friend or family member to assist you") could deter individuals from taking the test and would need further consideration. Two of the participants suggested grammatical changes be made to the instructions provided. One participant suggested that a sentence encouraging individuals to complete all items be added.

**Effectiveness of language used**

A majority of the participants (n=49) felt that the tool will be easily understood by diverse groups in South Africa (see Table 4), as echoed by the following participant phrases "*simple English*", "*does not contain any difficult words*", "*very simplistic words*" and "*simply put and easy to understand*". Three participants made reference to the general public of South Africa not being English first language speakers and said it was imperative to ensure that all South Africans understand the items. These three participants suggested that the tool be translated into African languages, with one participant highlighting caution when doing translations.

**Length of the tool and item order**

All participants who commented on the length of the tool felt that it was appropriate for an individual who is depressed. This sentiment is represented by the following comment by participant 9: "*The short length of the questionnaire is a strength of the tool as someone with moderate to severe depression will struggle to complete tasks*."

Only two participants mentioned that the order of the items needs to be reconsidered. Participants suggested that items measuring similar symptoms do not appear together and to prioritise symptoms specific to the South African context in the ordering of items.

**Scoring and feedback provided**

Although scoring and feedback does not form part of the COSMIN criteria for content validity, it is a vital point to discuss as the end-users of the tool will ultimately receive immediate feedback in a non-typical, face-to-face interaction. Table 4 shows that it is evident that the majority of participants felt that the scoring and feedback provided are appropriate (n=41 and n=35, respectively).

Only five participants commented on the scoring of the tool, with three participants suggesting that the scoring was not transparent as they did not know the score that was attributed to each response and the cut-offs were not mentioned upfront. Comments made regarding the feedback given to participants all emphasised the need to highlight the urgency of seeking help when individuals receive a high score on the tool. In addition, participants stated that the feedback was calmly stated so that it should not further perpetuate depression symptoms. Participants indicated that individuals who do not meet the criteria for depression should also be offered contact details if they feel the need to seek help. Lastly, participants felt that “consulting with your family practitioner” should be the first point of contact that needs to be included.

**Study two**

**Participants**

A non-probability, purposive sample of 21 mental health care personnel participated in the study (Patton, 1990). A majority of the sample was represented by psychologists (n=16). A majority of the participants stated that they had been practising in their respective fields

between 10 and 20 years (n=10), with only one participant practising for under 10 years. A majority of the sample were females (n=17). Just over half of participants identified as belonging to the White population group (n=11) and being Christian (n=11). English was noted as the dominant home language used by participants (n=16) (Table 2).

Only eight participants had not previously diagnosed depression, with the majority of participants (n=6) diagnosing depression weekly. Lastly, a majority of the participants (n=15) had previously utilised a depression screening tool. The most commonly cited screening tool used was the BDI-II followed by the HAM-D.

**Procedure**

The first step of this study involved item refinement based on the results of study one. Weight, eating patterns and sleep items were represented by one item each which accounted for either side of the scale (weight gain or loss, increased or decreased appetite, and less or more sleep) (Table 2). The item regarding bewitchment was removed from the scale based on the results of study one. Items representing self-blame, loneliness and guilt were added. Therefore, a total of 20 items were included in study two. Given the occurrence of violence and traumatic events in South Africa as well as comments made in study one regarding the time period, this was changed to a two-month period of symptoms experienced as this will rule out symptoms experienced due to these events which could result in an over-diagnosis of depression. Lastly, based on the feedback received regarding the response format in study one, the response format was changed to: “Not at all”, “Some of the time”, “Most of the time” and “All of the time.”

**Data collection and Instruments**

Participants were required to complete the same brief demographic questionnaire as per study one. Once the demographic questions were completed, participants were presented with

a page detailing the content validation instructions. A 3-point Likert scale was used to assess the relevance of each of the 21 items included in the screening tool (1= item is not essential; 2=item is useful but not necessary; and 3=item is essential for diagnosing depression). Participants were also asked to rate the response format used as being “relevant”, “somewhat relevant” or “not relevant”. Lastly, participants were asked for any additional feedback or input on the tool. The questionnaire took, on average, 10 minutes to complete. Data collection took place electronically between October and December 2019 through an online survey tool.

**Data analysis**

Data were downloaded from the online tool and coded for analysis. Demographic variables were analysed using frequencies. There are various statistical calculations for content validity which either provide a consensus estimate or consistency estimate. Most commonly used in the field of psychology is the Content Validation Ratio (CVR) proposed by Lawshe (1975 cited in Polit et al., 2007). There is debate in the literature as to which CVR value to utilise thus, at a 5% level of significance with 21 experts, a CVR value lower than 0.359 or 0.429 would exclude an item (Ayre & Scally, 2014; Wilson, Pan & Schumsky, 2012).

Polit et al. (2007) recommend the use of the Item-Content Validation Index (I-CVI), Scale-Content Validation Index (S-CVI) as well as the Kappa statistic. Therefore, this study used the CVR, I-CVI, S-CVI (average) as well as the Kappa statistic to investigate content validity (Polit et al., 2007). With regards to the I-CVI values, any values under 0.70 should be eliminated, values between 0.70 and 0.79 required some revision and any value of at least 0.78 is considered as appropriate. The Kappa statistic values between 0.40 and 0.59 were considered fair, 0.60 and 0.74 were good and 0.75 and higher were considered excellent (Polit et al., 2007). For the development of a new tool, the average S-CVI of 80% or above is considered acceptable (Davis, 1992).

In order to compute the I-CVI and Kappa values, response options 2 (“item is useful but not necessary”) and 3 (“item is essential for diagnosing depression”) were combined and represented as a relevant item and the response option 1 (“item is not essential”) represented a non-relevant item.

**Results of study two**

When looking at items rated as essential by the experts, only three items (3, 8 and 9) were rated by all experts as being essential. Fifteen items received an essential rating by the majority of the experts (n >10) (see Table 4). With regards to experts rating items as relevant, 12 items received a relevant rating by all experts. Item 11 (“I have been feeling happy”) received the lowest number of experts rating the item as relevant (n=13).

CVR calculations had a very wide range from -0.524 to 1. Both I-CVI and Kappa ranged from 0.62 to 1. The lowest CVR value was obtained on item 6, while the lowest I-CVI and Kappa values were obtained for item 11. It is evident that all 20 items included in the tool were considered as good items with the exception of item 11. Item 11 did not meet two out of the three content validity criteria (CVR and I-CVI). The Kappa value was 0.62, which indicated the item was good.

Using the guidelines in the literature (Ayre & Scally, 2014; Polit et al., 2007; Wilson et al., 2012), 10 items (3, 8, 9, 14, 19, 4, 17, 5, 20 and 21) met all the content validity criteria (CVR, I-CVI and Kappa). Items 3, 8, 9 and 14 obtained absolute scores on all three criteria (Table 4). Eleven items did not meet the CVR criteria for inclusion (16, 18, 21, 7, 15, 10, 2, 1, 11 and 6) but 10 of these items met the I-CVI and Kappa criteria for an excellent item. Three (16, 18 and 21) out of the 11 items that did not meet the CVR criteria received absolute scores on the I-CVI and Kappa scores.

*Table 4: Content validation statistics of study two*

| Item | $N_e$ (Essential) | $N_r$ (relevant) | CVR | I-CVI | Kappa |
|---|---|---|---|---|---|
| 3. I have been feeling sad or down | 21 | 21 | **1** | **1** | **1** |
| 8. I could not get rid of this sad feeling | 21 | 21 | **1** | **1** | **1** |
| 9. I have lost interest in my usual activities | 21 | 21 | **1** | **1** | **1** |
| 14. My sleep has changed (having trouble sleeping or sleeping more than usual) | 21 | 21 | **1** | **1** | **1** |
| 19. Nothing has made me happy | 19 | 21 | **0.810** | **1** | **1** |
| 4. I had trouble keeping my mind on what I was doing | 18 | 21 | **0.714** | **1** | **1** |
| 17. I could not focus on important things | 17 | 21 | **0.619** | **1** | **1** |
| 5. My weight has changed without me trying (lost weight or increased weight) | 15 | 21 | **0.429** | **1** | **1** |
| 20. I have been feeling alone | 15 | 21 | **0.429** | **1** | **1** |
| 12. I have not liked myself | 15 | 19 | **0.429** | **0.91** | **0.91** |
| 16. I have been feeling tired | 14 | 21 | 0.333 | **1** | **1** |
| 18. My eating has changed (eating less than normal or more than normal) | 14 | 21 | 0.333 | **1** | **1** |
| 21. I have not felt like myself | 14 | 21 | 0.333 | **1** | **1** |
| 7. I could not make a decision about simple things | 14 | 20 | 0.333 | **0.95** | **0.95** |
| 15. I could not do things that I have always done | 13 | 19 | 0.238 | **0.91** | **0.91** |
| 10. I felt that most things are my fault | 11 | 20 | 0.048 | **.95** | **0.95** |
| 2. I have been thinking too much | 10 | 19 | -0.048 | **0.91** | **0.91** |
| 1. I have been experiencing more body aches and pains (eg. headaches, neck pain or back pain) | 9 | 20 | -0.143 | **0.95** | **0.95** |
| 11. I have been feeling happy | 8 | 13 | -0.238 | 0.62 | **0.62** |
| 6. I felt like I have been moving too slowly | 5 | 18 | -0.524 | **.86** | **0.86** |

| | |
|---|---|
| S-CVI average = 0.95 | **0.95** |

Note: **CVR**= $[N_e- (N/2)]/(N/2)$
**I-CVI**= Nr/Number of experts
**Kappa**= I-CVI (1)- $P_c$ / 1-$P_c$
**S-CVI**=$[I\text{-}CVI_{item1}+ ICVI_{item2+} ICVI_{item3}\ldots ICVI_{item19}]/19$
$N_{e:}$ Number of experts rating an item as essential, $N_r$: Number of experts rating an item as relevant.
Values in bold meet the criteria for inclusion in the online depression screening tool

The average S-CVI score for the tool was 0.94. The majority of participants (n=18) felt that the adapted time period and response format was relevant.

**Discussion**

Two studies were used to determine the content validity of an adapted online depression screening tool. For study one, 50 mental health experts unanimously agreed that the tool was valid in terms of the instructions, items, scoring and feedback provided. However, various suggestions were made to improve the quality of the tool. For study two, the recommendations suggested during study one were undertaken and the tool was revised.

In terms of the COSMIN criteria for content validity, the adaption of the depression screening tool for online usage by diverse groups in South Africa shows good relevance.

A follow-up content validation was conducted with 21 experts in the field. Nineteen of the experts in study two (final tool) felt that all the items on the tool were relevant for screening of depression, with the exception of item 11 (“I have been feeling happy”). Only 13 experts felt item 11 was relevant. This could be attributed to the item being reversed scored. Therefore, it was decided that this item would be excluded from the final tool. The average S-CVI further highlights the content validity of the overall tool by achieving an average S-CVI score of higher than 80% (Davis, 1992).

Four South African idioms of distress and depression were added to the tool, namely, “I have been experiencing more body aches and pains (e.g. Headaches, neck

pain or back pain))", "I have been thinking too much", "I have been feeling alone" and "I have not felt like myself". Three of these items did not meet the CVR criteria, however, both the I-CVI and Kappa criteria were met. These items received a low CVR as a result of few experts rating the items as essential in depression screening, however, many experts indicated that the time was useful in depression screening hence the items were retained.

The nine items which were rephrased from the CESD-R and which represented the DSM 5 depression criteria received absolute I-CVI and Kappa scores and met the CVR criteria. Items 7 and 15 did not appear on the original CESD-R but were recommended by experts in study one to be included in the screening tool. These items did not meet the CVR criterion but met the I-CVI and Kappa criteria. It should be noted that these two items assessed the symptom criteria for depression as highlighted in the DSM 5 (focus and indecisiveness).

This study demonstrated that a 19-item adapted online depression screening tool displays relevance in terms of the construct being measured and the appropriateness of the target population and context for which it is intended. There are limitations in that content validation is a subjective view of experts and therefore could result in bias when items are rated, however the two studies with various experts and both qualitative and quantitative indicators reduced this risk. It is acknowledged that the pool of experts is small and does not represent the various language groups present in South Africa. Going forward, it would be necessary to establish the content validity in terms of comprehensiveness and comprehensibility ratings as described by COSMIN. These ratings are dependent on the target population views and pilot testing of the tool and

not the development stage of the tool. In addition, the construct and criterion validity as well as reliability of the tool would need to be assessed.

## Conclusion

This study highlighted that the adapted online depression screening tool designed for diverse groups in South Africa shows good relevance in terms of content validity. In addition, the tool was phrased using simple language free from psychological jargon, which is hoped would encourage better understanding by second language English speakers. Screening individuals for depression allows for early detection of their depression risk and has much to offer for the under-resourced South African mental health care landscape. The online screening of depression allows for early detection and self-help options for depression. Further it empowers individuals to discuss their symptoms from a better knowledge base with a doctor or other health care professional allowing for intervention much sooner than would have been the case if the individual had no support or no means of checking their symptoms and of accessing information on depression. The tool therefore has the potential to be incorporated as a screening tool for depression across standard platforms in university counselling centres, primary health care intake forms or even on web platforms such as the South African Depression and Anxiety Support Group (SADAG).

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## Competing interest

The authors have declared that no competing interests exist.

**Author contributions**

XX is the sole author and was responsible for the conceptualisation, data collection and analysis as well as write up for the article.

**Disclaimer**

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

**References**

Aguilera, A. (2015). Digital technology and mental health interventions: Opportunities and challenges. *Arbor*, *191*(771), a210-a210.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th edition). APA.

Andersen, L., Kagee, A., O'Cleirigh, C., Safren, S., & Joska, J. (2015). Understanding the experience and manifestation of depression in people living with HIV/AIDS in South Africa. *AIDS Care*, *27*(1), 59-62. DOI: https://doi.org/10.1080/09540121.2014.951306

Austin, D. W., Carlbring, P., Richards, J. C., & Andersson, G. (2006). Internet administration of three commonly used questionnaires in panic research: Equivalence to paper administration in Australian and Swedish samples of people with panic disorder. *International Journal of Testing*, *6*(1), 25-39.

Ayre, C., & Scally, A. J. (2014). Critical values for Lawshe's content validity ratio: Revisiting the original methods of calculation. *Measurement and Evaluation in Counseling and Development*, *47*(1), 79-86.

Bantjes, J. R., Kagee, A., McGowan, T., & Steel, H. (2016). Symptoms of posttraumatic stress, depression, and anxiety as predictors of suicidal ideation among South African university students. *Journal of American College Health*, *64*(6), 429-437.

Bantjes, J., Lochner, C., Saal, W., Roos, J., Taljaard, L., Page, D., ... & Stein, D. J. (2019). Prevalence and sociodemographic correlates of common mental disorders among first-year university students in post-apartheid South Africa: Implications for a public mental health approach to student wellness. *BMC Public Health*, *19*(1), 922.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101.

Buchanan, T. (2003). Internet-based Questionnaire Assessment: Appropriate Use in Clinical Contexts. *Cognitive Behaviour Therapy*, 32(3), 100–109.

Caruso, R., Nanni, M. G., Riba, M., Sabato, S., Mitchell, A. J., Croce, E., & Grassi, L. (2017). Depressive spectrum disorders in cancer: Prevalence, risk factors and screening for depression: A critical review. *Acta Oncologica*, *56*(2), 146-155.

Cortelyou-Ward, K., Rotarius, T., & Honrado, J. C. (2018). Using Technology to Improve Access to Mental Health Services. *The Health Care Manager*, *37*(2), 101-108.

Davis, L. L. (1992). Instrument review: Getting the most from a panel of experts. *Applied Nursing Research*, *5*(4), 194-197.

Docrat, S., Besada, D., Cleary, S., Daviaud, E., & Lund, C. (2019). Mental health system costs, resources and constraints in South Africa: A national survey. *Health Policy And Planning*, *34*(9), 706-719.

Donker, T., Van Straten, A., & Cuijpers, P. (2010). Internet-based mental health screening. In J. Bennett-Levy, D. Richards, P. Farrand, H. Christensen, K. Griffiths, D. Kavanagh, B. Klein, M. A. Lau, J. Proudfoot, L. Ritterband, J. White, & C. Williams (Eds.), *Oxford guide to low intensity CBT interventions* (pp. 241-245). Oxford University Press.

Eaton, W. W., Smith, C., Ybarra, M., Muntaner, C., & Tien, A. (2004). Center for Epidemiologic Studies Depression Scale: Review and Revision (CESD and CESD-R). In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment: Instruments for adults* (pp. 363–377). Lawrence Erlbaum Associates Publishers.

Ellis, C. G. (2003). Cross-cultural aspects of depression in general practice. *South African Medical Journal*, *93*(5), 342.

Foxcroft, C. (2018). Developing a psychological measure. In C. Foxcroft & G. Roodt (Eds.), *Introduction to psychological assessment in the South African context*. (5th edition). Oxford University Press.

Grahn, B., & Gard, G. (2008). Content and concurrent validity of the motivation for change questionnaire. *Journal of Occupational Rehabilitation*, *18*(1), 68-78.

Hassem, T., & Laher, S. (2018). Ethics of online screening for mental illnesses: A systematic review. Paper presented at the World Congress of Psychiatry Conference on Psychiatry and Mental Health: Global inspirations, locally relevant inspirations, Lisbon, Portugal, 21-24 August.

Hassem, T., & Laher, S. (2019). A systematic review of online depression screening tools for use in the South African context. *South African Journal of Psychiatry*, *25*(1), 1-8.

Hertog, T. N., De Jong, M., Van der Ham, A. J., Hinton, D., & Reis, R. (2016). "Thinking a Lot" among the Khwe of South Africa: A Key Idiom of Personal and Interpersonal Distress. *Culture, Medicine, and Psychiatry*, *40*(3), 383-403.

IBM Corp. (2017). IBM SPSS Statistics for Windows, Version 25.0. IBM Corp.

Kaiser, B. N., Haroz, E. E., Kohrt, B. A., Bolton, P. A., Bass, J. K., & Hinton, D. E. (2015). "Thinking too much": A systematic review of a common idiom of distress. *Social Science & Medicine*, *147*, 170-183. DOI: https://doi.org/10.1016/j.socscimed.2015.10.044

Lal, S., & Adair, C. E. (2014). E-mental health: A rapid review of the literature. *Psychiatric Services*, *65*(1), 24-32.

Lawshe, C. H. (1975). A quantitative approach to content validity 1. *Personnel Psychology*, *28*(4), 563-575.

Leentjens, A. F. (2010). [Review of the book: *Global Perspectives on Mental-physical Comorbidity in the WHO World Mental Health Surveys*, edited by M. R. Von Korff, K. M. Scott, & O. Gureje]. Cambridge University Press. 2009. *Psychological Medicine*, *40*(7), 1226-1227.

Lenz, E. R. (2010). Visual analog scales. In C. F. Waltz, O. L. Strickland, & E. R. Lenz (Eds.), *Measurement in nursing and health research* (pp. 319-325). Springer.

Lund, C., Kleintjes, S., Kakuma, R., Flisher, A. J., & MHaPP Research Programme Consortium. (2010). Public sector mental health systems in South Africa: Inter-provincial comparisons and policy implications. *Social Psychiatry and Psychiatric Epidemiology*, *45*(3), 393-404.

Mall, S., Mortier, P., Taljaard, L., Roos, J., Stein, D. J., & Lochner, C. (2018). The relationship between childhood adversity, recent stressors, and depression in college students attending a South African university. *BMC Psychiatry*, *18*(1), 63.

Meyer, W., Moore, C., & Viljoen, H. (2003). *Personology: From individual to ecosystem* (3rd edition). Heinemann.

Mosotho, N. L., Louw, D. A., Calitz, F. J., & Esterhuyse, K. G. (2008). Depression among Sesotho speakers in Mangaung, South Africa. *African Journal of Psychiatry*, *11*(1), 35-43.

Mufamadi, J., & Sodi, T. (2010). Notions of mental illness by Vhavenda traditional healers in Limpopo Province, South Africa. *Indilinga African Journal of Indigenous Knowledge Systems*, *9*(2), 253-264.

Nglazi, M. D., Joubert, J. D., Stein, D. J., Lund, C., Wiysonge, C. S., Vos, T., ... & Bradshaw, D. (2016). Epidemiology of major depressive disorder in South Africa (1997–2015): A systematic review protocol. *BMJ Open*, *6*(7), e011749.

Patel, V. (2001). Cultural factors and international epidemiology: Depression and public health. *British Medical Bulletin*, *57*(1), 33-45.

Patel, V., Saxena, S., Lund, C., Thornicroft, G., Baingana, F., Bolton, P., ... & UnÜtzer, J. (2018). The Lancet Commission on global mental health and sustainable development. *The Lancet*, *392*(10157), 1553-1598.

Patton, M. (1990). *Qualitative evaluation and research methods* (2nd edition). Sage.

Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health*, *30*(4), 459-467.

SADAG, see South African Depression and Anxiety Group. https://www.sadag.org/

South African ICD-10 Technical User Guide. (2014). https://www.health.gov.za/wp-content/uploads/2021/02/icd-10_technical_mzuserguide.pdf

Stafford, G. I., Pedersen, M. E., Van Staden, J., & Jäger, A. K. (2008). Review on plants with CNS-effects used in traditional South African medicine against

mental diseases. *Journal of Ethnopharmacology*, *119*(3), 513-537. DOI: https://doi.org/10.1016/j.jep.2008.08.010

Statistics South Africa. (2018). *General Household Survey*. http://www.statssa.gov.za/publications/P0318/P03182018.pdf

Statistics South Africa. (2019). *General Household Survey*. http://www.statssa.gov.za/publications/P0318/P03182019.pdf

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*, 1295.

Sulmasy, D. P. (2002). A biopsychosocial-spiritual model for the care of patients at the end of life. *The Gerontologist*, *42*(suppl_3), 24-33.

Terwee, C. B., Prinsen, C. A., Chiarotto, A., Westerman, M. J., Patrick, D. L., Alonso, J., ... & Mokkink, L. B. (2018). COSMIN methodology for evaluating the content validity of patient-reported outcome measures: A Delphi study. *Quality of Life Research*, *27*(5), 1159-1170.

The Center for Epidemiologic Studies Depression Scale Revised. (n.d.) CESD-R website. https://cesd-r.com/ (accessed 17 April 2018).

Thornicroft, G., & Semrau, M. (2018). Mental health capacity building in low and middle income countries: The Emerald Programme. *Epidemiology and Psychiatric Sciences*, *27*(1), 1-2.

Tomlinson, M., Grimsrud, A. T., Stein, D. J., Williams, D. R., & Myer, L. (2009). The epidemiology of major depression in South Africa: Results from the South African stress and health study. *South African Medical Journal*, *99*(5).

Van Rensburg, A. J., Poggenpoel, M., Myburgh, C. P. H., & Szabo, C. P. (2015). Defining and measuring spirituality in South African specialist psychiatry. *Journal of Religion and Health*, *54*(5), 1839-1855.

Van der Walt, S., Mabaso, W. S., Davids, E. L., & De Vries, P. J. (2020). The burden of depression and anxiety among medical students in South Africa: A cross-sectional survey at the University of Cape Town. *SAMJ: South African Medical Journal*, *110*(1), 69-76.

Wilson, F. R., Pan, W., & Schumsky, D. A. (2012). Recalculation of the critical values for Lawshe's content validity ratio. *Measurement and Evaluation in Counseling and Development*, *45*(3), 197-210.

World Health Organisation [WHO]. (2017). Depression and other common Mental Disorders: Global Health Estimates. http://apps.who.int/iris/bitstream/10665/254610/1/WHO-MSD-MER-2017.2-eng.pdf

# Chapter Eight: Evaluating the efficacy of an online depression screening tool in South Africa

## 8.1 Introduction

Once it was established that the tool displayed good content validity, it needed to be pre-tested on the target population in order to obtain quantitative information regarding the performance of the items on the tool as well as the accuracy of the tool. Therefore, this chapter describes the final publication which details the pilot study that addressed the last research question:

*Does the online adapted depression screening tool display good psychometric properties in terms of reliability and criterion validity (sensitivity and specificity)?*

The results of this pilot study indicate that the online adapted CESD-R displays excellent reliability with both the Cronbach alpha coefficient and McDonald's Omega of 0.95. With regards to the criterion validity, the tool displayed a sensitivity score of 90.48% and a specificity score of 47.67%. Lastly, the participants indicated that the website and the adapted tool were user friendly and that the instructions and the items and the feedback were appropriate and easy to understand.

Based on Chapters Seven and Eight, it is evident that the tool displays good content and criterion validity and is reliable. These results confirm that the online adapted CESD-R has the potential to be utilised by the general population of South Africa.

This paper is referenced as follows:

Hassem, T. (in press). Evaluating the efficacy of an online depression screening tool in South Africa: A Pilot study. *South African Journal of Psychiatry*.[8]

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[8] See Appendix P.

**Evaluating the efficacy of an online depression screening tool in South Africa: A Pilot study**

**Hassem, T.**

## Abstract

**Background:** A global increase of 16% in depression rates from 1990-2019, highlights the alarming increase in depression. Research has indicated that this rate is likely to increase as a result of the COVID-19 pandemic. In South Africa, the depression life-time prevalence rate is 9,47%. However, the lack of access to mental health care services leads to people not receiving much needed information and care. The growing accessibility to the internet for South Africans offers a solution for the screening and access to self-help information for depression. The CESD-R was adapted for online usage and a website, mddsa.co.za, was piloted in this regard. This study reports on the efficacy of the online adapted CESD-R for use in South Africa by reporting on the reliability and criterion validity as well as the user friendliness of the website and the appropriateness of the instant feedback provided.

**Methods:** This study followed a quantitative, cross-sectional research design. A convenience sample of 21 individuals with a depression diagnosis and 86 individuals with no mental health diagnoses, above the age of 18 participated in the study. Participants accessed the screening instrument online at the website.

**Results:** Internal consistency reliability coefficients exceeded 0.80. T-test and sensitivity and specificity results attested to the accuracy of the tool. All items contributed well to the instrument including the items that were culturally specific to South Africa. Feedback from participants indicated that the tool was easily comprehensible, the website was user friendly and the instant feedback provided was appropriate.

**Conclusion:** The online adapted CESD-R evidenced excellent reliability and criterion validity and was able to accurately screen for depression amongst South Africans. The

website and the tool have the potential to be utilised to increase access to a screening instrument for individuals who display symptoms of depression and to enhance the opportunity for individuals to practise self-help.

**Keywords:** criterion validity**,** depression**,** online screening, reliability, sensitivity, specificity

## Introduction

Depression is currently ranked as the 13th leading cause of global burden of Disability Adjusted Life Years (DAYLS) in 2019 [1], as a result of a 16% increase in the global prevalence rate from 1990-2019. The life-time prevalence rate of depression in South Africa is 9.47%[2]. Research suggests that depression rates are likely to increase as a result of the Coronavirus (COVID-19) pandemic[3-4]. This can be attributed primarily to experiences of isolation as well as other dramatic changes in social and occupational spheres during the pandemic[5].

Research on depression in the South African context highlights unique symptoms experienced by individuals diagnosed with depression such as feelings of loneliness, not feeling like oneself, "thinking too much" as well as an increased emphasis placed on somatic symptoms experienced and reported by individuals [6-7; 10-11]. These symptoms have not been included in the Diagnostic and Statistical Manual diagnostic criteria for depression[12]. In South Africa the diagnosis and treatment of depression has been compromised for various reasons, such as, the challenges experienced in accessing mental health care, lack of mental health resources, depression terminology is often not available in all South African languages to describe the diagnosis, the term depression is not understood in the same way across cultures and the stigma associated with mental illnesses[6-9]. An additional factor which compromises and often results in the underdiagnosis of depression is the instrument used to screen for depression amongst individuals. Instruments which screen for depression is an additional source of information to assist with diagnosis are mostly self-report instruments developed for Westernised countries, thus poses a variety of challenges which impact on the

accuracy of these instruments. These instruments utilise psychological jargon when assessing symptoms which is not often understood by second language English speakers and translations of these instruments into indigenous South African languages often results in construed meaning of the constructs measured. In addition, there is an emphasis placed on assessing cognitive symptoms of depression and these instruments do not account for the unique depression symptoms identified in the South African context. Despite the unique presentation of depression experienced by South Africans, commonly used depression screening tools in the South Africa context have not been adapted, however they have been translated into various South African languages[13-15].

The Center for Epidemiologic studies Depression Scale (CESD) is among one of the commonly utilised screening instruments for individuals that have symptoms of depression that has been translated into 3 South African languages (Afrikaans, isiZulu and IsiXhosa)[13]. The translated tool evidenced reliability scores ranging between 0.69-0.89, sensitivity and specificity ranging between 71.4% and 84.1% and 72.6%-95% respectively. Positive predictive values ranged from 16.1% to 54.8%[13]. The Center for Epidemiological Studies Depression - Revised scale (CESD-R) administered on an electronic device (hand-held tablet) evidenced an internal consistency reliability score of 0.95, a sensitivity of 0.81 and specificity of 0.82 in a sample of HIV positive South African individuals[16]. A pooled analysis of the CESD has evidenced sensitivity and specificity of 87% (95% CI 0.82-0.91) and 70% (95% CI 0.65-0.75) respectively in a sample of general and primary care population[16]. Internationally, the paper versions of the CESD, CESD-10 and CESD-R evidenced reliability coefficients ranging from 0.94-0.83 [18-22], while a Cronbach alpha of 0.82 was established for a shortened online version of the CESD (7-items) amongst college students in Spain[23].

On the basis of the unique symptom presentation of depression, lack of mental health resources and the fact that 64.7% of South Africans have at least one member in their household that has access to the internet and only 8.4% of individuals speak English as a home-language [24], [Author(s), in press] (under review) adapted the (CESD-R) for online usage within the South African context[25].

The online depression screening tool is located on MDDSA.co.za as an open access resource. The website provides the user with information regarding depression, the screening tool as well as various contact details for individuals that are in need of support. Once individuals take the test, they receive instant feedback regarding their risk level (low, medium and high) in terms of the depression symptoms they are experiencing. The online adapted CESD-R demonstrates good content validity[25] and relevance, and a high internal consistent reliability of 0.93 among postgraduate university students. The efficacy of the tool for the general South African population has not been determined. Thus, this study investigated the reliability, criterion validity (sensitivity and specificity) comprehensibility and user friendliness of the online adapted CESD-R as well as the user friendliness of the website and appropriateness of the instant feedback provided.

## Methods

### Study design

The study followed a non-experimental, quantitative, cross-sectional research design, as participants completed a survey via the website (MDDSA.co.za). A request made for participation in the study was circulated by psychologists, psychiatrists and general practitioners on various social media platforms and in their consulting rooms. Data collection commenced on the 28th September 2020 and closed on the 30 November 2020. It should be noted that data collection occurred during the COVID lockdown phases 2 and 1 in South Africa. During lockdown phases 2 and 1, all individuals were required to wear face masks when in public spaces and all major sectors were permitted to resume operations. Access to hospitals were only permitted for obtaining medication and seeking treatment, while adhering to strict health protocols [25].

### Study population

A non-probability convenience sample of 107 individuals participated in the study[27]. Table 1 highlights the sample demographics. The majority of the sample ($n$ =86) were not diagnosed with depression (No diagnosis (ND) sample) whereas 21 individuals reported

having received a formal depression diagnosis (formally diagnosed (FD)). The majority of the ND sample identified as being female (*n* =60, 69.8%), Black (*n* =25, 37.9%), Christian (*n* =40, 46.5%) and spoke English as their home language (*n* =50, 58.1%). The FD were mainly female (*n* =13, 61.9%), White (*n* =50.0%), Christian (*n* =42.9%) and spoke English (*n* =17, 81%). ND participants had an age range of 19-70 years old (M=35, SD=12.205), while the age arrange for the FD was 19-66 (M= 33.5, SD=11.405).

In the ND sample nine of the eleven official languages of South Africa were selected as a home language, whereas only three of the eleven languages were selected as the home language by the FD sample. With regards to comprehension and reading ability in English, majority of both the ND and FD samples rated their ability as excellent. Majority of the ND and FD samples reported not having been diagnosed with a physical chronic condition – see Table 1.

The majority of the FD sample reported being diagnosed with depression by a psychiatrist (*n* =17, 81%) and stated that they had a depressive episode at least within the past six months of taking the survey (*n* =12, 57.1%). 12 out of the 21 individuals in the FD sample were on medication to treat their depression as is evident in Table 2.

### Instruments

The survey consisted of a brief demographic questionnaire, the adapted online CESD-R as well as several questions assessing the comprehensibility and user friendliness of the online adapted CESD-R, the user friendliness of the website and the appropriateness of the instant feedback provided. The brief demographic questionnaire requested information regarding age, gender, population group, religious affiliation, home language, health condition, depression diagnosis. Participants who answered yes to being diagnosed with depression had three follow-up questions relating to year of diagnosis, who made the diagnosis as well as the occurrence of the last depressive episode. Lastly, participants were asked to rate ability in English from *Excellent* to *very poor* with regards to proficiency, comprehension and reading ability.

*Table 3: Combined, ND and FD sample demographics*

| | | Combined sample | | ND sample | | FD sample | |
|---|---|---|---|---|---|---|---|
| Variable | | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage |
| Gender | Female | 73 | 68,2 | 60 | 69.8 | 13 | 61.9 |
| | Male | 34 | 31,8 | 26 | 30.2 | 8 | 38.1 |
| Race[a] | Black | 28 | 35 | 25 | 37.9 | 3 | 21.4 |
| | Coloured | 8 | 10 | 6 | 9.1 | 2 | 14.3 |
| | Indian | 15 | 18.8 | 14 | 21.2 | 1 | 7.1 |
| | White | 25 | 31.3 | 18 | 27.3 | 7 | 50 |
| | Asian | 2 | 2.5 | 1 | 1.5 | 1 | 7.1 |
| | Other | 2 | 2.5 | 2 | 3 | 2 | 14.3 |
| Religious affiliation | Christianity | 49 | 45.8 | 40 | 46.5 | 9 | 42.9 |
| | Hinduism | 9 | 8.4 | 6 | 7.0 | 3 | 14.3 |
| | Islam | 27 | 25.2 | 25 | 29.1 | 2 | 9.5 |
| | Judaism | 6 | 5.6 | 5 | 5.8 | 1 | 4.8 |
| | No religious affiliation | 11 | 10.3 | 7 | 8.1 | 4 | 19.0 |
| | Traditional African | 3 | 2.8 | 3 | 3.5 | - | - |
| | Other | 2 | 1.9 | - | - | 2 | 9.5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Home Language | Afrikaans | 5 | 4.7 | 5 | 5.8 | | |
| | English | 67 | 62.6 | 50 | 58.1 | 17 | 81.0 |
| | Sepedi | 4 | 3.7 | 4 | 4.7 | | |
| | Setswana | 12 | 11.2 | 10 | 11.6 | 2 | 9.5 |
| | Sotho | 4 | 3.7 | 2 | 2.3 | 2 | 9.5 |
| | Tshivenda | 2 | 1.9 | 2 | 2.3 | - | - |
| | Xitsonga | 3 | 2.8 | 3 | 3.5 | - | - |
| | Xhosa | 2 | 1.9 | 2 | 2.3 | - | - |
| | Isizulu | 4 | 3.7 | 4 | 4.7 | - | - |
| | Non-South African | 4 | 3.7 | 4 | 4.7 | - | - |
| Language proficiency (ability to speak and | Excellent | 79 | 73.8 | 62 | 72.1 | 17 | 81.0 |
| undertake various tasks) | Good | 25 | 23.4 | 21 | 24.4 | 4 | 19.0 |
| | Poor | 2 | 1.9 | 2 | 2.3 | - | - |
| | Very poor | 1 | 0.9 | 1 | 1.2 | - | - |
| Language comprehension (ability to | Excellent | 80 | 74.8 | 63 | 73.3 | 17 | 81.0 |
| understand) | Good | 26 | 24.3 | 22 | 25.6 | 4 | 19.0 |
| | Very poor | 1 | 0.9 | 1 | 1.2 | - | - |
| Reading skills | Excellent | 83 | 77.6 | 66 | 76.7 | 17 | 81.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Good | 22 | 20.6 | 18 | 20.9 | 4 | 19.0 |
| | Poor | 1 | 0.9 | 1 | 1.2 | - | - |
| | Very poor | 1 | 0.9 | 1 | 1.2 | - | - |
| Have you been diagnosed with a physical illness | No | 84 | 78.5 | 71 | 17.4 | 13 | 61.9 |
| | Yes | 23 | 21.5 | 15 | 82.6 | 8 | 38.1 |
| Are you currently taking medication for your illness | No | 79 | 73.8 | 70 | 81.4 | 9 | 42.9 |
| | Yes | 28 | 26.2 | 16 | 18.6 | 12 | 57.1 |
| Have you been diagnosed with depression previously | No | 86 | 80.4 | 86 | 100 | - | - |
| | Yes | 21 | 19.6 | - | - | 21 | 100 |

*Note*. $N = 101$, except where indicated otherwise, [a]*N=80*

*Table 4: Depression History of the depressed sample*

| | | Frequency | Percentage |
|---|---|---|---|
| Who diagnosed you with depression? | General Doctor | 4 | 19 |
| | Psychiatrist | 17 | 81 |
| Last depression episode | A year ago | 9 | 42.9 |
| | During this month | 4 | 19 |
| | In the past two months | 7 | 33.3 |
| | In the past six months | 1 | 4.8 |

*Note*. $N = 21$

The online adapted CESD-R is grounded in the Biopsychosocial-Spiritual (BPSS) model and consists of 19 items with a 4-point Likert type response format (0= Not at all, 1= Some of the time, 2= Most of the time and 3= All the time). It assesses symptoms over a two-month period. In addition, the items are jargon free and can be easily understood. Four items pertain specifically to the idioms of distress experienced by the South African population, namely, 'I have been experiencing more body aches and pains (e.g. headaches, neck pain or back pain)', 'I have been thinking too much', 'I have been feeling alone' and 'I have not felt like myself'. The tool is scored out of 57 and uses a two-tier scoring system. Tier one looked at symptoms of sadness and loss of interest, while tier appetite, sleep, concentration, guilt, fatigue and movement based on the symptom presentation outlined in the DSM-5[28]. A cut-off score of 20 and less placed individuals into the low-risk category, a score ranging from 21-34 placed individuals in a medium-risk category and a cut-off score of 35 and above placed individuals in high-risk category. The tool displayed good content validity in the South African context[24].

Lastly, participants were asked to indicate via a yes/no response format on the user-friendliness of the tool and the website, if the instructions provided were easily understood, item appropriateness as well as to indicate if there any words/phrases they did not understand. After completion participants were presented with the results of the CESD-R and asked to comment on the appropriateness of the feedback provided.

## Procedure

Participants received information about the study via psychologists, psychiatrists, general practitioners and through social media such as WhatsApp. Information about the study included a link to the survey on the MDDSA.co.za website. The survey took approximately 15 minutes to complete and participants were provided with instant results based on their item responses on the online adapted CESD-R.

## Ethical considerations

Ethical clearance was obtained from the Human Research Ethics Committee, Medical (HRECM) of the University of the Witwatersrand (Ethics protocol number: M180402). Participation in the study was completely voluntary and anonymous. Participants were informed about the study via a participant information sheet and free online and telephonic counselling details were provided to participants in the event of experiencing any form of distress.

## Data analysis

Data was extracted from the website database and coded for analysis. IBM SPSS Statistics 27 and JASP were used to analyse the coded data. Demographic variables as well as the six questions regarding the tool and website were analysed using frequencies and percentages. In order to determine the internal consistency reliability a Cronbach alpha coefficient and the McDonald's Omega coefficient were calculated. To determine the criterion validity(sensitivity, specificity, positive predictive values (PPV) and negative predictive values (NPV)of the tool were calculated are per the recommendations made by Trevethan[29]. The Area Under (AUC) the Receiver Operating Characteristic Curve (ROC) was used to determine the accuracy of the tool as well as the model quality. All the items were normally distributed as per skewness calculations. In order to determine the discriminatory power of the items among the

ND and FD samples, an independent samples t-test was utilised, and where results were significant the Cohen's d was calculated to determine the effect size.

## Results

### Descriptive statistics

Table 3 highlights the means scores obtained for both the ND and FD samples. For all items, the mean scores for the FD sample were larger than the mean scores for the ND sample; however, all differences were statistically significant ($p<0.05$) with the exception of items 2, 3, 6 and 7 ($p>0.05$). Large effect sizes ranging between 0.906 and 1.021, was evident for items 1, 5, 8, 9, 10, 11, 12 and 18, while moderate effect sizes ranging between 0.785 and 0.888 was evident for items 4, 13, 14, 15, 16, 17 and 19. Lastly, the mean total score for the FD sample was significantly higher than the mean total score for the ND sample ($t_{105}=4.22$, $p=0.000$; Cohen's d= 12.239).

### Reliability of the adapted online CESD-R

As is evident in table 4, the online adapted CESD-R displays an excellent internal consistency reliability with a Cronbach alpha coefficient of 0.952 and McDonald omega coefficient of 0.954 for the combined samples.[30] The Cronbach alpha for the FD sample was 0.934, while the McDonald omega was 0.938. For the ND sample the Cronbach alpha coefficient was 0.948 and the McDonald omega coefficient was 0.950. Table 4 also demonstrates the effect on reliability if an item is excluded. There are no significant increases or decreases to the reliability coefficients if any of the items are excluded. Thus, each item contributes well to the tool.

**Validity of the adapted online CESD-R**

As is evident from table 5, the majority (*n* =45, 52.37%) of the group without depressive features scores ranked them in the low-risk category, while in the FD sample the majority of the participants score ranked them in the high-risk category (*n* =10, 47.6%). In order to determine the sensitivity, specificity, PPV and NPV, medium and high-risk group were combined to represent participants who display depressive features. In addition, reporting being formally diagnosed with depression constituted the "Gold Standard". Therefore, for the ND sample 41 participants (47.7%) were classified as displaying depressive symptoms, while in the FD sample 19 (90.5%) participants were classified as displaying prominent depressive features.

*Table 5: Descriptive statistics and independent samples t-test*

| | Combined sample[1] | | ND sample[2] | | FD sample[3] | | Independent samples t-test | | |
|---|---|---|---|---|---|---|---|---|---|
| **Item** | **Mean** | **Standard Deviation** | **Mean** | **Standard Deviation** | **Mean** | **Standard Deviation** | **t** | **P-value** | **Cohen's d** |
| **1. I have been experiencing more body aches and pains (eg. headache, neck pain or back pain)** | 1.26 | 0.94 | 1.14 | 0.88 | 1.76 | 1.00 | 2.83 | **0.006***** | 0.906 |
| **2. I have been thinking too much** | 1.70 | 0.91 | 1.64 | 0.94 | 1.95 | 0.74 | 1.64 | 0.110 | 0.909 |
| **3. I have been feeling sad or down** | 1.14 | 0.77 | 1.08 | 0.77 | 1.38 | 0.74 | 1.61 | 0.110 | 0.765 |
| **4. I had trouble keeping my mind on what I was doing** | 1.07 | 0.84 | 0.92 | 0.76 | 1.71 | 0.90 | 4.16 | **0.000***** | 0.785 |
| **5. My weight has changed without me trying (lost weight or gained weight)** | 1.07 | 1.04 | 0.93 | 0.99 | 1.67 | 1.07 | 3.01 | **0.003***** | 1.006 |
| **6. I felt like I have been moving too slowly** | 1.04 | 0.92 | 0.98 | 0.84 | 1.29 | 1.19 | 1.12 | 0.272 | 0.917 |
| **7. I could not make a decision about simple things** | 0.79 | 0.95 | 0.70 | 0.93 | 1.14 | 0.96 | 1.95 | 0.054 | 0.940 |
| **8. I could not get rid of this sad feeling** | 0.97 | 0.94 | 0.85 | 0.91 | 1.48 | 0.87 | 2.84 | **0.005***** | 0.906 |
| **9. I have lost interest in my usual activities** | 1.00 | 0.98 | 0.81 | 0.88 | 1.76 | 1.04 | 4.28 | **0.000***** | 0.909 |
| **10. I felt that most things are my fault** | 1.16 | 1.05 | 1.03 | 1.35 | 1.00 | 1.11 | 2.54 | **0.013***** | 1.021 |
| **11. I have not liked myself** | 0.93 | 1.02 | 2.15 | 0.71 | 0.92 | 0.93 | 4.91 | **0.000***** | 0.921 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **12. My sleep has changed (having trouble sleeping or sleeping more than usual)** | 1.35 | | 1.06 | | 2.63 | 1.16 | 0.99 | 1.00 | 3.86 | **0.000**$^{***}$ | 0.993 |
| **13. I could not do things that I always done** | 0.86 | | 0.90 | | 2.43 | 0.76 | 0.83 | 1.06 | 2.49 | **0.014**$^{***}$ | 0.874 |
| **14. I have been feeling tired** | 1.45 | | 0.92 | | 2.99 | 1.27 | 0.87 | 0.87 | 4.46 | **0.000**$^{***}$ | 0.851 |
| **15. I could not focus on important things** | 0.98 | | 0.89 | | 2.69 | 0.83 | 0.77 | 1.07 | 3.90 | **0.004**$^{***}$ | 0.836 |
| **16. My eating has changed (eating less than normal/more than normal)** | 1.07 | | 0.94 | | 2.62 | 0.90 | 0.85 | 1.00 | 4.03 | **0.000**$^{***}$ | 0.883 |
| **17. Nothing has made me happy** | | 0.82 | | 0.92 | 2.26 | 0.70 | 0.84 | 1.07 | 2.94 | **0.004**$^{***}$ | 0.888 |
| **18. I have been feeling alone** | 1.09 | | 1.01 | | 2.52 | 0.99 | 1.01 | 0.93 | 2.21 | **0.029**$^{***}$ | 0.996 |
| **19. I have not felt like myself** | 1.06 | | 0.90 | | 2.70 | 0.95 | 0.87 | 0.93 | 2.44 | **0.016**$^{***}$ | 0.879 |
| **Total depression score** | 20.80 | | 13.17 | | 18.34 | 12.16 | 30.90 | 12.57 | 4.22 | **0.000**$^{***}$ | 12.239 |

Note ***Significant at $\alpha$=0.05, [1] N=107, [2] N=86, [3] N=2

Table 4: Reliability analyses

| Item | Cronbach alpha if item is deleted | McDonalds Omega if item deleted |
|---|---|---|
| I have been experiencing more body aches and pains (e.g. headache, neck pain or back pain) | 0.953 | 0.954 |
| I have been thinking too much | 0.950 | 0.951 |
| I have been feeling sad or down | 0.950 | 0.951 |
| I had trouble keeping my mind on what I was doing | 0.950 | 0.951 |
| My weight has changed without me trying (lost weight or gained weight) | 0.951 | 0.952 |
| I felt like I have been moving too slowly | 0.951 | 0.952 |
| I could not make a decision about simple things | 0.952 | 0.953 |
| I could not get rid of this sad feeling | 0.949 | 0.950 |
| I have lost interest in my usual activities | 0.948 | 0.950 |
| I felt that most things are my fault | 0.949 | 0.951 |
| I have not liked myself | 0.950 | 0.951 |
| My sleep has changed (having trouble sleeping or sleeping more than usual) | 0.950 | 0.952 |
| I could not do things that I always done | 0.950 | 0.951 |
| I have been feeling tired | 0.949 | 0.950 |
| I could not focus on important things | 0.949 | 0.950 |
| My eating has changed (eating less than normal/more than normal) | 0.950 | 0.951 |
| Nothing has made me happy | 0.949 | 0.951 |
| I have been feeling alone | 0.950 | 0.952 |
| I have not felt like myself | 0.949 | 0.950 |
| Combined sample | 0.952 | 0.954 |
| FD sample | 0.934 | 0.938 |
| ND sample | 0.948 | 0.950 |

*Table 5: Depression symptom risk category for the combined, ND and FD samples*

| | | Combined sample | | ND Sample | | FD sample | |
|---|---|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage |
| Depression risk category | Low risk | 47 | 43.9 | 45 | 52.3 | 2 | 9.5 |
| | Medium risk | 30 | 28 | 21 | 24.4 | 9 | 42.9 |
| | High risk | 30 | 28 | 20 | 23.3 | 10 | 47.6 |

Table 6: Basis for deriving sensitivity, specificity, positive and negative predictive values

| | |
|---|---|
| True Positive N=19 | False Positive N= 41 |
| False Negative N=2 | True Negative N= 45 |

With a cut-off score of 20, the tool produced a sensitivity of 90.48% and a specificity of 47.67% while the positive predictive value was 31.67% and negative predictive value was 95.75%. When looking at the ROC curve is it evident that the test has a fair accuracy with AUC (area under the curve) equal to 0.776 and the accuracy of the tool is statistically significant at a 95% confidence interval (p=0.000; 0.6631-0.889) (see Figure 1). Lastly, the model quality based on the total survey score was equal to 0.66 (see Figure 2).

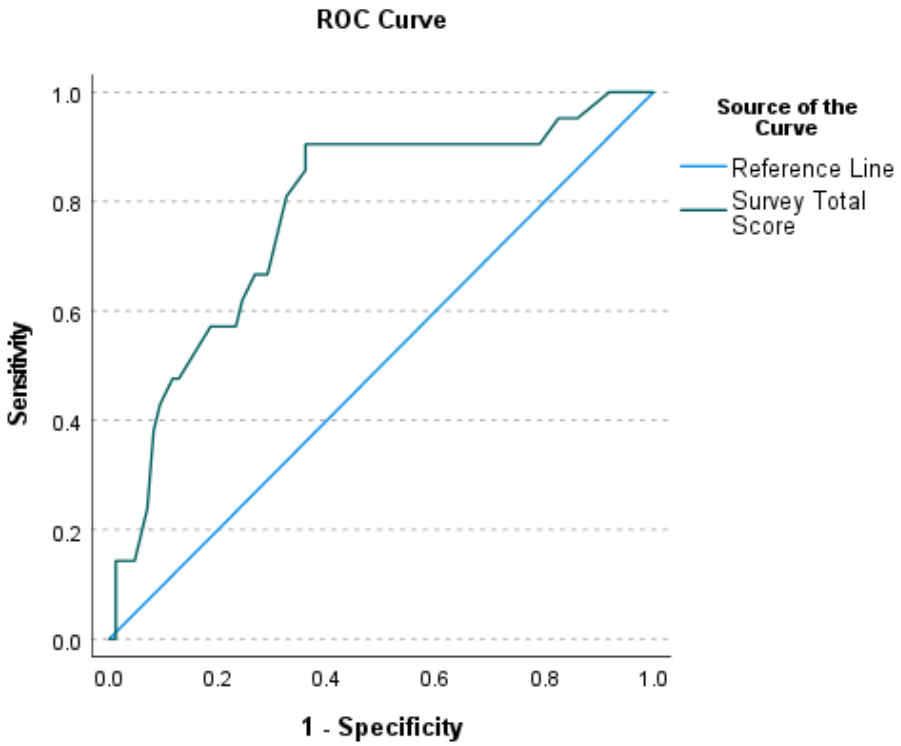



Figure 3: ROC Curve showing the AUC for the online adapted CESD-R

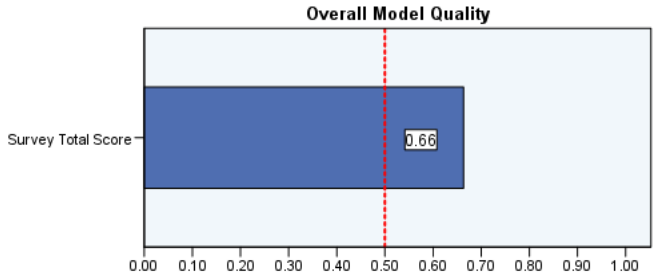



*Figure 4: Model quality as per the total survey score*

As evidenced in table 7 the website and depression screening tool were viewed as user friendly by the majority of participants (*n* =103, 98.1%). The majority of the participants reported that the instructions of the tool were easily understood (*n* =104, 99%). Participants noted that terminology used to define symptoms were easy to understand (*n* =101, 97.1%) and reported that the items or phrases in the tool were appropriate (*n* =100, 96.2%). With regards to the instant feedback provided only 90 participants responded, with majority (*n*=86, 96%) indicating the feedback provided was useful.

*Table7:Tool and website feedback for combined, ND and FD samples*

| | | Combined | | ND sample | | FD sample | |
|---|---|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage |
| Is the website user friendly? [a] | No | 2 | 1.9 | 1 | 1.2 | 1 | 4.8 |
| | Yes | 103 | 91 | 83 | 98.8 | 20 | 95.2 |
| Is the tool user friendly? [b] | No | 1 | 0.8 | 1 | 1.2 | - | - |
| | yes | 102 | 99 | 81 | 98.8 | 21 | 100 |
| Were the instructions easily understood? [c] | No | 1 | 1.0 | 1 | 98.8 | - | - |
| | yes | 104 | 99.0 | 83 | 1.2 | 21 | 100 |
| Any words or phrases that were not understood? [d] | No | 101 | 97.1 | 81 | 97.6 | 20 | 95.2 |
| | Yes | 3 | 2.9 | 2 | 2.4 | 1 | 4.8 |
| Were the items appropriate? [e] | No | 4 | 3.8 | 3 | 3.6 | 1 | 4.8 |
| | yes | 100 | 96.2 | 80 | 96.4 | 20 | 95.2 |

*Note.* [a,c]*N= 105,* [b]*N=103,* [d,e]*N=104*

**Discussion**

This study set out to assess the reliability, criterion validity (sensitivity and specificity) comprehensibility as well as the user friendliness of the online adapted CESD-R tool. In addition, the user friendliness of the website as well as the appropriateness of the instant feedback provided was assessed. Results indicate that the online adapted CESD-R is reliable, valid, user friendly and comprehensible. In addition, the website on which the tool is located is user friendly and the instant feedback provided is appropriate.

The 19 items on the tool are each able to discriminate between individuals that present with depressive features and individuals that do not display prominent symptoms of depression, as the FD sample obtained statistically higher means on fifteen (1, 4, 5, 8-19) out of the nineteen items when compared to the ND sample. Items that did not display a statistical difference in mean scores between the FD and ND sample, assessed concentration (3, 7), sadness (2) as well as movement (6).

The four items which constitute symptoms unique to individuals that are diagnosed with depression in South Africa, which are not included in the diagnostic manual used for classifying and diagnosing depression can be deemed appropriate. The appropriateness of these items (1, 18, 19) is reflective in a statistically higher mean obtained by the FD sample when compared to the ND sample. In addition, these items all contribute to the overall reliability score of the tool and removal of any of these items does not increase the overall reliability score of the tool.

The online adapted CESD-R evidenced an excellent reliability scores, which is higher than the lower and equivalent upper range of the paper-based CESD-10[13] and equivalent to the CESD-R administered on a hand-held tablet within the South African context[16]. When compared to the reliability scores established on the paper-based version of the CESD, CESD-10 and the CESD-R, the adapted version evidenced a higher reliability co-efficient[18-22]. Lastly, the online adapted CESD-R displays a higher reliability coefficient when compared

to the online CESD administered to a Spanish college sample[23] and the online adapted CESD-R administered to a South African postgraduate sample.

The online adapted CESD-R displayed a higher sensitivity and a lower specificity score in relation to the paper-based CESD-10 and CESD-R administered on a hand-held tablet within the South African context[12]. The higher sensitivity score can be attributed to the easy-to-understand language, the inclusion of the symptoms displayed by South Africans formally diagnosed with depression as well as the removal of positive affect items which performed poorly on the paper-based CESD-10[13]. The lower specificity score can be attributed to the timing of the study, where depression is viewed as a psychological reaction to the COVID-19 pandemic[5], thus, increasing depression symptoms experienced by the ND sample. The low PPV and high NPV evidenced is in accordance with that reported by Baron et al.[13]. However, the PVV is lower and the NPV is higher than the report by Kagee et al.[16], which can be attributed to the higher prevalence rate of depression amongst the sample recruited by Kagee et al.[16]. The low PPV is a direct result of the relatively small sample size of FD depressed individuals in the study.

As a result of the removal of psychological jargon from the online adapted tool, it is evident that the instructions as well as items can be easily understood by individuals who are not first language English speakers. The user friendliness of the tool and the website highlights the potential the tool has in allowing individuals to assess their symptoms in the comfort of their own homes and on their own time, thus holding the potential to reduce the stigma associated with depression within the community settings. Lastly, the instant feedback provided to all risk groups (low, medium, and high) was well received, thus highlighting the appropriateness of the way feedback is displayed.

**Limitations**

The sample size and the time at which the study was conducted are limitations in this study. As a result of the COVID-19 pandemic and limited access to hospitals and treatment facilities the researcher was not able to obtain a larger and more representative sample of individuals diagnosed with depression. In addition, many individuals with no history of

depression, may have experienced symptoms of depression as a result of the effects of the pandemic. As a result of the sample size, more sophisticated statistical techniques such as Item response theory analysis and confirmatory factor analysis could not be performed. Thus, is it recommended that testing continue to obtain a larger and more representative sample size.

## Conclusion

The study provides evidence that the online adapted CESD-R displays good reliability and validity while accounting for the unique symptoms of depression experienced by South Africans. As a result of the ease of accessibility and user friendliness of the tool, the adapted online CESD-R has the potential to be utilised in both public and private health care facilities in South Africa as an adjunct to the clinical and observations that are usually done on the clinical setting. Lastly, the instant feedback provided as well as the information on self-help and contact details for further assistance can be viewed as a step towards the creation of awareness of the symptoms of distress that might lead to a diagnosis of depression and it might assist individuals to seek more formal modes of assessment and treatment if necessary.

**Reference list**

1. Vos T, Lim SS, Abbafati C, Abbas KM, AbbasAM, Abbasifard M, Abbasi-Kangevari M, Abbastabar H, Abd-Allah F, Abdelalim A, Abdollahi M. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. The Lancet. 2020 Oct 17;396(10258):1204-22.
2. Tomlinson M, Grimsrud AT, Stein DJ, Williams DR. and Myer L. The epidemiology of major depression in South Africa: results from the South African stress and health study. South African Medical Journal. 2009;99(5).
3. Salari N, Hosseinian-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, Rasoulpoor S, Khaledi-Paveh B. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. Globalization and health. 2020 Dec;16(1):1-1.
4. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. Asian journal of psychiatry. 2020 Apr 10:102066.
5. Zhou X, Snoswell CL, Harding LE, Bambling M, Edirippulige S, Bai X, Smith AC. The role of telehealth in reducing the mental health burden from COVID-19. Telemedicine and e-Health. 2020 Apr 1;26(4):377-9.
6. Mosotho NL, Louw DA, Calitz FJ, Esterhuyse KG. Depression among Sesotho speakers in Mangaung, South Africa. African journal of psychiatry. 2008;11(1):35-43.
7. Andersen L, Kagee A, O'Cleirigh C, Safren S, Joska J. Understanding the experience and manifestation of depression in people living with HIV/AIDS in South Africa. AIDS care. 2015 Jan 2;27(1):59-62.
8. Lund C, Kleintjes S, Kakuma R, Flisher AJ, MHaPP Research Programme Consortium. Public sector mental health systems in South Africa: inter-provincial comparisons and policy implications. Social psychiatry and psychiatric epidemiology. 2010 Mar 1;45(3):393-404.
9. G Ellis C. Cross-cultural aspects of depression in general practice: clinical practice: SAMJ forum. South African Medical Journal. 2003 May 1;93(5):342-5.
10. Kaiser BN, Haroz EE, Kohrt BA, Bolton PA, Bass JK, Hinton DE. “Thinking too much”: A systematic review of a common idiom of distress. Social Science & Medicine. 2015 Dec 1;147:170-83.

11. Den Hertog TN, De Jong M, Van Der Ham AJ, Hinton D, Reis R. “Thinking a lot” among the Khwe of South Africa: A key idiom of personal and interpersonal distress. Culture, medicine, and psychiatry. 2016 Sep 1;40(3):383-403.
12. American Psychiatric Association and American Psychiatric Association, 2013. DSM 5. American Psychiatric Association, 70.
13. Baron EC, Davies T, Lund C. Validation of the 10-item centre for epidemiological studies depression scale (CES-D-10) in Zulu, Xhosa and Afrikaans populations in South Africa. BMC psychiatry. 2017 Dec 1;17(1):6.
14. Cholera R, Gaynes BN, Pence BW, Bassett J, Qangule N, Macphail C, Bernhardt S, Pettifor A, Miller WC. Validity of the patient health questionnaire-9 to screen for depression in a high-HIV burden primary healthcare clinic in Johannesburg, South Africa. Journal of affective disorders. 2014 Oct 1;167:160-6.
15. Bhana A, Rathod SD, Selohilwe O, Kathree T, Petersen I. The validity of the Patient Health Questionnaire for screening depression in chronic care patients in primary health care in South Africa. BMC psychiatry. 2015 Dec 1;15(1):118.
16. Kagee A, Bantjes J, Saal W, Sterley A. Predicting caseness of major depressive disorder using the Center for Epidemiological Studies Depression Scale (CESD-R) among patients receiving HIV care. General Hospital Psychiatry. 2020 Nov 1;67:70-6.
17. Vilagut G, Forero CG, Barbaglia G, Alonso J. Screening for depression in the general population with the Center for Epidemiologic Studies Depression (CES-D): a systematic review with meta-analysis. PloS one. 2016 May 16;11(5):e0155431.
18. Demirchyan A, Petrosyan V, Thompson ME. Psychometric value of the Center for Epidemiologic Studies Depression (CES-D) scale for screening of depressive symptoms in Armenian population. Journal of affective disorders. 2011 Oct 1;133(3):489-98.
19. Campo-Arias A, Díaz-Martínez LA, Rueda-Jaimes GE, Cadena-Afanador LD, Hernández NL. Psychometric properties of the CES-D scale among Colombian adults from the general population. Revista Colombiana de Psiquiatría. 2007 Dec;36(4):664-74.
20. González P, Nuñez A, Merz E, Brintz C, Weitzman O, Navas EL, Camacho A, Buelna C, Penedo FJ, Wassertheil-Smoller S, Perreira K. Measurement properties of the Center for Epidemiologic Studies Depression Scale (CES-D 10): Findings from HCHS/SOL. Psychological Assessment. 2017 Apr;29(4):372.

21. Psaki SR, Hindin MJ. Lessons in cross-cultural measurement of depressive symptoms: findings from a mixed-methods study in Ghana. International journal of culture and mental health. 2016 Oct 1;9(4):340-55.

22. Van Dam NT, Earleywine M. Validation of the Center for Epidemiologic Studies Depression Scale—Revised (CESD-R): Pragmatic depression assessment in the general population. Psychiatry research. 2011 Mar 30;186(1):128-32.

23. Herrero J, Meneses J. Short Web-based versions of the perceived stress (PSS) and Center for Epidemiological Studies-Depression (CESD) Scales: A comparison to pencil and paper responses among Internet users. Computers in Human Behavior. 2006 Sep 1;22(5):830-46.

24. Africa SS. General Household Survey Statistics South Africa [homepage on the Internet]. c2017 [cited 2020 Nov 15]. Available from: www.statssa.gov.za/publications/P0318/P03182017.pdf

25. Hassem, T. Content validation of an online screening measure for depression in South Africa. *Sage Open*. (Under review).

26. South African Government [Internet]. South Africa: Republic of South Africa; [updated 2020 August 17; cited 2020 December 21]. Available from: https://www.gov.za/coronavirus/alert-level.

27. Laher, S. & Botha, A. Methods of sampling. In C. Wagner, B.Kawulich & M. Garner. Doing social research: A global context. London: McGraw-Hill; 2012. P.86-100.

28. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. BMC Med. 2013;17:133-7.

29. Trevethan R. Sensitivity, specificity, and predictive values: foundations, pliabilities, and pitfalls in research and practice. Frontiers in public health. 2017 Nov 20;5:307.

30. Field A. Discovering Field, A. (2009). *Discovering Statistics Using SPSS* (3rd edition). London: SAGE Publications.

# Chapter Nine: Discussion

## 9.1 Introduction

Depression is a common mental health disorder which has increased at a rate of 16% globally (Vos et al., 2019). This rate is likely to further increase given the on-going COVID-19 pandemic (Rajkumar, 2020; Salari et al., 2020). In South Africa, it has been estimated that 20% of the population is likely to experience at least one depressive episode in their lifetime (Tomlinson et al., 2009). However, given the limited or lack of mental health resources available to the population, depression is often underdiagnosed. The inaccuracy of depression screening tools further contributes to the under-diagnosis of depression. This calls for depression screening tools to be specifically designed or adapted for the South African context and highlights the urgency for depression screening tools to be easily accessible. Ease of accessibility can be achieved by capitalising on the ever-increasing rates of internet access amongst South Africans (Statistics South Africa, 2019). Therefore, this research project set out to adapt an open access online depression screening tool using a sequential exploratory mixed method design.

The research design involved a five-phased approach. Phases One and Two formed the foundational work for the tool adaptation by identifying existing depression screening tools currently being used online which could potentially be adapted for the South African context (Hassem & Laher, 2019) as well as the ethical guidelines which govern the online placement of an adapted screening tool (Hassem & Laher, 2020). Phase Three involved the adaptation of the CESD-R in accordance with the BPSS model and South African literature on depression. In addition, the MDDSA website (see www.mddsa.co.za) was developed in order to host the adapted screening tool. The assessment of the psychometric properties of the

online adapted CESD-R was carried out in Phases Four and Five of the project and formed the basis for a publication on “Establishing the content validity of an online depression screening tool for South Africa” (Hassem, under review) and “Evaluating the efficacy of an online depression screening tool in South Africa: A Pilot study” (Hassem, in press).

The discussion that follows draws on six core areas that need further unpacking beyond those provided in the published articles as well as the narratives provided in this dissertation. In so doing, the knowledge contributions of this project are made salient. The first aspect that is discussed focuses on why an online depression screening tool and ethical guidelines for online mental health screening tools are needed with a particular reference to the South African context and this project. The discussion highlights the unique contribution this project makes to the field of online mental health screening and particularly online depression screening during a pandemic when depression rates have increased. The discussion further examines the hybrid emic-etic approach in tool adaptation employed in this project and its associated strengths and limitations in order to highlight the low-cost manner in which tools can be adapted for a specific context. Charting the online metal health space is relatively new and thus is discussed in relation to the instant feedback provided, the website development as well as the role for mental health professionals in mental health website development. This project employed various methodologies which are new in the field of psychological assessment, particularly in South Africa, and therefore this project makes unique methodological contributions to the field of psychological assessment. As a result of the last phase of this project being conducted during the COVID-19 pandemic, the discussion reflects the impact the COVID-19 pandemic has had on this project. The section concludes by highlighting the various contributions that this study has made to the field and notes the effective use of the hybrid emic-etic approach to tool adaptation as evidenced by the

psychometric properties.

### 9.2 Biases in the assessment of online depression screening tools and depression research

By drawing on the results of the various studies conducted in this project, this section acknowledges the relevance of this study in the current pandemic and draws attention to the potential biases in depression and depression screening literature with particular reference to the research samples used in this field.

#### 9.2.1 Relevance of this study within the broader body of literature on the online screening of depression

After a comprehensive search, only 17 articles were identified for inclusion in the study (Hassem & Laher, 2019). This highlights the lack of published literature on the use of online depression screening tools globally. The review was conducted prior to the COVID-19 pandemic. Whilst the pandemic has highlighted the importance of capitalising on the online environment to provide and promote mental health care with limited resources and contact, especially within the South African context, it is possible that further tools or publications may have emerged as practitioners have had to utilise this platform to conduct therapy and assessments. A cursory search on Google Scholar indicates that research has focused on the impact the COVID-19 pandemic has on individuals' mental health and how practitioners could move to or adapt to online platforms. There still appears to be a lack of research being conducted on online depression screening tools. In addition, the role that screening tools provide in facilitating and providing mental health access is further neglected. This adds to the concerns as the global depression prevalence rates have been flagged to increase as a result of the pandemic (Rajkumar, 2020; Salari et al., 2020). Yet the accessibility of online screening has not changed much. Hence, this study remains both relevant and necessary

within this space.

### 9.2.2 Thinking critically about bodies in depression screening

This study also points to a blind spot that is often not obvious in health sciences research. Across the 17 articles examined for the systematic review, the gendered nature of research in this area was very evident. The majority of the samples across the 17 articles (Hassem & Laher, 2019) consisted of females, mainly from the United States or the United Kingdom, pointing to a further bias in that only particular female experiences tend to be reported in the literature. These samples lead to questions regarding whether the higher prevalence rates reported amongst women can be attributed to the gender distribution of the samples screened, whether implicit biases exist in sample selection, whether females are more likely to volunteer for these types of studies or whether this is consistent with tendencies of men to not report depression symptoms as particularly evident in South African literature (see Mosotho et al., 2008, Nel et al., 2015).

In addition to the gendered nature of depression research, there is also the question of using online depression screening tools in middle-to-low income countries. Despite the efforts made in validating depression screening tools for middle to low-income countries (Akena at el., 2012), these tools have not been placed in the ever expanding online mental health platform. The lack of online depression screening tools in middle to low-income countries is further highlighted in the systematic review (Hassem & Laher, 2019) where all online depression screening tools have been validated on or intended for populations in high-come countries. This study is amongst the first to adapt an online depression screening tool for a middle-income country. Given the global prevalence rate of depression coupled with the inequalities in mental health services, particularly in low-to-middle income countries, there is

an overwhelming need for mental health practitioners to capitalise on and embrace the use of digital technologies in bridging this gap and providing much needed care and services (Naslund et al., 2017; Rodriquez-Villa et al., 2020; Tahir et al., 2021). Therefore, further intervention and research is required in this space locally, regionally and internationally.

Depression research and screening tool validation studies in middle-to-low income countries are mostly conducted on patient samples such as HIV/AIDS patients (Akena et al., 2012). This trend is also prevalent in depression research in South Africa (Bhana et al., 2015; Cholera et al., 2014; Kagee et al., 2014; Kagee et al., 2020; Smit et al., 2008). Given the fact that depression not only affects individuals diagnosed with chronic conditions or the effects of the COVID-19 pandemic, there is a pressing need for these screening tools to be validated amongst the general populations in middle-to-low income countries.

What is encouraging is that the commonly utilised online depression screening tools (PHQ-9, CESD and the BDI-II) concur with the commonly utilised paper-based screening tools in the South African context. Despite not specifically assessing the online psychometric properties of these tools, when comparisons were conducted, it became evident that the psychometric properties of online tools did not differ significantly from the paper-based versions, despite concerns raised by Buchanan (2003). However, a careful analysis needs to be made of the samples in these studies to ensure that factors, such as the level of test-wiseness and the quality of education and literacy, do not impact the psychometric properties and serve as impediments to access.

### 9.3 The ethics of online screening – unchartered terrain

The online mental health screening space is one that does not seem to have any particular rules of engagement. The discussion that follows highlights the need for ethical

guidelines for online mental health screening, the development of a guideline document as well as the contribution that this unique guideline document will make to the field and this study, in particular.

Through the systematic review and various web searches, it became apparent that the depression screening tools available to the general public were often not developed or validated by professionals and this is concerning given the past abuses of psychological assessments in South Africa (see Laher & Cockroft, 2014). Thus, it was imperative that the placement of the adapted online screening tool in the online environment be governed by ethical guidelines. A close examination of various ethical principles/guidelines/documents developed by the Health Professions Council of South Africa (2008), the Employment Equity Act No. 55 of 1998 and the results of the systematic review of the ethics of online screening for mental health in South Africa (Hassem & Laher, 2020) highlighted the need for the development of ethical guidelines specific to the online/internet environment.

This need for guidelines has become stronger given that the COVID-19 pandemic has witnessed 70% of countries utilising telemedicine or teletherapy and the World Health Organisation calling for mental health and psychosocial support services to be developed and strengthened (WHO, 2020). The internet plays a crucial role in the effective roll out of these interventions, with online mental health screening forming a vital component. The shift to telemedicine or teletherapy has highlighted the need to foster positive ethics amongst professionals in the field.

In a time such as the COVID-19 pandemic, when depression rates have increased, individuals are likely to use a mental health screening tool which falls under the category of open mode tests. Thus, based on this need as well as to foster positive ethics amongst

professionals in the field, the results of the systematic review of ethical guidelines for online mental health screening were developed into a formal guideline document that addresses the ethics of developing and placing an open mode test in the online environment. This can be found in Appendix L.

The development of the formal guideline document involved two distinct rounds of expert input. During the initial guideline development phase, 15 experts in the field commented on the appropriateness of the guidelines. These comments were used to further develop the guidelines in terms of informed consent, experiences of distress, the feedback provided and confidentiality. Following the initial process, a second round of consultations occurred, where nine experts completed the Appraisal of Guidelines for Research and Evaluation (AGREE) instrument (Brouwers et al., 2016). The results obtained from utilising the AGREE tool resulted in a revision of the guidelines document to include a section on objectives, more explicit information on the target population as well as target users, explicit statements on updating the guidelines, independence from funding bodies and a declaration of no competing interests. Overall, experts in this round suggested that they would support the use and dissemination of the guidelines.

This contribution of a formal ethical guideline document for online mental health screening holds a twofold significance in terms of the novel contributions to knowledge from this study. Firstly, the guideline document is amongst the first documents, both globally and locally, dedicated to addressing the ethical concerns of an open mode psychological screening test in the online environment. The document provides practical implementational guidelines which can be used to foster positive ethical behaviour in the online environment by encouraging developers to consider issues relating to access, fairness, minimal harm and data

protection. This document comes at a time when individuals are highly prone to mental health disorders as a result of the pandemic, and mental health professionals are charting a relatively new landscape.

Secondly, these guidelines were pivotal for this study when adapting the CESD-R and also placing the adapted online CESD-R in the online environment. They dictated the type of items that could be included as well as the accessibility and fairness of the screening tool. For example, all suicide ideals were removed from the tool. Given the limited resources and mental health infrastructure in South Africa, it would be unethical to assess suicide ideation when the country does not have designated resources available to contact the individuals who display suicide ideation tendencies. The inclusion of this domain can only happen once resources become available in South Africa that allow efficient and effective tracking of individuals who endorse these items during the online screening. In addition, in order to ensure accessibility and fairness, the language used excluded any form of psychological jargon and included South African idioms of distress.

With regards to placing the tool online, the entire website design was informed by the ethical guidelines to ensure accessibility (minimal images), fairness (simple, easy to understand English used, inclusive of local idioms of distress), minimal harm (contact details of various organisations are provided which are inclusive of toll-free numbers) and data protection (routine monitoring and updates of the site), which are discussed in detail below. Due to this study being a pilot study and also the cost implication of setting up end-to-end encryption for the data security, data were not encrypted and thus further resources will be required to ensure that data on the site are encrypted.

### 9.4 Understanding the depression construct in the SA context

In understanding depression in the South Africa context for this study, the discussion highlights the manner in which the emic-etic approach was used in order to adapt the CESD-R to incorporate the South African experience of depression. This study used the etic approach to depression as a framework to which emic items of depression were added. The etic framework was governed by the DSM 5 symptom criteria of depression (APA, 2013) as the original CESD-R was developed in accordance with the DSM 5 depression symptom criteria (https://cesd-r.com/). Therefore, both the online adapted CESD-R and the CESD-R assessed the following symptom domains in accordance with the DSM 5 (APA, 2013): dysphoria, appetite, sleep disturbances, thinking and concentration, anhedonia, fatigue, guilt and movement.

The inclusion of the emic experiences of depression resulted in the deletion of the suicide ideation items and the addition of four items/symptoms specifically experienced amongst depressed individuals in South Africa. The deletion of the suicide ideation items was not only informed by the ethical guidelines developed during this project but also as a result of suicide being viewed as a taboo topic amongst various cultural groups in South Africa (Nel et al., 2015). This approach furthermore includes the addition of four items specific to South Africa. This highlights the emic and ethical approach employed in the tool adaptation.

The three items specifically included in the adapted tool based on experiences of depressed individuals in South Africa were from patient samples presenting at primary healthcare facilities (Mosotho et al., 2008; Andersen et al., 2015). However, the results of this study indicate that these symptoms were significantly endorsed by the depressed patient sample in the pilot study. Despite not being significantly endorsed by the depressed patient

sample in the pilot study, the cultural idiom of distress, “thinking too much”, included in the online adapted CESD-R, received good content validity ratios (Hassem, under review).

Despite the adaptation of the tool being governed by the BPSS model, the item tapping into the spiritual beliefs of South Africans was removed as experts deemed this item as culturally inappropriate. In addition, it can be further argued that depression is often seen as a result of witchcraft. Hence bewitchment is not the symptom; it is believed to be amongst the etiologies leading towards depression in individuals (Crawford & Lipsedge, 2004; Davies et al., 2016).

Through the incorporation of both the etic and emic experiences of depression, this study provides the first step in understanding depression symptoms through a hybrid emic-etic lens in the South African context. As evident from the results of psychometric studies conducted in this project (Hassem, under review; Hassem, in press), the South African items worked well and contributed positively to the reliability and validity of the tool. This adds further to the utility of the online adapted CESD-R as a valid and reliable tool for use in the South African context. The inclusion of these items holds great promise for a more culturally balanced way of understanding mental health and illness and depression, in particular.

Another contributing factor to the psychometric properties’ evidence for the tool is the adaptation of the time-period for assessing symptoms. The time period of assessing depression symptoms of two weeks was initially retained; however, this was adjusted based on expert feedback. Experts indicated that, as a result of the high rate of violence and traumatic events experienced by South Africans, a two-week period of experiencing depression symptoms could be equated to the consequences of these events and not necessarily depression, hence the increase in the time period.

These revisions also further highlight the low-cost manner in which psychological tools can be adapted to suit a specific context, given the wealth of research conducted on mental health symptoms in various communities and the plethora of DSM applicability studies. The low cost associated with adapting an existing mental health screening tool is essential in a country like South Africa where only 5% of the public health budget is allocated to public mental health. Of this, just below 50% of the budget is spent on the psychiatric hospital level of care (Docrat et al., 2019) thus highlighting the need for researchers to consult the large body of literature as one of the key resources in making decisions on developing a new instrument or adapting existing instruments.

It is recommended that future research explores conducting interviews relating to the particular use of South African items and the emic view of introspection required in completing the screening tool to gain an in-depth understanding regarding the appropriateness and comprehensibility of the items. The interview samples should include both practitioners as well as individuals from various cultural and language groups. This will ensure that both emic and etic perspectives are obtained. This would also provide information regarding the use of the cultural idiom of "thinking too much" as research highlights a difference in meaning associated with the idiom amongst various cultural groups (Haroz et al., 2017; Kaiser et al., 2015).

Given the fact that face-to-face interviews are not always possible, given the COVID-19 pandemic, it is suggested that these interviews be conducted using a virtual platform, such as Zoom, and that individuals be compensated for data they furnish. Researchers can provide interested participants with the tool prior to the discussion and also ask participants to sign a consent prior to participation via email. This may exclude many individuals and thus every

effort needs to be made to reach a representative group of individuals whilst practicing strict health protocols.

### 9.5 Charting the online mental health space

This section of the discussion focuses on and emphasises the key considerations which need to be taken into account when placing a mental health screening tool, such as the online adapted CESD-R, on the online platform. This is discussed in relation to instant feedback provided by an online screening tool, the practical considerations when developing a mental health website in South Africa as well as the role mental health care professionals should play in designing online mental healthcare platforms.

#### 9.5.1 Instant Feedback

On completion of the tool, individuals receive their scores and feedback immediately. The instant feedback provided is novel in the South African context as currently there is no online resource that provides feedback in this form. One of the only existing screening tools can be found on the South African Depression and Anxiety group (see https://www.sadag.org/images/stories/zungselfrateddepressionscale.pdf) which requires individuals to manually calculate their scores and determine whether their score falls within the range for depressed individuals. The manual calculation of a score requires the individual to download and edit the PDF document, which places a cognitive and data cost burden on the individual. The manner in which feedback is provided violates the ethical guidelines as the statement alludes to a diagnosis and does not encourage self-help behaviour. In comparison, the feedback provided after completion of the online adapted CESD-R is governed by the ethical principles outlined by Hassem and Laher (2020).

The feedback helps the individuals understand their symptoms and also serves as a first step in encouraging the individuals to seek formal treatment and care, if needed. The online adapted CESD-R gives users the option to download their results or have them emailed to them. This provides individuals the opportunity to present their results and further discuss a way forward with a professional. In addition, the results and feedback document provides the professional with baseline information which can be further explored as the screening tool can be used as a supplement to the clinical assessment. Since the Black Dog Institute (https://onlineclinic.blackdoginstitute.org.au/) website was utilised as an exemplar for online depression screening, the manner in which the results are presented on the MDDSA website is consistent with the results obtained from the depression screening tool hosted on the Black Dog Institute website.

In terms of the instant feedback provided to the test users, it is recommended that longitudinal studies be conducted to assess the use and uptake of resources for individuals who had a medium or high-risk score in seeking a professional diagnosis. In order to conduct a longitudinal study of this nature, the researcher needs the study to be POPI compliant (POPI Act).

### 9.5.2 Practical considerations when developing mental health website in South Africa

#### *Ethical considerations*

From the results obtained from the systematic review of ethical guidelines, it is evident that, currently, mental health websites are not regulated as there is no formal set of guidelines. This is further substantiated through a brief Google Scholar search and comparison of the CESD-R, Black Dog Institute (BDI) and MDDSA websites (https://cesd-r.com/; https://www.blackdoginstitute.org.au/; http://mddsa.co.za/). The results of the brief

Google Scholar search using the following search terms: “web-screening for mental health” and “internet screening for mental health”, “using a website to screen for a mental illness” and “mental health screening websites” evidenced a lack of literature on the mental health screening websites.

When comparing the content placed on the websites, in relation to ethical principles of online mental health screening (Hassem & Laher, 2020), the MDDSA website is the only screening website that explicitly states the age and target population of the screening tool. The Black Dog Institute alludes to the target population being Australian citizens through the use of depression statistics and mental health services available in Australia and describes depression in children, the elderly as well as post pregnancy but does not state the intended target population of the screening tool. With regards to the CESD-R, a target audience is not specified and it is evident that the website targets both the mental health professional and the individual seeking depression information; however, emphasis is placed on a mental health professional audience through the use of psychological and medical jargon (https://cesd-r.com/; https://www.blackdoginstitute.org.au/; http://mddsa.co.za/).

In relation to the language, the choice of words and language usage on both the MDDSA and Black Dog Institute websites are basic and avoids connotations of a formal diagnosis. This is further echoed in the logo and website title of the MDDSA website, which specifically states “screening”. Connotations of a formal diagnosis are evident in the screening page of the CESD-R, which uses terms such as “Diagnostic and Statistical Manual-5” and “Major Depressive episodes”. Out of the three websites, only the MDDSA website includes cultural terms of describing depression and emphasises a hybrid (combined etic-emic) model of understanding depression symptoms.

***Data usage costs***

Lastly, in relation to data usage, Google PageSpeed Insights were employed to determine the data usage when accessing/loading the home page of each website. These results indicate that the CESD-R utilised the lowest amount of data (217 Kilobytes) in comparison to the MDDSA (538 Kilobytes) and the BDI (2.1 Megabytes). However, the CESD-R utilises no images and a dark colour palette which aids in reducing data usage as the download is smaller and appeals more to a professional audience.

The Black Dog Institute website home page does not provide immediate information of depression and thus the user would require more than 2,1 megabytes to access the depression pages. In relation to the low data cost in Australia, this would be appropriate, however, in a country like South Africa, where the data costs are among the highest on the African continent, this cost can be viewed as high (Bottomley, 2020). The MDDSA website has utilised images and still maintains a low data cost to the user. In addition, the MDDSA website makes use of one page for all the depression screening tool items whereas the CESD-R and Black Dog Institute depression screening tool questions are displayed on multiple pages as each item loads on a separate page.

With regards to the website, there is much research to be conducted in terms of the user-friendliness of the website. The current study has assessed the user friendliness of the website but, due to non-representativeness of the sample, it is unclear if individuals who have limited exposure to websites will find the website easy to use. This research would further aid in determining if the response style utilised on the screening tool is easy to understand given the varying levels of test-wiseness and familiarity of screening tests amongst South Africans. The familiarity of website use and response styles has implications for administration bias

and thus has implications for the efficacy of the tool.

A further consideration with the use of digital technologies, such as an online screening tool, is that, although it has the potential to reach vulnerable populations and provide specialised care, the financial costs associated with a screening tool can be too much for individuals to carry. Providing access to all individuals in a given population without imposing a cost factor would require various partnerships between governments and non-governmental organisations (Naslund et al., 2017; Rodriquez-Villa et al., 2020; Tahir et al., 2021).

### 9.5.3 Role of mental health professionals in navigating the online platform

This discussion emphasises the key role a researcher or mental health professional would play in the development of mental health screening websites and the use of psychological tests as a service (Iliescu, 2019). It is evident that the web-developer is only responsible for placing the given content online and ensuring the optimal functionality of the website. Thus, the researcher or mental health professional is responsible for ensuring that ethical guidelines and considerations are taken into account during the website development. The mental health professional understands the nuances related to aspects like screening vs diagnosis, the need to avoid particular language and that the layout and colour must be suitable and welcoming for individuals. Similarly, with the web interface, the researcher should work closely with the developers to ensure that the back end of the system works. This would ensure that strict ethical principles and codes will be adhered to despite embracing technology in psychological tests.

## 9.6 Expanding the methods space in psychological research

The section that follows draws on the methodological contributions made by this project to psychological research, namely, systematic reviews and the development of a critical appraisal tool for theoretical papers, the AGREE checklist, the COSMIN guidelines for assessing psychometric properties of a mental health instrument as well as calculating the internal consistency and reliability using the McDonald's Omega coefficient.

### 9.6.1 Systematic reviews and development of a critical appraisal tool for theoretical papers

This study makes a further contribution to knowledge through the employment of the systematic review methodologies to identify a depression screening tool and ethical guidelines. In conducting these reviews, it became apparent that this method has been under-utilised in the field of psychology despite its emergence in the 18$^{th}$ century and its more recent use in the social and health sciences (Laher & Hassem, 2020). There were also a number of ways in which the systematic reviews could be conducted. Navigating this space allowed for the dissemination of methods knowledge through a methods publication on conducting systematic reviews (see Laher & Hassem, 2020).

In addition, when conducting the second systematic review on ethical guidelines, all the included articles were theoretical in nature. There were no critical appraisal tools for theoretical papers. The CASP checklist for qualitative studies (CASP, 2017) was thus utilised as guideline in order to develop an appraisal tool to assess theoretical papers. The theoretical appraisal tool consists of six questions that assess the aims, literature cited in the paper, consultation with experts in the field as well as the findings of a theoretical paper (see Appendix K).

### 9.6.2 The AGREE checklist

The AGREE checklist methodology is novel and has not been previously used to assess ethical guideline documents beyond the health sciences (Brouwers et al., 2010). The AGREE checklist allows for transparency, comprehensiveness and completeness in the reporting of clinical practice guidelines. Therefore, the checklist had to be adapted to suit the reporting of ethical guidelines. This resulted in the inclusion of "not applicable" in the response format and a comment section for additional elaboration after each question. The AGREE checklist consists of 23 questions which assess the scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability and editorial independence (Brouwers et al., 2010).

### 9.6.3 COSMIN guidelines

The current study is among one of a few studies that have assessed the content validity of a modified version of the CESD-R (CESD-R, n.d.; Koziara, 2016; Rababah et al., 2020; Tshering et al., 2020). This exposes the under-reporting of content validity despite Terwee et al. (2018) noting that modified versions of a tool should be treated as a new tool and thus assessed for content validity. The under-reporting of content validity can be attributed to the fact that the original development of the CESD-R is often referenced when assessing the content validity of a modified version of the CESD-R. In addition, guidelines on how to conduct content validity studies are lacking in the field and thus the COSMIN guidelines, which evaluate the content validity of patient-reported outcome measures (PROMs), were used to inform the content validity questions posed to experts (Terwee et al., 2018). The questions proposed to assess the content validity study of a PROM provided structure in terms of reporting the content validity of the tool. The COSMIN guidelines highlight the importance of the voice of the target population which is often overlooked when

assessing content validity. This systematic analysis proposed in the COSMIN guidelines will aid in evaluating which test is best suited for a given setting. With the increase in systematic reviews in the field of psychology, the COSMIN methodology of assessing the psychometric properties of a given test holds much value in a country where psychological tools are often imported from other countries and adapted for our context.

### 9.6.4 Recognition of a McDonald's Omega coefficient in calculating internal consistency reliability

Despite the removal and addition of several items described previously, the online adapted CESD-R produced a Cronbach alpha and a McDonald's omega coefficient of 0.95 (Hassem, in press) fairly similar to the original CESD-R (α= 0.92–0.93) (Van Dam & Earleywine, 2011). The use of Cronbach alpha by Van Dam and Earleywine (2011) could be questioned, as they report a two-factor structure significantly better than a one-factor structure. A major assumption of the Cronbach alpha coefficient and McDonald's omega coefficient is tau-equivalence which states that a measure is uni-dimensional (Dunn et al., 2014;Green & Yang, 2009). It should be noted that the McDonald's Omega is more sensitive to uni-dimensionality violations. Given that research on the CESD-R shows evidence for both a uni-dimensional model and multi-dimensional model (Koziara, 2016; Van Dam & Earleywine, 2011; Walsh, 2014), both the Cronbach Alpha and McDonald omega coefficients were calculated for this study.

The calculation of the Omega coefficient further seeks to encourage individuals in the field, especially in South Africa, to move away from reporting the Cronbach alpha coefficient and rather highlight the importance of calculating the Omega coefficient. The common practice of reporting the Cronbach alpha coefficient as a reliability score in South Africa is evident in all studies reporting psychometric properties of the CESD-R (Henn & Morgan,

2019; Kagee et al., 2020).

### 9.7 COVID and lockdown impacts on this study

The study was conducted during the COVID-19 pandemic thus limiting access to the patient sample diagnosed with depression therefore the researcher was reliant on mental health and health practitioners to distribute information about the study. Gaining direct access to the patient sample was not possible due to the restricted access to hospitals for research purposes. The direct implications on the psychometric properties assessed in the pilot study (Hassem, in press) are discussed followed by future recommendations for the assessment of all the relevant psychometric properties of the tool.

#### 9.7.1 Impact on psychometric properties

The sample size obtained for the pilot sample was 107, with 21 individuals formally diagnosed with depression and 86 individuals with no reported history of depression. The relatively small sample of formally diagnosed depressed participants had a direct impact on the criterion validity results of the online adapted CESD-R. The low PPV results of the current study are possibly due to the relatively small sample of depressed patients who participated in the study. The results can be viewed as undesirable as the rate of false positives is maximised. If the test is utilised by a sample with low depression prevalence, such as in the current study, this would pose an increased strain on the resource-constrained mental health services in a country like South Africa (Trevethan, 2017), where individuals will seek a formal diagnosis. A large sample of formally diagnosed depressed patients would be needed to determine if the current cut-off scores of the online adapted CESD-R would need to be adjusted if the test is to be utilised effectively amongst the general South African population. Thus, based on the current PVV scores obtained in this study, it is recommended

that the test be utilised amongst individuals who are at a high risk of presenting with depression symptoms.

The pilot sample utilised for assessing the psychometric properties of the tool described above was not representative of the subgroups within the general South African population despite efforts made to obtain a large and diverse sample. As a result, the construct validity of the online adapted CESD-R could not be assessed and the generalisation of the findings is limited. The sample of individuals diagnosed with depression was under-represented which directly impacted the criterion validity results obtained. The depressed sample accessed for this study differed from the depressed sample accessed in the majority of depression studies conducted in middle-to-low income countries like South Africa, where a majority of the samples are HIV positive patients or have various chronic physical conditions.

Given the limitations of the pilot sample, further research needs to be conducted on larger and more representative samples in order to determine the cultural applicability and accuracy of the tool. Despite the limitation of sample size and the lack of comparison studies, the high reliability score obtained for the tool can be utilised as an indicator of the appropriateness of the language used and the length of the tool (ITC, 2017).

### 9.7.2 Future recommendations for assessment of the psychometric properties of the tool

Due to the sample size obtained in the pilot study of this project, the confirmation, administration, score scales and interpretation, and documentation guidelines proposed by the ITC (2017) could not be assessed or formulated. Thus, in terms of the confirmation guidelines, it is recommended that the psychometric properties be further assessed to determine the appropriateness of the tool within the given context and, lastly, to determine the test equivalence to the original CESD-R.

In relation to the assessment of psychometric properties, it is recommended that construct validity, item bias, item discriminatory power, item difficulty and convergent and divergent validity of the online adapted CESD-R be assessed. Item bias was briefly assessed by asking respondents if they felt the items were appropriate. In doing so, the importance of obtaining input from the intended target population, rather than just relying on the expert opinion, is recognised.

It is recommended that the online adapted CESD-R be assessed for construct validity through confirmatory factor analysis by accessing a large and representative sample as the sample size has a direct impact on factor analysis results. The discrimination power, item difficulty and bias can be assessed by conducting a generalised Mantel-Haenszel procedure (ITC, 2017). This would determine which items should be included in the final tool. Lastly, the online adapted CESD-R convergent and discriminate validity needs to be assessed in order to fully determine the efficacy of the tool. These results will have implications for the online adapted CESD-R future utility and possible uptake by hospitals in South Africa.

The item analysis, construct, convergent and discriminant validity results will allow for a test manual to be developed for the screening tool in terms of the administration guidelines proposed by the ITC (2017). This can be made available on the website for practitioners who want to use this tool in the South African context or others who may want to adapt this tool. By providing open access to the tool and the website, this project hopes to align with the open science framework. This framework allows researchers to share their work and research processes to eliminate information gaps and also to enhance collaboration and information sharing (https://osf.io/).

## 9.8 Conclusion

This study aimed to adapt an existing depression screening tool for online usage by the general public of South Africa. Based on an exploratory sequential design, the study was able to identify the CESD-R as the most appropriate depression screening tool to adapt for the South African context. The adaptation of the CESD-R was based on a hybrid emic-etic approach informed by South African literature, the BPSS model and ethical guidelines for an online mental health screening tool. The online adapted CESD-R is hosted on www.mddsa.co.za. The website consists of pages that provide depression information, the screening instrument itself, which is the online adapted CESD-R, and contact details for psychological services. The online adapted CESD-R comprises 19 items which assess the depression risk over a two-month period. Through the placement on the website, the test users are able to receive an instant score and feedback regarding their depression risk category. Through the calculations of internal consistency, the tool evidenced excellent reliability alpha and omega coefficients. The online adapted CESD-R displays high sensitivity and low specificity scores; however, this is a direct result of the nature of the pilot sample.

This study adds value as this is the first depression screening tool to be specifically adapted for the South African context. It is also the first online screening tool for the country. This study provides an opportunity for further research to determine the efficacy of the online adapted CESD-R through the use of more representative samples. It also serves as a model for the development of other online screening instruments. In addition, the study employed various methodologies that have not been widely used in the field of psychology and psychological assessment, internationally and locally. The online adapted CESD-R has the potential to provide access to depression screening and self-help information on a resource constrained country like South Africa.

References Adewuya, A. O., Ola, B. A., & Afolabi, O. O. (2006). Validity of the patient health questionnaire (PHQ-9) as a screening tool for depression amongst Nigerian university students. *Journal of affective disorders*, *96*(1), 89–93. DOI: https://doi.org/10.1016/j.jad.2006.05.021

Aguilera, A. (2015). Digital technology and mental health interventions: Opportunities and challenges. *Arbor*, *191*(771), a210–a210.

Akena, D., Joska, J., Obuku, E. A., Amos, T., Musisi, S., & Stein, D. J. (2012). Comparing the accuracy of brief versus long depression screening instruments which have been validated in low and middle income countries: A systematic review. *BMC Psychiatry*, *12*(1), 1–7.

Ali, G. C., Ryan, G., & De Silva, M. J. (2016). Validated screening tools for common mental disorders in low and middle income countries: A systematic review. *PloS one*, *11*(6), e0156939.

American Psychiatric Association. (1952). *Diagnostic and Statistical Manual of mental disorders*. Washington, DC: APA.

American Psychiatric Association. (1968). *Diagnostic and Statistical Manual of mental disorders* (2nd ed.). Washington, DC: APA.

American Psychiatric Association. (1980). *Diagnostic and Statistical Manual of mental disorders* (3rd ed.). Washington, DC: APA.

American Psychiatric Association. (1987). *Diagnostic and Statistical Manual of mental disorders Revised*. Washington, DC: APA.

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of mental disorders* (4th ed.). Washington, DC.

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of mental disorders* test revision. Washington, DC: APA.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of mental disorders* (5th ed.). Washington, DC: APA.

Andersen, L., Kagee, A., O'Cleirigh, C., Safren, S., & Joska, J. (2015). Understanding the experience and manifestation of depression in people living with HIV/AIDS in South Africa. *AIDS Care*, *27*(1), 59–62. DOI: https://doi.org/10.1080/09540121.2014.951306

Andersson, L. M., Schierenbeck, I., Strumpher, J., Krantz, G., Topper, K., Backman, G., ... & Van Rooyen, D. (2013). Help-seeking behaviour, barriers to care and experiences of care among persons with depression in Eastern Cape, South Africa. *Journal of Affective Disorders*, *151*(2), 439–448.

Austin, D. W., Carlbring, P., Richards, J. C., & Andersson, G. (2006). Internet administration of three commonly used questionnaires in panic research: Equivalence to paper administration in Australian and Swedish samples of people with panic disorder. *International Journal of Testing*, *6*(1), 25–39.

Backe, E. L., Bosire, E. N., Kim, A. W., & Mendenhall, E. (2021). "Thinking Too Much": A Systematic Review of the Idiom of Distress in Sub-Saharan Africa. *Culture, Medicine, and Psychiatry, 2021*, 1–28. https://doi.org/10.1007/s11013-020-09697-z

Barak, A., & Buchanan, T. (2004). Internet-based psychological testing and assessment. In R. Kraus, J. S. Zack, & G. Stricker (Eds.), *Online counseling: A handbook for mental health professionals.* (pp. 217–239). New York, NY: Elsevier Science. (2004-00189-011).

Barney, L. J., Griffiths, K. M., Christensen, H., & Jorm, A. F. (2009). Exploring the nature of stigmatising beliefs about depression and help-seeking: Implications for reducing stigma. *BMC Public Health*, *9*(1), 61. DOI: https://doi.org/10.1186/1471-2458-9-61

Baron, E. C., Davies, T., & Lund, C. (2017). Validation of the 10-item centre for epidemiological studies depression scale (CES-D-10) in Zulu, Xhosa and Afrikaans populations in South Africa. *BMC Psychiatry*, *17*(1), 6. DOI: https://doi.org/10.1186/s12888-016-1178-x

Bartram, D. (2006). The Internationalization of Testing and New Models of Test Delivery on the Internet. *International Journal of Testing*, *6*(2), 121–131. https://doi.org/10.1207/s15327574ijt0602_2

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory-II*. Psychological Corporation.

Bhana, A., Rathod, S. D., Selohilwe, O., Kathree, T., & Petersen, I. (2015). The validity of the Patient Health Questionnaire for screening depression in chronic care patients in primary health care in South Africa. *BMC Psychiatry*, *15*(1), 118. DOI: https://doi.org/10.1186/s12888-015-0503-0

Blazer, D. G. (2003). Depression in late life: Review and commentary. *The Journals of*

*Gerontology Series A: Biological Sciences and Medical Sciences*, *58*(3), M249-M265.

Bottomley, E-J. (2020). SA has some of Africa's most expensive data, a new report says – but it is better for the richer. *Businessinsider*. Accessed on 06 September 2021 on https://www.businessinsider.co.za/how-sas-data-prices-compare-with-the-rest-of-the-world-2020-5

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Brouwers, M. C., Kho, M. E., Browman, G. P., Burgers, J. S., Cluzeau, F., Feder, G., ... & Zitzelsberger, L. (2010). AGREE II: Advancing guideline development, reporting and evaluation in health care. *CMaj*, *182*(18), E839–E842.

Buchanan, T. (2003). Internet-based Questionnaire Assessment: Appropriate Use in Clinical Contexts. *Cognitive Behaviour Therapy*, 32(3), 100–109.

Burns, J. K. (2011). The mental health gap in South Africa: A human rights issue. *The Equal Rights Review*, *6*(99), 99–113.

Burns, J. K., Tomita, A., & Lund, C. (2017). Income inequality widens the existing income-related disparity in depression risk in post-apartheid South Africa: Evidence from a nationally representative panel study. *Health & Place*, *45*, 10–16. DOI: https://doi.org/10.1016/j.healthplace.2017.02.005

Center for Epidemiologic Studies Depression Scale Revised (CESD-R). (n.d.). https://cesd-r.com/

Chentsova-Dutton, Y. E., & Tsai, J. L. (2009). Understanding depression across cultures. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 467–491). The Guilford Press.

Cholera, R., Gaynes, B. N., Pence, B. W., Bassett, J., Qangule, N., Macphail, C., Bernhardt, S., Pettifor, A., & Miller, W. C. (2014). Validity of the patient health questionnaire-9 to screen for depression in a high-HIV burden primary healthcare clinic in Johannesburg, South Africa. *Journal of Affective Disorders*, *167*, 160–166. DOI: https://doi.org/10.1016/j.jad.2014.06.003

Cortelyou-Ward, K., Rotarius, T., & Honrado, J. C. (2018). Using technology to improve access to mental health services. *The Health Care Manager*, *37*(2), 101–108.

Crawford, T. A., & Lipsedge, M. (2004). Seeking help for psychological distress: The interface of Zulu traditional healing and Western biomedicine. *Mental Health, Religion & Culture*, *7*(2), 131–148. DOI: https://doi.org/10.1080/13674670310001602463

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral and social sciences* (pp. 209–240). Sage.

Critical Appraisal Skills Programme (CASP). (2017). *CASP Qualitative Checklist.* Retrieved from http://www.casp-uk.net/checklists (accessed in 2019)

Cuijpers, P., Boluijt, P., & Van Straten, A. (2008). Screening of depression in adolescents through the Internet. *European Child & Adolescent Psychiatry*, *17*(1), 32–38.

Davies, T., Schneider, M., Nyatsanza, M., & Lund, C. (2016). “The sun has set even though it is morning”: Experiences and explanations of perinatal depression in an urban township, Cape Town. *Transcultural Psychiatry*, *53*(3), 286–312.

Denis, P. (2006). The rise of traditional African religion in post-apartheid South Africa. *Missionalia: Southern African Journal of Mission Studies*, *34*(Issue 2/3), 310–323.

Docrat, S., Besada, D., Cleary, S., Daviaud, E., & Lund, C. (2019). Mental health system costs, resources and constraints in South Africa: A national survey. *Health Policy And Planning*, *34*(9), 706–719.

Donker, T., Van Straten, A., Marks, I., & Cuijpers, P. (2010). Brief self-rated screening for depression on the Internet. *Journal of Affective Disorders*, *122*(3), 253–259.

Dunn T. J., Baguley T., & Brunsden V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. British Journal of Psychology, 105, 399–412.

Ellis, C. G. (2003). Cross-cultural aspects of depression in general practice. *South African Medical Journal*, *93*(5), 342.

Ellis, E. (2017). *Depression costs SA economy billions every year*. http://www.sadag.org/index.php?option=com_content&view=article&id=2907:depression-costs-sa-economy-billions-every-year&catid=74&Itemid=132

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1), 107–115.

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science*, *196*(4286), 129–136.

Estabrook, L. S., Witt, G. E., & Rainie, H. (2007). *Information searches that solve problems: How people use the internet, libraries, and government agencies when they need help*. Pew Internet & American Life Project.

Fann, J. R., Berry, D. L., Wolpin, S., Austin-Seymour, M., Bush, N., Halpenny, B., Lober, W. B., & McCorkle, R. (2009). Depression screening using the Patient Health Questionnaire‐9 administered on a touch screen computer. *Psycho‐Oncology*, *18*(1), 14–22. DOI: https://doi.org/10.1002/pon.1368

Feighner, J. P., Robins, E., Guze, S. B., Woodruff, R. A., Winokur, G., & Munoz, R. (1972). Diagnostic criteria for use in psychiatric research. *Arch Gen Psychiatry*, *26*(1), 57–63.

Flanagan, B., & O'Sullivan, M. (Eds.). (2012). *Spiritual capital: Spirituality in practice in Christian perspective*. Ashgate Publishing, Ltd.

Foxcroft, C. (2018). Developing a psychological measure. In C. Foxcroft & G. Roodt. (Eds.), *Introduction to psychological assessment in the South African context* (5th Ed.). Oxford University Press.

Gelaye, B., Williams, M. A., Lemma, S., Deyessa, N., Bahretibeb, Y., Shibre, T., Wondimagegn, D., Lemenhe, A., Fann, J. R., Van der Stoep, A., & Zhou, X. H. A. (2013). Validity of the patient health questionnaire-9 for depression screening and diagnosis in East Africa. *Psychiatry Research*, *210*(2), 653–661. DOI: https://doi.org/10.1016/j.psychres.2013.07.015

Gibbs, A., Govender, K., & Jewkes, R. (2018). An exploratory analysis of factors associated with depression in a vulnerable group of young people living in informal settlements in South Africa. *Global Public Health*, *13*(7), 788–803.

Goldstein, W. N., & Anthony, R. N. (1988). The diagnosis of depression and the DSMs. *American Journal of Psychotherapy*, *42*(2), 180–196.

Gouda, H. N., Charlson, F., Sorsdahl, K., Ahmadzada, S., Ferrari, A. J., Erskine, H., ... & Whiteford, H. (2019). Burden of non-communicable diseases in sub-Saharan Africa, 1990–2017: Results from the Global Burden of Disease Study 2017. *The Lancet Global Health*, *7*(10), e1375–e1387.

Green S. B., & Yang Y. (2009). Commentary on coefficient alpha: A cautionary tale. Psychometrika*, 74*, 169–173. doi:10.1007/s11336-008-9098-4

Green, S., Higgins, J. P. T., Alderson, P., Clarke, M., Mulrow, C. D., & Oxman, A. D. (2011). Introduction. In J. P. T. Higgins & S. Green (Eds.), *Cochrane Handbook for Systematic Reviews of Interventions* (Version 5.1.0). The Cochrane Collaboration.

Gruenberg, A. M., Goldstein, R. D., & Pincus, H. A. (2005). Classification of depression: Research and diagnostic criteria: DSM-IV and ICD-10. *Biology of Depression*, *11*, 43.

Haroz, E. E., Ritchey, M., Bass, J. K., Kohrt, B. A., Augustinavicius, J., Michalopoulos, L., ... & Bolton, P. (2017). How is depression experienced around the world? A systematic review of qualitative literature. *Social Science & Medicine*, *183*, 151–162.

Harris, B., Goudge, J., Ataguba, J. E., McIntyre, D., Nxumalo, N., Jikwana, S., & Chersich, M. (2011). Inequities in access to health care in South Africa. *Journal of Public*

*Health Policy*, *32*(1), S102–S123.

Hassem, T., & Laher, S. (2019). A systematic review of online depression screening tools for use in the South African context. *South African Journal of Psychiatry, 25*(1), 1–8. http://dx.doi.org/10.4102/sajpsychiatry.v25i0.1373

Hassem, T., & Laher, S. (2020). The ethics of online screening for mental health in South Africa: A systematic review. *International Journal of Mental Health*, 1–17. https://doi.org/10.1080/00207411.2020.1802693

Hassem, T. Establishing the content validity of an online depression screening tool for South Africa. Sage open. *Manuscript under review*

Hassem, T. (in press). Evaluating the efficacy of an online depression screening tool in South Africa: A Pilot study. *South African Journal of Psychiatry*.

Hatala, A. R. (2013). Towards a biopsychosocial-spiritual approach in health psychology: exploring theoretical orientations and future directions. *Journal of Spirituality in Mental Health*, *15*(4), 256–276.

Health Professions Council of South Africa (HPCSA). (2008). *Guidelines for good practice in the health care professions: General ethical guidelines for health researchers*. Retrieved January 2, 2014, from http://www.hpcsa.co.za

Henn, C., & Morgan, B. (2019). Differential item functioning of the CESDR-R and GAD-7 in African and white working adults. *SA Journal of Industrial Psychology*, *45*(1), 1–10.

Hertog, T. N., De Jong, M., Van der Ham, A. J., Hinton, D., & Reis, R. (2016). "Thinking a Lot" Among the Khwe of South Africa: A Key Idiom of Personal and Interpersonal Distress. *Culture, Medicine, and Psychiatry*, *40*(3), 383–403.

Hill, P. C., & Pargament, K. I. (2008). Advances in the conceptualization and measurement of religion and spirituality: Implications for physical and mental health research. *The American Psychologist*, *58*(1), 64–74.

Horwitz, A. V., Wakefield, J. C., & Lorenzo-Luaces, L. (2016). History of depression. In D. R. Strunk & R. J. DeRubeis (Eds.), *The Oxford handbook of mood disorders* (pp. 11–23). Oxford University Press.

Hruschka, D. J. (2009). Culture as an explanation in population health. *Annals of Human Biology*, *36*(3), 235–247.

Iliescu, D. (2017). *Adapting tests in linguistic and cultural situations*. Cambridge University Press.

International Test Commission (ITC). (2017). The ITC Guidelines for Translating and Adapting Tests (Second edition). [www.InTestCom.org] Retrieved 10 May, 2020 from https://www.intestcom.org/files/guideline_test_adaptation_2ed.pdf

Jackson, S. W. (1986). *Melancholia and depression: From Hippocratic times to modern times*. Yale University Press.

Kagee, A., Bantjes, J., Saal, W., & Sterley, A. (2020). Predicting caseness of major depressive disorder using the Center for Epidemiological Studies Depression Scale (CESD-R) among patients receiving HIV care. *General Hospital Psychiatry*, *67*, 70–76.

Kagee, A., Nel, A., & Saal, W. (2014). Factor structure of the Beck Depression Inventory-II among South Africans receiving antiretroviral therapy. *AIDS Care*, *26*(2), 257–262. DOI: https://doi.org/10.1080/09540121.2013.802278

Kaiser, B. N., Haroz, E. E., Kohrt, B. A., Bolton, P. A., Bass, J. K., & Hinton, D. E. (2015). "Thinking too much": A systematic review of a common idiom of distress. *Social Science & Medicine*, *147*, 170–183. DOI: https://doi.org/10.1016/j.socscimed.2015.10.044

Kasambala, A. E. (2005). The impact of an African spirituality and cosmology on God-images in Africa: A challenge to practical theology and pastoral ministry. *International Journal of Practical Theology*, *9*(2), 300–323.

Kendler, K. S., & Gardner, C. O. (2014). Sex differences in the pathways to major depression: A study of opposite-sex twin pairs. *American Journal of Psychiatry*, *171*(4), 426–435. DOI: https://doi.org/10.1176/appi.ajp.2013.13101375

Kendler, K. S., Gardner, C. O., & Prescott, C. A. (2002). Toward a comprehensive developmental model for major depression in women. *American Journal of Psychiatry, 159*(7), 1133–1145.

Kerr, L. K., & Kerr Jr., L. D. (2001). Screening tools for depression in primary care: The effects of culture, gender, and somatic symptoms on the detection of depression. *Western Journal of Medicine*, *175*(5), 349.

Kessler, R. C., & Bromet, E. J. (2013). The epidemiology of depression across cultures. *Annual Review of Public Health*, *34*, 119–138. DOI: https://doi.org/10.1146/annurev-publhealth-031912-114409

Koziara, K. (2016). Assessment of depressiveness in population. Psychometric evaluation of the Polish version of the CESD-R. *Psychiatr. Pol*, *50*(6), 1109–1117.

Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals*, *32*(9), 509–515.

Labaka, A., Goñi-Balentziaga, O., Lebeña, A., & Pérez-Tejada, J. (2018). Biological sex differences in depression: A systematic review. *Biological Research for Nursing*, *20*(4), 383–392.

Laher, S. (2014). An overview of illness conceptualizations in African, Hindu, and Islamic traditions: Towards cultural competence. *South African Journal of Psychology*, *44*(2), 191–204.

Laher, S., & Cockcroft, K. (2014). Psychological assessment in post-apartheid South Africa: The way forward. *South African Journal of Psychology*, *44*(3), 303–314.

Laher, S., & Hassem, T. (2020). Doing systematic reviews in Psychology. *South African Journal of Psychology*, *50*(4), 450–468.

Lal, S., & Adair, C. E. (2014). E-mental health: A rapid review of the literature. *Psychiatric Services*, *65*(1), 24–32.

Lund, C., Kleintjes, S., Kakuma, R., & Flisher, A. J. (2010). Public sector mental health systems in South Africa: Inter-provincial comparisons and policy implications. *Social Psychiatry and Psychiatric Epidemiology*, *45*(3), 393–404.

Makhubela, M. S., & Mashegoane, S. (2016). Validation of the Beck Depression Inventory–II in South Africa: Factorial validity and longitudinal measurement invariance in

university students. *South African Journal of Psychology*, *46*(2), 203–217.

Malmgren, H. (2005). The theoretical basis of the biopsychosocial model. In P. White (Ed.), *Biopsychosocial medicine. An integrated approach to understanding illness* (pp. 21–38). Oxford University Press.

Manea, L., Gilbody, S., & McMillan, D. (2012). Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): A meta-analysis. *Canadian Medical Association Journal*, *184*(3), E191–E196. DOI: https://doi.org/10.1503/cmaj.110829

Mashaba, B. L., Moodley, S. V., & Ledibane, N. R. (2021). Screening for depression at the primary care level: Evidence for policy decision-making from a facility in Pretoria, South Africa. *South African Family Practice*, *63*(1).

Matsea, T., Ryke, E., & Weyers, M. (2018). Assessing mental health services in a rural setting: Service providers' perspective. *International Journal of Mental Health*, *47*(1), 26–49.

McIntyre, D., & Ataguba, J. (n.d.). *Access to quality health care in South Africa: Is the health sector contributing to addressing the inequality challenge?* Health Economics Unit, University of Cape Town. https://www.parliament.gov.za/storage/app/media/Pages/2017/october/High_Level_Panel/Commissioned_reports_for_triple_challenges_of_poverty_unemployment_and_inequality/Diagnostic_Report_on_Access_to_Quality_Healthcare.pdf

Meyer, W., Moore, C., & Viljoen, H. (2003). *Personology: From individual to ecosystem* (3rd ed.). Heinemann.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med, 6*(7), e1000097. doi:10.1371/journal.pmed100009

Morahan-Martin, J. M. (2004). How internet users find, evaluate, and use online health information: A cross-cultural review. *CyberPsychology & Behavior*, *7*(5), 497–510.

*15*(1), 87–88.

Mosotho, N. L., Louw, D. A., Calitz, F. J., & Esterhuyse, K. G. (2008). Depression among Sesotho speakers in Mangaung, South Africa. *African Journal of Psychiatry*, *11*(1), 35–43.

Mulrow, C. D. (1994). Systematic reviews: Rationale for systematic reviews. *British Medical Journal*, *309*(6954), 597–599.

Myer, L., Smit, J., Roux, L. L., Parker, S., Stein, D. J., & Seedat, S. (2008). Common mental disorders among HIV-infected individuals in South Africa: Prevalence, predictors, and validation of brief psychiatric rating scales. *AIDS Patient Care and STDs*, *22*(2), 147–158.

Nabbe, P., Le Reste, J. Y., Guillou-Landreat, M., Munoz Perez, M. M. A., Argyriadou, S., Claveria, A., Fernandez San Martin, M. I., Czachowski, S., & Sowinska, A. (2017). Which DSM validated tools for diagnosing depression are usable in primary care research? A systematic literature review. *European Psychiatry*, *39*, 99–105. DOI: https://doi.org/10.1016/j.eurpsy.2016.08.004

Naslund, J. A., Aschbrenner, K. A., Araya, R., Marsch, L. A., Unützer, J., Patel, V., & Bartels,

S. J. (2017). Digital technology for treating and preventing mental disorders in low-income and middle-income countries: A narrative review of the literature. *The Lancet Psychiatry*, *4*(6), 486–500.

Nduna, M., Jewkes, R. K., Dunkle, K. L., Shai, N. P. J., & Colman, I. (2010). Associations between depressive symptoms, sexual behaviour and relationship characteristics: A prospective cohort study of young women and men in the Eastern Cape, South Africa. *Journal of the International AIDS Society*, *13*(1), 44. DOI: https://doi.org/10.1186/1758-2652-13-44

Nel, K., Masola, J., Rankoana, S. A., Govender, S., & Mothibi, K. (2015). A comparison of responses on the Becks Depression Inventory-11 (BDI 11) amongst the Pedi, Tsonga and Venda cultures of Limpopo Province, South Africa: Indigenous knowledge system in health care. *African Journal for Physical Health Education, Recreation and Dance*, *21*(Supplement 1), 279–290.

Ngcobo, M., & Pillay, B. J. (2008). Depression in African women presenting for psychological services at a general hospital. *African Journal of Psychiatry*, *11*(2), 133–137.

Nglazi, M. D., Joubert, J. D., Stein, D. J., Lund, C., Wiysonge, C. S., Vos, T., ... & Bradshaw, D. (2016). Epidemiology of major depressive disorder in South Africa (1997–2015): A systematic review protocol. *BMJ Open*, *6*(7), e011749.

Ntombana, L. (2015). The trajectories of Christianity and African ritual practices: The public silence and the dilemma of mainline or mission churches. *Acta Theologica, 35*(2),

104–119. DOI: http://dx.doi.org/10.4314/actat.v35i2.7

Oxman, A. D., & Guyatt, G. H. (1993). The science of reviewing research. In F. Mosteller & K. S. Warren (Eds.), *Doing more good than harm: The evaluation of health care interventions* (pp. 156–163). Annals of the New York Academy of Sciences.

Pargament, K. I. (1999). The psychology of religion and spirituality? Yes and no. *The International Journal for the Psychology of Religion*, *9*(1), 3–16.

Passchier, R. V., Owens, S. E., Wickremsinhe, M. N., Bismilla, N., & Ebuenyi, I. D. (2019). Digital depression screening in HIV primary care in South Africa: Mood in retroviral+ application monitoring [MIR+ IAM]. *Global Mental Health*, *6*.

Patel, V. (2001). Cultural factors and international epidemiology: Depression and public health. *British Medical Bulletin*, *57*(1), 33–45.

Patel, V., Saxena, S., Lund, C., Thornicroft, G., Baingana, F., Bolton, P., ... & UnÜtzer, J. (2018). The Lancet Commission on global mental health and sustainable development. *The Lancet*, *392*(10157), 1553–1598.

Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health*, *30*(4), 459–467.

Rababah, J., Al-Hammouri, M. M., Drew, B. L., Alawawdeh, A., Dawood, Z., & Jawhar, W. E. (2020). Validation of the Arabic version of the center for epidemiologic studies depression-revised: A comparison of the CESD-R and CESDR-12. *Journal of Affective Disorders*, *274*, 450–456.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*(3), 385–401.

Raffle, A. E., & Gray, J. M. (2007). *Screening: Evidence and practice*. Oxford University Press.

Rajkumar, R. P. (2020). COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry*, *52*, 102066.

Ramchandani, P. G., Richter, L. M., Stein, A., & Norris, S. A. (2009). Predictors of postnatal depression in an urban South African cohort. *Journal of Affective Disorders*, *113*(3), 279–284.

Reynolds III, C. F., & Patel, V. (2017). Screening for depression: The global mental health context. *World Psychiatry*, *16*(3), 316.

Rodriguez-Villa, E., Rauseo-Ricupero, N., Camacho, E., Wisniewski, H., Keshavan, M., & Torous, J. (2020). The digital clinic: Implementing technology and augmenting care for mental health. *General Hospital Psychiatry, 66*(September–October), 59–66.

Rosenthal, R., & Rosnow, R. L. (1991). *Essentials of behavioral research: Methods and data analysis* (Vol. 2). McGraw-Hill.

Sadock, B., & Sadock, V. (2015). *Kaplan & Sadock's Synopsis of Psychiatry.* Lippincott Williams and Wilkins.

Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., ... & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: A systematic review and

meta-analysis. *Globalization and Health*, *16*(1), 1–11.

Schotte, C. K., Van Den Bossche, B., De Doncker, D., Claes, S., & Cosyns, P. (2006). A biopsychosocial model as a guide for psychoeducation and treatment of depression. *Depression and Anxiety*, *23*(5), 312–324.

Singer, M. K., Dressler, W., George, S., & The NIH Expert Panel. (2016). Culture: The missing link in health research. *Social Science & Medicine*, *170*, 237–246. DOI: https://doi.org/10.1016/j.socscimed.2016.07.015

Skundberg-Kletthagen, H., Wangensteen, S., Hall-Lord, M. L., & Hedelin, B. (2014). Relatives of patients with depression: Experiences of everyday life. *Scandinavian Journal of Caring Sciences*, *28*(3), 564–571. DOI: https://doi.org/10.1111/scs.12082

Smarr, K. L., & Keefer, A. L. (2011). Measures of depression and depressive symptoms: Beck Depression Inventory - II (BDI - II), Center for Epidemiologic Studies Depression Scale (CES - D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire - 9 (PHQ - 9). *Arthritis Care & Research*, *63*(S11). DOI: https://doi.org/10.1002/acr.20556

Smit, J., Myer, L., Middelkoop, K., Seedat, S., Wood, R., Bekker, L. G., & Stein, D. J. (2006). Mental health and sexual risk behaviours in a South African township: A community-based cross-sectional study. *Public Health*, *120*(6), 534–542. DOI: https://doi.org/10.1016/j.puhe.2006.01.009

Smith, D. J., Kyle, S., Forty, L., Cooper, C., Walters, J., Russell, E., Caesar, S., Framer, A., McGuffin, P., Jones, I., Jones, L., & Craddock, N. (2008). Differences in depressive

symptom profile between males and females. *Journal of Affective Disorders*, *108*(3), 279–284.

Sorsdahl, K. R., Flisher, A. J., Wilson, Z., & Stein, D. J. (2010). Explanatory models of mental disorders and treatment practices among traditional healers in Mpumalanga, South Africa. *African Journal of Psychiatry*, *13*(4), 284–290.

South African Depression and Anxiety Group (SADAG). (2016). *Depression the Silent Killer*. http://www.sadag.org/images/brochures/Depression-Infographics-2017.pdf

Stafford, G. I., Pedersen, M. E., Van Staden, J., & Jäger, A. K. (2008). Review on plants with CNS-effects used in traditional South African medicine against mental diseases. *Journal of Ethnopharmacology*, *119*(3), 513–537. DOI: https://doi.org/10.1016/j.jep.2008.08.010

Stapley, E., Midgley, N., & Target, M. (2016). The experience of being the parent of an adolescent with a diagnosis of depression. *Journal of Child and Family Studies*, *25*(2), 618–630.

Statistics South Africa. (2016). *Community Survey in brief report 03-01-06.* http://www.statsSA.gov.za./publications/03-01-062016.pdf

Statistics South Africa. (2018). *General Household Survey*. http://www.statssa.gov.za/publications/P0318/P03182018.pdf

Statistics South Africa. (2019). *General Household Survey*. http://www.statssa.gov.za/publications/P0318/P03182019.pdf

Sulmasy, D. P. (2002). A biopsychosocial-spiritual model for the care of patients at the end of

life. *The Gerontologist*, *42*(suppl_3), 24–33.

Suls, J., & Rothman, A. (2004). Evolution of the biopsychosocial model: Prospects and challenges for health psychology. *Health Psychology*, *23*(2), 119.

Swinton, J. (2001). *Spirituality and mental health care: Rediscovering a 'forgotten' dimension*. Jessica Kingsley Publishers.

Tahir, M. J., Waheed, S., Ullah, I., & Ramalho, R. (2021). Telepsychiatry and mental healthcare referrals: Recommendations for low‐and middle‐income countries. *Perspectives in Psychiatric Care, 2021* Feb 2,10.1111/ppc.12732. doi: 10.1111/ppc.12732.

Terwee, C. B., Prinsen, C. A., Chiarotto, A., Westerman, M. J., Patrick, D. L., Alonso, J., ... & Mokkink, L. B. (2018). COSMIN methodology for evaluating the content validity of patient-reported outcome measures: A Delphi study. *Quality of Life Research*, *27*(5), 1159–1170.

The Center for Epidemiologic Studies Depression Scale Revised. (n.d.). CESD-R website. https://cesd-r.com/ (accessed 17 April 2018).

Tomita, A., Labys, C. A., & Burns, J. K. (2014). The relationship between immigration and depression in South Africa: Evidence from the first South African National Income Dynamics Study. *Journal of Immigrant and Minority Health*, *16*(6), 1062–1068.

Tomlinson, M., Grimsrud, A. T., Stein, D. J., Williams, D. R., & Myer, L. (2009). The epidemiology of major depression in South Africa: Results from the South African stress and health study. *South African Medical Journal*, *99*(5).

Trevethan, R. (2017). Sensitivity, specificity, and predictive values: Foundations, pliabilities, and pitfalls in research and practice. *Frontiers in Public Health*, *5*, 307.

Tshering, K., Suksomboon, N., Thavorncharoensap, M., & Poolsup, N. (2020). Prevalence and factors associated with depression among adult HIV patients attending ART clinics: A cross-sectional study in Western Bhutan. *AIDS Care*, *2020*(Sept 21), 1–7

Uman, L. S. (2011). Systematic reviews and meta-analyses. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *20*(1), 57.

Ungvarsky, J. (2017). *Systematic review*. Salem Press Encylopedia.

Van Dam, N. T., & Earleywine, M. (2011). Validation of the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R): Pragmatic depression assessment in the general population. *Psychiatry Research*, *186*(1), 128–132. https://doi.org/10.1016/j.psychres.2010.08.018

Van Rensburg, A. J., Poggenpoel, M., Myburgh, C. P. H., & Szabo, C. P. (2015). Defining and measuring spirituality in South African specialist psychiatry. *Journal of Religion and Health*, *54*(5), 1839–1855.

Vilagut, G., Forero, C. G., Barbaglia, G., & Alonso, J. (2016). Screening for depression in the general population with the center for epidemiologic studies depression (CES-D): A systematic review with meta-analysis. *PloS One*, *11*(5), e0155431.DOI: https://doi.org/10.1371/journal.pone.0155431

Vos, T., Lim, S. S., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasifard, M., ... & Bhutta, Z. A. (2020). Global burden of 369 diseases and injuries in 204 countries and territories,

1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, *396*(10258), 1204–1222.

Waines, D. (2003). *An introduction to Islam*. Cambridge University Press.

Walsh, T. (2014). *The conceptualization of depression and acculturative stress among Latino immigrants: A comparison of scores from Non-Hispanic Whites and persons of Mexican origin on the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R)* [Doctoral dissertation, The University of North Carolina at Chapel Hill].

Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: A systematic review. *BMC psychiatry*, *18*(1), 1–16.

World Health Organisation. (2010). *The ICD-10 classification of mental and behavioural disorders: Diagnostic criteria for research*. World Health Organisation.

World Health Organisation. (2017). Depression: Fact sheet. Retrieved July 06, 2017, from: http://apps.who.int/iris/bitstream/10665/254610/1/WHO-MSD-MER-2017.2-eng.pdf

World Health Organisation. 2020. Retrieved January 2021 from: https://www.who.int/news-room/fact-sheets/detail/depression

Yeung, A., & Kam, R. (2008). Ethical and cultural considerations in delivering psychiatric diagnosis: Reconciling the gap using MDD diagnosis delivery in less-acculturated Chinese patients. *Transcultural Psychiatry*, *45*(4), 531–552.

# Appendix A: Steps in designing a psychological measure proposed by Foxcroft (2013, p. 86)

**Figure A1**

*Developing a psychological measure*

| PHASE | SPECIFIC STEPS |
|---|---|
| Planning | • Specify the aim of the measure<br>• Define the content of the measure<br>• Develop the test plan |
| Item writing | • Write the items<br>• Review the items |
| Assembling and pretesting the experimental version of the measure | • Arrange the items<br>• Finalise length<br>• Answer protocols<br>• Develop administration instructions<br>• Pre-test the experimental version of the measure |
| Item analysis | • Determine item difficulty values<br>• Determine item discrimination values<br>• Investigate item bias<br>• Identify items for final pool |
| Revising and standardising the final version of the measure | • Revise test and item content<br>• Select the items for the standardisation version<br>• Revise and standardise administration and scoring procedures<br>• Compile the final version<br>• Administer the final version to a representative sample of the target population |
| Technical evaluation and establishing norms | • Establish validity and reliability<br>• Devise norm tables, setting performance standards or cut-points |
| Publishing and ongoing refinement | • Compile the test manual<br>• Submit the measure for classification<br>• Publish and market the measure<br>• Refine and update continuously |

*Note:* From Introduction to psychological assessment in the South African context, by C. Foxcroft & G. Roodt, 2013, p. 84. 

# Appendix B: Information Sheet provided to experts

Dear Mental Health Professional

My name is Tasneem Hassem and I am a PhD student in Psychology at the University of the Witwatersrand under the supervision of Prof Sumaya Laher. For my study I have adapted a Depression screening tool for online usage for the general public of South Africa. Based on your expertise in mental health, I would like to invite you to take part in this study.

Participation will entail providing demographic information, and rating the appropriateness of the items and response format of the tool. This should take approximately 10-15 minutes to complete. Participation in this study is voluntary and you have the right to decline participation. You have the right not to answer any of the questions or to stop participation at any point in time. The questionnaire will be completely confidential and anonymous as I will not be asking for your name or any identifying information. Results from this study will be written up as a journal publication.

If you have any queries, concerns or complaints regarding the ethical procedures of this study, please feel free to contact the Human Research Ethics Committee, Medical (HRECM),or Zanele.Ndlovu@wits.ac.za. Should you wish to receive a summary of the results, please feel free to contact my supervisor or myself.

Yours sincerely,

Tasneem Hassem, tasneen.hassem@wits.ac.za, 0824949725

Prof. Sumaya Laher, sumaya.laher@wits.ac.za, 011 717 453

# Appendix C: Information Sheet provided to individuals diagnosed with depression, & individuals with no history of a mental health disorder

Good Day

My name is Tasneem Hassem and I am a PhD student in Psychology at the University of the Witwatersrand under the supervision of Prof Sumaya Laher. For my study I have adapted a Depression screening tool for online usage for the general public of South Africa. I would like to invite you to take part in the study. We are particularly interested in your perceptions of the website, the actual tool you which you will complete and the feedback you will receive after completing the tool.

Participation will entail providing demographic information, completing the depression tool and answering questions based on the questions asked in the tool. This should take approximately 10-15 minutes to complete. Participation in this study is voluntary. You have the right not to answer any of the questions or to stop participation at any point in time. The questionnaire will be completely confidential and anonymous as I will not be asking for your name or any identifying information.

If you feel vulnerable after completion of the questionnaire, the following organisation may be contacted: South African Depression and Anxiety Group (SADAG)-0800 567 567 (toll free) (SADAG provides 24 hour telephonic counselling)

If you have any queries, concerns or complaints regarding the ethical procedures of this study, please feel free to contact the Human Research Ethics Committee, Medical (HREC-M) by emailing Zanele.Ndlovu@wits.ac.za.

Results of this study and the tool will be made available on the website. Please feel free to contact my supervisor or myself on the emails listed below if you require further information.

Yours sincerely,
Tasneem Hassem, tasneen.hassem@wits.ac.za, 011 717 4503
Prof. Sumaya Laher, sumaya.laher@wits.ac.za, 011 717 4532

* 1. I consent to participate in this study

□Yes

□No

# Appendix D: Demographic questionnaire for experts

*Demographic information*

Please select box where appropriate

1. What is your current occupation?

- ○ Psychologist
- ○ Psychiatrist
- ○ Researcher
- ○ Faith Healer
- ○ Traditional healer
- ○ Religious Leader/ teacher
- ○ Psychology/ Health Sciences student

Other (please specify)

2. Number of years you have been practicing (if applicable)

3. Gender

- ○ Female
- ○ Male

4. Please specify your population group (required for research purposes only)

- ◯ Black
- ◯ Coloured
- ◯ Indian
- ◯ White

Other (please specify)

5. Please specify your religious affiliation

- ◯ Christianity
- ◯ Hinduism
- ◯ Judaism
- ◯ Islam
- ◯ Traditional African Religion
- ◯ No religious Affiliation
- ◯ Other (please specify)

6. Please specify your home language

- Afrikaans
- English
- Xhosa
- Zulu
- Ndebele
- Sepedi
- Setswana
- Xitsongo
- Tshivenda
- Swati

Other (please specify)

7. How often do you diagnose depression?

- Weekly
- Once a month
- Once in six months
- Once a year
- Never

8. Have you used a depression screening tool before?

- Yes
- No

9. If yes, please state which tool

# Appendix E: Tool review questions for experts in content validity study 1

Tool review

The next 4 pages presents to you the instructions, the actual tool, as well as the feedback the individual will be presented with. You are not required to answer the tool but merely review the tool in order to answer the review questions which follow.

Tool review

What follows on this page is the instructions and items of the tool. You need not answer but read through to answer the questions which follow.

Instructions

- 
- This tool consists of 20 statements of how you might have felt or behaved over the last 2 weeks. Please click the box that shows how many times you have felt or behaved in
- this way in the past 2 weeks.

- Please answer these statements as honestly as possible in order to ensure that you get the correct results and feedback.

If you are feeling sad or down, it is best you ask a friend or family member to assist you while completing these statements.

Items of the depression screening tool

1. I cannot get rid of this sad feeling

○ Not at all

◯ 1 to 2 days

◯ 3 to 4 days ◯ 5 to 7 days ◯ nearly every day for 14 days

2. I feel sad

◯ Not at all

◯ 1 to 2 days

◯ 3 to 4 days ◯ 5 to 7 days ◯ nearly every day for 14 days

3. I am not eating as much as I normally eat

◯ Not at all

◯ 1 to 2 days

◯ 3 to 4 days ◯ 5 to 7 days ◯ nearly every day for 14 days

4. I lost a lot of weight without trying to

◯ Not at all

◯ 1 to 2 days

◯ 3 to 4 days ◯ 5 to 7 days ◯ nearly every day for 14 days

5. I do not sleep well

◯ Not at all

◯ 1 to 2 days

◯ 3 to 4 days ◯ 5 to 7 days ◯ nearly every day for 14 days

6. I sleep much more than usual.

◯ Not at all

◯ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

7. I have a lot trouble going to sleep

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

8. I have trouble keeping my mind on what I am doing.

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

9. I cannot focus on the important things.

○ Not at all

10. I am thinking too much recently

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

11. Nothing makes me happy

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

12. I have lost interest in my usual activities

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

13. I cannot do things that I always do o

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

14. I feel tired all the time

○ Not at all

15. I feel like a bad person

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

16. I do not like myself

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

17. I feel like I am moving too slowly

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

18. I have the need to play with my fingers or move around for no reason

○ Not at all

○ 1 to 2 days

○ 3 to 4 days ○ 5 to 7 days ○ nearly every day for 14 days

19. I am experiencing more body aches and pains lately

○ Not at all

20. I feel bewitched almost all of the time

○ Not at all

○ 1 to 2 days

○ 3 to 4 days

○ 5 to 7 days

○ nearly every day for 14 days

Once individuals complete the tool, responses will be scored out of 5 and a total score will be calculated. Immediately upon completion of the tool this page will appear:

If you feel vulnerable after completion of the questionnaire, the following organisation may be contacted telephonically if you are in South Africa:

South African Depression and Anxiety Group (SADAG)-0800 567 567 (toll free) (SADAG provides 24 hour telephonic counselling)

Alternatively you may visit www.sadag.org or contact any other mental health services in your community or country.

Please click here for your results and feedback.

## Feedback and scoring

For your reference individual scores will be scored on the following criteria (the individual will not be provided with this information):

Total Score: 80

Meets MDD criteria:

- 
- Score = 32 and above

Anhedonia or dysphoria nearly every day for the past two weeks (score of 8), plus symptoms in an additional 4 DSM symptom groups noted as occurring nearly every day for the past two weeks (score of 16)

Probable MDD:

- Score = 25-28
-

Anhedonia or dysphoria nearly every day for the past two weeks (score of 8), plus symptoms in an additional 3 DSM symptom groups reported as occurring either nearly every day for the past two weeks, or 5-7 days in the past week (score of 9-12)

Possible MDD:

-
- Score = 22-24

Anhedonia or dysphoria nearly every day for the past two weeks (score of 8), plus symptoms in an additional 2 other DSM symptom groups reported as occurring either nearly every day for the past two weeks, or 5-7 days in the past week (6-8)

Sub threshold:

- Score of at least 16 but above criteria not met

Not clinically significant:

- Score of below 16

Feedback provided to participants

(Score of 32 and above)

Based on your answers, you appear to be experiencing all the symptoms of depression. These symptoms can make your everyday tasks very difficult. Please try to contact one of the following organisations telephonically if you are in South Africa for assistance:

-
- The South African Depression and Anxiety Group (SADAG): 0800 21 22 23 (toll free)
-

Adcock Ingram Depression and Anxiety Helpline: 0800 70 80 90

Akeso Psychiatric Response Unit 24 Hour: 0861 435 787

Alternatively you may visit www.sadag.org or contact any other mental health services in your community or country.

(Score of 25-28)

Based on your answers, you maybe be experiencing symptoms of depression. These symptoms could cause difficulty in everyday tasks. Please try to contact one of the following organisations telephonically if you are in South Africa for assistance:

-
- The South African Depression and Anxiety Group (SADAG): 0800 21 22 23 (toll free)
-

Adcock Ingram Depression and Anxiety Helpline: 0800 70 80 90

Akeso Psychiatric Response Unit 24 Hour: 0861 435 787

Alternatively you may visit www.sadag.org or contact any other mental health services in your community or country.

(Score of 22-24)

Based on your answers, you maybe be experiencing some symptoms of depression. These symptoms are not likely impact your everyday tasks. It is important to monitor them. If you would like support, please try to contact one of the following organisations telephonically if you are in South Africa for assistance:

- 
- The South African Depression and Anxiety Group (SADAG): 0800 21 22 23 (toll free)
- Adcock Ingram Depression and Anxiety Helpline: 0800 70 80 90

Akeso Psychiatric Response Unit 24 Hour: 0861 435 787

Alternatively you may visit www.sadag.org or contact any other mental health services in your community or country.

(Score of 16 and below)

Based on your answers, you experiencing very few or no symptoms of depression.  Should you require support, please try to contact one of the following organisations telephonically if you are in South Africa for assistance:

- 
- The South African Depression and Anxiety Group (SADAG): 0800 21 22 23 (toll free)

Adcock Ingram Depression and Anxiety Helpline: 0800 70 80 90

Thank you for reviewing the tool. Please answer the following questions based on your review of the tool.

Tool instructions

1. Are the instructions provided appropriate?

   ○ Yes

   ○ No

2. Would you recommend any changes to the instructions provided?

   ◯ Yes

   ◯ No

   Please substantiate.

   •

   Tool items

3. Does the tool appear to measure depression?

   ◯ Yes

   ◯ No

Please substantiate.

4. Are there any phrases in the tool that were not understood? Please specify

5. Will the statements be easily understood by the general public?

- Yes
- No

Please substantiate.

6. Please identify any items which were inappropriate and elaborate on your response

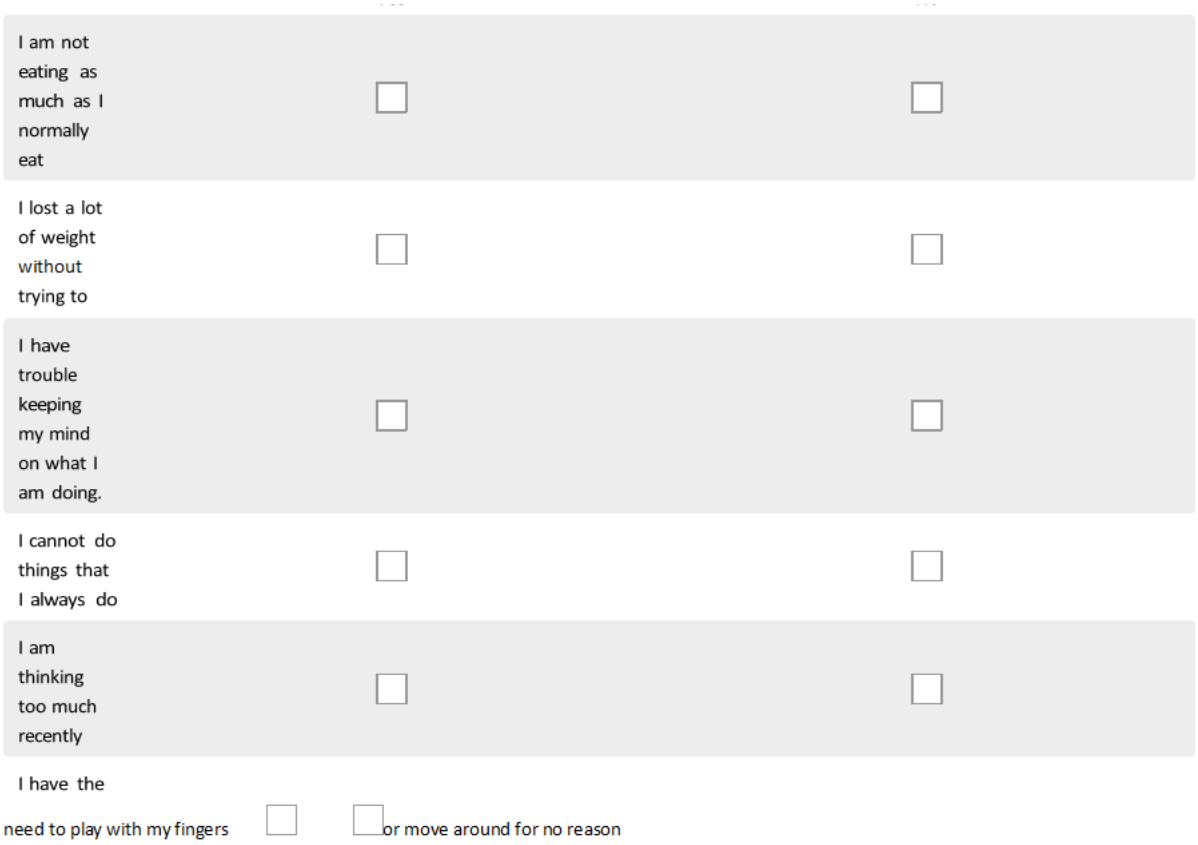
7. Based on your experience, please comment if the time taken to complete the tool would be satisfactory for the general public

8. Based on your experience with the culturally diverse population of South Africa, are there any items which need to be changed or added to the tool?

- ○ Yes
- ○ No

Please specify

9. The Diagnostic and Statistical Manual-5 is often criticized for being based on Western assumptions of the self which tend to be Individualistic, would you recommend changing the "I" in the following statements to "my family and friends have noticed"




Scoring

10. Is the scoring provided for the tool appropriate?

- ○ Yes
- ○ No

Please comment

Feedback

11. Is the feedback provided appropriate?

- ◯ Yes
- ◯ No

Please comment

12. Please provide any other feedback, based on your review of the tool.

Thank you for your time and feedback

# Appendix F: Tool review questions for experts in content validity study 2

Tool review

This online depression screening tool consists of 21 items. These items have been revised based on literature reviewed as well as feedback from psychologists, psychiatrists and other mental health professionals.

Please could you rate the appropriateness of the following items for screening depression using the following rating scale: 1= Item is not essential

2= Item is useful but not necessary

3= Item is necessary for diagnosing depression

| | 1 | 2 | 3 |
|---|---|---|---|
| 1. I have been experiencing more body aches and pains (eg. headache, neck pain or back pain) | ○ | ○ | ○ |
| 2. I have been thinking too much | ○ | ○ | ○ |
| 3. I have been feeling sad or down | ○ | ○ | ○ |
| 4. I had trouble keeping my mind on what I was doing | ○ | ○ | ○ |
| 5. My weight has changed without me trying (lost weight or gained weight) | ○ | ○ | ○ |
| 6. I felt like I have been moving too slowly | ○ | ○ | ○ |
| 7. I could not make a decision about simple things | ○ | ○ | ○ |
| 8. I could not get rid of this sad feeling | ○ | ○ | ○ |
| 9. I have lost interest in my usual activities | ○ | ○ | ○ |
| 10. I felt that most things are my fault | ○ | ○ | ○ |
| 11. I have been feeling happy | ○ | ○ | ○ |
| 12. I have not liked myself | ○ | ○ | ○ |
| 13. I have been to a religious leader or a tradition healer but I feel the same or worse | ○ | ○ | ○ |
| 14. My sleep has changed (having trouble sleeping or sleeping more than usual) | ○ | ○ | ○ |
| 15. I could not do things that I always done | ○ | ○ | ○ |
| 16. I have been feeling tired | ○ | ○ | ○ |
| 17. I could not focus on important things | ○ | ○ | ○ |
| 18. My eating has changed (eating less than normal/more than normal) | ○ | ○ | ○ |
| 19. Nothing has made me happy | ○ | ○ | ○ |
| 20. I have been feeling alone | ○ | ○ | ○ |
| 21. I have not felt like myself | ○ | ○ | ○ |

The instructions to the screening tool indicates to individuals to respond whether they have experienced any of the symptoms over a 2 month period. Individuals will respond to each item using the response format below in relation to the specified two months.

- 
- Not at all
- 
- Some of the time

Most of the time

All of the time

1. Please rate the response format

- ○ Relevant
- ○ Some what relevant
- ○ Not relevant

2. Please provide any other feedback regarding the response format or items of the depression screening tool

Thank you for feedback and time.

# Appendix G: Demographic questionnaire for the pilot sample (participants with no history of mental illness and participants who have been diagnosed with depression)

Demographic questionnaire for patient and normal sample

Please select the box where appropriate

1. Gender

□Male □Female

2. Age _____

3. Please specify your religious

□Christianity □Hinduism

□Judaism □Islam

□No religious affiliation □Traditional African Religion

□Other (please specify

4. Please specify your home language

□Afrikaans □English □Xhosa

□Zulu □ Ndebele □ Sepedi

□Setswana □Xitsonga □Tshivenda

□Swati □Other, Please specify_____

5. Please rate the following:

| | Very poor | Poor | Good | Excellent |
|---|---|---|---|---|
| Your English proficiency (ability to speak and undertake various tasks) | | | | |
| Your English comprehension (ability to understand English) | | | | |
| Your English reading skills | | | | |

6. Have you been diagnosed with any physical illness?

□Yes □No

If yes, please specify the illness

7. Have you been diagnosed with any mental illness?

□Yes □No

If yes, please specify the illness

8. Are you currently taking any medication for the physical or mental illnesses you have stated above?

□Yes □No

9. If you answered 'yes' to the previous question, please specify the type of and reason for medication:

10. Have you been diagnosed with depression?

□Yes □No

(if yes is selected please show the following questions, If, no proceed straight to the questionnaire)

11. When were you diagnosed with depression?

_____

12. Who diagnosed you with depression?

□ GP (doctor) □Psychiatrist

□Psychologist □Other

If other, please specify

_____

13. When was your last depression episode?

□During this month □In the past two months

□In the past six months □A year ago

# Appendix H: Online adapted CESD-R and review questions

Instruction

This tool consists of 19 statements of how you might have felt or behaved over the past two months

For each statement, please click the box that shows how often you have felt or behaved in this way over the past two months.

Please answer ALL the statements as honestly possible

IF you are feeling sad or down, it is best you ask a friend or family member to assist you while completing these statements.

If you feel vulnerable after completion of the questionnaire, the following organisation may be contacted telephonically if you are in South Africa:

South African Depression and Anxiety Group (SADAG)-0800 567 567 (toll free) (SADAG provides 24-hour telephonic counselling)

Alternatively, you may visit www.sadag.org or contact any other mental health services in your community or country.

| | Not at all | Some of the time | Most of the time | All the time |
|---|---|---|---|---|
| **1. I have been experiencing more body aches and pains (eg. headache, neck pain or back pain)** | | | | |
| **2. I have been thinking too much** | | | | |
| **3. I have been feeling sad or down** | | | | |
| **4. I had trouble keeping my mind on what I was doing** | | | | |
| **5. My weight has changed without me trying (lost weight or gained weight)** | | | | |
| **6. I felt like I have been moving too slowly** | | | | |
| **7. I could not make a decision about simple things** | | | | |
| **8. I could not get rid of this sad feeling** | | | | |
| **9. I have lost interest in my usual activities** | | | | |
| **10. I felt that most things are my fault** | | | | |
| **11. I have not liked myself** | | | | |
| **12. My sleep has changed (having trouble sleeping or sleeping more than usual)** | | | | |
| **13. I could not do things that I always done** | | | | |
| **14. I have been feeling tired** | | | | |
| **15. I could not focus on important things** | | | | |
| **16. eating has changed (eating less than normal/more than normal)** | | | | |
| **17. Nothing has made me happy** | | | | |
| **18. I have been feeling alone** | | | | |
| **19. I have not felt like myself** | | | | |

Please click here for your results and feedback.

Please click here to answer a few questions regarding the tool

1. Was the feedback provided useful?

□yes □No

Please elaborate on your answer

2. Is the website user friendly?

□yes □No

Please elaborate on your answer

3. Is the tool user friendly?

□yes □No

Please elaborate on your answer

4. Where the instructions of the depression screening tool easily understood?

□yes □No

Please elaborate on your answer

5. Are there any words or phrases in the depression screening tool that were not understood?

□yes □No

Please provide a reason

6. Where there any items in the depression screening tool you found inappropriate and why?

□yes □No

Please elaborate on your answer

Thank you for your time and feedback.

# Appendix I: Ethical Clearance Certificate for the study

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Miss Tasneem Hassem

**HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)**

**CLEARANCE CERTIFICATE NO. M180402**

| | |
|---|---|
| **NAME: (Principal Investigator)** | Miss Tasneem Hassem |
| **DEPARTMENT:** | School of Human and Community Development<br>Department of Psychology<br>Survey Monkey, Tara Psychiatric Hospital<br>Charlotte Maxeke Johannesburg Academic Hospital<br>Helen Joseph Hospital |
| **PROJECT TITLE:** | Adapting an online screening tool for Major Depressive Disorder in South Africa |
| **DATE CONSIDERED:** | 04/05/2018 |
| **DECISION:** | Approved unconditionally |
| **CONDITIONS:** | |
| **SUPERVISOR:** | Prof Sumaya Laher |
| **APPROVED BY:** | Dr CB Penny, Chairperson HREC (Medical) |
| **DATE OF APPROVAL:** | 30/10/2019 |

**This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.**

**DECLARATION OF INVESTIGATORS**

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. 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 resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in **April** and will therefore be due in the month of **April** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date

**PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES**

**Appendix J: Hassem, T., & Laher, S. (2019). A systematic review of online depression screening tools for use in the South African context. *South African Journal of Psychiatry*, *25*(1), 1-8.**

South African Journal of Psychiatry
ISSN: (Online) 2078-6786, (Print) 1608-9685

AOSIS

Page 1 of 8 Original Research

# A systematic review of online depression screening tools for use in the South African context

**Authors:**
Tasneem Hassem[1]
Sumaya Laher[1]

**Affiliations:**
[1]Department of Psychology, University of the Witwatersrand, Johannesburg, South Africa

**Corresponding author:**
Tasneem Hassem,
thassem@yahoo.co.za

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**Background:** According to the World Health Organization, the alarming increase in rates of depression globally has become a serious concern. In 2010, the prevalence rate of depression in South Africa was 4.6%. Given the context of South Africa where the majority of the population have limited access to healthcare facilities and 59.3% of the population have access to the Internet, an online depression screening tool would have much to offer.

**Objective:** To determine whether online depression screening tools would be suitable for use in South Africa.

**Methods:** This study presents a systematic review of online depression screening tools to determine whether one would be suitable for use in South Africa. Articles were accessed from seven electronic databases from 1970 to 2018. All articles included in the review were critically appraised.

**Results:** A total of 17 articles met the inclusion criteria. From the results, there was only one screening tool available on an open access platform for use by the general population. The most common depression online screening tools were the Beck Depression Inventory-II (BDI-II), the Center for Epidemiology Studies Depression Scale (CES-D) and the Patient Health Questionnaire (PHQ-9). It was also evident that there were negligible differences in the psychometric properties of online versus paper versions of the online screening tools. Furthermore, there were very few studies that considered the African or South African population and no online screening tools for major depressive disorder (MDD) developed in these contexts.

**Conclusion:** There appears to be a need for a depression screening tool to be adapted for online usage in South Africa. It is recommended that the online screening tool should be adapted from the three commonly used online depression screening tools: PHQ-9, CES-D and BDI-II.

**Keywords:** BDI-II; CES-D; depression; major depressive disorder; PHQ-9; screening tool.

## Introduction

A worldwide increase in depression prevalence rates by more than 18% from 2005 to 2015 has listed depression as a leading cause of disability and ill health.[1] According to the global burden of disease study in 2010, 5.0% of the southern sub-Saharan African population was diagnosed as having major depressive disorder (MDD)[2] In South Africa, the MDD prevalence rate in 2010 was 4.6%.[2] The majority of depression screenings are first made in primary care facilities, where accurate diagnoses of depression in patients only occur in less than 50.0% of cases.[3] This inaccuracy is often attributed to the lack of resources available in these facilities, time constraints, lack of training as well as screening tool bias.[4] Primary healthcare providers often want to use screening tools that require the least amount of training and time to administer and interpret. [5]

The majority of the paper-based depression screening tools are based on the Diagnostic and Statistical Manual of Mental Disorders (DSM), 4th Edition (DSM-IV) or DSM, 4th Edition, Text Revision (DSM-IV-TR) classification of MDD.[5,6] This classification was revised in the DSM 5th Edition (DSM 5),[7] where the categories of a single and recurrent depressive episode, as well as the symptoms of bereavement, were removed. Furthermore, the DSM criteria for depression are often criticised for being based on a Western set of cultural assumptions. These assumptions include the autonomy and uniqueness of each individual, the focus on the intrapersonal rather than interpersonal symptoms and the emphasis on emotional symptoms as a classification for depression. These Western cultural norms are not universal as various cultures view individuals as being interdependent; and the mind and body are not viewed as distinct entities but rather as mutually constitutive.[8] The DSM classification is based on a dichotomous approach when it comes to MDD diagnoses, but this

Read online:

# Appendix K: The ethics of online screening for mental health in South Africa: A systematic review

INTERNATIONAL JOURNAL OF MENTAL HEALTH
https://doi.org/10.1080/00207411.2020.1802693



## The ethics of online screening for mental health in South Africa: A systematic review

Tasneem Hassem and Sumaya Laher

Psychology, University of the Witwatersrand, Johannesburg, South Africa

**ABSTRACT**

Mental health care in many low to middle-income countries like South Africa is often under resourced. Many individuals in these countries have access to the internet and often use this as a first source to search for information. Hence the possibility for online screening of mental health holds the promise of early detection and intervention. However, there are no clear guidelines for the ethics of online screening for mental health. This study aims to explore the literature in an attempt to explore existing guidelines on online screening with a view to formulating recommendations for a more universally applicable standard for online screening of mental health. A systematic review method was used to explore the literature. Articles were obtained from six electronic databases from 1970 to 2019. Through the use of the PRISMA method 12 articles met the inclusion criteria. There was only one article that made specific reference to ethical considerations regarding online screening instruments, whilst the remaining 11 made reference to some pertinent ethical considerations for online screening of mental health. Using a thematic analysis, six core themes were identified across the articles which covered online screening, namely modes of tests, psychometric properties of the tool, issues of consent, accuracy of results, feedback and test security. These were aspects that needed to be addressed over those already in place for pen-and-paper screening tools. The results are used to provide recommendations for ethical guidelines for the online screening of mental health.

**KEYWORDS**

Assessment; ethics; mental health; online assessment; psychological testing; screening

### Background literature

According to the 2017 Global Burden of Disease Study, for over 3 decades mental disorders accounted for over 14% of the years lost due to disability (YLDs, Cooper, 2018). Prevalence rates for mental disorders are over 10% in all GBD regions (Kyu et al., 2018). In South Africa, the lifetime prevalence of a mental disorder was 30. 3% (Herman et al., 2009). In a country like South Africa where access to mental health care and resources are

**CONTACT** Tasneem Hassem thassem@yahoo.co.za Psychology, University of the Witwatersrand, Johannesburg, 2025, South Africa.

# Appendix L: Ethical Guidelines for Developing an Online Mental Health Screening Instrument

The guidelines have been prepared by Ms Tasneem Hassem & Professor Sumaya Laher from the Psychology Department at the University of the Witwatersrand, South Africa.

**These guidelines were developed in South Africa. In order to use these guidelines in another country, it is recommended that in addition to the international best practice documentation, the relevant legislation or other documented guidelines of the particular country be considered.**

**How to cite these guidelines**

Hassem, T., & Laher, S. (2020). Ethical guidelines for developing an online mental health screening instrument. The University of Witwatersrand, Johannesburg.

For comments or recommendations on enhancing these guidelines email Tasneen.hassem@wits.ac.za or Sumaya.Laher@wits.ac.za

Content

# Glossary of terms

**Computerised testing:** tests are both administered and scored using any mobile device ranging from computers to phones or tablets (Davies, Foxcroft, Griessel & Tredoux, 2013).

**Mode of testing:** Modes of tests are set characteristics that distinguish various types of psychological tests by considering the following criteria: (1) administration conditions, (2) level of access and (3) level of supervision required. Hence there are four modes of testing:

- **Open tests** are available to any individual accessing the internet and requires no supervision. Therefore, the environmental conditions of testing cannot be standardised or guaranteed.
- **Controlled tests** are available to test–takers who are known. Therefore, a unique username and login detail is required for each individual test-taker. These details are often sent to the test-taker via email. There is no supervision required and the test-taker can take the test at a time and place of his or her own choice.
- **Supervised tests** require an administrator to login for the test-taker and confirm that test administration requirements are met thus allowing the test-taking condition to be controlled through some level of direct supervision. This mode also allows one to validate the identity of the test-taker.
- **Managed tests** are mostly administered in testing centres where a high level of supervision and control over the test taking conditions is required.

(APS Online Testing Guidelines, 2018; Bartram 2006; ITC International Guidelines on Computer-based and Internet Delivered Testing, 2005).

**Online testing**: Online psychological tests refer to a psychological test that is delivered on the internet where the test administration is located on a server found on the internet and not on the computer where the test is administered (Tredoux, 2019). The test-taker submits their responses via a keyboard, mouse or touch input and test results and feedback can either be sent directly to the test-taker or to the registered professional (Barak & Buchanan, 2004).

**Psychological assessment:** refers to the integration of the results , by an appropriately trained professional, of the results obtained with psychological measures and other information to make an assessment and inform conclusions - a single test does not constitute a full psychological assessment (Foxcroft & Roodt, 2013).

**Psychological testing and testing instruments** refer to questionnaires, tests, apparati, techniques or instruments which measure psychopathology, psychophysiological functioning, personality make-up or functioning, aptitude as well as intellectual abilities (Health Professions Act, No. 56 of 1974). Such instruments would usually not be conducted online, but are managed and administered personally by a psychological practitioner in a highly supervised test centre (Health Professions Act, No. 56 of 1974).

**Screening tool/ test or instrument**: refers to a test or instrument (usually a

questionnaire), which may be administered online, and which has been validated in certain populations to screen for the possible presence of a specific mental health condition. It cannot provide a diagnosis.

## Introduction

Over the past decade the internet has become more readily accessible, therefore, online mental health care has been proposed in low resource countries and communities in order to increase access to care. This has seen the development of many ethical guidelines for professionals working in this field. These documents have been found to address the broad domains of professional and client interaction, psychological testing as well as e-therapy. However, there has been no specific set of guidelines aimed at the developers and professionals developing or utilising online screening tools for mental health. It is imperative in designing online screening tools that the ethical aspects relating to this unique administration environment be addressed.

## Aim

The aim of this document is to provide guidelines with regards to ethical considerations for all stakeholders involved in online mental health screening.

## Objectives

- To provide best practise guidelines with regards to screening instruments/tools (open mode tests) when being designed for online use or for research purposes
- To assist in ensuring that online mental health screening tools will be ethically sound for use by communities

This document should be read in conjunction with documents addressing international best practice guidelines and criteria linked to internet testing, particularly the International Test Commission (ITC) Guidelines on Test Use (ITC, 2013), the ITC Guidelines for Translating and Adapting Tests – Second Edition (ITC, 2017) and the ITC Guidelines on Computer-Based and Internet Delivered Testing (ITC, 2013).

These guidelines were originally developed to aid mental health screening in South Africa. Hence developers and practitioners should use this document in conjunction with the ethical rules of conduct for practitioners registered under the South African Health Professions Act, 1974 and the Mental Health Care Act, 2002 if being used in South Africa.

Who are the guidelines for?

The guidelines are applicable to the following group/s of individuals:

- Mental health test developers, publishers and consultants
- Professionals wanting to utilise online mental health screening tests for their practice / for obtaining additional information or research (psychiatrists, psychologists, psychometrists, social workers and other allied healthcare professionals)
- Organisations utilising online mental health assessments on their websites
- Students training in the field (psychiatrists, psychologists, psychometrists, social workers and other allied healthcare professionals)

Any individual mentioned above who will publish, use or design an online mental health screening tool should refer to this document as a guideline to ensure best practise.

Process of Guideline development

The development of these guidelines followed six phases as indicated in Figure 1. The first phase involved a qualitative design, where experts in the field comments on the appropriateness of the guidelines. The second phase involved a quantitative design, were experts utilised the Appraisal of Guidelines for Research and Evaluation to assess the quality of the guidelines. The phases are described in detail below.

**Figure L1**

*Guideline development process*


1. Systematic review

A systematic review was conducted to explore existing guidelines on online screening with a view to formulating recommendations for a more universally applicable standard for online screening of mental health (see Hassem & Laher, 2020). Articles were included in the review if the following two criteria were met: Ethical considerations for online screening or assessment were discussed (in relation to diagnosis or screening), and articles were published in English between 1970 to 2019 (this time frame was used as online psychological testing dates back to the early 1970s). Articles were excluded if there was no reference made to

online/internet testing, screening or assessment. Articles that referred to another source in relation to online testing were excluded, but the original source was obtained and subjected to the inclusion and exclusion criteria. Results of the systematic review indicated that there was no single guideline document focussing on the ethics of online mental health screening. Rather broad guidelines alluding to screening in other more generic online ethical documents in the field of mental health were found.

2. Development of draft guidelines

The draft guidelines were developed using the results of the systematic review as well as information from other guideline documents that addressed the online screening of mental. The following documents were the most influential in the development of this guideline:

Australian Psychological Society (2018). *Online Psychological testing*. Retrieved 22 January, 2019, from https://www.psychology.org.au/APS/media/Resource-Finder/Testing/Online-psychological-testing.pdf

Barak, A., & Buchanan, T. (2004). Internet-based psychological testing and assessment. In R. Kraus, J. S. Zack, & G. Stricker (Eds.), *Online counseling: A handbook for mental health professionals* (pp. 217–239). New York, NY: Elsevier Science. (2004-00189-011).

Bartram, D. (2006). The Internationalization of Testing and New Models of Test Delivery on the Internet. *International Journal of Testing*, *6*(2), 121–131. https://doi.org/10.1207/s15327574ijt0602_2

Buchanan, T. (2002). Online assessment: Desirable or dangerous? *Professional Psychology: Research and Practice*, *33*(2), 148–154. https://doi.org/10.1037/0735-7028.33.2.148

Evans, D. J. (2018). Some guidelines for telepsychology in South Africa. *South African Journal of Psychology*, *48*(2), 166–170. https://doi.org/10.1177/0081246318757943

Fisher, C. B., & Fried, A. L. (2008). Internet-mediated psychological services and the American Psychological Association Ethics Code. In D. N. Bersoff (Ed.), *Ethical conflicts in psychology., 4th ed.* (pp. 376–383). Washington, DC: American Psychological Association (2008-05541-084).

International Test Commission (2005). International guidelines on computer-based and internet delivered testing. International Journal of Testing, 6(2), 143-172. Retrieved 22 January, 2019, from http://www.intestcom.org/files/guideline_computer_based_testing.pdf

Joint Task Force for the Development of Telepsychology Guidelines for Psychologists. (2013). Guidelines for the practice of telepsychology. *American Psychologist*, *68*(9), 791–800. https://doi.org/10.1037/a0035001

Kier, F. J., & Molinari, V. (2004). Do-It-Yourself Testing for Mental Illness: Ethical Issues, Concerns, and Recommendations. *Professional Psychology: Research and Practice*, *35*(3), 261. https://doi.org/10.1037/0735-7028.35.3.261

Luxton, D. D., Nelson, E.L., & Maheu, M. M. (2016). Conducting psychological assessments during telemental health. In *A practitioner's guide to telemental health: How to conduct legal, ethical, and evidence-based telepractice* (pp. 85–95). https://doi.org/10.1037/14938-008

Naglieri, J. A., Drasgow, F., Schmit, M., Handler, L., Prifitera, A., Margolis, A., & Velasquez, R. (2008). Psychological testing on the Internet: New problems, old issues. In D. N. Bersoff (Ed.), *Ethical conflicts in psychology, 4th ed.* (pp. 306–312). Washington, DC: American Psychological Association (2008-05541-067).

**3.** Expert input

Once the first draft of the guidelines was developed, various international and national experts were invited to comment on the appropriateness of the guidelines. Each expert was provided with a working document of the guidelines and asked to provide feedback on the content, formatting or other issues using track changes and comments on the document.. Experts were provided with a month to respond to the call. A total of 15 experts out of 51 approached responded and provided feedback regarding the document. The expert group consisted of psychiatrists, psychologists as well as experts in the field of psychological testing.

**4.** Revision

Based on the results of the expert feedback received the draft guideline document was revised further and circulated to a second expert group for feedback regarding the guidelines based on the Appraisal of Guidelines for Research and Evaluation (AGREE) checklist (Brouwers, Kerkvliet, Spithoff, & AGREE Next Steps Consortium, 2016).

**5.** Guideline appraisal

The revised guidelines together with the AGREE checklist was circulated to 31 international and local experts and 10 experts responded. The expert group consisted of psychologists and

experts in the field of assessment. The AGREE checklist assessed the guidelines based on six broad domains; scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability and editorial Independence. Experts completed the checklist and also provided feedback for improvements on the guidelines.

**6.** Revisions

Based on the feedback provided on the AGEE checklist and recommendations made for improving the guidelines, the guidelines were further revised and presented in this document.

**7.** Procedures for updating the guidelines

Guidelines will be updated every 5 years following the recommendations of the National Institute for Health Care Excellence (NICE) for updating guidelines (see: https://www.nice.org.uk/process/pmg20/chapter/ensuring-that-published-guidelines-are-current-and-accurate)

For comments or recommendations on enhancing these guidelines email Tasneen.hassem@wits.ac.za or Sumaya.Laher@wits.ac.za

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9. Competing interests

The authors declare that they have no competing interests.

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## 11. Disclaimer

The views and opinions expressed in this guideline are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

**Guidelines for developing an open mode online mental health screening tool**

The following guidelines are specific to development of an open mode online mental health screening tool and consists of seven sections, namely: (1) Purpose and scope (2) Modes of testing, (3) Psychometric properties, (4) Informed consent, (5) Ensuring minimal risk to participants Risk, (6) Feedback and (7) Data security.

**1.** Purpose or scope

1.1. Information regarding the construct being tested/measured as well as the aim and purpose of the test needs to be provided. The context in which results should be considered and the target population needs to be described

**2.** Modes of testing

2.1. There needs to be a clear understanding and explanation of the type and mode of the screening test, which could be either open or controlled. For example, if the screening instrument is open mode then this should be clarified, that is, that the instrument is available to any individual on the internet and requires no supervision, while for a controlled screening instrument, it should be clarified that a unique user name is required (refer to Glossary of terms).

**3.** Psychometric properties

Statements should be provided regarding:

3.1. The rigorous procedure which was followed for the development of the instrument, supported by the relevant psychometric information pertaining to the reliability and validity of the instrument. In addition, the sensitivity and specificity of the tool need to be stated.

3.2. The relevance of the populations for which the instrument has been found to be reliable and/or valid should be discussed in relation to the individuals/groups to be tested as well as any limitations of the instrument.

3.3. The user interface (tool layout and appearance) needs to be consistent across various devices. Thus. this needs to be checked and verified for usage via various devices (computers, mobile devices and tablets) in order to ensure accuracy of results and feedback. Where necessary, provision should be made for special populations, e.g. people with visual, auditory, or gross motor challenges.

3.4. The user connectivity and data usage needs to be considered. Particular attention needs to be given to the data usage cost when designing a tool for low resource communities. Connection disruptions need to be programmed into the tool design in order for the user to continue with the test if interrupted due to connectivity issues.

3.5. As screening instruments are typically for community members to use, many of the recommended testing conditions cannot be adhered to at the same level as controlled tests, e.g. appropriate time for taking the test; conditions under which the test should be taken - a quiet room that is well lit and also free from distractions such as friends, family, pets, loud noises, phones, etc. Hence:

3.5.1. A brief description of the ideal test taking conditions need to be presented to the test taker. This should include but should not be limited to:

- Completing the test at a time when the test-taker will not be distracted or interrupted
- Completing the test when they are well rested and able to focus on the questions / statements and provide accurate responses
- The conditions in which they will be taking the test should ideally be well

lit and quiet to ensure focus in responding as accurately as possible to the questions posed.

3.5.2. The ideal testing conditions noted above are not likely t0 be available for low resource communities, however it is still recommended that they be included to the extent that they can attempt at ensuring a comfortable space for the individual completing the screening.

3.5.3. A detailed description of what the test would require of the test-taker should be provided. Typically, this could include:

- What the test screens for
- Estimated time it will typically take for the test to be completed
- The manner in which responses should be completed in terms of the response format, ideal conditions, etc as in 3.5.1 and 3.5.2.
- A statement regarding the adherence to instructions in order to ensure that the most reliable and accurate test results can be obtained.
- What feedback can be expected, what resources can be accessed and who can be contacted for any questions that the test taker may have.

**4.** Informed consent

4.1. In order to obtain consent participants should be provided with information regarding the process and this should be followed by a check box or similar mechanism. Consent is valid if done by checking a single checkbox or alternatively by checking several checkboxes. Failure to do so should prevent an individual from continuing to the next page.

4.2. Information provided for consent purposes should state the following:

- The nature/purpose of the test;
- Who the target populations of the test are (country specific or international, age, if gender specific, specific nationality, religious or cultural group group);
- The manner in which results will be obtained (see glossary of terms for information specific to the test mode);
- The open access nature of the screening (the tool can be accessed by anyone, does not require any form of supervision by a trained professional and scores are not directly interpreted by a trained professional);
- The manner in which results and information provided will be used (third party data sharing, data used for research purposes);
- Data storage (e.g. all responses will be stored on a cloud or a password protected folder)
- The possibility of false positives must also be clearly explained in terms of the test being a screening not a diagnosis and results may not be accurate;
- Contact details for further information should be provided;
- The limitations of a screening test must be explained;
- Any risks to taking the test need to be specified;
- The test can be stopped or abandoned at anytime or stage if needed, there is no obligation to complete the test if adverse reactions are experienced
- Appropriate referral sources should be provided

4.3. In relation to limitations, the test-taker should be aware that screening has certain limitations; that screening represents a provisional process based on the information provided and cannot replace a formal diagnostic process and confirmation can only be

done by an appropriately trained healthcare professional. The screening is just the first step in a longer process of seeking psychological help.

4.4 If there are risks to confidentiality in terms of the test data, results and feedback, these should be explained as well as the steps taken by the developers to prevent this from occurring. Confidentially of data should adhere to the relevant legislation of the country. for example, the Protection of Personal Information (POPI) Act will apply in South Africa. In the Europe the General Data Protection Regulation (GDPR) will apply. In addition, if the data is shared with third parties, a statement stating who will access the data and how the data will be utilised by the third party needs to be provided as well as obtaining user consent. **If the guidelines are used outside of South Africa, the relevant legislation for that particular country should be applied.**

4.5. The information provided should be given in a clear and easy-to-understand language (possibly in more than one language as specific to the population using the instrument) and should be free from field specific jargon.

5. Ensuring minimal risk to participants

5.1. As instruments are open mode (accessible by anyone on the internet), they should have minimal risk to the individual.

5.2.Basic information regarding seeking assistance with the relevant contact details should be present on every screen of the test as well as on the home page, consent page and the feedback page as an individual could feel overwhelmed at any point in time while taking the test.

5.3. If potentially disturbing questions are asked, a red flag (or similar) warning should

appear prior to the question

5.4. Warnings need to be provided where limited access to mental health resources are available,

5.5. Flagging that mental health is treatable is highly recommended.

5.6. Be cognisant of the potential impact of a mental health screening for the individual particularly in terms of self or public stigma that may be associated with a particular mental illness

6. Feedback

6.1. Feedback for online screening instruments should be provided in clear and easy-to-understand language, informative but tentative, so that the potential negative effects of receiving a result pertaining to mental health are somewhat controlled. In addition, appropriate use of the results should be indicated. The possibility of a false-positive or false-negative test result should also be addressed. The nature of self-report measures of the screening tool should be explained.

6.2. Typically, feedback should emphasise support that is available and should refer the test-taker to various psychological services that would be accessible to test-takers and which have been established to be reliable and accessible ideally at no cost. The referral should be accompanied with contact numbers, website addresses, online therapeutic tools and preferably include services provided by local clinics.

6.3. In cases where the screening instrument does detect a great potential for self- harm, a red flag response with a possible action list should appear. This may include:

- Asking test-takers to provide a contact number or information where s/he can be reached. (If this is allowed, it is imperative that follow-up must be done. It could

be an automated process to provide such information to pre-arranged reliable psychological services mentioned in the next bullet – but could be difficult because the measure is completed anonymously – see data security below.)

- Alerting test-takers to pre-arranged reliable psychological services and/or information for a self-help service where someone will contact him/her to make and confirm an appointment – either by phone or online or in person.
- Encouraging test-takers to access available support services and where possible the local clinic for follow-up assistance.

7. Data Security

In order to ensure data security, the website should be secure to minimise the possibility of hacking. Generally screening instruments are completed anonymously, hence there should be no user information collected other than location, search terms, IP addresses, and so forth that are routinely collected on the "back-end" of a website. However, the website needs to keep this information safe and confidential. Routine backups should be done on the server. In order to ensure confidentiality and security of data one should adhere to the relevant legislation of a particular country. In South Africa this would be the POPI Act. **If the guidelines are used outside of South Africa, the relevant legislation for that particular country should be applied**

**References**

Australian Psychological Society (2018). *Online Psychological testing*. Retrieved 22 January, 2019, from https://www.psychology.org.au/APS/media/Resource-Finder/Testing/Online-psychological-testing.pdf

Barak, A., & Buchanan, T. (2004). Internet-based psychological testing and assessment. In R.

Kraus, J. S. Zack, & G. Stricker (Eds.), *Online counseling: A handbook for mental health professionals.* (pp. 217–239). New York, NY: Elsevier Science. (2004-00189-011).

Bartram, D. (2006). The Internationalization of Testing and New Models of Test Delivery on the Internet. *International Journal of Testing*, *6*(2), 121–131. https://doi.org/10.1207/s15327574ijt0602_2

Brouwers, M. C., Kerkvliet, K., Spithoff, K., & AGREE Next Steps Consortium. (2016). The AGREE Reporting Checklist: a tool to improve reporting of clinical practice guidelines. *Bmj*, *352*, i1152.

Chipise, E. M., Wassenaar, D., & Wilkinson, A. (2018). Towards new ethics guidelines: the ethics of online therapy in South Africa. *South African Journal of Psychology*, 0081246318811562.

Davies, C., Foxcroft, C., Griessel, L., & Tredoux. N. (2013). Computer-based and internet-delivered assessment. In C. Foxcroft, & G. Roodt (Eds.), *Introduction to psychological assessment in the South African context. (4th Edition). Cape Town: Oxford University Press. (ISBN 978-0-1990-4473-3)*.

Foxcroft, C. D. (2004). Planning a psychological test in the multicultural South African context. *SA Journal of Industrial Psychology*, *30*(4), 8-15.

Foxcroft, C., & Roodt, G. (2019). An overview of assessment: definition and scope. In C. Foxcroft, & G. Roodt (Eds.), *Introduction to psychological assessment in the South African context. (5th Edition)* (pp.2-7). Cape Town: Oxford University Press. (ISBN 9780190418595).

Hassem, T., & Laher, S. (2019). A systematic review of online depression screening tools for use in the South African context. *South African Journal of Psychiatry*, *25*(1), 1-8.

Hassem, T., & Laher, S. (2020). The ethics of online screening for mental health in South Africa: A systematic review. International Journal of Mental Health, 1-17.

International Test Commission. (2001). International Guidelines for Test Use, International Journal of Testing, 1(2), 93-114. Retrieved 10 May, 2020 from https://www.intestcom.org/files/guideline_test_use.pdf

International Test Commission (ITC). (2013). International guidelines on computer-based and internet delivered testing. International Journal of Testing, 6(2), 143-172. Retrieved 22 January, 2019, from http://www.intestcom.org/files/guideline_computer_based_testing.pdf

International Test Commission (ITC). (2017). The ITC Guidelines for Translating and Adapting Tests (Second edition). [www.InTestCom.org] Retrieved 10 May, 2020 from

https://www.intestcom.org/files/guideline_test_adaptation_2ed.pdf

Tredoux, N. (2019). Computer-based and internet-delivered assessment. In C. Foxcroft, & G. Roodt (Eds.), *Introduction to psychological assessment in the South African context. (5th Edition)* (pp.2-7). Cape Town: Oxford University Press. (ISBN 9780190418595).

# Appendix M: Scoring criteria for the online adapted CESD-R

**Scoring and feedback**

| Symptoms Grouping | Items |
|---|---|
| **Sadness** | 3. I have been feeling sad or down |
| | 8. I could not get rid of this sad feeling |
| | 17. Nothing has made me happy |
| **Loss of interest** | 9. I have lost interest in my usual activities |
| | 13. I could not do things that I always done |
| **Appetite** | 5. My weight has changed without me trying (lost weight or gained weight) |
| | 16. My eating has changed (eating less than normal/more than normal) |
| **Sleep** | 12. My sleep has changed (having trouble sleeping or sleeping more than usual) |
| **Thinking/concentration** | 2. I have been thinking too much |
| | 4. I had trouble keeping my mind on what I was doing |
| | 7. I could not make a decision about simple things |
| | 15. I could not focus on important things |
| **Guilt** | 10. I felt that most things are my fault |
| | 11. I have not liked myself |
| **Tired** | 14. I have been feeling tired |
| **Movement** | 1. I have been experiencing more body aches and pains (e.g. headache, neck pain or back pain) |
| | 6. I felt like I have been moving too slowly |
| **Specific to SA** | 18. I have been feeling alone |
| | 19. I have not felt like myself |

Response format

Not at all= **0**

Some of the time= **1**

Most of the time= **2**

All the time= **3**

Total score of 57

**Two-tiered scoring system**

| | **High Risk** | **Medium Risk** | **Low Risk** |
|---|---|---|---|
| **First tier: Sadness & loss of interest items** | Score of 7/ more | Score of 6 | Score of 5 or less |
| **Second tier: all other categories (remaining 14 items)** | Score above 28 | Score of 15-28 | Score of 15 or less |

High Risk response:

- If and individual scores High on both tiers
- If an individual is high on one tier and medium or low of the other

Medium Risk response:

- If an individual score medium on both tiers
- If an individual scores medium on one tier and low on another

Low Risk

- If an individual score low on both tiers

# Appendix N: Instant Feedback

**Online Depression Screening Results**
**From: www.mddsa.co.za**

**Remember:**

- The result below is not a diagnosis, it is a guide to help you understand your feelings.
- If you have any questions or concerns regarding your health, please visit your local clinic, a psychologist, psychiatrist or doctor for advice.

**Your results:**

**You are low risk**

| *Low Risk* | *Medium Risk* | *High Risk* |
|---|---|---|
| | | |

Based on your answers, you experiencing very few or no symptoms of depression.

**Getting help in South Africa:**

Please contact one of the following organisations telephonically if you are in South Africa for immediate assistance:

- The South African Depression and Anxiety Group (SADAG): 0800 21 22 23 (toll free)
- Akeso Adcock Ingram Depression and Anxiety Helpline: 0800 70 80 90 (toll free)

Psychiatric Response Unit 24 Hour: 0861 435 787

Please contact a GP, go to your local clinic or make an appointment with a psychiatrist or psychologist who can aid you with an accurate diagnosis. You may show them your report from this website.

**Getting help outside of South Africa**

Please contact a GP, go to your local clinic or make an appointment with a psychiatrist or psychologist who can aid you with an accurate diagnosis. You may show them your report from this website. You may also find online or telephonic support services available in your area.

**Online Depression Screening** **Results**

**From: www.mddsa.co.za**

**Remember:**

- The result below is not a diagnosis, it is a guide to help you understand your feelings.
- If you have any questions or concerns regarding your health, please visit your local clinic, a psychologist, psychiatrist or doctor for advice.

**Your results:**

**You are medium risk**

| *Low Risk* | *Medium Risk* | *High Risk* |
|---|---|---|
| | | |

Based on your answers, you maybe be experiencing symptoms of depression.

These symptoms could cause difficulty in everyday tasks. There are various ways in which you can cope with the symptoms you are experiencing. With the correct treatment the symptoms you are experiencing can be treated.

**Getting help in South Africa:**

Please contact one of the following organisations telephonically if you are in South Africa for immediate assistance:

- The South African Depression and Anxiety Group (SADAG): 0800 21 22 23 (toll free)
- Adcock Ingram Depression and Anxiety Helpline: 0800 70 80 90 (toll free
- Akeso

Psychiatric Response Unit 24 Hour: 0861 435 787

Please contact a GP, go to your local clinic or make an appointment with a psychiatrist or psychologist who can aid you with an accurate diagnosis. You may show them your report from this website.

**Getting help outside of South Africa**

Please contact a GP, go to your local clinic or make an appointment with a psychiatrist or psychologist who can aid you with an accurate diagnosis. You may show them your report from this website. You may also find online or telephonic support services available in your area.

**Online Depression Screening Results**

R

**From: www.mddsa.co.za**

**Remember:**

- The result below is not a diagnosis, it is a guide to help you understand your feelings.
- If you have any questions or concerns regarding your health, please visit your local clinic, a psychologist, psychiatrist or doctor for advice.

**Your results:**

**You are high risk**

| *Low Risk* | *Medium Risk* | *High Risk* |
|---|---|---|
| | | |

Based on your answers, you appear to be experiencing the symptoms of depression.

These symptoms can make your everyday tasks very difficult. There are various ways in which you can cope with the symptoms you are experiencing. With the correct treatment the symptoms you are experiencing can be treated.

**Getting help in South Africa:**

Please contact one of the following organisations telephonically if you are in South Africa for immediate assistance:

- 
- The South African Depression and Anxiety Group (SADAG): 0800 21 22 23 (toll free)
Adcock Ingram Depression and Anxiety Helpline: 0800 70 80 90 (toll free) • Akeso

Psychiatric Response Unit 24 Hour: 0861 435 787

Please contact a GP, go to your local clinic or make an appointment with a psychiatrist or psychologist who can aid you with an accurate diagnosis. You may show them your report from this website.

**Getting help outside of South Africa**

Please contact a GP, go to your local clinic or make an appointment with a psychiatrist or psychologist who can aid you with an accurate diagnosis. You may show them your report from this website. You may also find online or telephonic support services available in your area.

# Appendix O: Acceptance letter from African Journal of Psychological Assessment

Editor
18-Aug-21 11:39



DELETE

Subject: AJOPA External Review Decision 62 - Accepted for publication
**********
Ref. No.: 62
Manuscript title: Establishing the content validity of an online depression screening tool for South Africa
Journal: African Journal of Psychological Assessment
**********

Dear Miss Hassem

Thank you for your revised manuscript. We have reached a decision regarding your submission. I am pleased to inform you that your manuscript has now been accepted for publication.

The Editorial Office will contact you by 25 August 2021. If you need any assistance, kindly contact the Editorial Office at submissions@ajopa.org with any questions or concerns.

Thank you for submitting your interesting and important work to the African Journal of Psychological Assessment.

Kind regards,
Ms Menezies
AOSIS

# Appendix P: Acceptance letter from South African Journal of Psychiatry

Editor
06-Aug-21 15:44



Subject: SAJPSYCHIATRY External Review Decision 1687 - Accepted for publication DELETE

**********

Ref. No.: 1687
Manuscript title: Evaluating the efficacy of an online depression screening tool in South Africa: A Pilot study
Journal: South African Journal of Psychiatry

**********

Dear Miss Hassem

Thank you for your revised manuscript. We have reached a decision regarding your submission. I am pleased to inform you that your manuscript has now been accepted for publication.

The Editorial Office will contact you by 13 August 2021. If you need any assistance, kindly contact the Editorial Office at submissions@sajp.org.za with any questions or concerns.

Thank you for submitting your interesting and important work to the South African Journal of Psychiatry.

Kind regards,
Prof. Burns
University of Exeter

**********