THE EFFECTS OF COVID-19 ON PAEDIATRIC THERAPEUTIC SERVICES AT CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL

Robyn Lesley McGrath

Student number: 305490

Supervisor: Prof Wiedaad Slemming

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Public Health

Johannesburg, February 2024

DECLARATION

I, Robyn McGrath, declare that this research report is my own, unaided work. It is being submitted for the degree of Master of Public Health at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

Signature: _____

Robyn McGrath

Date: 27 February 2024

DEDICATION

This research report is dedicated to:

All the unsung heroes of the healthcare system in South Africa who strive to give vulnerable children and their families the best possible care. I see the challenges you face, and I salute you for your perseverance and unwavering devotion.

My husband, Nathan, for pushing me to reach my potential through pursuing this Masters program and encouraging me along the way - I could never have done this without you.

And

My son, Seth, for teaching me so much about child health and what it means to be a mother.

ABSTRACT

Background: The COVID-19 pandemic has affected child health services worldwide, including in South Africa, where prioritisation of paediatric therapeutic services was lacking despite their vital role in health promotion and disease management.

Aim: This study aimed to assess the impact of the COVID-19 pandemic on paediatric therapeutic services at a tertiary level hospital in Johannesburg, South Africa, focusing on service outputs, challenges, and innovations during 2020 and 2021.

Methods: This study used a concurrent triangulation mixed methods approach. Quantitative analysis of service output data was combined with qualitative analysis of healthcare worker interviews. Integration was facilitated through a convergent design joint display during interpretation.

Results: In 2020, patient contact sessions significantly decreased, particularly during lockdown phases, leading to missed diagnoses and adverse patient outcomes. Ineffective hospital management contributed to a lack of communication and direction for managers and clinicians which was worsened by the absence of national guidelines. Persistent trends of low service utilisation during the pandemic drove healthcare worker innovation, forcing healthcare workers to adopt a systems approach to decision making. Innovations centred on inter-professional communication and coordination, service re-evaluation and restructuring, new service delivery models, technology use, patient education and prioritisation, and adapting the duration and frequency of care.

Conclusion: Paediatric services healthcare workers responded innovatively to pandemic challenges, with some solutions improving long-term service delivery efficiency. Insights from this study can enhance health system preparedness and inform planning for paediatric therapeutic services in South Africa, especially in anticipation of future events and the National Health Insurance scheme.

ACKNOWLEDGEMENTS

Firstly, I would like to thank Jesus Christ, my Lord and Saviour, who has given me a heart of compassion for the vulnerable and blessed me with the ability and opportunity to pursue this Masters program. To God be the glory.

Secondly, this study would not have been possible without the support and assistance of certain people:

- My research supervisor, Prof Wiedaad Slemming. I am grateful for your patience, support, and encouragement throughout the research process. Your guidance has been invaluable.

- My study participants at Chris Hani Baragwanath Academic Hospital. I am grateful for your time and honesty. I have learnt so much about the resilience of healthcare workers in the COVID-19 pandemic through your stories.

- My family and friends. I am grateful for your love, encouragement, and patience over the last four years. Thank you for believing in me.

TABLE OF CONTENTS

DECLARATION ..... **II**

DEDICATION ..... **III**

ACKNOWLEDGEMENTS ..... **V**

LIST OF ABBREVIATIONS AND NOMENCLATURE ..... **VIII**

LIST OF FIGURES ..... **IX**

LIST OF TABLES ..... **IX**

CHAPTER 1: INTRODUCTION, BACKGROUND AND LITERATURE REVIEW **1**

1.1 INTRODUCTION 1

1.1.1 Background *1*

1.1.2 Problem statement *4*

1.1.3 Justification *4*

1.1.4 Research question *5*

1.1.5 Aim *5*

1.1.6 Objectives *5*

1.2 LITERATURE REVIEW 6

1.2.1 COVID-19 and paediatric services *6*

1.2.2 COVID-19 and paediatric services in SA *6*

1.2.3 COVID-19 and changes in PTS *7*

1.2.4 Barriers and challenges to service delivery *7*

1.2.5 Innovations made and solutions explored by therapeutic services HCWs *10*

1.2.6 Conclusion *12*

CHAPTER 2: METHODS **13**

2.1 INTRODUCTION 13

2.1.1 Study design *13*

2.1.2 Study setting *14*

2.1.3 Study population *14*

2.1.4 Study sample *15*

2.1.5 Data collection *16*

2.1.6 Pilot study *17*

2.1.7 Data analysis *18*

2.1.8 Ethical considerations *19*

CHAPTER 3: RESULTS **21**

3.1 Introduction 21
3.2 Quantitative results 21
3.2.1 Description of the sample 21
3.2.2 Patient contact sessions 21
3.2.3 Changes in service outputs following the introduction of COVID-19 lockdown measures 29
3.3 Qualitative results 32
3.3.1 Objective 2: Barriers and challenges to service delivery 34
3.3.2 Objective 3: Innovations and solutions explored by each PTS department 49
Convergent design joint display: Narrative summary 63
3.4 Conclusion 67

CHAPTER 4: DISCUSSION 68

4.1 Introduction 68
4.2 Key findings 68
4.2.1 Decrease in service outputs and the underlying causal factors 69
4.2.2 Innovations used to maintain and improve service delivery 73
4.3 Study strengths and limitations 79
4.4 Conclusion 80

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS 81

5.1 Main findings 81
5.2 Implications for clinical practice, policy, and decision-making 82
5.3 Recommendations for further research 83
5.4 Conclusion 84

REFERENCES 85

APPENDICES A – J 96

Appendix A: Additional qualitative data 96
Appendix B: Plagiarism policy 104
Appendix C: Turnitin cover page 105
Appendix D: HREC clearance certificate 106
Appendix E: Medical Advisory Committee permission letter 108
Appendix F: Study information document 109
Appendix G: Participant consent form 112
Appendix H: Consent form for audio recording 114
Appendix I: Indepth interview guide 115
Appendix J: COREQ guidelines 118

LIST OF ABBREVIATIONS AND NOMENCLATURE

CHBAH	Chris Hani Baragwanath Academic Hospital
CDC	Centers for Disease Control and Prevention
CPD	Continuing Professional Development
HCW	Healthcare worker
HoD	Head of Department
MDT	Multidisciplinary team
MPH	Master of Public Health
PPE	Personal Protective Equipment
PTS	Paediatric therapeutic services
SA	South Africa
SDG	Sustainable Development Goal

Paediatric therapeutic services - In this study, paediatric therapeutic services include occupational therapy, physiotherapy, speech-language therapy and audiology, social work, and dietetics services.

A systems approach – In this study, a “systems approach” refers to a way of thinking that views an organisation (such as the healthcare system) as a system comprised of many interconnected parts. It emphasizes holistic understanding, recognising that changes in one part of the system can have ripple effects throughout the entire system.

LIST OF FIGURES

Figure 1.1 Total daily COVID-19 cases for Gauteng (March 2020 – December 2021) (13) 2
Figure 2.1 Concurrent triangulation strategy 13
Figure 3.1 Number of patient contact sessions in each department per month 22
Figure 3.2 Number of inpatient contact sessions in each department per month 23
Figure 3.3 Number of outpatient contact sessions in each department per month 25
Figure 3.4 Number of paediatric patients seen by dietetics per month 26
Figure 3.5 Number of paediatric diagnoses seen, and assistive devices issued to paediatric patients by occupational therapy 27
Figure 3.6 Number of paediatric patients seen by social work, by diagnosis 28

LIST OF TABLES

Table 2.1 Variables analysed from routine data 16
Table 3.1 Description of routine data 21
Table 3.2 Changes in the number of paediatric patients seen by dietetics per month following the introduction of COVID-19 lockdown measures 29
Table 3.3 Changes in the numbers of paediatric diagnoses seen and assistive devices issued to paediatric patients by occupational therapy following the introduction of COVID-19 lockdown measures 30
Table 3.4 Changes in the number of paediatric patients seen by social work following the introduction of COVID-19 lockdown measures, by diagnosis 31
Table 3.5 Sociodemographic characteristics of therapeutic services healthcare workers interviewed at Chris Hani Baragwanath Academic Hospital 32
Table 3.6 Overview of themes and subthemes 33
Table 3.7 Convergent design joint display 64

CHAPTER 1: INTRODUCTION, BACKGROUND AND LITERATURE REVIEW

1.1 Introduction

Access to healthcare is a fundamental social determinant of child health (1). The COVID-19 pandemic has affected healthcare services worldwide, with low- and middle-income countries (LMIC) being disproportionately affected (2). As healthcare workers (HCWs) prioritised the COVID-19 response, child health services, including therapeutic services, were significantly reduced in many contexts (3). This disruption could have lasting effects on progress towards the Sustainable Development Goal (SDG) targets (3).

South Africa (SA), like many other health systems, has faced obstacles in health service delivery and progress towards Universal Health Coverage (4,5). This study looks at the effects of the pandemic on paediatric therapeutic services (PTS) at Chris Hani Baragwanath Academic Hospital (CHBAH) in Johannesburg, SA. The first chapter provides a background of the pandemic in SA, with a focus on child healthcare access during national lockdown restrictions. This is followed by the problem statement, justification for the research, and a description of the study aim and objectives. The chapter concludes with a review of the literature, drawing from studies in both developed and developing countries.

1.1.1 Background

Globally, the COVID-19 pandemic has profoundly impacted all areas of daily life (6). Unlike many other countries, SA's initial response was decisive, declaring a state of national disaster on 15 March 2020 (7), and initiating a nationwide lockdown on 26 March 2020 to contain the spread of the virus (7,8). The level 5 lockdown was one of the harshest globally, with widespread closures of businesses, schools, recreational facilities, and places of worship for extended periods. Restrictions on outdoor activities, gatherings, and public transport operations were enforced, and all international and

inter-provincial travel was banned (7,9). Additionally, a strict curfew was imposed, and the sale of cigarettes and alcohol was prohibited (7).

These strict measures were intended to slow down the virus transmission rate and allow time for the already vulnerable healthcare system to prepare (9,10). The beginning of level 4, on 1 May 2020, brought some relief from the harsh restrictions; however, minimal movement was permitted until level 3 began on 1 June 2020 (11). Since then, lockdown levels have fluctuated based on epidemiological data, with greater restrictions imposed during the second and third waves in January and July 2021 (Figure 1.1) (11,12).

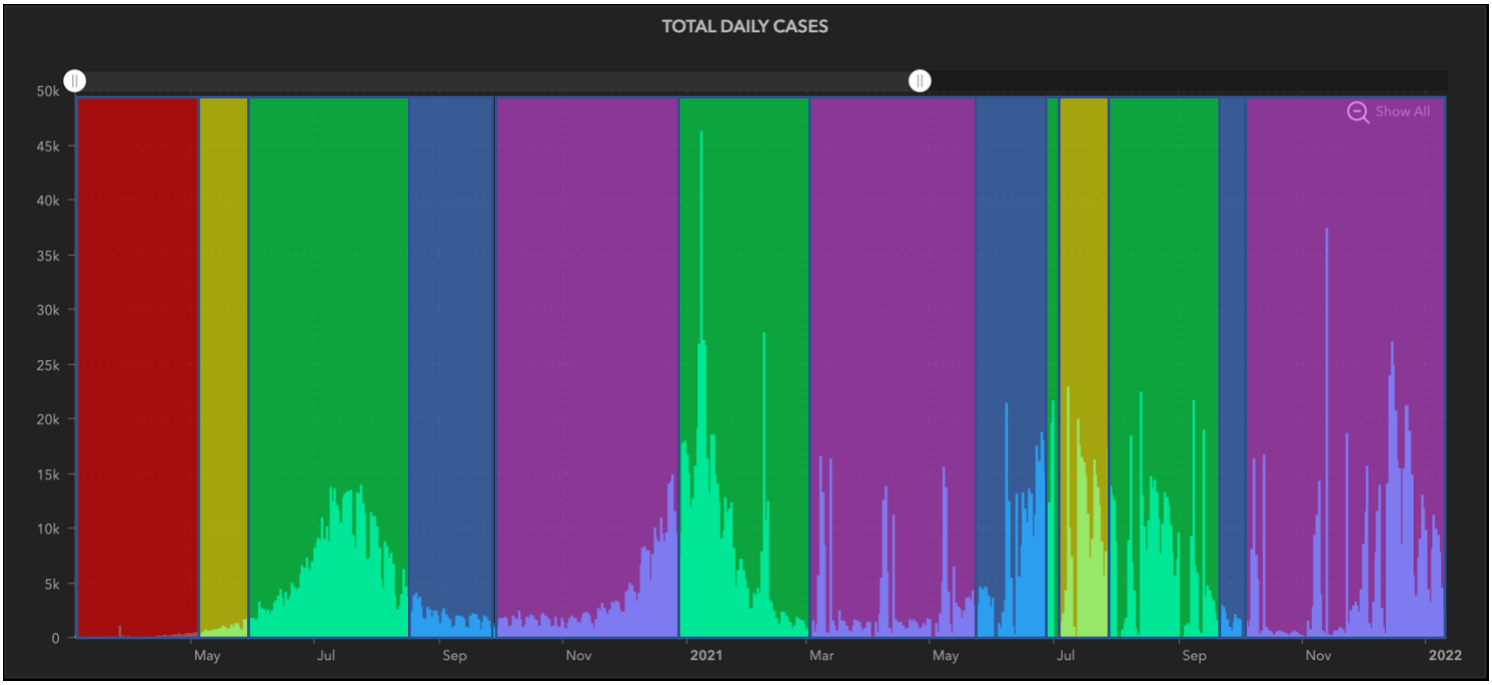


Figure 1.1 Total daily COVID-19 cases for Gauteng (March 2020 – December 2021) (13)

*Levels of lockdown: Red – level 5, yellow – level 4, green – level 3, blue – level 2, pink – level 1

Service delivery for all routine paediatric healthcare services in SA has been significantly affected by the pandemic (14–19). PTS play a critical role in health promotion, disease prevention and management (20) and should therefore be

considered essential services. Moreover, the Africa Centers for Disease Control and Prevention (CDC) guidelines (21) and the Global Rehabilitation Alliance (22), recommended prioritising child health and rehabilitation as part of the COVID-19 response in order to prevent worsening of chronic health conditions. Despite this, in many healthcare facilities across the country, PTS were not prioritised (14,23).

PTS address the needs of children with acute illness and long-term health conditions, including disabilities. Although most of these conditions are not fatal, they can cause long-term complications and negatively affect child health and development (24). Early recognition and management of developmental difficulties are therefore essential to improve child health outcomes (25,26). Limited PTS during lockdown levels 4 and 5 may have resulted in lost windows of opportunity for intervention or regression in skills for many children (27,28). Furthermore, frequent school closures, intended to curb the spread of the virus (29,30), have prevented children with disabilities, who usually access therapeutic services at school, from receiving care (31).

The economic crisis in SA due to the COVID-19 pandemic has resulted in a loss of income for millions of people (32), significantly increasing the risk of food insecurity in the country (33). Consequently, there is concern that the nutritional status of children in vulnerable households has been negatively affected (34). Poor access to PTS would have compounded this, increasing the risk of malnutrition, wasting and stunting, especially for the youngest children (34), which is known to have disastrous long-term effects on developmental potential.

UNICEF reported a dramatic increase in the risk of child abuse and violence in SA during the pandemic (35). Contributing factors include stress associated with lockdown, isolation and financial strain (35). In addition, children with disabilities are at an even greater risk of violence and abuse (27). Access to PTS offering psychosocial support could have helped caregivers develop better coping strategies, mitigating the risk of abuse and violence and addressing the effects on children and families.

In SA, health service delivery in the public sector is monitored through a routine facility reporting system (36). Routine service data are captured at each healthcare facility and include key outputs or units of service delivery (36,37). These outputs refer to the range of services offered and treatments provided and are usually measured in terms of quantity, quality, cost and timeliness (36,37). Outputs can be used to monitor the strength of the health system over time (36).

1.1.2 Problem statement

The central problem investigated in this research study is the extent to which the COVID-19 pandemic affected PTS in the SA public healthcare system. As a foundation for the study, the researcher recognised the problem to have two aspects.

First, it is evident in the literature that COVID-19 affected the delivery of PTS globally (38–42); however, we do not know to what extent, particularly in resource-limited contexts like SA. Most existing research on the challenges and innovations in service delivery during the pandemic is from high-income countries, with different patient populations and resources (12,18,35,40–44)01/03/2024 10:42:00. This study will contribute to a local evidence base on the topic, which is currently limited.

Secondly, most SA studies focus on the effect of the pandemic on one specific profession (45–48), but few incorporate a range of therapeutic services (49,50). Considering that children often require more than one type of therapeutic service, and HCWs work in multidisciplinary teams (MDTs), it is important to situate the professions within a broader context. This study will provide a holistic picture of the pandemic's effect on a range of PTS within one SA tertiary hospital setting.

1.1.3 Justification

Although SA is no longer in lockdown, the COVID-19 pandemic is ongoing, and therefore, research on this topic is highly relevant. Considering the ongoing nature of the pandemic and the potential for future similar events, this topic will contribute to healthcare system preparedness. Moreover, there is limited literature on the impact of

COVID-19 on service delivery for therapeutic services, particularly in SA. This study therefore adds a unique perspective on the situation in a developing context.

This study makes use of a mixed-methods approach which provides a more comprehensive understanding of the impact of COVID-19 on PTS than only quantitative or qualitative methodology. Qualitative data on successful innovations introduced to maintain service delivery during the pandemic could inform future planning and decision-making for PTS on a national level.

Additionally, the upcoming National Health Insurance (NHI) system in SA is focused on pooling existing resources and improving access to universal healthcare (51). As such, strategies to improve service delivery efficiency are key. The pandemic has presented a unique opportunity to identify weaknesses in the healthcare system that must be addressed for the successful implementation of NHI. Key insights and strategies captured by this research could help to mitigate these weaknesses and optimise the use of existing resources.

1.1.4 Research question

What effect did the COVID-19 pandemic have on PTS at CHBAH during 2020 and 2021?

1.1.5 Aim

The aim is to determine the effect of the COVID-19 pandemic on PTS at CHBAH in terms of service outputs, challenges experienced, and innovations made by HCWs during 2020 and 2021.

1.1.6 Objectives

1. To determine the effect of COVID-19 lockdowns on the routinely monitored PTS outputs between January 2019 and December 2021.
2. To explore the barriers and challenges to service delivery experienced by each PTS department during the COVID-19 pandemic.

3. To describe the innovations made and possible solutions explored by each PTS department to facilitate service delivery during the COVID-19 pandemic.

1.2 Literature review

This review includes literature from both international sources and SA. Existing evidence is presented according to the study objectives and covers what is already known about the effect of the COVID-19 pandemic on paediatric services, and more specifically, PTS.

1.2.1 COVID-19 and paediatric services

There is substantial evidence demonstrating the global impact of the COVID-19 pandemic on healthcare services (38). Despite children's lower vulnerability to the virus and less severe course of disease than adults (52), all paediatric clinical services were still heavily affected (53–55). Hospital admissions and presentations to emergency departments decreased significantly during the initial months (56,57) and many routine follow-ups and well-child visits (e.g. immunisation) were deferred (58–60). There was also a noticeable delay in health-seeking behaviour, leading to late diagnosis and treatment, and adverse outcomes for numerous children (43,54,61). A primary reason for this was parents avoiding health facilities due to fear of contracting the virus (55,61,62).

1.2.2 COVID-19 and paediatric services in SA

The pandemic's impact on SA paediatric services mirrored global trends (63,64). Studies in KwaZulu Natal reported a significant reduction in child health visits during the initial months of the lockdown (15), reduced coverage of child health interventions, and a reduction in paediatric hospital admissions (16). Confirming this, the Wave 1 NIDS-CRAM survey reported significant decreases in health seeking behaviour among mothers with children requiring healthcare in the public sector during the pandemic (19). Essential interventions particularly affected by lockdowns include immunisation, HIV and TB prevention and treatment, and nutrition programs (64). HCW shortages, travel restrictions and disrupted community health worker routines have reduced healthcare

access (64). SA population surveys echo global trends, revealing that health-seeking behaviour was influenced more by fear of the virus than factors such as transport or service availability (65–67).

1.2.3 COVID-19 and changes in PTS

Therapeutic services worldwide experienced service delivery challenges due to the pandemic (38–42). During lockdown levels 4 and 5 in SA, non-critical outpatient and outreach services stopped, and therapeutic teams prioritised patients for in-person services based on level of urgency (14,23,45). Medically stable patients requiring rehabilitation faced delays and were placed on waiting lists, aggravating HCW scarcity and backlogs (23). Patients considered to be most affected during this period were those with comorbidities, immunocompromise and disabilities (23). There were also serious concerns regarding the effects of worsening socio-economic conditions and secondary complications due to the extended lockdown period (14).

Changes to inpatient services varied, with some HCWs not treating any patients, some treating patients after COVID-19 negative tests, and some treating patients in wards alongside persons under investigation (23). Beyond patient care, many HCWs took on additional roles at their facilities, such as patient and visitor screening, health education, community screening and testing, and participation in COVID-19 task teams (23).

1.2.4 Barriers and challenges to service delivery

A World Health Organization (WHO) survey noted that national disasters like COVID-19 disrupt rehabilitation services, particularly affecting vulnerable populations and weak health systems (68). Rehabilitation is often overlooked in health system readiness and initial response, leading to exacerbated service delivery limitations, and heightened risk of impairment and disability for affected individuals (49,68).

In the initial hard lockdown phase of the pandemic in SA, van Biljon and van Niekerk (49) highlight that critical disability-specific services were considered ‘non-essential’. This classification led to limitations in various vital services (49). Consequently,

essential forms of support such as group sessions, vocational rehabilitation, caregiver training, and family meetings were subject to restrictions (49). Furthermore, there was no guidance available from the National and Provincial Directorates on the role of therapeutic services during the pandemic (45). The absence of guidance left managers to make their own decisions about clinical practice, which resulted in some departments working independently, without consulting other MDT members, due to the urgency of the pandemic response (45).

HCWs reported experiencing multiple barriers to service delivery related to COVID-19 regulations (14,23). Efforts to protect inpatients from the virus made service delivery challenging for HCWs. Quick discharge of non-COVID-19 inpatients, often within 24 hours, limited opportunities for therapeutic services in the acute stage (14,23,49). Shortened sessions, intended to limit exposure time to patients, also restricted intervention (14,23). A pervasive fear among patients about contracting the virus during hospital visits further contributed to challenges in maintaining follow-up appointments and ensuring treatment compliance (49).

The challenges of using Personal Protective Equipment (PPE) during the COVID-19 pandemic had a multifaceted impact on HCWs and patient care. Donning and doffing of PPE required for treating COVID-19 patients added time to treatment sessions, thus limiting the number of patients that could be seen in one day (14,23). There was a lack of PPE or inappropriate PPE in some hospitals, particularly in rural areas, which impacted HCW safety (23,45). PPE was also expensive and restricted movement between different units in the hospital (23). Furthermore, HCWs experienced social distancing, masks and gloves as barriers during treatment, especially when treating patients with cognitive and speech deficits (23,49).

The pandemic brought a sense of disorder and confusion to HCWs, which was worsened by absent or inconsistent leadership and poor communication (49). According to a global survey of occupational therapists (69), inadequate leadership and management was a common experience during the pandemic, leading to

inconsistencies within organisations. This was exacerbated by the presence of frequent and conflicting information, which obstructed service delivery and contributed to heightened stress and confusion (69).

HCWs providing therapeutic services experienced increased emotional and psychological stress, particularly during the initial level 5 lockdown (14,23,49), which has subsequently increased the risk of burnout and mental health conditions (44,70). This trend has been reported globally and across healthcare professions (71–73). Inadequate, irregular, and poorly distributed information from hospital management about the numbers of infected patients and staff members and the number of deaths contributed significantly to anxiety and stress levels (14,23). Clear guidelines for PPE use, contact tracing, quarantine, and isolation to protect HCWs and their patients were also lacking in many places (23). Moreover, many HCWs were required to work outside of their scope of practice during the pandemic, (e.g., in swabbing tents) which increased their anxiety levels (49). In addition, HCWs commonly reported experiencing fatigue and moral injury, a feeling of severe distress from exposure to traumatic events which violate their personal moral values (74). Furthermore, many HCWs received no mental health support from their hospitals (14,23).

Logistics and staff challenges also impacted service delivery. Closure of wards, departments, and at times, entire facilities for decontamination resulted in HCWs constantly changing their routine and moving around (14). Step-down facilities were often reportedly full, resulting in difficulty discharging patients to lower levels of care (14). In addition, staff shortages due to COVID-19 infection, quarantine, and isolation were a constant challenge, and vulnerable staff who could not work on the frontline also had to be considered (14). Student clinical supervision was significantly affected (49). Furthermore, there were concerns about PPE shortages, misuse of resources and corruption (49). Consequently, decision fatigue, especially at a managerial level, was commonly reported (14).

1.2.5 Innovations made and solutions explored by therapeutic services HCWs

HCWs have implemented numerous innovations to sustain service delivery during the pandemic. Many countries have adopted telemedicine/telehealth for patient care (40,55,75–78) with a positive overall response (42,75,76,79). Adams *et al* (23), reported a significant improvement in teamwork and collaboration among speech-language pathologists, both intra- and inter-professionally, with nurses, doctors, and other MDT members, a finding which is supported in international literature (23,80,81). Additionally, van Biljon and van Niekerk (49) observed a distinct creativity among rehabilitation clinicians during the pandemic, with a readiness to extend their professional scope of practice and embrace the challenges presented.

Many discipline-specific innovations have also been documented. For example, physiotherapists implemented customised home exercise programs, (82) developed an algorithm to identify patients requiring intervention, upskilled MDT members in techniques such as prone positioning, and created new treatment protocols (83). They also re-skilled and reassigned staff to other areas and facilitated early patient discharges (84). Social workers in Canada, the United States, Israel, and the United Kingdom demonstrated adaptability in maintaining therapeutic relationships with clients through creative approaches, such as meaningful interactions via text or email, involving clients in activities during video sessions, and accommodating client preferences during video-conferencing sessions (85).

In SA, HCWs used a combination of telephonic consultations, WhatsApp calls, and telehealth for a small percentage of patients (14,23,86) as inequitable access to technological resources, particularly in rural areas, restricted its use (87,88). Additionally, HCWs developed extended home programs for discharge, along with videos and pamphlets for caregiver training (14). Many HCWs also produced therapy kits for in-hospital and home use, although these innovations were not unique to SA (41,42). Other innovations and solutions in SA included the development of new resources for improving service delivery. For example, one speech-language therapy department began making toys from waste materials that parents could use with their

children at home (23). Furthermore, some occupational therapists changed their approach to splint making to decrease exposure time to patients, choosing to adapt commercially available splints rather than creating customised ones (14).

According to Balton *et al* (45), the speech-language therapy and audiology department at CHBAH employed a range of innovative strategies to maintain service delivery and ensure the well-being of their staff. This included training on the effect of COVID-19 on speech, language, hearing, balance, and swallowing. It also incorporated occupational health and safety protocols, infection control measures, and strategies to promote employee health and well-being (45). To ensure HCW safety, various protocols were introduced, and adherence was monitored through audits conducted by the infection control team. Most meetings were moved to online platforms. The department also explored various ideas, including using an alternative working model involving shifts and team rotations and conducting home visits. Unfortunately, these proposals were not approved by hospital management (45).

Challenges in maintaining service delivery led the speech-language therapy and audiology department to collaborate with a non-governmental organisation, which assumed responsibility for delivering care packages with various supplies and information to patients in the community (45). Additionally, the department modified and refined treatment protocols, including risk reduction strategies and prioritisation criteria (45). Various other strategies were used to reduce the risk of viral transmission, including reducing patient contact time, decreasing the frequency of sessions, altering the position of therapists in relation to patients, and stopping all MDT joint treatment sessions (45). Throughout the pandemic, the department maintained a strong focus on HCW mental health and well-being, continuously sharing resources on support services and well-being activities relevant to healthcare professionals (45).

1.2.6 Conclusion

The literature review highlights the global impact of the COVID-19 pandemic on PTS, emphasising disruptions in healthcare access, service delivery, and innovative responses by HCWs from both international and South African perspectives. Despite the existing body of literature documenting these effects, there remains a notable gap in understanding the specific impact on PTS in SA. This study seeks to address this gap by comprehensively examining the effects of the pandemic on PTS at a tertiary hospital in Johannesburg, SA. By investigating the nuances of these challenges and innovations within the SA context, this research aims to contribute to the broader understanding of pandemic response strategies in paediatric healthcare settings. The subsequent chapter will describe the research methodology, facilitating a seamless transition from literature review to the investigation.

CHAPTER 2: METHODS

2.1 Introduction

This section outlines the methodology used to investigate the effects of COVID-19 on PTS at CHBAH, Johannesburg. It presents a description of the study design, setting and population as well as the data collection and analysis process. It also incorporates ethical considerations and strategies used to ensure trustworthiness.

2.1.1 Study design

The researcher undertook a concurrent triangulation mixed-methods study (89). This design involved collecting and analysing quantitative and qualitative data simultaneously, with greater emphasis on the qualitative part. Based on Creswell's notation for mixed methods (89), this study design is represented as follows:

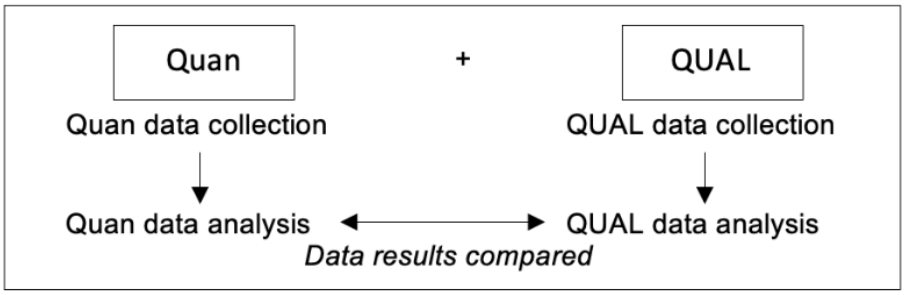


Figure 2.1 Concurrent triangulation strategy

Due to time constraints and challenges with quantitative data collection, the researcher chose a concurrent triangulation mixed-methods study design rather than the originally planned sequential explanatory design. This was deemed appropriate as the quantitative data did not directly inform the qualitative enquiry.

Quantitative Phase

The researcher collected routine data on service outputs for 2019 - 2021, which is recorded by HCWs in each therapeutic services department and reported monthly for monitoring and evaluation. The data include information on contact sessions, inpatients, outpatients, assistive devices, and departmental staff, and is entered into various health

information systems at district, provincial and national levels. Although most of the data were not specific to paediatric care, some additional data on children were available from the occupational therapy, dietetics, and social work departments.

Qualitative Phase

The researcher conducted individual in-depth interviews to obtain a deeper understanding of HCWs' experiences of delivering PTS during the pandemic (90). This qualitative approach enriched the quantitative data and provided explanations for changes in paediatric service delivery over this period. It also provided a more nuanced understanding of the unique challenges that HCWs experienced during the pandemic and the innovations and solutions they used to maintain service delivery.

2.1.2 Study setting

The study was conducted at CHBAH, a tertiary level teaching hospital in Soweto, Johannesburg (2). With approximately 3 200 beds, it is the largest hospital in Africa and the third largest globally (3). Paediatric services at CHBAH serve children up to 13 years old. The hospital's therapeutic services include occupational therapy, physiotherapy, speech-language therapy and audiology, social work, and dietetics. These services are largely specialised, often handling the most complex cases. Each of the departments offers a range of paediatric in- and outpatient services.

2.1.3 Study population

The study population for the quantitative phase was all clinical paediatric services at CHBAH, including PTS, between 2019 and 2021.

The study population for the qualitative phase was all PTS HCWs in the occupational therapy, physiotherapy, speech-language therapy and audiology, social work, and dietetics departments at CHBAH between 2019 and 2021.

2.1.4 Study sample

Quantitative Phase

The researcher employed purposive sampling to include all PTS at CHBAH between 2019 and 2021 (occupational therapy, physiotherapy, speech-language therapy and audiology, social work, and dietetics). There were no exclusion criteria for this phase.

Qualitative Phase

The study sample comprised key informants from each PTS department who were information-rich on the topic. The researcher used purposive selection to find these informants, who included Heads of Departments (HoDs), Chief paediatric HCWs and production-level workers for various perspectives. HoDs offered managerial insights, Chief HCWs provided specific team-related challenges and innovations while production-level HCWs provided practical perspectives on patient care and service delivery. The researcher requested HoDs or Chief HCWs in each department to identify information-rich production-level workers who met the inclusion and exclusion criteria.

Inclusion criteria

- All HoDs and Chief paediatric HCWs.

  For production-level workers:
- Must have worked in paediatric services for a minimum of three months during the COVID-19 pandemic (between March 2020 and December 2021).
- Must have been employed at CHBAH for at least six months before the first lockdown (employed during or before September 2019).

Exclusion criteria

Community service HCWs were excluded as they had not been employed at CHBAH for long enough to have experienced the level 4 and 5 lockdowns.

The sample consisted of 16 HCWs, including three key informants from each of the occupational therapy, physiotherapy, social work, and dietetics departments, and four from the speech-language therapy and audiology department, as the department has

dual functions. All participants were female apart from one. The participants had been working at CHBAH for various lengths of time (between 3 – 30 years). Their years of professional experience also ranged in time (between 4 - 32 years).

2.1.5 Data collection

The researcher obtained permission to access the quantitative data from the Medical Advisory Committee (Appendix E) and each therapeutic services HoD at CHBAH. Thereafter, paper-based routine data submitted monthly to the DHIS was obtained from the hospital administration department. Where possible, additional paper-based and electronic data was collected from some therapeutic services HoDs. Variables analysed for the quantitative phase were drawn from the available data (Table 2.1). The first three variables were drawn from routine data submitted to the DHIS. The additional variables were sourced from the dietetics, occupational therapy, and social work departments.

Table 2.1 Variables analysed from routine data

Variables for all therapeutic services	
Number of patient contact sessions in each department per month	
Number of inpatient contact sessions in each department per month	
Number of outpatient contact sessions in each department per month	
Additional variables for specific therapeutic services	
Dietetics	Total number of new patients <5 years
	Total number of new patients between 5 - 12 years
Occupational therapy	Total number of diagnoses seen <5 years
	Total number of assistive devices issued to paediatric patients
Social work	Total number of patients <5 years per month
	Total number of child abandonment cases per month
	Total number of child abuse cases per month
	Total number of child neglect cases per month
	Total number of children referred for adoption per month

From May to July 2022, the researcher conducted in-depth interviews with HCWs at CHBAH using a semi-structured interview guide until the point of data saturation was reached. A total of 16 interviews were conducted. All interviews were conducted face-to-face by the researcher in English; however, participants were also given the choice of online and telephonic options. All participants were informed about the study and provided informed consent (Appendix F). Interviews lasted 30 - 75 minutes and were audio recorded. No participants dropped out or refused to participate at any point. Repeat interviews were not necessary; however, clarity on specific statements was sought through email correspondence with participants.

In-depth interviews were chosen for their confidentiality and ability to provide rich accounts of HCWs experiences of the COVID-19 pandemic (91). Questions in the interview guide (Appendix I) focused on the second and third study objectives, exploring the impact of the pandemic on HCWs at both individual and team levels, managerial decisions, and patient access to services.

All in-depth interviews were conducted face-to-face. After the interviews, the researcher used journaling techniques to record details about the participants, such as body language, physical appearance, facial expressions and how participants responded. These notes were used to enhance reflexivity, transcript analysis and to identify any potential bias (92).

2.1.6 Pilot study

The researcher pre-tested the interview guide with two HCWs who had similar characteristics to the sample but were not working in paediatrics at CHBAH. Through pre-testing, the researcher was able to refine questions, clarify ambiguities, and determine if the information obtained would answer the research question (93). No major changes were deemed necessary; however, the researcher gained insight into how questions should be asked and was able to practice using the interview guide.

2.1.7 Data analysis

The researcher analysed quantitative data using SPSS version 28.0. Descriptive statistics were used to summarise data from each of the therapeutic services departments. All variables were continuous and were summarised using the mean and standard deviation or median and inter-quartile range, depending on the normality of data distribution. Inferential techniques were applied, including the use of non-parametric tests (the Mann-Whitney and Wilcoxon Signed Rank tests) as the data were not normally distributed. These tests were interpreted using U test statistics and p-values. The data were recoded to reflect the introduction of lockdown measures in month 15 of the dataset, and medians were compared using the Mann-Whitney test for each variable. Results are presented using graphs and tables.

For qualitative data, the researcher transcribed interviews verbatim using *Otter.ai* software. Using *MAXQDA* coding software, codes were applied to the raw data to uncover initial thoughts and ideas, developing a codebook, and looking for themes using an inductive approach. The researcher coded and recoded sections of text numerous times, considering as many potential themes as possible. At this point, the researcher shared the codebooks and emergent themes with her supervisor to cross-check analysis and to ensure reliability and consistency. An interpretive paradigm was employed to understand participants' subjective experiences.

The results of each phase are presented separately (quantitative findings followed by qualitative). Following this, the data are integrated using a narrative approach and convergent design joint display during data interpretation to confirm and validate the findings generated by each method (89,94). The process of integration allows the researcher to produce a "whole" which is more valuable than the collective value of its separate quantitative and qualitative parts (94). The researcher used the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines as a framework against which to check reporting of the qualitative methodology and results (Appendix J) (95).

Trustworthiness

To enhance the study's rigour, the researcher followed Lincoln and Guba's criteria for trustworthiness: credibility, transferability, dependability and confirmability (96). Triangulation was used to establish credibility, including data triangulation by including different levels of HCWs to obtain different perspectives, and investigator triangulation by having a supervisor as an additional researcher to make decisions on data analysis and interpretation (97). In addition, the results of both phases were integrated at the data interpretation stage using a convergent design joint display and narrative summary (94). Thick description of participants was used to establish transferability, including their context, behaviours and experiences (97). An audit trail of the research process was used to demonstrate dependability and confirmability (97).

Reflexivity

As a 33-year-old Master of Public Health student and female Caucasian occupational therapist with experience in the public sector, RM was conscious of her position as an 'insider', with insight into some unique challenges that HCWs may experience. She acknowledged her "allegiance" to therapeutic services and potential to unconsciously overinflate the success of innovations used by HCWs during the pandemic. RM's initial interest in the topic was sparked by anecdotal reports of challenges from other HCWs during the pandemic. Being aware of this position, she tried to be as objective as possible in her questioning and data analysis, despite her preconceived ideas and assumptions.

2.1.8 Ethical considerations

The researcher obtained the following permissions to conduct the study:

- Ethical clearance was granted by the Human Research Ethics Committee (HREC - Medical) at the University of the Witwatersrand, Johannesburg. Clearance certificate number: M220122 (Appendix D).
- Permission to conduct the study was granted by the School of Public Health postgraduate assessor committee at the University of the Witwatersrand.

- Institutional permission was obtained from the CHBAH Research Protocol Assessment Committee and each therapeutic services HoD at CHBAH (Appendix E).
- The study was registered on the National Health Research Database prior to commencement of data collection (NHRD No. GP202201_018).

In the qualitative phase, the researcher provided each study participant with an information letter informing them that involvement was voluntary (Appendix F). This information letter included information on the protection of the identity of participants, confidentiality, reporting of results and data storage. Informed consent was obtained from all participants, confirming their willingness to participate in the study. COVID-19 protocols were followed during face-to-face interviews in accordance with national and facility guidelines.

CHAPTER 3: RESULTS

3.1 Introduction

This section presents the results of both phases of the study on the effects of COVID-19 on PTS at CHBAH. The findings of each phase are presented separately: quantitative findings from the routine data on service outputs are presented first related to objective one, followed by the qualitative findings from HCW interviews related to objectives two and three. The results of both phases are then integrated at the data interpretation stage using a convergent design joint display and narrative summary (94).

3.2 Quantitative results

3.2.1 Description of the sample

A total of 305 routine data documents were reviewed and analysed (Table 3.1). Of these, 201 were paper-based documents submitted monthly to the DHIS; the remainder were electronic records. Most of the paper-based documents were obtained from the hospital administration department. Additional paper-based and electronic records not submitted to the DHIS were collected from some of the therapeutic services HoDs.

Table 3.1 Description of routine data

	Paper-based documents	Electronic records	Total
Dietetics	75	26	101
Occupational therapy	32	35	67
Physiotherapy	32	0	32
Social work	31	43	74
Speech-language therapy and audiology	31	0	31
Total	201	104	305

3.2.2 Patient contact sessions

The analysis that follows uses summarised scores for the variables constituting each section. Trends are depicted in the following figures. These indicate the number of patients per category per month for each year. The mean count per month is shown on the y-axis.

3.2.2.1 Trends observed in the number of patient contact sessions

Physiotherapy experienced a decrease in the number of patient contact sessions in 2020 from the levels observed in 2019 (Figure 3.1). However, the numbers started to increase again towards the end of 2020. They remained stable for most of 2021 apart from reductions in January, July and December, which correspond with waves of the pandemic. Occupational therapy experienced a dip in 2020 from the levels observed in 2019. Numbers increased in 2021; however, reductions were noted in April, July and December. The levels for social work decreased from 2019 and remained at a lower level for the remaining two years, apart from a spike towards the end of 2020. The number of contact sessions for speech-language therapy and audiology remained fairly constant and much lower than the other disciplines. Overall, the most notable changes were observed in the number of patient contact sessions during 2020 in the physiotherapy, occupational therapy and social work departments.

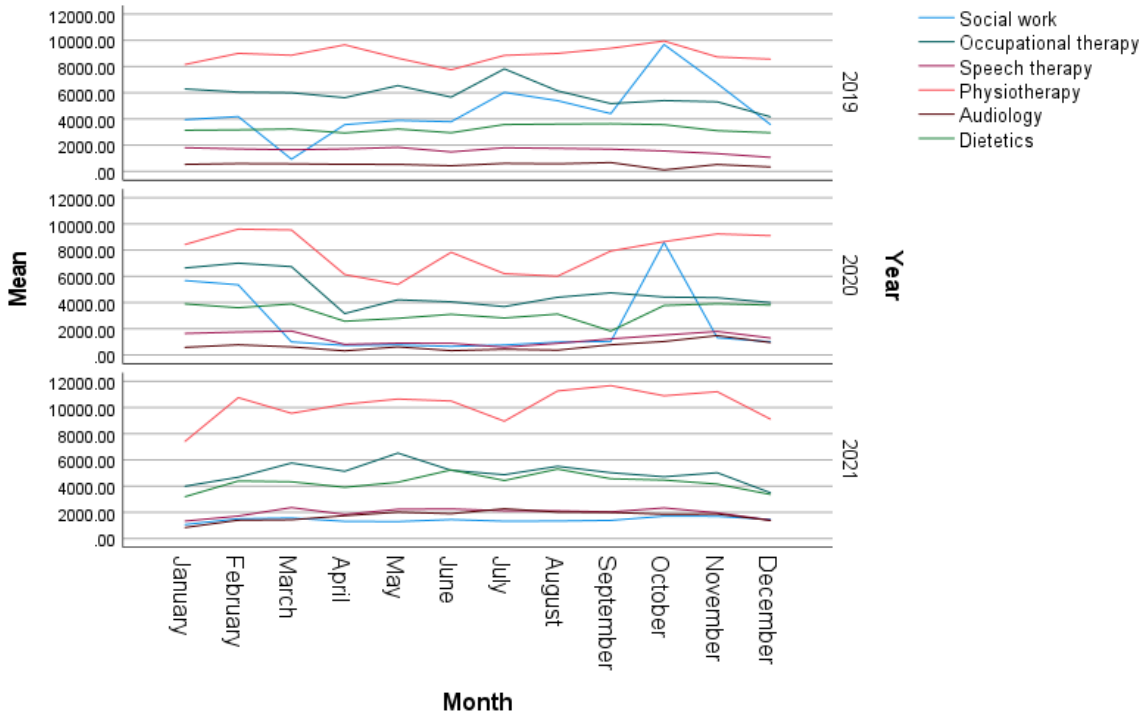


Figure 3.1 Number of patient contact sessions in each department per month

3.2.2.2 Trends observed in the number of inpatient contact sessions

Physiotherapy experienced reductions in inpatient contact sessions during April and August of 2020 and January, July and December of 2021 (Figure 3.2). After an initial dip in April 2020, the number of inpatient contact sessions for occupational therapy remained fairly constant for 2020 and 2021 apart from slight peaks in May and August 2021. Dietetics experienced reductions in April and September 2020 compared to the levels observed in 2019. There were increases in numbers between February and March 2021 as well as peaks during June and August 2021.The number of inpatient contact sessions remained fairly constant over the three year period for social work and speech-language therapy and audiology. Overall, the most significant changes in the number of inpatient contact sessions were seen in the physiotherapy and occupational therapy departments during April 2020, which corresponds with the initial level 5 national lockdown.

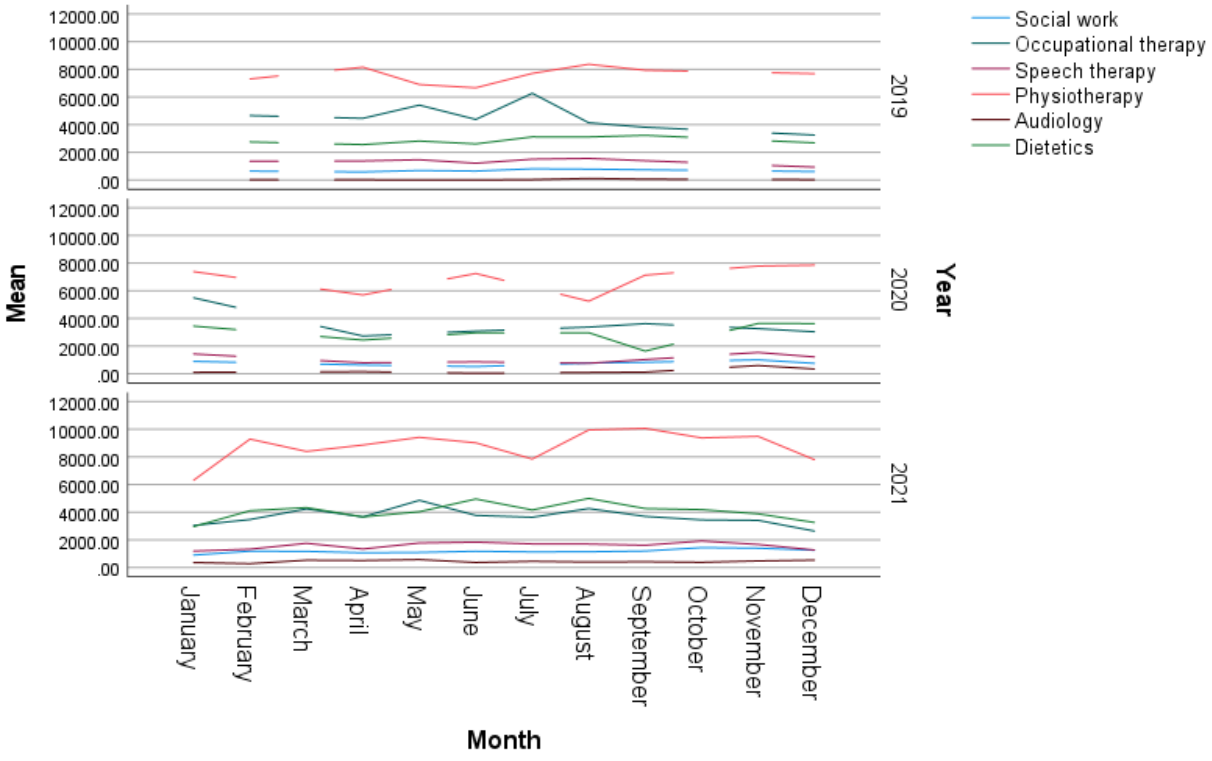


Figure 3.2 Number of inpatient contact sessions in each department per month

*Note: breaks in graph lines indicate missing data.

3.2.2.3 Trends observed in the number of outpatient contact sessions

Physiotherapy experienced a reduction in 2020 from the levels observed in 2019 (Figure 3.3). However, the numbers started to increase towards the end of 2020 with a spike in November. They remained fairly stable for most of 2021 apart from decreases in January, March, July and December. Occupational therapy also experienced a reduction in April 2020 from the levels observed in 2019. Numbers began to increase steadily towards the end of 2020 and in 2021; however, dips were noted in January and December 2021. Speech-language therapy experienced a reduction in outpatient numbers between March and July 2020 compared to the levels observed in 2019. However the numbers began to increase again towards the end of 2020, and spiked in March 2021. Outpatient numbers for social work and dietetics remained fairly constant throughout the three year period, with a slight decrease in 2020. Outpatient numbers for audiology decreased slightly in 2020 compared to 2019 levels. However, there was a significant increase in patient numbers in 2021 which exceeded pre-pandemic numbers. Overall, the most notable changes were observed for physiotherapy and occupational therapy in April 2020; however, there were reductions in the number of outpatient contact sessions for all departments over that period.

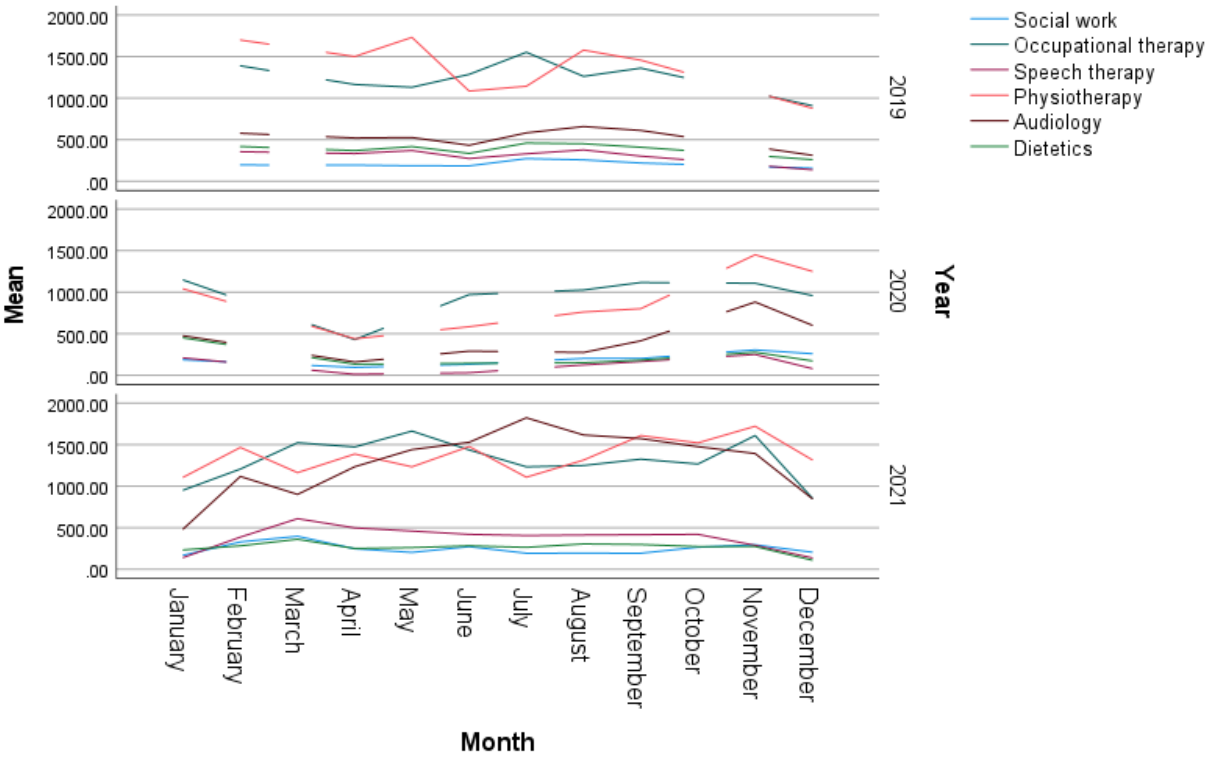


Figure 3.3 Number of outpatient contact sessions in each department per month

*Note: breaks in graph lines indicate missing data.

3.2.2.4 Trends observed in the dietetics department

There was a decrease in the total number of new patients < 5 years seen in 2020 compared to the levels observed in 2019 (Figure 3.4). This reduction corresponds with the initial level 5, 4 and 3 lockdown period. However, the numbers remained fairly constant in 2021, apart from a reduction towards the end of the year (November – December 2021). The total number of new patients between 5 – 12 years remained fairly constant throughout the three year period, apart from a slight decrease in 2020. Overall, the most notable change observed was the decrease in new patients < 5 years seen in 2020 which only began to recover fully in the later months of 2021.

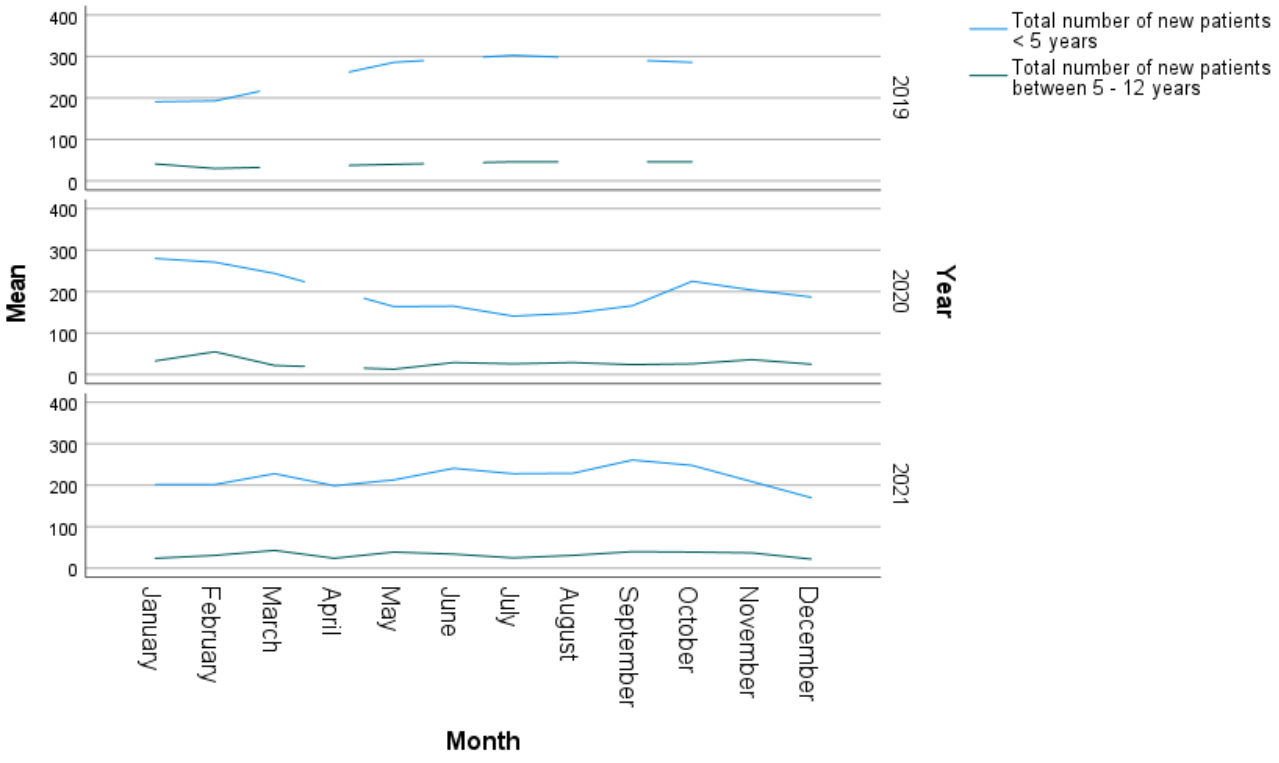


Figure 3.4 Number of paediatric patients seen by dietetics per month

3.2.2.5 Trends observed in the occupational therapy department

There was a significant decrease in the total number of diagnoses seen < 5 years in April 2020 which corresponds with the beginning of the initial hard lockdown period (Figure 3.5). After this, levels began to increase steadily again in the second half of 2020 and remained fairly constant for 2021.The total number of assistive devices issued to paediatric patients remained fairly constant over the three year period. Overall, the most significant change observed was the reduction in total number of diagnoses seen < 5 years in April 2020.

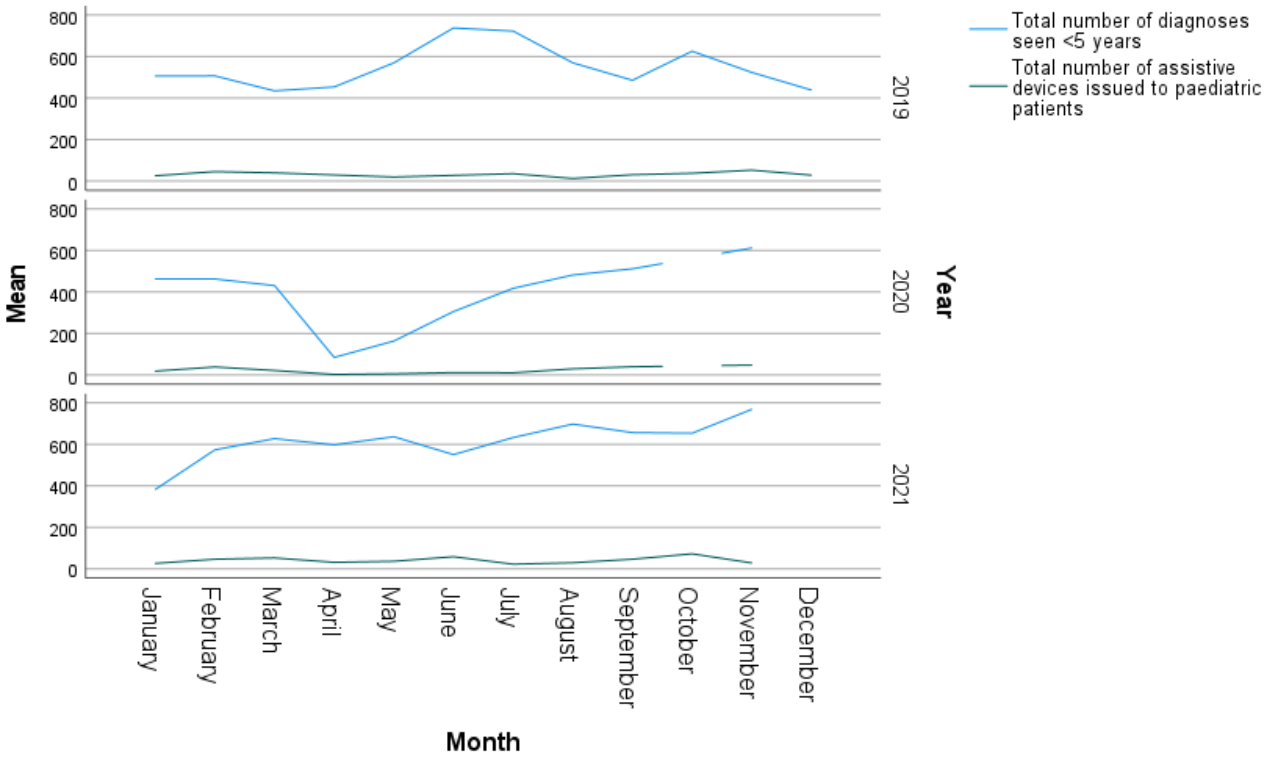


Figure 3.5 Number of paediatric diagnoses seen, and assistive devices issued to paediatric patients by occupational therapy

3.2.2.6 Trends observed in the social work department

There was a decrease in the total number of patients younger than 5 years seen per month in April 2020, which corresponds with the initial hard lockdown period (Figure 3.6). Patient numbers peaked between February – April 2021 and again in November 2021, which corresponds with adjusted level 1 lockdown periods. It is important to note that the number of patients < 5 years seen per month in 2021 significantly exceeded those observed in 2019. The number of child abuse cases per month remained fairly constant for the three year period, apart from a peak observed in February 2021, which corresponds with a level 3 lockdown period. The total number of child neglect cases per month decreased in 2020 compared to the levels observed in 2019. Overall, the most notable changes were the reduction in total number of patients < 5 years in April 2020 and the subsequent increase in these numbers in 2021.

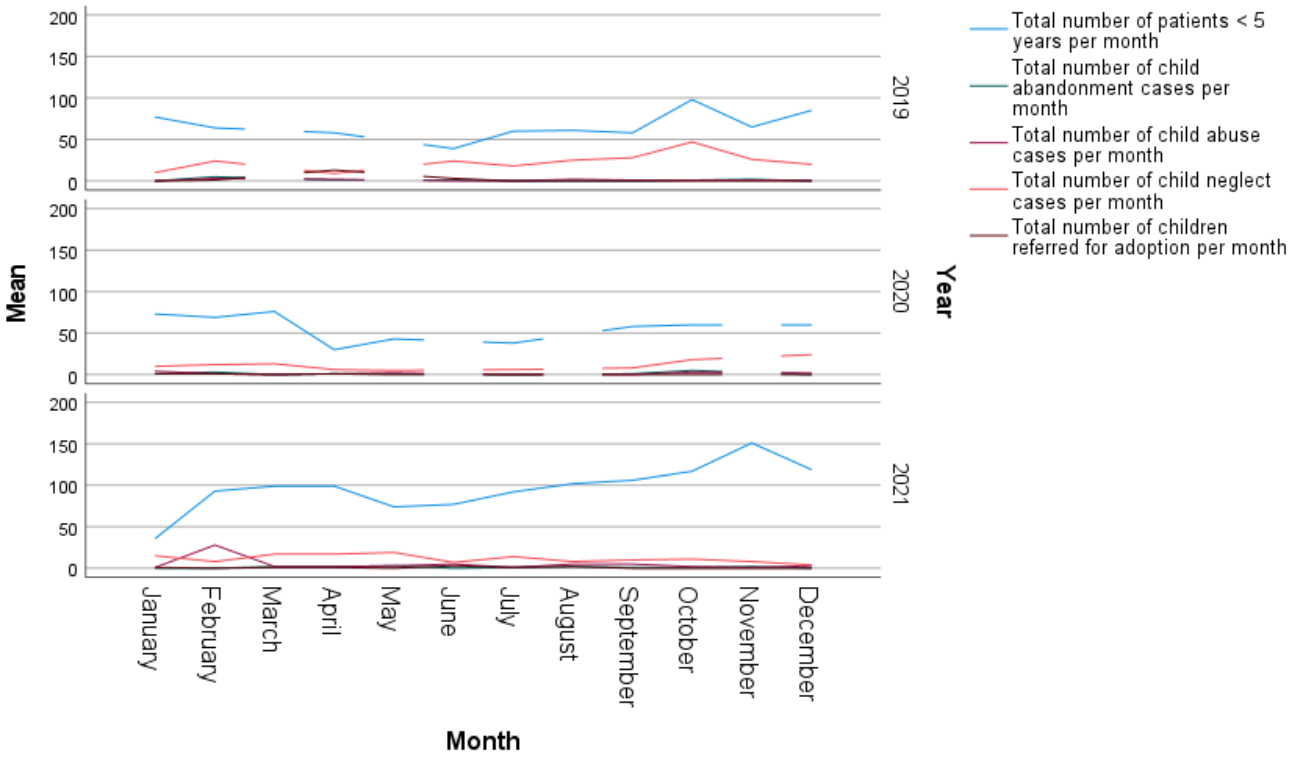


Figure 3.6 Number of paediatric patients seen by social work, by diagnosis

3.2.3 Changes in service outputs following the introduction of COVID-19 lockdown measures

The data were recoded to reflect the introduction of lockdown measures in month 15 of the dataset (March 2020). The results are shown below.

Table 3.2 Changes in the number of paediatric patients seen by dietetics per month following the introduction of COVID-19 lockdown measures

	Covid-19																	
	Prior to lockdown measures								After introduction of lockdown measures									
	Count	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Maximum	Minimum	Count	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Maximum	Minimum	Mann-Whitney U	Mann-Whitney p-value
Total number of new patients < 5 years	14	258.57	46.47	**280.00**	193.00	286.00	303.00	191.00	22	203.52	34.37	**204.00**	170.00	228.00	261.00	141.00	**28.000**	**0.016***
Total number of new patients between 5 - 12 years	14	41.57	8.46	**41.00**	33.00	46.00	55.00	30.00	22	29.48	7.54	**29.00**	24.00	36.00	43.00	13.00	**18.500**	**0.003****

*p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

The test results indicate that there were significant differences before and after the introduction of lockdown measures for the total number of new patients under 5 years (U=28.000, p=0.016) and the total number of new patients between 5 – 12 years (U=18.500, p=0.003). An inspection of the median values indicate that the medians (IQR) were higher before lockdown (280.00 (193.00-286.00) and 41.00 (33.00-46.00)) compared to after the introduction of lockdown measures in both cases (204.00 (170.00-228.00) and 29.00 (24.00-36.00)).

Table 3.3 Changes in the numbers of paediatric diagnoses seen and assistive devices issued to paediatric patients by occupational therapy following the introduction of COVID-19 lockdown measures

	Covid-19																	
	Prior to lockdown measures								After introduction of lockdown measures									
	Count	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Maximum	Minimum	Count	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Maximum	Minimum	Mann-Whitney U	Mann-Whitney p-value
Total number of diagnoses seen <5 years	14	536.00	99.06	**506.50**	463.00	570.00	738.00	435.00	22	515.45	175.76	**562.50**	424.50	635.00	769.00	85.00	**149.000**	**0.753**
Total number of assistive devices issued to paediatric patients	14	32.00	10.89	**30.50**	26.00	39.00	53.00	13.00	22	33.05	17.70	**30.00**	23.00	47.00	73.00	3.00	**151.000**	**0.893**

*p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

There is no significant difference between the medians (distributions are the same) for before lockdown compared to after the introduction of lockdown measures for each of the variables (U=131.000, p=0.753 and U=143.000, p=0.893). That is, the medians (IQR) are similar (506.50 (463.00-570.00), 562.50 (424.50-635.00) and (30.50 (26.00-39.00), 30.00 (23.00-47.00)).

Table 3.4 Changes in the number of paediatric patients seen by social work following the introduction of COVID-19 lockdown measures, by diagnosis

	Covid-19																	
	Prior to lockdown measures								After introduction of lockdown measures									
	Count	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Maximum	Minimum	Count	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Maximum	Minimum	Mann-Whitney U	Mann-Whitney p-value
Total number of patients < 5 years per month	14	67.25	14.98	64.50	59.00	75.00	98.00	39.00	22	80.53	32.52	77.00	58.00	102.00	151.00	30.00	84.500	0.231
Total number of child abandonment cases per month	14	1.17	1.53	1.00	0.00	1.50	5.00	0.00	22	1.16	1.30	1.00	0.00	2.00	5.00	0.00	108.500	0.815
Total number of child abuse cases per month	14	1.33	1.23	1.00	0.50	2.00	4.00	0.00	22	3.47	6.15	2.00	1.00	3.00	28.00	0.00	77.000	0.125
Total number of child neglect cases per month	14	21.08	10.71	**22.00**	11.00	25.50	47.00	9.00	22	11.47	5.61	**10.00**	7.00	17.00	24.00	4.00	**41.500**	**0.003****
Total number of children referred for adoption per month	14	1.58	3.70	0.00	0.00	1.00	13.00	0.00	22	0.53	0.84	0.00	0.00	1.00	3.00	0.00	105.000	0.674

*p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

There was a significant drop in the median number of child neglect cases per month after the introduction of lockdown measures (U=41.500, p=0.003), with the median (IQR) number of cases during lockdown (10.00 (7.00-17.00) being approximately half of that before lockdown measures were introduced (22.00 (11.00-25.50)). None of the other variables showed significant differences between the before lockdown measures and after the introduction of lockdown measures scenarios.

3.3 Qualitative results

The sociodemographic profile of the HCWs interviewed is presented in Table 3.5. Out of the 16 HCWs interviewed, there were 15 females. Three HCWs were interviewed from the occupational therapy, physiotherapy, social work, and dietetics departments and four from the speech-language therapy and audiology department. Across professions, the HCWs had between 4-32 years of work experience, with a mean of 15 years. They had been employed at CHBAH for between 3-30 years, with a mean employment time of 11 years. Five of the HCWs were HoDs. Five were Chief paediatric HCWs or paediatric team supervisors, and one was an acting team leader in paediatrics. The remaining five were production-level HCWs. As per the eligibility criteria, they had all worked in paediatric services for at least three months during the pandemic and had been employed at CHBAH for at least six months before the first lockdown. Each HCW was knowledgeable about the functioning of their department.

Table 3.5 Sociodemographic characteristics of therapeutic services healthcare workers interviewed at Chris Hani Baragwanath Academic Hospital

Variable	Characteristic / category	Total (n = 16)
Sex	Male	1
	Female	15
Department	Occupational therapy	3
	Physiotherapy	3
	Speech-language therapy and audiology	4
	Social work	3
	Dietetics	3
Years of professional experience	0 – 5	1
	6 – 10	4
	11 – 15	6
	16 – 20	2
	21 – 25	0
	26 – 30	2
	>30	1
Years employed at CHBAH	0 – 5	2
	6 – 10	9
	11 – 15	3
	16 – 20	0
	21 – 25	0
	26 – 30	2
	>30	0

The results of the qualitative phase are organized according to the second and third study objectives, namely a) the barriers and challenges to service delivery experienced by each PTS department during the COVID-19 pandemic; and b) the innovations made, and possible solutions explored by each PTS department to facilitate service delivery during the COVID-19 pandemic.

Table 3.6 Overview of themes and subthemes

Objectives	Themes	Subthemes
Objective 2	Theme 1: Questioning the meaning of essential services	Protectiveness of doctors towards therapeutic services HCWs
		Service cancellation, reduced caseloads and referrals during the pandemic
		Missed opportunities and backlogs created by the pandemic
	Theme 2: HCWs carried additional loads during the pandemic, sometimes outside of their scope of practice	Adjustment and change brought on by the pandemic
		Additional duties and administrative responsibilities
		The mental health of HCWs
	Theme 3: Structural barriers faced by HCWs affecting service delivery	Closure of partner organisations
		Challenges with patient follow-up
		Challenges with the availability and use of resources
		Lack of leadership and communication
Objective 3	Theme 1: A systems approach to decision-making during the pandemic	Role release
		Inter-professional communication and coordination
		Restructured MDT services
		Changed models of service delivery
	Theme 2: Working smarter	Service evaluation and patient prioritisation
		Innovations in patient care
		Patient education, remote monitoring and follow-up

3.3.1 Objective 2: Barriers and challenges to service delivery

Theme 1: Questioning the meaning of essential services

One major barrier to service delivery during the pandemic was the concept of "essential services". HCWs struggled to define "essential" and felt they had to prove their worth as therapeutic services. Some felt non-essential because they did not provide "life-saving" services. Others thought that they played an indispensable role during the pandemic, whilst HCWs also felt that their role became more evident as the pandemic progressed and the secondary complications of COVID-19 revealed themselves.

> *I think in some areas - so some doctors consulted a lot. Others were like, "We don't need you in here, you're just causing traffic".* (HCW 1)

> *And then we started realising that COVID had other effects as well, neurological effects and things. And so, we realised, "goodness, we have just as much of a role here with something that attacks your breathing and your lung function as anyone else next to us".* (HCW 2)

Protectiveness of doctors towards therapeutic services HCWs

A significant challenge was doctors' attitude of "protectiveness" towards therapeutic services staff. For example, initially, all therapeutic services HCWs were kicked out of the paediatric wards because doctors were afraid of them being exposed to COVID-positive patients and spreading the virus to other patients.

> *… our first hurdle, in terms of service delivery, was to convince doctors to allow us - that we don't need their protection from COVID patients. That it's actually okay and that we are okay to go into the wards.* (HCW 16)

Service cancellation, reduced caseloads and referrals during the pandemic

Another barrier to service delivery was service cancellation. HCWs reported that many services were put on hold during the pandemic as a directive from the hospital

management. All outpatient services, group sessions, caregiver training, and MDT sessions stopped for a considerable period.

> *So in the times where we had the waves… they cancelled a whole lot of services. So like our, our clinics weren't running.* (HCW 8)

> *I remember we were cancelling, um, services like our Neuro rehab clinic where patients with cerebral palsy that was considered obviously more high risk, said for now, you know, just don't come in. Um, our tracheostomy patients that again, are also considered more high risk, were also, you know, we were cancelling those services…* (HCW 4)

In addition, patient screening for conditions such as malnutrition and hearing loss stopped during waves of the pandemic, which contributed to lower caseloads.

> *So we actually were asked to stop screening in the wards because we do severe acute malnutrition screening... And then, every time there was a wave, they would ask us to stop again, and they would refer patients if we needed to see them.* (HCW 8)

Service cancellation caused a significant drop in caseloads, particularly during the initial level 4 and 5 hard lockdown period. In addition, only priority patients were admitted, and there were strict guidelines regarding which HCWs could handle babies. Moreover, hospital management cancelled all elective surgery, and there was a national alcohol ban which resulted in a significant decrease in trauma patients.

Furthermore, many HCWs reported reduced referrals from doctors during COVID-19 because they were not allowed to be present during patient management discussions.

> *…and even the consultants would say to you, if, if you are there as a dietician, they will remember to refer to you. If you're not there, they forget.* (HCW 9)

Missed opportunities and backlogs created by the pandemic

HCWs felt that the limited access to patients during hard lockdown periods resulted in many missed windows of opportunity for children's diagnosis and treatment.

> *And a lot of patients who didn't come during lockdown, because they were, families were scared. There were so many missed diagnoses or opportunities for diagnosis and therapy…* (HCW 2)

One specific group affected were children with developmental delays of schooling age. Many of these children missed out on opportunities for assessment for school placement which has now resulted in delays in accessing schooling.

> *Now we [sic] starting with first therapy, and they're already 5, 6 years old… And should be going to school. So… now we're trying to play catch up and trying to rush through things so that we can get some sort of report for them to be able to get school placement.* (HCW 2)

Furthermore, some paediatric patients were admitted to the hospital in a more severe condition than they should have been. These unnecessary admissions were due to missed opportunities for outpatient education and treatment.

> *…all the paediatric diabetics, um, we weren't seeing, but we were seeing them in, when they were getting admitted in hospital because they weren't… being educated by us and… they weren't being followed by us and, and stuff like that. So they were just carrying on doing their own stuff without the support of a dietician. Um, so then we'd end up seeing them in hospital, which is not ideal where you can manage that condition as an outpatient.* (HCW 9)

Many HCWs also reported a backlog in paediatric services because of the lockdown restrictions. However, once the restrictions were lifted and it became easier for patients to access care, there were suddenly many more patients to be seen.

> *Because now there's almost like a backlog. And um, with… so many kids that have had neurological fallout and things like that, because of COVID, there's now… more patients to be seen.* (HCW 2)

Theme 2: HCWs carried additional loads during the pandemic, sometimes outside of their scope of practice

Adjustment and change brought on by the pandemic

Several HCWs reported experiencing rapid and continuous change that was difficult to "stay on top of" during the pandemic. Policies and protocols were constantly adjusted and updated based on new evidence and fluctuated daily.

> *…you might have one policy today, and then same day, there's a new policy on the same thing.* (HCW 10)

Those in leadership positions were responsible for updating their team members with the latest information. This usually took the form of quick meetings, which detracted from service delivery time.

In addition, HCWs continuously re-evaluated and adjusted services to maintain patient access while minimising viral transmission risk. HCWs made these changes with little guidance and mostly through “trial and error". However, some reported feeling unhappy about changing functional systems.

> *…it was a drain… trying to come up with new ways to get to patients - um, how to adjust our services… you went from having a fully established clinic to re-evaluating everything and then coming up with new ways… it's almost like you*

weren't very happy about changing it. But you knew that the change had to happen. (HCW 7)

One finding was the change in HCW communication and interaction. Particularly during the hard lockdown period, hospital management stopped ward rounds to reduce unnecessary numbers in the wards. Consequently, communication between HCWs changed from in-person discussions to telephone calls and emails. Moreover, social distancing was introduced, and physical interaction between HCWs was limited to prevent viral transmission. This meant that communal lunches, departmental meetings, and team-building activities were largely put on hold. Participants felt that these changes affected team dynamics and HCW morale.

… a lot of things were sent via email, so there's that lack of human connection, which is a big problem… Also… we said, lunchtime, you need to have on your own... we didn't want everybody to take off their mask at the same time. So that whole social atmosphere was completely ruined. (HCW 9)

In addition, there were significant changes in MDT work during the pandemic. Occupational therapy, speech therapy and physiotherapy MDT clinics were stopped as these clinics involved too many people in a room. Each discipline then held its own private sessions, which most HCWs found negatively impacted patient care.

I think one of the biggest things we grappled with is that COVID took everybody back into their own individual space. (HCW 6)

However, a few participants mentioned that MDT work changes were imminent before COVID-19 and some HCWs felt optimistic about services being more discipline-specific.

A few HCWs pointed out the negative impact of the pandemic on training and mentorship of HCWs and families. In addition, several HCWs mentioned challenges with student training, with students not having the same level of clinical exposure during

placements compared to before the pandemic. Once employed for their Community Service year, senior HCWs would then have to invest time and energy to help them build competence.

> *… with our new comserves [sic], we have to put in a lot of initial capacity building, skills building, peer learning sessions with them to… give them that that exposure. Um, because, ja, feedback from them was also that at varsity level, everything was taking place online.* (HCW 4)

Additional duties and administrative responsibilities

Most participants reported taking on additional duties outside of their usual workload and scope of practice during the pandemic. These included participating in various committees, managing the swabbing tent, bathing neonates, packing PPE kits for COVID-19 wards, making visors for hospital staff, assisting with the vaccination campaign and rollout, queue marshalling, developing new protocols, and developing a COVID-19 hospital database.

Moreover, many HCWs reported additional responsibilities related to infection prevention and control in their departments. All HCWs had to be screened every morning, which involved temperature and symptom checks. Patients entering each department were screened similarly, and social distancing regulations were continuously enforced. Furthermore, clinicians were responsible for cleaning personal belongings, departments and treatment areas numerous times a day to prevent viral transmission. This became very time-consuming.

> *The other thing we also did was… that was quite time-consuming was we did cleaning. So, we were cleaning the department like three times in the day… All door handles, light switches, kitchen, like kitchen would be cleaned in the morning, at lunchtime, in the evening, I mean after work and like it was just very, we were all cleaning every time.* (HCW 3)

Furthermore, many HCWs reported a heavy administrative load during the pandemic, which was particularly relevant to managers and those in leadership. This administration was centred around staff who developed symptoms, tested positive, and all the processes and documents that were needed to record and respond to such incidents.

> *Parcels and parcels and parcels and parcels… the amount of papers it generated was immense... monitoring staff symptoms, and then responding when they had symptoms was nearly a full time job.* (HCW 16)

The mental health of HCWs

One HCW reported experiencing a "professional burden" brought on by the pandemic, or an obligation to help patients without having the capacity to do so. This burden became particularly evident as the pandemic progressed and many people fell into poverty.

> *Now, this is a family, maybe a mother with two kids. She has been kicked out of a house where she was renting. She lost her job… You can't just say no, but I'm in a hospital…I don't have anywhere to put you guys. There is a department somewhere where you should go. And yes, that department is on lockdown…Or it's not in the area here. They don't have money to reach there. So what happens? What do we do then?* (HCW 12)

In addition, many HCWs reported carrying a heavy "psychological burden" during the pandemic. This burden resulted from the high pressure, community fear and anxiety, lost hope and desperate social circumstances. This constant emotional stress took a heavy toll on many HCWs, particularly social workers.

> *But the burden… the sort of compounding, compounding effects of social factors or social effects on a social worker were actually bigger than anyone would imagine.* (HCW 12)

…you don't realise how much… it costs like it really weighs on you. (HCW 10)

During the initial hard lockdown period, HCWs reported experiencing overwhelming fear, paranoia, and anxiety. Much of this fear came from the "unknown" - uncertainty around the virus, what to do in the event of exposure, and whether PPE offered sufficient protection.

It was… so traumatising because it's for the first time we see something like that, ja. And then I think the fear of not knowing what is going to happen, what is this virus and then no cure... (HCW 11)

All HCWs reported intense stress during the pandemic, particularly during the hard level four and five lockdown periods. Some of this stress was related to being exposed to and contracting the virus and getting sick themselves.

…and the moment you heard someone was in quarantine, then you just lose your mind thinking, "My goodness, when was the last time they blinked at me (laugh) or the last thing that's happened?" (HCW 2)

Many HCWs also reported stress around passing the virus on to "vulnerable" people, such as those with high-risk comorbidities. However, most HCWs reported that the intensity of these feelings subsided somewhat as the pandemic progressed. Furthermore, vaccination significantly reduced some of the fear around the virus.

Those in leadership or management positions reported feeling stressed about "everything just consistently changing" and trying to stay on top of what was happening.

…so, stress levels… were quite ridiculous at one point. But I also couldn't like really show it to, to the team, you know, because everybody was stressed… and my stress was particularly related to whether or not we, we were in the loop of

what's happening, because I kind of felt like everyday staff are being sent into a black hole, and they don't know what they're going to. (HCW 3)

In addition, many managers and team leaders felt responsible for protecting their teams and ensuring their safety during the pandemic.

Several HCWs reported experiencing burnout due to the compounding effects of the pandemic. Although burnout was not new to these HCWs, they felt it started earlier in the year compared to pre-pandemic times (e.g., by March rather than towards September).

…I think a lot of people are… a bit "gatvol" of everything... they're all on a burnout… I think we're all on burnouts... We're all exhausted… And with everybody getting sick… you have to carry that load, there's no one else. (HCW 9)

Several HCWs mentioned being concerned about their family members and carrying additional responsibility for them during the pandemic. Almost all the HCWs reported feeling stressed or fearful about "taking it home to their families".

…I was worried every time when I was going back home... If it happens that I contract COVID from work, then I will be taking it to my children. (HCW 13)

Furthermore, a few HCWs who lived far away from their families reported significant concern about not being able to travel to care for their relatives should the need arise. One HCW also reported the strain of constantly observing COVID-19 regulations at work.

I think work somehow became complicated in that whatever that you were doing, you had to ensure that COVID regulations were observed. (HCW 13)

More than half of the HCWs reported contracting the COVID-19 virus; however, they had varying experiences regarding symptoms and recovery. A common theme of post-COVID-19 "fatigue" was reported, and this negatively impacted work performance.

> *…but the fatigue was just something unreal. And I think… coming back into the workspace… you have to again, you know, immediately sort of like hit the ground running… And get back into it, so I think that was also hard.* (HCW 4)

Theme 3: Structural barriers faced by HCWs affecting service delivery

Most HCWs raised concerns about structural barriers that affected service delivery during the pandemic and which were outside of their control.

Closure of partner organisations

One significant barrier to service delivery reported by social workers was the closure of partner organisations, such as the Department of Social Development and Child Protection Organisations, for periods of time during the pandemic. Hospital-based social workers depend on these external stakeholders for their services to operate smoothly. The result was backlogs in moving children out of hospital wards, which placed them at risk of contracting COVID-19.

> *Most of their employees were at home. They would close the whole office for the week or two once they have found a COVID case. Then that would mean children had to stay, babies had to overstay in the wards while at the same time there were standing the risk of contracting COVID.* (HCW 13)

Challenges with patient follow-up

Participants reported significant challenges with contacting patients and families during the pandemic, particularly once services started opening again and HCWs tried to bring patients back into care. HCWs were concerned that patients fell through the "cracks" of the system during this period, implying that they were lost to follow-up.

> *So even if you've got hold of them to cancel, to get hold of them six months later when you can book them is by then the phone's changed three times … and the person's never heard of the person you're trying to speak to and so yes, I have no doubt people fell through the cracks.* (HCW 3)

Social workers, in particular, had difficulty with contacting patients, especially in cases of child abandonment where mothers often gave false contact information.

> *In most cases, babies that are abandoned… you will find that the mother did not even give the proper address, they give invalid address and then when you get there, there is no address. When you phone, it doesn't go through.* (HCW 13)

One HCW also mentioned the issue of patient defaulting in nutritional services, i.e., children not being brought in for treatment during the pandemic due to fear or a lack of transport money. In such cases, HCWs felt that caregivers did not perceive the child's condition to be enough of an emergency to be prioritised over other more immediate needs. However, once restrictions were lowered, HCWs noticed a sudden influx of malnutrition cases.

Challenges with the availability and use of resources

One of the most significant challenges to service delivery was space shortages. Social distancing regulations and ventilation requirements were often difficult to meet in the available facilities, which resulted in HCWs not being able to provide certain services.

> *…when paed clinic opened up again… we didn't go back there, because they, they haven't got enough rooms for all of us. So we're all sitting in a very tight space. And we can open the windows, but it's not enough ventilation that's going through there.* (HCW 8)

Another challenge mentioned was obtaining the necessary stock of supplies during the pandemic, particularly of patient feeds. Many companies' employees were working from

home which meant that procurement processes and systems slowed down. In addition, many hospital administration staff were also working from home, and as government systems can only be accessed physically from the hospital premises, there were backlogs in processing orders.

> *So, like our orders took long to get the purchase orders, so and then like our feeds… And then now you have like a hundred patients that are like now with high, high sugars like hyper, hyperglycemia because that's what we saw with COVID. Now you have to order extra. Companies didn't forecast that for us, because like we didn't know.* (HCW 10)

As the pandemic progressed, HCWs reported more pressure to communicate electronically, do their work online and offer services such as telehealth. All of these required technological equipment and resources such as cellphones, computers, internet connectivity and data, which were frequently not available in the hospital.

> *That's why even computers - Microsoft Teams, maybe you have what two? And you have got 30 people that are supposed to… listen to the meeting through those two, only two computers.* (HCW 12)

To overcome these challenges, HCWs frequently used their own personal devices and data for work purposes, which introduced additional costs.

Several HCWs mentioned challenges around obtaining PPE in the initial stages of the pandemic. Because of the high risk of being exposed to the COVID-19 virus, PPE was considered invaluable and as nobody wanted to go into wards and treat patients without being completely covered, many HCWs bought their own supplies out of desperation.

> *… PPE was not so readily available. But… the doctors even bought, um, these yellow rain suits, the municipal rain suits and visors from the building stores.* (HCW 16)

There was a lot of fear of PPE stock running out, especially in the beginning stages of the pandemic, but largely due to donations, this never happened. However, even once PPE was more readily available, there were restrictions on items like N95 masks and HCWs had to set up systems of reusing them to ensure that they did not run out.

Furthermore, several HCWs reported feeling concerned about the quality of PPE they were given and whether they would be adequately protected from contracting the virus. In particular, there were questions about masks not having received the necessary clearance certificates which caused a lot of alarm among HCWs.

> *It was just the one time when we had a fight where we found out that the PPE we were using was not approved or something. So it was like, I've been going to COVID with a mask that hasn't been approved.* (HCW 14)

In order to regulate the supply and quality of PPE, a PPE committee was later established which appeared to help with maintaining certain standards.

Moreover, many HCWs reported the use of PPE as a barrier in patient care, especially with children. Some experienced shortness of breath, headaches and fatigue when wearing masks for extended periods of time. One HCW also mentioned experiencing visual difficulties as a result of her glasses steaming up when wearing a mask. In addition, many HCWs reported challenges with establishing rapport with their patients because the children were afraid of them and the whole "PPE vibe".

> *…it almost feels like you're putting up this barrier between yourself and a patient or, or a parent… I mean, obviously there there's a need for it, but I think it did have a massive impact on being able to build that… connection with patients.* (HCW 4)

Many HCWs mentioned that careful donning and doffing of PPE was time consuming and limited the number of patients they could see per day.

> *So instead of… let's say you spent three hours in the ward, it was now three and a half or four hours, because you had to do that extra donning and doffing… and you know, the stuff that you had with you like, um, measuring tapes, um, books, um, uh, notes or stuff like that...* (HCW 9)

However, many HCWs mentioned that the use of PPE became like "second nature" after a while, indicating that they became much more comfortable wearing it as time went on.

Lack of leadership and communication

Several participants reported experiencing a lack of leadership and communication from hospital management during the pandemic, particularly during the initial stages. Some felt that nobody really knew what others were doing and there was a lack of direction.

> *… the lack of leadership was definitely a big one. The lack of communication as to what was happening in the hospital - was there an overall strategy?... and just information didn't filter through consistently unless you almost demanded it*. (HCW 6)

In addition, many HCWs reported being "bombarded" with emails, but not being told what information was important to pay attention to.

> *…and you were bombarded with a lot of policies, protocols, um, updates from the different websites and stuff like that. So you don't know… nothing was said this is a priority, or this is… information sharing, and whatever the case is.* (HCW 9)

Later on, the COVID-19 Steering Committee was introduced with the purpose of improving communication within the hospital. Although some HCWs reported an

improvement once this committee was established, others felt that therapeutic services HCWs were not fully included in the decision-making process.

> *But for me… the steering committee was more of a rather superficial level of decision making because we as allied or rehab would attend these meetings, and you'd hear people make reference to other meetings…Which was predominantly medical staff and admin…That we weren't a part of.* (HCW 6)

In contrast to the lack of leadership and communication from the hospital management, most participants reported receiving regular updates and continuous support from their HoDs, which helped to ease anxiety, ensure they felt care for and provide direction.

One significant barrier to treating paediatric patients with COVID-19 was the limited worldwide knowledge of COVID-19 disease and children. Unfortunately, most of the information available was on adults and not children. Therefore, HCWs had to draw logical conclusions from the available evidence and use it to inform their intervention.

So you kind of had to do your own reading up… and then just look at what is available in terms of…extracting from what they saying in the adult population and saying, okay, well, um, they have high requirements, because it's, um, a disease affecting the immune system, and, um, like a whole bunch of other things to that effect. So you kind of… extrapolated that to the paediatric population, even though there wasn't really, um, information on, on that. So that was a big barrier for how to go about treating these patients. (HCW 9)

In addition, during the pandemic, therapeutic services HCWs had no guidelines on COVID-19 and rehabilitation from the National Department of Health. This lack of profession-specific guidance was a significant barrier to COVID-19 patient management.

On a broader scale, one participant raised an important point about leadership and communication at a government level, highlighting the lack of transparency in spending and the abundance of corruption during the pandemic.

> *… our government spend a lot of money, billions during COVID under special arrangements, they were not following proper… normal procurement policies… After spending those billions, what do we have?* (HCW 12)

Furthermore, the same participant posed a question about the “legacy” we will have after the pandemic, expressing that there should be evidence of lasting improvements or investments in the healthcare system considering the amount of money that has been spent. For example, these investments might have been centred around improving connectivity or technological infrastructure in healthcare facilities or migrating records onto a digital platform.

> *Other countries have legacies out of COVID. I don't know if we have that.* (HCW 12)

3.3.2 Objective 3: Innovations and solutions explored by each PTS department

Theme 1: A systems approach to decision-making during the pandemic

One HCW mentioned that the pandemic forced a new level of collaboration between departments and managers in the hospital that would not naturally have occurred otherwise. This collaboration was reportedly a positive experience and enabled a more holistic "systems approach" to decision-making.

Role release

Some HCWs mentioned the concept of "role release" and how their teams had begun sharing resources and delegating tasks to other professionals where appropriate. For example, the dietetics department developed a document outlining their available

products and the indications for each one. The speech-language therapy and audiology department had a similar experience with role release.

> *… and we also developed quite a few algorithms for nurses and the doctors within the wards. So, it was almost having to… do a little bit of role release if there was a patient with feeding difficulties. Where in the past they would have sort of routinely been referred to speech therapy - there, we came up with algorithms for the nurses to, for example, initiate, um, like a feeding with the patient and only if there were specific concerns… to make that referral.* (HCW 4)

Inter-professional communication and coordination

HCWs reported that WhatsApp became a valuable platform for inter-professional communication. This electronic platform cut out the need for paper referrals to limit viral transmission and made communication much more efficient.

> *… we had to adapt to WhatsApp communication, where we'll not use paper, but just use the phone to communicate, and instead of, uh, filling or fetching - okay, the doctors would have to fill the referral form, but then we would not take it. Instead, they would take a picture and then send it to us.* (HCW 13)

Another element of communication which improved during the pandemic was interdisciplinary coordination, whereby professionals would try to coordinate their outpatient appointment dates.

> *We try to coordinate with other disciplines as well. So if they're coming for the doctor review on that day, whether that's a clinic day for us or not, we try and make those arrangements so that the patient doesn't have to come more than once.* (HCW 2)

Restructured MDT services

One significant adaptation was restructuring MDT therapeutic services, particularly for occupational therapy, speech therapy, and physiotherapy. During the pandemic, there was a very "active and passionate" MDT coordinator who motivated for outpatient MDT services to start up again after the initial hard lockdown period.

> *… we came up with the MDT SOP where we… moved from… a multidisciplinary more to transdisciplinary services... So, for example, a clinic like our Neuro rehab clinic that we did jointly speech and OT, what we used to then do then, is still have patients that require both speech and OT, um, and physio come in on a day, but one service would cover that, that clinic for the day.* (HCW 4)

> *… we did a lot of role release, sharing of resources so that we didn't have to have everybody in the same room at the same time… but that we ensured that patients got everything that they needed from all of the professions.* (HCW 5)

Changed models of service delivery

Several HCWs reported that the COVID-19 pandemic forced them to consider different service delivery models. A significant change brought in by one department was the establishment of an acute walk-in service for outpatients. This service also caters for more chronic patients, such as children with cerebral palsy, who see the doctor and then come for therapy.

> *… normally outpatients… have booked appointments but we also realise, you know, with the economic situation of most patients and all the lockdowns and when you can travel and when you can't travel - if you're in the hospital and your Plaster of Paris was removed today, we will come across, and we'll fit you in somehow.* (HCW 16)

Many departments introduced some form of telehealth during the pandemic to maintain service delivery despite lockdowns. This telehealth took various forms, from email,

videos, WhatsApp messages, and telephonic follow-up to synchronous WhatsApp video calls and Zoom treatment sessions. Several HCWs reported barriers to implementing telehealth, which is why they had never executed it before the pandemic. However, the pandemic also pushed HCWs to become more innovative in their service delivery.

> *But we always thought that it wasn't possible until we were forced to make it possible.* (HCW 6)

> *… COVID did some bad, but it did some good also, with regards to our services - made us think out of the box.* (HCW 7)

Several HCWs reported positive outcomes of telehealth, including improved service accessibility, especially for those who could not afford to bring their children to the hospital, and improved patient outcomes, particularly for those with long-term health conditions such as developmental delay. Telehealth follow-up also enabled HCWs to spread out physical follow-up sessions.

> *… and we will do a telephonic follow-up. So just asking, "How's it going? Are you implementing - yes, no? Okay, fine". And then seeing them rather every second month, which is also better for families because then they not spending so much money on transport.* (HCW 2)

In addition, many participants reported better buy-in from patients and families after the introduction of telehealth, possibly because there was more frequent contact with service providers. In addition, telehealth was also more convenient for patients and families because HCWs contacted them at their convenience.

> *So they more willing to attend their follow-up appointments… and have us conduct telehealth with them. So I think that's something that even after COVID, we're gonna continue with… It sort of helps us work better with them. It's not just*

> *"Okay, I'm seeing you this month, and I'm seeing you next month"... Now we have that in-between to to sort of keep up with them.* (HCW 7)

> *But it's not, it's not like a burden to the parent, cause we calling them at their available time.* (HCW 7)

Furthermore, a few participants reported high levels of patient satisfaction with telehealth.

> *So we do a satisfaction [scale] at the end of each, um, consultation, and I don't think we've ever had anything less than 95.* (HCW 14)

However, one interesting observation was that some services appear to be better suited to telehealth than others. For example, services requiring hands-on or face-to-face intervention, such as anthropometric assessments, splinting, wheelchair seating and social work assessments, were more challenging to offer via telehealth.

> *… we kind of struggled because, um, you can't make a splint on a patient that's not there. And you can't make a pressure garment on a patient that's not there, and you can't, uh, fit a wheelchair for patients… so, a lot of what we were finding is we need the patient here.* (HCW 3)

> *So, unfortunately, we can't do telehealth really all that well. We can do it with some of the adult patients, but with the kids, it's really important to do the anthropometry and see that they're growing properly… we rely quite heavily on our on our in-person assessment.* (HCW 8)

Conversely, services that relied more on communicating with the patient or caregiver, such as counselling, education or troubleshooting equipment such as hearing aids, appeared to have more success with telehealth.

One element reported to be a significant challenge in offering telehealth was that of limited equipment, resources and technological infrastructure in the hospital, such as computers, cell phones and internet connectivity. Despite numerous proposals and motivations, hospital management could not accommodate departments by freeing up funds for these resources. However, to overcome this barrier, many HCWs used their own resources or worked from home.

> *… we asked for improved Wi-Fi, we asked for cell phones. Um, we asked for like a hub that would allow telehealth access. Um, but no, so what… I started doing is allowing people to work from home when they were doing telehealth so that if they had, but now obviously, with, um, load shedding, that becomes challenging...But if they had Wi-Fi that they could access at home, then ja, and then a few of us also put money together, and we we paying for our own Wi-Fi that quite a few of us are accessing.* (HCW 4)

> *So we used our own devices, and we used our own data. And that's why we didn't get videos of children or photos of children or anything like that. Because we're, we obviously used the phone lines here, if we were, if we were just making calls. Uh, but also to get outside lines is also not easy; you wait long. So half the time, ja, the, the physios in this department just basically used their own resources just to get it up and going.* (HCW 15)

Patient and family resources also proved to be a barrier as many forms of telehealth require internet connectivity and data on both sides.

> *And obviously… data remains a big thing… Because if you send a video to parents, many of them couldn't upload anything; they couldn't even, even upload pictures because they didn't have data.* (HCW 15)

However, one department took on the challenge of mapping out community resources to find places that patients could access for internet connectivity to facilitate telehealth.

> *… the other thing which we did as a team is identified spots in Soweto where people could access free Wi-Fi… And then… if someone doesn't… have data or internet at home, then we would say to them, "There's this place next to you; could you get there and then access Wi-Fi from there?".* (HCW 6)

Although using their own resources was not ideal, several HCWs felt that this was necessary to set up telehealth and prove its effectiveness before they could adequately motivate for more resources.

> *And sometimes you have to do that to see if something works. And then you can then motivate, because usually if you motivate for something that you're not already doing.....your chances will be very slim.* (HCW 15)

Another unexpected finding was that even once lockdown restrictions decreased and services became much more accessible for patients and families, some continued to use telehealth services in combination with face-to-face intervention.

> *…for some, they're choosing a hybrid kind of approach.* (HCW 6)
> This patient preference indicates that telehealth may have value beyond the COVID-19 pandemic.

Theme 2: Working smarter

A few HCWs reported that the pandemic had forced their teams to work "smarter" and develop more efficient ways of delivering services.

Service evaluation and patient prioritisation

All HCWs reported that the pandemic caused them to re-evaluate and restructure their services. Initially, this was done out of necessity, as many departments were running on skeleton staff; however, all participants reported positive outcomes, including a new level of efficiency.

So we had to re-evaluate our service and see what's absolutely necessary, um, and, and carry on with that. But the good part is that even though we let go of a lot of services, it's given us a chance to actually relook at, you know, the service that we were running. Were they really necessary? Or kind of like, um, restructure them in a way where we can actually, we don't need as many people to run a service because we realise we're actually surviving… (HCW 14)

Additionally, a few HCWs commented on how the pandemic had brought an opportunity for the "co-production" of services, enabling HCWs to work together with their service recipients to improve the design.

And that's really led our department to look at co-production within the workspace and how we actually involve families and patients in the planning of services, um, as compared to us as clinicians deciding the way that we need to provide services. (HCW 5)

One significant adaptation reported by all HCWs was how the pandemic forced them to prioritise some patients over others. For example, inpatients were prioritised over outpatients; and even among inpatients, certain conditions took priority over others.

It was prioritising - I remember we had to do SOPs, and… each team in our department had to come up with who would be most priority when it came to patients. How were we going to structure our week so that we are getting only to our high-priority patients and then maybe try and get to the others if there was time… left in the week. (HCW 2)

…and we had to almost… come up with a priority list and say, for these patients, um, we might be able to provide more of a remote role or monitoring role, versus for these patients, we could do more face-to-face, um, and hands-on therapy. (HCW 4)

In addition, many participants mentioned increasing the number of referrals they issued to lower levels of care during the pandemic, particularly to clinics. One of the driving forces behind this was fewer known COVID-19 cases at a community level than at the hospital. In addition, HCWs reported that they started looking more intentionally at their packages of care and noticing that patients could access the same services at a community level.

> *… our down referral rates has also improved a lot more. So we're not keeping patients that don't need to be kept. We're actually send them, sending them out to their clinics to carry on with their rehab.* (HCW 14)

Innovations in patient care

One major adaptation reported by all HCWs was having to book fewer outpatients at any given time to abide by COVID-19 regulations.

> *…so we… had to decrease the amount of people who could actually book in just to declutter. Um, we couldn't participate in a lot of the clinics anymore. Um, we had to just be a lot more mindful of how many, uh, patients or how many people are accompanying a child, especially, um, how many we'll allow into the room.* (HCW 14)

Furthermore, once group sessions restarted, there were restrictions on the size, which meant that large group sessions were divided into smaller groups. These restrictions impacted the amount of time allocated for group therapy.

> *We've, um, really noticed that we've also had to be conscious about the amount of patients that we do get in for a group. So what that's done is maybe where we could have run one big group on a day… we had to, um, sort of allocate more time for the programme to run in smaller groups*. (HCW 4)

Several participants spoke about reducing physical contact during their intervention, which was a difficult adjustment, particularly for therapies which rely on hands-on facilitation.

> *… it's very difficult to treat children by remote control… like, you wouldn't put them to come and sit on your lap, for example, because although it was unknown where the children transmitted initially… you don't want to give it to the child, and that child gives it to the grandmother… So we kind of got parents to handle and do a little bit less and not have the child climbing all over you, you know, as you normally would.* (HCW 15)

Some HCWs also mentioned changing the order they saw inpatients to reduce the risk of viral transmission. For example, one HCW mentioned not going from the Burns unit to the Neonatal unit because there were often COVID-19-positive cases in the Burns unit.

> *… we came up with a system where we would see least-risk patients first and then most, at most-risk patients last… And if we did have any patients in isolation, then obviously they get seen last; we go to any ward that we need to first and then we go see a high-risk patient, for example. So that's really nice because you feel like everyone is still getting seen, but we just we we've done anything to just minimise the risk, the spread of infection.* (HCW 2)

In addition, as far as possible HCWs tried to limit patient contact time and have shorter treatment sessions with children to reduce the chance of viral transmission.

> *… we also… try to limit our hands on the child for too long… So shorter treatments. So you would try and keep it, you know, so as before, you might spend 45 minutes, now you were trying 15, 20 minutes.* (HCW 15)

Furthermore, one HCW also mentioned discharging outpatients as quickly as possible from care. This sooner discharge was primarily during the hard lockdown period when there were restrictions on public transport, and it was difficult for patients to access the hospital. Discharging patients as quickly as possible was also protective as it meant less chance of patients and families contracting the virus.

Several participants reported decreasing the frequency of care for outpatients and staggering appointments, again to minimise the risk of patients contracting the virus.

> *… and then instead of booking to come back sooner, you'll book back a bit longer and say to them but contact us if there's a problem.* (HCW 3)

In the interim, HCWs ensured that patients had enough supplies, such as supplements, to continue their treatment at home. Several HCWs, particularly in the speech therapy, physiotherapy and occupational therapy departments, also mentioned relying heavily on extensive home programmes. These programmes were given to outpatients and would then enable a slightly more extended follow-up period.

> *So… for our children that we know don't need to necessarily be seen, uh, every week or every month, we would say every second month, but then give an extensive home program.* (HCW 2)

In addition, HCWs also issued home programmes to caregivers of inpatients, who could then implement more regular treatment and exercises during their child's admission.

> *… and… explaining to mom and then… not going in the ward every day to do it, but mom does it, for example.* (HCW 3)

As mentioned by one HCW, the use of home programmes was already well-instituted before the onset of the pandemic and, therefore, was not a new adaptation but instead became more frequent to maintain service delivery despite restrictions.

So they were used to coming only perhaps once a month or once every five weeks. And so it's all based on home programmes anyway. (HCW 15)

Furthermore, one HCW reported the use of therapy kits which were issued in conjunction with home programmes to facilitate the continuation of treatment at home.

… we've done it in Burns where we've done, um, little packages, so they get their information pamphlet, they get the specific exercises…Then if it's appropriate, then they get their aqueous scream, their coconut oil, their little sunscreen as well, just for scar management and wound care. (HCW 2)

At one point in the pandemic, the speech-language therapy and audiology department also sent care packages out to some patients who did not have access to recent information about the pandemic. These packages included information on COVID-19 and any specific resources they required for managing their condition, such as a hearing aid battery or a change of a valve.

So we sent through a few care packages to them just to educate both the child and the parent on COVID, and… why have things changed so much in terms of our service delivery and that sort of thing? And then any home programmes or resources that they then required - we were lucky to have an NGO assist us then with the delivery of care packages to our patients. (HCW 4)

Many participants expressed adapting and adjusting their acquisition, storage and use of information during the pandemic. For example, a few departments reportedly changed the way they wrote patient notes to make it more efficient and therefore limit the exposure time of the HCW to patients.

I think one of the big things we did, um, in inpatient services… to just reduce, um, the amount of times we spent in wards, um, was also our record-keeping sort of systems… So just to re reduce the amount of time, we came up with a lot of…

resources for quicker record keeping - just like a tick system that you can tick, tick, tick. (HCW 4)

In addition, several HCWs mentioned that their departments had made a significant effort to migrate all their resources onto an online platform, such as Google Drive, for ease of access and sharing between team members.

… therapists were able to share home programmes. Um, we made a significant move to everything being online to just facilitate that process. So in a very paper-based hospital, we've done quite a bit to get on the online platform… Our resources all have soft copies, all of that, so it's easy enough for us to share, um, and circulate. (HCW 5)

This resource sharing was crucial in the context of telehealth services.

Moreover, several participants also mentioned that CPD activities moved online during the pandemic. Initially, HCWs would access these from within the department but spread out in different spaces to maintain social distancing. However, due to the limited technological equipment and unstable internet connection at the hospital, HCWs were then allowed to log in to these sessions from home with careful attendance monitoring.

… we started doing a lot of online training. So our CPDs would then be online… (HCW 15)

Furthermore, a few HCWs reported sharing knowledge and resources with HCWs in other institutions and provinces. This knowledge sharing took place through webinars.

…So we started setting up webinars..... as a means of training because you obviously couldn't have in person. (HCW 15)

Patient education, remote monitoring and follow-up

Several HCWs reported a strong focus on patient education and remote monitoring and follow-up during the pandemic, especially when patients were not able to come into the hospital for in-person intervention.

> *So I think we tried to look at where could we connect with people - we also did a lot of phone calls just to check in with our patients to explain to them about COVID.* (HCW 6)

> *But we'd… looked at how we could provide information to caregivers when they weren't able to visit, um, calling them, letting them know that we had seen them, how they were doing with their feeding.* (HCW 5)

In addition, one HCW mentioned being involved in community education on a television platform during the pandemic.

> *… I also did a session with Soweto TV, where they came in and filmed me talking to parents about how to stimulate their kids at home during lockdown… And they, they ran that throughout like on the news bulletins and so forth, so that was quite, um, good to have that kind of broader exposure.* (HCW 6)

Furthermore, several HCWs also reported making educational videos for patients and families as part of their telehealth programmes.

> *And then we did a lot of videos as part of our telehealth, so information for patients on how to take care of their hearing aids, um, their cochlear implants, their laryngectomies, their traches - so we did these in English, we had them translated into different languages - so we made a lot of videos.* (HCW 6)

One HCW also mentioned that their department considered uploading these videos onto the hospital Facebook page so caregivers could access them anytime.

Convergent design joint display: Narrative summary

Hard lockdowns during the pandemic drove service cancellations, and hindered HCW's ability to maintain service delivery. Possible reasons for this were that some participants felt therapeutic services were regarded as non-essential. Doctors' protective attitudes prevented other HCWs from offering patient care in wards. Space limitations in wards and MDT clinics resulted in fewer referrals to therapeutic services. Ineffective leadership at a hospital management level resulted in a lack of communication and direction for therapeutic services departments. Additionally, the absence of relevant national guidelines left managers and clinicians with limited guidance to inform decision-making during the pandemic.

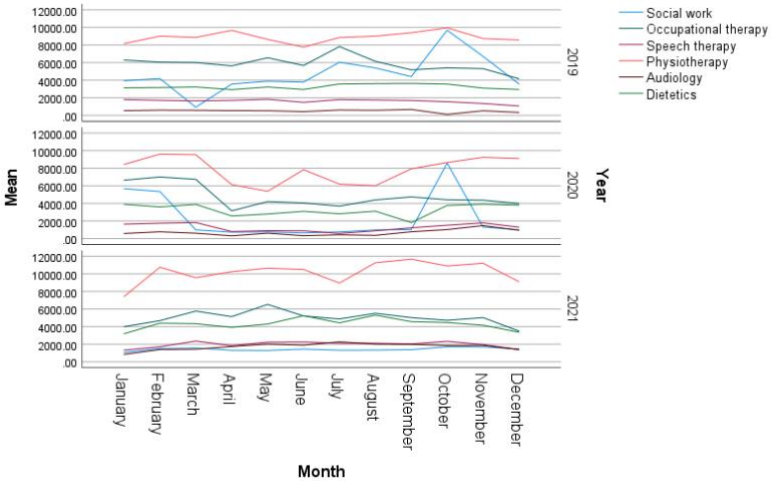
Outpatient service delivery was particularly challenging to maintain during hard lockdowns as hospital management ordered these services to be cancelled, resulting in backlogs in patient care. Consequently, some paediatric patients were admitted to the hospital in more severe conditions than necessary, highlighting missed opportunities for outpatient education and early intervention. Moreover, HCWs faced difficulties reintegrating patients into care after regulations were relaxed due to challenges with patient follow-up.

Paediatric-specific data showed a decrease in patients under the age of five seen by dietetics, occupational therapy and social work in 2020. This drop may be attributed to the suspension of in-patient screening for conditions like malnutrition during hard lockdowns and families avoiding hospital visits due to fear of contracting the virus. Consequently, numerous opportunities for diagnosis and treatment were missed, which only became evident upon service reopening. In addition, closures of external partner organisations during lockdowns presented patient management challenges, particularly for social workers.

Persistent trends of low service utilisation during the pandemic drove HCW innovation, forcing HCWs to adopt a systems approach and increased efficiency. Innovations centred on inter-professional communication and coordination, service re-evaluation

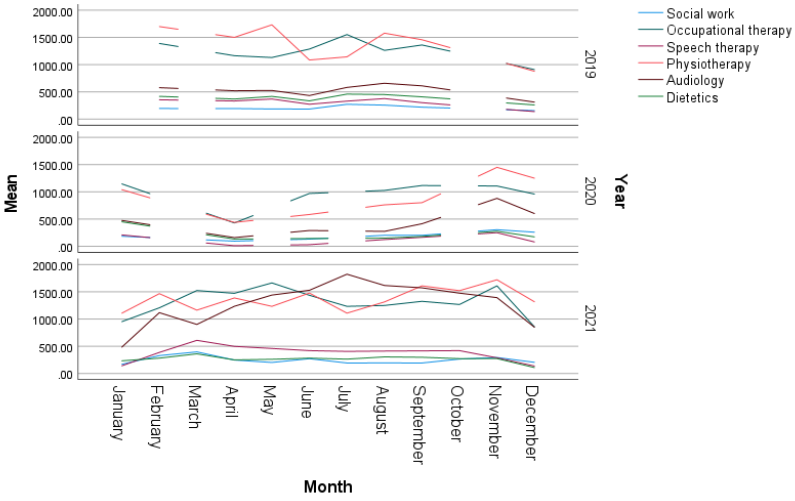
and restructuring, new models of service delivery, technology use, patient education and prioritisation and adapting the duration and frequency of care.

Table 3.7 Convergent design joint display

Quantitative findings	Qualitative findings
Number of patient contact sessions in each department per month  The most notable changes observed were the reduction in patient contact sessions during 2020 in the physiotherapy, occupational therapy and social work departments.	**Therapeutic services regarded as non-essential** *I think in some areas - so some doctors consulted a lot. Others were like, "We don't need you in here, you're just causing traffic".* (HCW 1) **Protectiveness of doctors towards therapeutic services HCWs** *… our first hurdle, in terms of service delivery, was to convince doctors to allow us - that we don't need their protection from COVID patients. That it's actually okay and that we are okay to go into the wards.* (HCW 16) **Poor management and leadership** *… the lack of leadership was definitely a big one. The lack of communication as to what was happening in the hospital - was there an overall strategy?... and just information didn't filter through consistently unless you you almost demanded it*. (HCW 6) **Lack of guidelines for therapeutic services** *… but to this day from the National Department of Health, there are no rehab guidance or guidelines. (HCW 16)*

Interpretation: Hard lockdowns during the pandemic drove service cancellations, and impacted HCW's ability to maintain service delivery. HCWs experienced barriers in delivering patient services due to COVID-19 regulations and protocols and broader systemic factors within the hospital and Department of Health.

Number of outpatient contact sessions in each department per month



The most notable changes were observed for physiotherapy and occupational therapy in April 2020; however, there were significant reductions in the number of outpatient contact sessions for all departments over that period.

Service cancellation

So in the times where we had the waves… they cancelled a whole lot of services. So like our, our clinics weren't running. (HCW 8)

Backlogs created by the pandemic

Now we starting with first therapy, and they're already 5, 6 years old… And should be going to school. So… now we're trying to play catch up and trying to rush through things so that we can get some sort of report for them to be able to get school placement. (HCW 2)

Unnecessary admissions

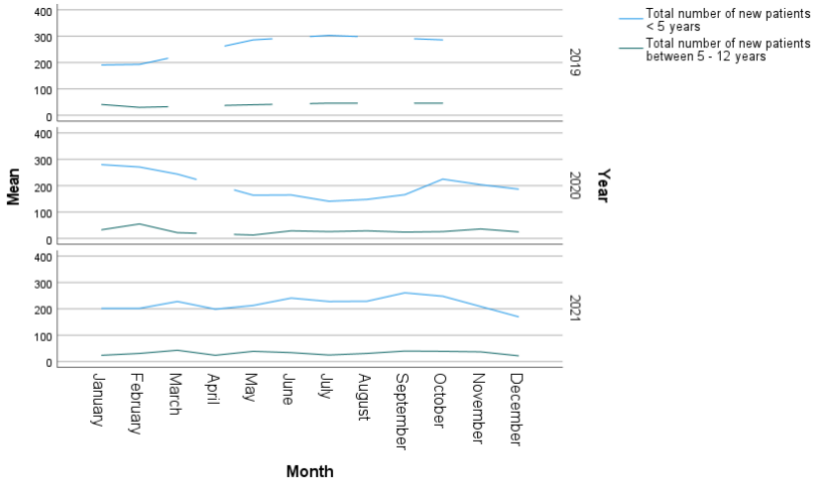
…all the paediatric diabetics, um, we weren't seeing, but we were seeing them in, when they were getting admitted in hospital because they weren't… being educated by us and… they weren't being followed by us and, and stuff like that. So they were just carrying on doing their own stuff without the support of a dietician. Um, so then we'd end up seeing them in hospital, which is not ideal where you can manage that condition as an outpatient. (HCW 9)

Challenges with patient follow-up

So even if you've got hold of them to cancel, to get hold of them six months later when you can book them is by then the phone's changed three times … and the person's never heard of the person you're trying to speak to and so yes, I have no doubt people fell through the cracks. (HCW 3)

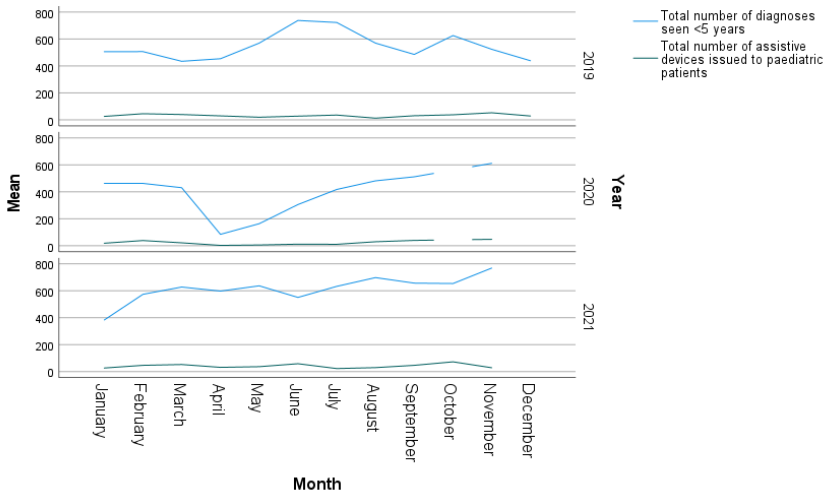
Interpretation: Outpatient service delivery, in particular, was difficult to maintain during the hard lockdowns. Once regulations were relaxed it was difficult to bring patients back into care and there were additional backlogs which impacted patient outcomes.

Dietetics



The most notable change observed was the drop in new patients < 5 years seen in 2020 which only began to recover later in 2021.

Occupational therapy



The most significant change observed was the drop in total number of diagnoses seen < 5 years in April 2020.

Cessation of patient screening

So we actually were asked to stop screening in the wards because we do severe acute malnutrition screening... And then, every time there was a wave, they would ask us to stop again, and they would refer patients if we needed to see them. (HCW 8)

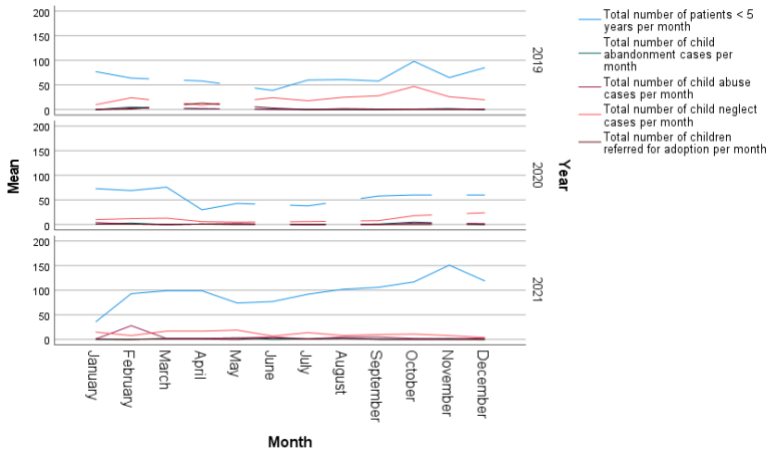
Missed opportunities

And a lot of patients who didn't come during lockdown, because they were, families were scared. There were so many missed diagnoses or opportunities for diagnosis and therapy… (HCW 2)

Closure of partner organisations

Most of their employees were at home. They would close the whole office for the week or two once they have found a COVID case. Then that would mean children had to stay, babies had to overstay in the wards while at the same time there were standing the risk of contracting COVID. (HCW 13)

Social work



The most notable changes were reduction in number of patients < 5 years in April 2020 and the subsequent increase in numbers in 2021.

Interpretation: Paediatric-specific data for dietetics, occupational therapy and social work indicates that service delivery for young children in these departments was significantly impacted in 2020 and only began to recover towards the end of year. Lockdown restrictions affected normal screening activities for children which resulted in missed or delayed opportunities for diagnosis and treatment. Additionally, the pandemic affected the activities of external partner organisations, which impacted the operations of hospital-based services, and ultimately, patient outcomes.

3.4 Conclusion

The results section highlights how hard lockdown measures during the pandemic significantly disrupted PTS. These findings underscore the critical need for comprehensive strategies to mitigate the impact of future crises on paediatric healthcare delivery. In the discussion section, we will delve deeper into these results, examining their implications for PTS and exploring potential avenues for improvement and future research.

CHAPTER 4: DISCUSSION

4.1 Introduction

This chapter presents and consolidates the key findings of the study to answer the overall research question. It integrates quantitative and qualitative results and offers possible explanations for the findings. Furthermore, it interprets the findings in relation to existing literature and highlights the study's contribution to the existing knowledge base. Finally, the chapter concludes with an outline of the study strengths and limitations.

4.2 Key findings

The aim of the study was to determine the effect of the COVID-19 pandemic on PTS at CHBAH in terms of service outputs, challenges experienced, and innovations made by HCWs during 2020 and 2021. The collective results of this study reveal that the COVID-19 pandemic had a significant effect on PTS at CHBAH during 2020 and 2021, with implications not only for HCWs in therapeutic services but also for hospital management structures, training institutions, and professional bodies.

Objective	Key findings
1. To determine the effect of COVID-19 lockdowns on the routinely monitored PTS outputs between January 2019 and December 2021.	During 2020, there was a noticeable drop in patient contact sessions across all departments, particularly during the initial level 5 and 4 hard lockdown period. Outpatients were more severely affected than inpatients. Social work, occupational therapy, and dietetics experienced a decline in the number of paediatric inpatients under five years old in 2020.
2. To explore the barriers and challenges to service delivery experienced by each PTS department during the COVID-19 pandemic.	PTS were not consistently prioritised as essential during the pandemic, resulting in long-term consequences for patient care. One of the most significant outcomes was the missed opportunities for diagnosis and treatment. The increased load on HCWs during the pandemic has and continues to impact their capacity to deliver services. This is particularly related to HCW mental health and burnout. Structural barriers, including hospital management, leadership and communication, resource availability and use, and closure of external partner organisations during lockdowns affected service delivery during the pandemic.

3. To describe the innovations made and possible solutions explored by each PTS department to facilitate service delivery during the COVID-19 pandemic.	A systems approach, involving role release and inter-professional communication and coordination, effectively streamlined service delivery. Departments were compelled to evaluate and restructure their services, adapting their models of service delivery. While telehealth showed potential for therapeutic services in the SA public sector context, its suitability varied across professions. Enhanced support at a systems level is necessary for improved implementation. The pandemic drove departments to work more efficiently and optimise their use of time and resources.

4.2.1 Decrease in service outputs and the underlying causal factors

During 2020, there was a noticeable reduction in the number of patient contact sessions across all therapeutic services, particularly during the initial level 5 and 4 hard lockdown period. More specifically, the social work, occupational therapy, and dietetics departments experienced a significant reduction in the number of paediatric inpatients under five years. A closer analysis of this reduction in patient contact sessions suggests that both supply-side and demand-side factors were at play.

On the supply side, many therapeutic services were put on hold for a considerable period during the pandemic as a directive from the hospital management following the State of Disaster declaration in March 2020 (98). Outpatient services were most disrupted; however, inpatient services were also affected by hospital management's decision to discharge medically stable patients to create space and staff availability for COVID-19 patients (45). HoDs reported having to advocate strongly for their teams' role in patient management in order to be allowed to continue clinical care. The need for advocacy to increase understanding and awareness of their profession's role was also reported in a global survey of occupational therapists during the pandemic (69).

In addition, protective attitudes from doctors prevented therapeutic services HCWs from being able to enter wards to offer patient care at the beginning of the hard lockdown. These restrictions resulted in routine services, such as inpatient screening for conditions such as malnutrition and hearing loss, being stopped for considerable periods of time during waves of the pandemic. In the context of COVID-19 regulations and protocols, space limitations in wards and MDT clinics also resulted in fewer referrals to therapeutic

services which reduced caseloads. Moreover, patients considered to be high-risk for severe COVID-19 disease were requested to avoid coming into the hospital for their own safety. Instead, they were placed on waiting lists until it was considered safe for them to continue with treatment.

A South African study (23) found similar service delivery changes among speech-language pathologists during the pandemic. Outpatient services decreased or stopped, while inpatient services were affected based on patients' COVID-19 status. Paediatric outpatients and high-risk groups, such as those with comorbidities or immunocompromise, were most affected (23). Significant reductions in outpatient services were also reported in rehabilitation centers in Slovenia (99) and Saudi Arabia (100). Conversely, Lalla-Edward *et al* (4) reported a significantly increased patient load during the pandemic in two different SA study sites (rural and urban). This increase was due to staff changes, clinic and service closures, COVID-19 screening targets and testing. However, this observation may be attributed to the study's focus on essential health services, which excludes PTS. The study also noted a decrease in sick children at both hospitals and clinics, attributed to school closures and reduced mobility during lockdowns (4).

Study participants expressed ambiguity regarding the term "essential services", with some feeling that therapeutic services were not prioritised as essential during the pandemic when they should have been. Nationally, there was no guidance from the Health Professions Council on essential services and HCWs were advised to look to their own professional bodies for direction. The Africa CDC guidelines on essential healthcare services during COVID-19 recommend prioritising child health to prevent morbidity, mortality, and worsening of chronic conditions by maintaining treatment regimens (21). Moreover, the fact that child health still accounts for a significant proportion of SA's burden of disease further emphasises the need for prioritisation (19). The Global Rehabilitation Alliance underscores the importance of rehabilitation in COVID-19 management, urging decision makers to ensure its availability for all patients, particularly vulnerable populations, and advocating for sufficient resources and research

(22). Considering the critical role of PTS in long-term health promotion and disease prevention and management in children (20), limited advocacy from higher levels to prioritise these services during the pandemic is concerning.

Furthermore, HoDs reported a lack of specific guidance from the hospital and the National and Provincial Rehabilitation Directorates on their professions' role during the pandemic. Instead, they were referred to a 2019 document written by the Commission for Conciliation, Mediation and Arbitration (CCMA) on Designated Essential Services (101). This document categorises therapeutic services in public healthcare facilities, including clinics and hospitals, as non-essential. The absence of relevant national guidelines left managers and clinicians with limited guidance to inform decision-making during the pandemic; however, this also led departments to go back to their core values, vision and mission and use these to guide their clinical practice (45). Therapeutic services HCWs worked hard to create new resources, adapt existing protocols, and develop standard operating procedures to guide their patient care (45).

Evidence from Brazil indicates that therapeutic services departments were offered much greater guidance and support from various governmental ministries and regulatory bodies during the pandemic (102). For example, the Ministry of Health provided free online training for health professionals, including physiotherapists, focusing on official clinical protocols (102). The Ministry of Education adjusted graduation requirements for HCWs, allowing physiotherapy students who completed 75% of their coursework to graduate early and work under supervision (102). Furthermore, national institutions and professional councils, like the Brazilian Federal Council for Physical Therapy and Occupational Therapy (COFFITO), adapted international guidelines to support physiotherapists' performance during the pandemic and ensure their safety. Moreover, regional councils and specialised associations offered various measures to support clinicians, including information, audits, training courses, and guidance on COVID-19 related care (102).

In addition, ineffective hospital management leadership led to a lack of communication and direction for therapeutic services departments. Frustration towards healthcare facility management during the pandemic was also reported by Lalla-Edward *et al* (4). A global survey of occupational therapists found inadequate leadership and management to be a common experience resulting in organisational inconsistencies during the pandemic, with frequent and contradictory information hindering service delivery, leading to stress and confusion (69). Adams *et al* (23) highlighted the need for additional support from hospital management, including COVID-19 updates, infection control training, and sufficient PPE. Similarly, van Biljon and van Niekerk (49) confirmed that good leadership during COVID-19 was crucial in keeping rehabilitation clinicians in the public sector well-informed, safe, cared for, and committed to their work.

On the demand-side, HCWs identified key factors influencing patients and families' health-seeking behaviour during the pandemic. Household financial constraints due to lockdown restrictions and job losses affected the affordability of transport to the hospital. Moreover, difficult social circumstances caused families to prioritise more pressing needs, such as food provision, over seeking healthcare for children. Additionally, fear of contracting the virus, especially before the COVID-19 vaccine was available, served as a significant barrier to seeking medical care.

Multiple studies (61,62) highlight fear of the virus as a major reason for poor or delayed health-seeking behaviour during the pandemic. Lalla-Edward *et al* (4) confirm this finding, adding that some patients in their study were also unaware of available services. According to the Wave 1 NIDS-CRAM survey (19), five percent of mothers with children needing healthcare or vaccinations in the public sector did not seek these services during the pandemic. Fear of contracting the virus was the primary reason for not accessing healthcare. Furthermore, poorer mothers were worst affected, which highlights stark inequities in healthcare access during the pandemic (19).

The main consequence of the reduction in patient contact sessions was many missed opportunities for diagnosis and treatment. Participants noted that some paediatric

patients presented at the hospital much later and in a more severe condition than necessary, leading to avoidable admissions. For instance, malnourished children who could have been managed as outpatients, were later admitted with severe acute malnutrition. Similar adverse outcomes of delayed healthcare seeking were reported by Lazzerini *et al* (61) in an Italian paediatric case series. Lalla-Edward *et al* (4) confirmed this finding, reporting that only severely ill patients sought care during the hard lockdown period. However, as restrictions eased, district hospitals experienced an influx of patients, particularly those with chronic health conditions (4).

Another noteworthy finding was the considerable number of school-aged children with developmental delays who missed out on special school placement opportunities during the pandemic, leading to delays in accessing appropriate formal education. This finding was also reported by the Department of Education in the Philippines (103). These missed opportunities may have been exacerbated by extended school closures which have negatively impacted children's learning, safety and security, physical and mental health and development (30). Furthermore, in SA, children with disabilities lost access to therapeutic services at school during the extended school closures and lockdowns, potentially resulting in lost progress. Lost access to disability-specific and support services for children with disabilities due to school closures during the pandemic is reported widely in the literature, in both developed and developing countries (104–106).

4.2.2 Innovations used to maintain and improve service delivery

The pandemic acted as a catalyst for heightened intra and inter-departmental collaboration that would not have occurred under usual circumstances. This improved collaboration enabled a more holistic "systems approach" to decision-making and effectively streamlined service delivery. In addition, the concept of role-release was embraced by HCWs in therapeutic services, with teams starting to share resources and delegate tasks to other professionals more readily. Moreover, inter-professional communication and coordination significantly improved during the pandemic, facilitated by the efficiency of WhatsApp.

Lalla-Edward *et al* (4) described an increase in role reallocation in their study, with HCWs adopting a “team spirit” approach to meet service delivery needs during the pandemic. Adams *et al* (23) observed improved inter and intra-professional teamwork and a spirit of togetherness among speech-language pathologists and colleagues. This increase in teamwork, respect and solidarity among HCWs during COVID-19 is widely supported in the literature (81,107–110). Additionally, Fernandes *et al* (111) highlight the critical role of interprofessional collaboration, collaborative practice, interprofessional work, and interprofessional learning in transforming and improving healthcare practices and outcomes for patients with COVID-19. Khurshid *et al* (110) reported that the pandemic flattened existing hierarchies within MDTs and helped team members work across traditional boundaries and recognise the strengths of other professions. Furthermore, van Biljon and van Niekerk (49) found that effective communication within and between professional teams impacted services and the well-being of clinicians.

As part of the systems approach, HCWs explored new models of service delivery, the most notable of which was telehealth. Participants reported several benefits of telehealth, including improved service accessibility, better patient outcomes, and the ability to spread out physical follow-up sessions. Additionally, participants reported high levels of patient satisfaction and improved engagement from patients and families, potentially attributed to more frequent interactions with healthcare providers. Therapeutic services demonstrated varying levels of suitability for telehealth. Interventions requiring physical contact or in-person involvement, such as anthropometric assessments, splinting, wheelchair seating and social work assessments, faced greater challenges in transitioning to telehealth. Conversely, communication-based services, such as counselling, education, or equipment troubleshooting, exhibited comparatively better outcomes with telehealth.

Despite challenges with limited equipment, resources, and technological infrastructure, some HCWs established highly successful telehealth programs during the pandemic, even incorporating synchronous sessions. The speech-language therapy and audiology department championed this initiative, mapping out community locations with free

internet access, implementing rostering and accountability mechanisms for staff to conduct telehealth sessions at home, compiling new resources, and consulting regulatory bodies for ethical compliance (45). Notably, these successful initiatives often relied on the personal resources of HCWs as funding proposals were rejected or ignored. Nevertheless, this experience has demonstrated the feasibility of telehealth for therapeutic services in the public healthcare system in a developing context. However, for a comprehensive and sustainable telehealth program to be successfully integrated into the public healthcare system, dedicated resources and logistical support from the Department of Health are crucial at both facility and community levels (45).

Several studies have looked at the feasibility of implementing telehealth in SA and realised the “digital divide” or stark inequity in access to resources, such as technology and internet connection, between rich and poor (23,46,50,112,113). Additionally, patients with low income, low health literacy, computer literacy, limited English proficiency, and those utilising public healthcare face restricted access to telehealth (114). However, considering that SA has the highest smartphone penetration in Africa, and has seen increasing access to smartphones in recent years (82% in 2018 and 91% in 2019), telehealth using smartphone technology may be a feasible option (115,116). Moreover, Franz *et al* (112) found that contextual and content modifications were necessary to improve intervention success in SA versus the United States. These modifications included using an asynchronous rather than synchronous format and sharing session materials with families via WhatsApp, which is likely to be acceptable in a developing context due to its low cost (112).

SA is preparing to implement a NHI scheme with the goal of ensuring universal access to quality healthcare services for all citizens, regardless of socioeconomic status (51). Given the scale of this endeavour, the allocation of financial and human resources to meet population needs is anticipated to be a significant challenge. Furthermore, SA has a significant shortage of therapeutic services HCWs with a ratio of <1 therapist per 10 000 uninsured population across all provinces (117). Digital technologies in healthcare (e.g., telehealth) offer many potential benefits, including improved access to services in

remote areas, better safety and quality of care, enhanced knowledge and information access, and greater health service utilisation (118). They also have the potential to improve efficiency and cost-effectiveness of healthcare delivery (118). Consequently, digital health has gained significant global momentum as an innovative catalyst towards achieving the SDGs and Universal Health Coverage (118). Given the unique challenges of the SA healthcare context, telehealth holds significant potential to improve universal healthcare access for therapeutic services.

Findings from the current study suggest that there are benefits to both in-person services and telehealth. Telehealth is convenient and offers easy follow-up, while in-person services provide better patient-provider connections and allow for treatment interventions that are not possible remotely. Growing evidence in the literature advocates a hybrid approach to service delivery, combining in-person services and telehealth, as a cost-effective means to achieve positive clinical outcomes, improved patient compliance, and positive patient experiences (47,48).

The pandemic compelled departments to streamline operations and maximise efficiency with limited resources, leading to service re-evaluation and restructuring. Study participants reported positive outcomes from this process, including opportunities for co-production with service recipients to enhance service design. For example, the dietetics department has permanently stopped some of their clinics or incorporated patients from clinics into outpatient services to improve efficiency. In addition, HCWs adapted their prioritisation of patients during the pandemic, favouring inpatients over outpatients and prioritising certain conditions within inpatient care. Furthermore, HCWs increased their referrals to lower levels of care (e.g., clinics) due to lower numbers of COVID-19 cases in the community and recognising that patients could access similar services at a community level. These findings appear to be unique and have not been reported elsewhere in the literature.

HCWs made various operational and clinical adaptations in patient care to maintain services despite COVID-19 regulations. These adaptions included pre-screening,

booking fewer outpatients, dividing large group sessions into smaller groups, reducing physical contact during interventions, changing the order of patient visits, and limiting contact time with paediatric patients. Other adaptations included discharging patients quickly, decreasing the frequency of care, providing home programs and therapy kits, and streamlining record-keeping practices. One department also collaborated with a non-governmental organisation to disseminate care packages to patients in the community. Furthermore, many departments reported migrating resources online and participating in online CPD activities. HCWs also engaged in knowledge sharing through webinars with colleagues from other institutions and provinces, which was particularly important given the lack of national guidelines at the time.

Ray and Mash (119) found that primary health services in six sub-Saharan African countries were frequently reorganised to accommodate COVID-19 activities. Several studies (120–122) also reported reorganisation in therapeutic services during the pandemic, including clinical and operational changes like outpatient cancellations, remote staff interaction, early discharge for negative patients, home and community services, pre-admission screening, isolation protocols, use of PPE, space reorganisation and the use of technology for home assistance.

Multiple studies in both high and low income settings across therapeutic services report the use of digital technologies as a means of continuing service delivery during the pandemic (69,82,84,123–128). Other innovations reported by physiotherapists include customised home exercise programs, (82) developing an algorithm to identify patients requiring intervention, upskilling MDT members in techniques such as prone positioning, the creation of new treatment protocols, (83) re-skilling and redeploying staff to other areas, and early discharge (84). Mishna *et al* (85) highlight how social workers in Canada, the United States, Israel and the United Kingdom creatively adapted to maintain therapeutic relationships with clients remotely. Strategies included meaningful interactions through texting or emailing, engaging clients in activities during video sessions, and accommodating camera preferences during video-conferencing sessions. However, these changes were mainly implemented to ensure service delivery during the

immediate crisis. To date, no other studies have reported long-term service reorganisation and prioritisation changes.

HCWs prioritised patient education and remote monitoring during the pandemic when in-person interventions were not possible. They created educational videos for patients and families as part of telehealth programs, with the idea of uploading these videos onto the hospital's Facebook page for easy access. Additionally, the speech-language therapy and audiology department partnered with Soweto TV, providing community education on how to stimulate literacy, language and play for children during the pandemic (45). Numerous studies in the literature have reported successful patient education programmes offered via telehealth (50,129,130).

Throughout the pandemic, there was a strong focus on HCW well-being and mental health across all departments, with exceptional leadership and communication from all HoDs. Support offered to HCWs ranged from open-door policies, training on mental health, psychological support and debriefing by the Employee Wellness Program, and departmental well-being activities (e.g., mindfulness activities), to more tangible and practical support such as providing regular updates and ensuring sufficient supplies of PPE. Some departments (social work and dietetics) also implemented rotational systems or shifts to limit the number of people in the department, reducing the chance of viral transmission. Furthermore, the recruitment of contract workers to relieve pressure on permanent staff during the pandemic was viewed as a tangible gesture of support from management. These factors acted as protective measures, helping HCWs to cope with the challenges faced during the pandemic.

Van Biljon and van Niekerk (49) found that employee assistance programmes and health and wellness programmes were successful in supporting rehabilitation HCWs during the pandemic. Practical support from management in the form of PPE for rehabilitation staff, rehabilitation-specific information, and training sessions were also appreciated (49). In addition, Kotera *et al* (131) found that supportive workplace

communication, mostly with line managers and colleagues, as well as having their work acknowledged and appreciated was a protective factor for the mental health of HCWs. An unexpected finding of this study was the question about the SA government's response to COVID-19, specifically regarding issues of leadership and accountability, as well as the tangible results of the financial resources expended during the pandemic. This leads us to question whether a legacy has been established post-pandemic and assesses the preparedness of our healthcare system for future pandemics or disasters.

4.3 Study strengths and limitations

The use of a mixed methods approach is a major strength of this study as it provided a rich understanding of the pandemic's effect on PTS, setting it apart from studies that typically used either a quantitative or qualitative approach. Furthermore, this study explored the effects on five therapeutic services departments, in contrast to prior SA studies focusing on a single discipline (23,23,45). The use of three years of data to follow paediatric service trends also strengthened the study, considering that the one other mixed methods study on maternal and child health services used a three-month period (132).

In this study, the innovations and solutions used by HCWs to maintain service delivery during a global pandemic were researched. These valuable insights can be used to inform future decision-making and planning for therapeutic services in the context of NHI and increasing resource challenges in SA.

One major limitation was the limited paediatric-specific routine data available on service outputs. Only three of the departments were able to provide data that were disaggregated for children, which made data analysis more challenging than anticipated. Despite the study being conducted at the largest hospital in Africa, data collection was limited to only this site and thus this limits the generalisability of findings.

Social desirability may have influenced qualitative data collection, potentially leading to socially acceptable answers rather than candid ones (133). Additionally, there may have

been recall bias due to the time lapse between the end of hard lockdowns and data collection, impacting the accuracy and detail of information (134).

4.4 Conclusion

The discussion chapter provides a comprehensive analysis of the pandemic's impact on PTS at CHBAH, revealing significant disruptions to service outputs, challenges faced by HCWs, and innovative solutions implemented during the crisis. Despite barriers such as inconsistent prioritisation of PTS and limited guidance, HCWs demonstrated resilience by implementing strategies like role release and telehealth initiatives to maintain service delivery. The findings highlight the importance of prioritising HCW well-being and addressing healthcare access inequities. While the study's strengths include its mixed methods approach and exploration of innovative solutions, limitations such as data availability and social desirability bias highlight the need for further research to inform strategies for enhancing PTS resilience. As the chapter concludes, it transitions to the subsequent chapter by emphasising the significance of healthcare system preparedness for future crises, contributing to ongoing efforts to strengthen PTS and healthcare resilience in SA.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The final chapter summarises the main study findings and addresses their implications for clinical practice, policy, and decision-making in the fields of child health and therapeutic services. The chapter concludes with recommendations for further research to explore questions beyond the scope of this study.

5.1 Main findings

In 2020, a noticeable reduction in patient contact sessions occurred across all therapeutic services at CHBAH, particularly during the initial hard lockdown phases. In particular, the social work, occupational therapy, and dietetics departments saw a decrease in the number of paediatric inpatients under five years old. The reduction in patient contacts was influenced by both supply and demand-side factors, including hospital management's response to the State of Disaster declaration, protective attitudes from other HCWs, COVID-19 protocols, and fear of the virus.

Despite global calls to prioritise child health and rehabilitation during the pandemic and the vital role of PTS in children's long-term health promotion and disease management, many participants believed therapeutic services were not prioritised as "essential services". The reduction in patient contact sessions led to missed opportunities for diagnosis and treatment, resulting in some paediatric patients presenting later and in more severe conditions than necessary and causing avoidable admissions. Additionally, the pandemic led to delayed school placements for children with disabilities, impacting access to formal education.

Amid the abundant barriers to service delivery, therapeutic services Department Heads had to advocate strongly for their teams' involvement in patient care to ensure the continuation of clinical services. In addition, there was a lack of specific guidance from hospital and National/Provincial Rehabilitation Directorates regarding their roles. This absence of guidelines prompted departments to rely on their core values for decision-

making, leading to innovative resource creation, protocol adaptation, and procedural development by therapeutic services HCWs to navigate patient care challenges.

Many departments embraced new models of service delivery in response to the pandemic, including telehealth, yielding benefits like enhanced accessibility, patient outcomes, and engagement. However, it was noted that communication-based interventions showed better telehealth compatibility while services requiring physical interaction faced challenges migrating to telehealth. Despite limited resources, some departments effectively implemented telehealth, underscoring its feasibility in the public healthcare system.

The pandemic sparked a holistic “systems approach” to decision-making across departments and management structures. This spurred increased collaboration within and between departments, streamlining service delivery, promoting role-sharing, and enhancing inter-professional communication through efficient platforms like WhatsApp. Additionally, the pandemic prompted departments to restructure services for efficiency, with adaptations like patient prioritisation changes, increased referrals to lower levels of care, and operational adjustments, such as pre-screening and online resource migration. These innovations, including collaborations with NGOs, creating educational videos, home programs, online learning, and knowledge sharing, reflect unique responses that have not been widely documented.

5.2 Implications for clinical practice, policy, and decision-making

A hybrid approach

The study findings indicate benefits of both in-person and telehealth services, while the literature suggests a hybrid approach as a cost-effective strategy for positive clinical outcomes and patient compliance (47,48). Amid the resource challenges anticipated with the introduction of SA’s NHI scheme and the existing therapeutic services HCW shortages (117), telehealth holds substantial promise to improve universal access to quality healthcare. Incorporating a hybrid approach as standard practice in therapeutic services interventions should therefore be explored further.

Students and training institutions

HCWs observed improved interprofessional communication, collaboration, and a "systems approach" to decision-making during the pandemic. Additionally, there was an increase in role-release, resource sharing and task delegation which streamlined service delivery. Moving forward, it would be beneficial to integrate these skills and behaviours into the training of future HCWs to build upon pandemic-induced gains in the healthcare system. Hence, it is important to consider how these elements can be incorporated into the current curriculum and clinical training of students.

Professional bodies and guidelines

The HCWs who implemented telehealth interventions in this study mostly used their own resources. However, if a comprehensive telehealth program were to be successfully integrated into our healthcare system, buy-in from the Department of Health, along with dedicated resources for implementation are essential.

The pandemic has painted a harsh reality in terms of the lack of leadership and guidance from professional bodies and the Department of Health for therapeutic services. This needs to be urgently addressed, with a focus on emergency preparedness, should a situation like this arise in future.

5.3 Recommendations for further research

- *Pilot of a hybrid approach intervention in therapeutic services* - Future research should consider piloting a hybrid approach intervention across different healthcare settings and levels of care to assess its feasibility and cost-effectiveness for therapeutic services.
- *Evidence-based guidelines for therapeutic services* – It would be beneficial to use the evidence available to compile guidelines for therapeutic services for managing COVID-19 and its associated complications in SA. It would also be beneficial to use the opportunity to advocate for stronger guidelines on essential services in emergencies and the role of therapeutic services in such situations.

- *Long-term reorganisation and prioritisation changes in PTS* – It would be beneficial to learn if the changes catalysed by the COVID-19 pandemic brought about long-term reorganisation and prioritisation changes in services or if the services reverted back to the pre-covid structure.
- This study can also form the foundation for further studies on the impact of COVID-19 on children and their families, considering what HCWs now see as the consequences of the decreased services over 2020 and 2021.

5.4 Conclusion

Healthcare access is a fundamental human right crucial to child health which should be protected (1,135). Globally, healthcare services, including child health services, have been significantly disrupted by the COVID-19 pandemic (2). Findings of this study indicate that PTS at CHBAH in SA were impacted similarly. Persistent trends of low service utilisation during the pandemic drove HCW innovation, forcing HCWs to adopt a systems approach and develop increased efficiency. Considering the potential for future similar events as well as the upcoming NHI scheme in SA, the lessons learned from this study can contribute to health system preparedness and inform future planning and decision-making for PTS on a national level.

REFERENCES

1. World Health Organization. 2008. Commission on Social Determinants of Health. Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health. Available: https://www.who.int/publications/i/item/WHO-IER-CSDH-08.1 [Accessed 31.07.2023]

2. El Salih, I., Njuguna, F.M., Widjajanto, P.H., Kaspers, G., Bailey, A. & Mostert, S. Impact of COVID-19 measures on the health and healthcare of children in East-Africa: scoping review. *Int J Health Plann Manage*. 2023;38(3):579–98. doi: 10.1002/hpm.3612

3. Bhattacharyya, H., Agarwalla, R. & Khandelwal, A. Impact of COVID-19 on child health and healthcare services. *Med J Armed Forces India*. 2022;78(1):3–6. doi: 10.1016/j.mjafi.2021.10.006

4. Lalla-Edward, S.T., Mosam, A., Hove, J., *et al*. Essential health services delivery in South Africa during COVID-19: community and healthcare worker perspectives. *Front Public Health*. 2022;10:992481. doi: 10.3389/fpubh.2022.992481

5. World Health Organization. 2021. Building health systems resilience for universal health coverage and health security during the COVID-19 pandemic and beyond: WHO position paper. Available: https://apps.who.int/iris/bitstream/handle/10665/346515/WHO-UHL-PHC-SP-2021.01-eng.pdf?sequence=1&isAllowed=y [Accessed 02.08.2023]

6. Nicola, M., Alsafi, Z., Sohrabi, C., *et al*. The socio-economic implications of the coronavirus pandemic (COVID-19): a review. *Int J Surg*. 2020;78:185–93. doi: 10.1016/j.ijsu.2020.04.018

7. Burger, R. & Mchenga, M. 2021. Partnership for Economic Policy. Anticipating the impact of the COVID-19 pandemic on health inequality in South Africa: early evidence on direct and indirect influences. Available: https://www.google.com/search?q=anticipating+the+impact+of+the+covid-19+pandemic+on+health+inequality+in+south+africa%3A+early+evidence+on+direct+and+indirect+influences.&oq=&gs_lcrp=EgZjaHJvbWUqCQgAECMYJxjqAjIJCAAQIxgnGOoCMgkIARAjGCcY6gIyCQgCECMYJxjqAjIJCAMQIxgnGOoCMgkIBBAjGCcY6gIyCQgFECMYJxjqAjIJCAYQIxgnGOoCMgkIBxAjGCcY6gLSAQk2NDE5M2owajeoAgiwAgE&sourceid=chrome&ie=UTF-8 [Accessed 31.03.2023]

8. South African Government. Disaster Management Act No. 57 of 2002.

9. Haffejee, S. & Levine, D.T. 'When will I be free': lessons from COVID-19 for child protection in South Africa. *Child Abuse Negl*. 2020;110:104715. doi: 10.1016/j.chiabu.2020.104715

10. Adebiyi, B.O., Roman, N.V., Chinyakata, R. & Balogun, T.V. The negative impacts of COVID-19 containment measures on South African families - overview and recommendations. *Open Public Health J*. 2021;14(1). doi: 10.2174/1874944502114010233

11. South African Government. 2020. About alert system. Available: https://www.gov.za/covid-19/about/about-alert-system [Accessed 01.05.2021]

12. National Institute of Communicable Diseases. 2020. National COVID-19 Daily Report. Available: https://www.nicd.ac.za/page/3/?s=national+daily+covid-19+report [Accessed 09.08.2021]

13. South African National Department of Health. 2021. Covid-19 Daily Cases - SA Corona Virus Online Portal. Available: https://sacoronavirus.co.za/covid-19-daily-cases/ [Accessed 27 March 2023]

14. OTASA. 2020. COVID 19 – Practical issues for Occupational Therapy in the public health sector. Available: https://www.youtube.com/watch?v=H555vcUCUcY [Accessed 17.04.2021]

15. Siedner, M.J., Kraemer, J.D., Meyer, M.J., *et al.* Access to primary healthcare during lockdown measures for COVID-19 in rural South Africa: an interrupted time series analysis. *BMJ Open*. 2020;10(10):e043763. doi: 10.1136/bmjopen-2020-043763

16 Jensen, C. & McKerrow, N.H. Child health services during a COVID-19 outbreak in KwaZulu-Natal Province, South Africa. *S Afr Med J*. 2020;111(2):114–9. doi: 10.7196/SAMJ.2021.v111i2.15243

17. UNICEF. 2020. Social workers on the frontline during COVID-19. Available: https://www.unicef.org/southafrica/stories/social-workers-frontline-during-covid-19 [Accessed 28 April 2021]

18. Baleta, A. Spotlight. 2020. Dramatic drop in SA's immunisation rates. Available: https://www.spotlightnsp.co.za/2020/06/24/dramatic-drop-in-sas-immunisation-rates/ [Accessed 26.07.2021]

19. Burger, R., Nkonki, L., Rensburg, R., *et al.* 2020. Examining the unintended health consequences of the COVID-19 pandemic in South Africa. Available: https://cramsurvey.org/wp-content/uploads/2020/07/Burger-examining-the-unintended-health-consequences.pdf [Accessed: 26.07.2021]

20. World Health Organization. 2023. Rehabilitation. Available: https://www.who.int/news-room/fact-sheets/detail/rehabilitation [Accessed: 30.04.2023]

21. Africa Centres for Disease Control and Prevention. 2020. Guidance for the continuation of essential health services during COVID-19 pandemic. Available: https://africacdc.org/download/guidance-for-the-continuation-of-essential-health-services-during-covid-19-pandemic/ [Accessed: 24.05.2023]

22. Gutenbrunner., C, Stokes, E.K., Dreinhöfer, K., *et al.* Why rehabilitation must have priority during and after the COVID-19-pandemic: a position statement of the Global Rehabilitation Alliance. *J Rehabil Med*. 2020;52(7):1–4. doi: 10.2340/16501977-2713

23. Adams, S.N., Seedat, J., Coutts, K., *et al.* 'We are in this together' voices of speech-language pathologists working in South African healthcare contexts during level 4 and level 5 lockdown of COVID-19. *S Afr J Commun Disord.* 2021;68(1):12. doi: 10.4102/sajcd.v68i1.792

24. World Health Organization, UNICEF. 2012. Early childhood development and disability: a discussion paper. Available: https://apps.who.int/iris/handle/10665/75355 [Accessed: 02.05.2021]

25. Scherzer, A.L., Chhagan, M., Kauchali, S., *et al.* Global perspective on early diagnosis and intervention for children with developmental delays and disabilities. *Dev Med Child Neurol.* 2012;54(12):1079–84. doi: 10.1111/j.1469-8749.2012.04348.x

26. Dawson, G., Rogers, S., Munson, J., *et al.* Randomized, controlled trial of an intervention for toddlers with autism: the Early Start Denver Model. *Pediatr*. 2010;125(1):e17–23. doi: 10.1542/peds.2009-0958

27. Mulay, K.V., Aishworiya, R., Lim, T.S., *et al.* Innovations in practice: adaptation of developmental and behavioral pediatric service in a tertiary center in Singapore during the COVID-19 pandemic. *Pediatr Neonatol.* 2021;62(1):70–9. doi: 10.1016/j.pedneo.2020.09.003

28. University of Cape Town. 2020. The education of children with disabilities risks falling by the wayside. Available: http://www.news.uct.ac.za/article/-2020-05-28-the-education-of-children-with-disabilities-risks-falling-by-the-wayside [Accessed 26.07.2021]

29. Amnesty International. 2021. COVID-19 pushes inequality in schools to crippling new level, risks a lost generation of learners. [cited 2021 Jul 26]. Available: https://www.amnesty.org/en/latest/news/2021/02/south-africa-covid19-pushes-inequality-in-schools-to-crippling-new-level-risks-a-lost-generation-of-learners/ [Accessed: 26.07.2021]

30. Spaull, N & van der Berg, S. Counting the cost: COVID-19 school closures in South Africa and its impact on children. *S Afr J Child Educ*. 2020;10(1):13. doi: 10.4102/sajce.v10i1.924

31. Beckmann, J. & Reyneke, M. COVID-19 challenges to access to education for learners living with severe disabilities: an education law perspective. *Perspect Educ.* 2021;39(1):122–37. doi: 10.18820/2519593X/pie.v39.i1.8

32. Dludla, S. 2020. 2020 Review: SA economy rocked by Covid-19. Available: https://www.iol.co.za/business-report/economy/2020-review-sa-economy-rocked-by-covid-19-4ef67084-8159-4cc8-a7e6-8da9f0f2b3fa [Accessed: 16.04.2021]

33. Statistics South Africa. 2020. Loss of income resulting from the COVID-19 pandemic may lead to higher levels of food insecurity SA. Available: http://www.statssa.gov.za/?p=13327 [Accessed 16.04.2021]

34. Akseer, N., Kandru, G., Keats, E.C., *et al.* COVID-19 pandemic and mitigation strategies: implications for maternal and child health and nutrition. *Am J Clin Nutr.* 2020;112(2):251–6. doi: 10.1093/ajcn/nqaa171

35. UNICEF. 2020. Children at increased risk of abuse and violence, as COVID-19 takes its toll. Available: https://www.unicef.org/southafrica/press-releases/children-increased-risk-abuse-and-violence-covid-19-takes-its-toll [Accessed 16.04.2021]

36. World Health Organization. 2010. Health service delivery. Available: https://www.who.int/healthinfo/systems/WHO_MBHSS_2010_section1_web.pdf [Accessed: 26.07.2021]

37. Health Management Institute of Ireland. 2011. The differences between outputs and outcomes. Available: https://healthmanager.ie/2011/03/the-differences-between-outputs-and-outcomes/ [Accessed 26.07.2021]

38. Prvu Bettger, J., Thoumi, A., Marquevich, V., *et al.* COVID-19: maintaining essential rehabilitation services across the care continuum. *BMJ Glob Health.* 2020;5(5):e002670. doi: 10.1136/bmjgh-2020-002670

39. Minghelli, B., Soares, A., Guerreiro, A., *et al.* Physiotherapy services in the face of a pandemic. *Rev Assoc Med Bras.* 2020;66(4):491–7. doi: 10.1590/1806-9282.66.4.491

40. Camden, C. & Silva, M. Pediatric teleheath: opportunities created by the COVID-19 and suggestions to sustain its use to support families of children with disabilities. *Phys Occup Ther Pediatr.* 2021;41(1):1–17. doi: 10.1080/01942638.2020.1825032

41. Gibson, R., Rochus, D., Musasizi, D., *et al.* The impact of COVID-19 on speech-language pathology practices in Western Kenya. *Perspect ASHA Spec Interest Groups.* 2020;5(6):1801–4. doi: 10.1044/2020_PERSP-20-00108

42. Law, B.M., Polovoy, C., Kornak, J., *et al*. American Speech-Language-Hearing Association. 2020. In the season of the virus, the professions changed forever. Available: https://leader.pubs.asha.org/do/10.1044/leader.FTR2.25062020.56/full/ [Accessed 01.05.2021]

43. Rabbone, I., Schiaffini, R., Cherubini, V., *et al.* Has COVID-19 delayed the diagnosis and worsened the presentation of type 1 diabetes in children? *Diabetes Care*. 2020;43(11):2870–2. doi: 10.2337/dc20-1321

44. Hardy G. COVID-19 - increased risk for healthcare burnout. Cape Town: de Novo Medica; 2020. Available: https://www.denovomedica.com/cpd-online/wp-content/uploads/COVID-19-increased-risk-for-healthcare-burnoutCOVID-19-increased-risk-for-healthcare-burnout-_-Online-1.pdf

45. Balton, S., Vallabhjee, A.L. & Pillay, S.C. When uncertainty becomes the norm: the Chris Hani Baragwanath Academic Hospital's speech therapy and audiology department's response to the COVID-19 pandemic. *S Afr J Commun Disord.* 69(2):913. doi: 10.4102/sajcd.v69i2.913

46. Bhamjee, A., le Roux, T., Swanepoel, D.W., *et al.* Perceptions of telehealth services for hearing loss in South Africa's public healthcare system. *Int J Environ Res Public Health*. 2022;19(13):7780. doi: 10.3390/ijerph19137780

47. Khatib, N. & Hlayisi, V.G. Is a hybrid of online and face-to-face services feasible for audiological rehabilitation post COVID-19? Findings from three public health patients. *S Afr J Commun Disord.* 2022;69(2):11. doi: 10.4102/sajcd.v69i2.907

48. Khoza-Shangase, K., Moroe, N. & Neille, J. Speech-language pathology and audiology in South Africa: clinical training and service in the era of COVID-19. *Int J Telerehabil*. 2021;13(1):e6376. doi: 10.5195/ijt.2021.6376

49. van Biljon, H.M. & van Niekerk, L. Working in the time of COVID-19: rehabilitation clinicians' reflections of working in Gauteng's public healthcare during the pandemic. *Afr J Disabil.* 2022;11(1):889. doi: 10.4102/ajod.v11i0.889

50. Ernstzen, D., Keet, J., Louw, K.A., *et al.* "So, you must understand that that group changed everything": perspectives on a telehealth group intervention for individuals with chronic pain. *BMC Musculoskelet Disord.* 2022;23(1):538. doi: 10.1186/s12891-022-05467-7

51. South Africa. Dept. of Health. 2017. National Health Act, 2003 (Act No. 61 of 2003). National Health Insurance Policy. Government Gazette No. 40955:627 30 June.

52. Castagnoli, R., Votto, M., Licari, A., *et al.* Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection in children and adolescents: a systematic review. *JAMA Pediatr.* 2020;174(9):882–9. doi: 10.1001/jamapediatrics.2020.1467

53. Minagorre, P.J., Pinto E.V., Fernández, J.M., *et al.* Changes from COVID-19. A perspective from internal pediatric medicine. *An Pediatr (Engl Ed).* 2020;93(5):343.e1-343. doi: 10.1016/j.anpede.2020.06.003

54. Ding, Y.Y., Ramakrishna, S., Long, A.H., *et al.* Delayed cancer diagnoses and high mortality in children during the COVID-19 pandemic. *Pediatr Blood Cancer.* 2020;67(9):e28427. doi: 10.1002/pbc.28427

55. Davis, C., Chong Ng, K., Oh, J.Y., *et al.* Caring for children and adolescents with eating disorders in the current coronavirus 19 pandemic: a Singapore perspective. *J Adolesc Health.* 2020;67(1):131–4. doi: 10.1016/j.jadohealth.2020.03.037

56. Haripersad, Y.V., Kannegiesser-Bailey, M., Morton, K., *et al.* Outbreak of anorexia nervosa admissions during the COVID-19 pandemic. *Arch Dis Child*. 2021;106(3):e15–e15. doi: 10.1136/archdischild-2020-319868

57. Scaramuzza, A., Tagliaferri, F., Bonetti, L., *et al.* Changing admission patterns in paediatric emergency departments during the COVID-19 pandemic. *Arch Dis Child.* 2020;105(7):704.2-706. doi: 10.1136/archdischild-2020-319397

58. Santoli, J.M., Lindley, M.C., DeSilva, M.B., *et al.* Effects of the COVID-19 pandemic on routine pediatric vaccine ordering and administration — United States, 2020. *MMWR Morb Mortal Wkly Rep.* 2020;69:591-593. Available: https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e2.htm#suggestedcitation

59. Taquechel, K., Diwadkar, A.R., Sayed, S., *et al.* Pediatric asthma health care utilization, viral testing, and air pollution changes during the COVID-19 pandemic. *J Allergy Clin Immunol Pract.* 2020;8(10):3378-3387. doi: 10.1016/j.jaip.2020.07.057

60. Roberton, T., Carter, E.D., Chou, V.B., *et al.* Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income

countries: a modelling study. *Lancet Glob Health.* 2020;8(7):e901–8. doi: 10.1016/S2214-109X(20)30229-1

61. Lazzerini, M., Barbi, E., Apicella, A., *et al.* Delayed access or provision of care in Italy resulting from fear of COVID-19. *Lancet Child Adolesc Health*. 2020;4(5):e10–1. doi:

62. Asmundson, G.J. Coronaphobia: Fear and the 2019-nCoV outbreak. *J Anxiety Disord.* 2020;70:102196. doi: 10.1016/j.janxdis.2020.102196

63. The Mail & Guardian. 2020. Covid-19 vs Child Nutrition. Available: https://mg.co.za/special-reports/2020-07-02-covid-19-vs-child-nutrition/ [Accessed 29.04.2021]

64. Feucht, U. The Conversation. 2020. South Africa needs a plan to protect children's health beyond COVID-19. Available: http://theconversation.com/south-africa-needs-a-plan-to-protect-childrens-health-beyond-covid-19-144608 [Accessed: 29.04.2021]

65. Statistics South Africa. 2020. Behavioural and health impacts of the COVID-19 pandemic in South Africa. Available: https://www.statssa.gov.za/publications/Report-00-80-02/Report-00-80-022020.pdf [Accessed 08.08.2023]

66. Spaull, N., Ardington, C., Bassier, I., *et al.* 2020. NIDS-CRAM Synthesis Report Wave. Working Paper Series. 2020;17. Available: https://resep.sun.ac.za/wp-content/uploads/2020/11/Spaull-et-al.-NIDS-CRAM-Wave-1-Synthesis-Report-Overview-and-Findings-1.pdf [Accessed: 08.09.2023]

67. Cleary, K. Spotlight. 2020. In-depth: the long shadow of child malnutrition in South Africa. Available: https://www.spotlightnsp.co.za/2020/07/24/in-depth-the-long-shadow-of-child-malnutrition-in-south-africa/ [Accessed: 29.04.2021]

68. World Health Organization. 2020. Pulse survey on continuity of essential health services during the COVID-19 pandemic: Interim Report. Available: https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS_continuity-survey-2020.1 [Accessed 04.08.2023]

69. Hoel, V., von Zweck, C. & Ledgerd, R. The impact of Covid-19 for occupational therapy: findings and recommendations of a global survey. *World Fed Occup Ther Bul.* 2021;77(2):69–76. doi: 10.1080/14473828.2020.1855044

70. Robertson, L.J., Maposa, I., Somaroo, H., *et al.* Mental health of healthcare workers during the COVID-19 outbreak: a rapid scoping review to inform provincial guidelines in South Africa. *S Afr Med J.* 2020;110(10):1010–9. doi: 10.7196/SAMJ.2020.v110i10.15022

71. Adams JG, Walls RM. Supporting the health care workforce during the COVID-19 global epidemic. *JAMA*. 2020;323(15):1439–40. doi: 10.1001/jama.2020.3972

72. Cipolotti, L., Chan, E., Murphy, P., *et al.* Factors contributing to the distress, concerns, and needs of UK neuroscience health care workers during the COVID-19 pandemic. *Psychol Psychother.* 2021;94(S2):e12298. doi: 10.1111.papt.12298

73. Pfefferbaum, B. & North, C.S. Mental health and the Covid-19 pandemic. *N Engl J Med.* 2020;383(6):510–2. doi: 10.1056/NEJMp2008017

74. Griffin, B.J., Purcell, N., Burkman, K., *et al.* Moral injury: an integrative review. *J Trauma Stress.* 2019;32(3):350–62. doi: 10.1002/jts.22362

75. Ben-Pazi, H., Beni-Adani, L. & Lamdan, R. Accelerating telemedicine for cerebral palsy during the COVID-19 pandemic and beyond. *Front Neurol*. 2020;11:746. doi: 10.3389/fneur.2020.00746

76. Zhai, Y., Ge, X., Liu, X., *et al.* An internet-based multidisciplinary online medical consultation system to help cope with pediatric medical needs during the COVID-19 outbreak: a cross-sectional study. *Transl Pediatr.* 2021;10(3):56068–568. doi: 10.21037/tp-20-348

77. Alsaffar, H., Almamari, W. & Al Futaisi, A. Telemedicine in the era of COVID-19 and beyond. *Sultan Qaboos Univ Med J*. 2020;20(4):e277–9. doi: 10.18295/squmj.2020.20.04.001

78. Ye, J. Pediatric mental and behavioral health in the period of quarantine and social distancing with COVID-19. *JMIR Pediatr Parent.* 2020;3(2):e19867. doi: 10.2196/19867

79. Weidner, K. & Lowman, J. Telepractice for adult speech-language pathology services: a systematic review. *Perspect ASHA Spec Interest Groups*. 2020;5(1):326–38. doi: 10.1044/2019_PERSP-19-00146

80. Salas-Vallina, A., Ferrer-Franco, A. & Herrera, J. Fostering the healthcare workforce during the COVID-19 pandemic: shared leadership, social capital, and contagion among health professionals. *Int J Health Plann Manage*. 2020;35(6):1606-1610. doi: 10.1002/hpm.3035

81. Liu, Q., Luo, D., Haase, J.E., *et al.* The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *Lancet Glob Health*. 2020;8(6):e790–8. doi: 10.1016/S2214-109X(20)30204-7

82. Mir, N., Hussain, A., Mishra, P., *et al.* Physiotherapy in COVID times: hybrid care is the new norm. *Saudi J Sports Med*. 2020;20:57. doi: 10.4103/sjsm.sjsm_30_20

83. Bullough, H., Zhan, G., Igandan, E., *et al.* Innovation feed: the development of a web tool to support innovation at GOSH. *Arch Dis Child*. 2020;105(Suppl 2):A1-A43. doi: 10.1136/archdischild-2020-gosh.13

84. Haines, K.J. & Berney, S. Physiotherapists during COVID-19: usual business, in unusual times. *J Physiother.* 2020;66(2):67–9. doi: 10.1016/j.jphys.2020.03.012

85. Mishna, F., Milne, E., Bogo, M., *et al.* Responding to COVID-19: new trends in social workers' use of information and communication technology. *Clin Soc Work J.* 2021;49(4):484–94. doi: 10.1007/s10615-020-00780-x

86. Msomi, N. News24. 2021. Using telehealth during the Covid-19 pandemic in SA. Available: https://www.news24.com/health24/medical/infectious-diseases/coronavirus/using-telehealth-during-the-covid-19-pandemic-in-sa-20210217 [Accessed: 30.04.2021]

87. Shai, K.B. & Ogunnubi, O. [South] Africa's health system and human rights: a critical African perspective. *J Econ Behav Stud*. 2018;10(1):69–77. doi: 10.22610/jebs.v10i1(J).2090

88. Pillay, M., Tiwari, R., Kathard, H., *et al.* Sustainable workforce: South African audiologists and speech therapists. *Hum Resour Health.* 2020;18(1):47. doi: 10.1186/s12960-020-00488-6

89. Creswell J. Research design. 3rd ed. Los Angeles:SAGE, 2009.

90. Neubauer, B.E., Witkop, C.T. & Varpio, L. How phenomenology can help us learn from the experiences of others. *Perspect Med Educ*. 2019;8(2):90–7. doi: 10.1007/s40037-019-0509-2

91. Boyce, C. & Neale, P. 2006. Conducting in-depth interviews: a guide for designing and conducting in-depth interviews for evaluation input. Pathfinder International Tool Series, Monitoring and Evaluation-2. Available: http://www.pathfind.org/site/DocServer/m_e_tool_series_indepth_interviews.pdf?docID=6301 [Accessed 08.09.2023]

92. Ortlipp, M. Keeping and using reflective journals in the qualitative research process. *Qual Rep.* 2008;13(4):695-705. doi: 10.46743/2160-3715/2008.1579

93. Chenail, R.J. Interviewing the investigator: strategies for addressing instrumentation and researcher bias concerns in qualitative research. *Qual Rep.* 2011;16(1):255-262. doi: 10.46743/2160-3715/2011.1051

94. Guetterman, T.C., Fetters, M.D. & Creswell, J.W. Integrating quantitative and qualitative results in health science mixed methods research through joint displays. *Ann Fam Med*. 2015;13(6):554–61. doi: 10.1370/afm.1865

95. Tong, A., Sainsbury, P. & Craig, J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care.* 2007;19(6):349–57. doi: 10.1093/intqhc/mzm042

96. Lincoln, Y.S. & Guba, E.G. But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Dir Eval.* 1986;1986(30):73–84. doi: 10.1002/ev.1427

97. Korstjens, I. & Moser, A. Series: practical guidance to qualitative research. Part 4: trustworthiness and publishing. *Eur J Gen Pract.* 2018;24(1):120–4. doi: 10.1080/13814788.2017.1375092

98. South Africa. Dept. of Cooperative Governance. 2020. Disaster Management Act, 2002 (Act No. 57 of 2002). Declaration of a national state of disaster. Government Gazette No. 43096:313 15 March.

99. Jesensek Papez, B., Sosic, L. & Bojnec, V. The consequences of COVID-19 outbreak on outpatient rehabilitation services: a single-center experience in Slovenia. *Eur J Phys Rehabil Med.* 2021;451–7. doi: 10.23736/S1973-9087.21.06678-8

100. Ilyas, A., Naiz, A., Abualait, T., *et al.* The impact of COVID-19 pandemic on rehabilitation services in a tertiary care hospital in the eastern region of Saudi Arabia: a single-center study. *Cureus*. 2021; doi: 10.7759/cureus.18303

101. Commission for Conciliation, Mediation and Arbitration. 2019. Designated Essential Services Alphabetical List - 2019.

102. Pegorari, M.S., Ohara, D.G., Matos, A.P., *et al.* Barriers and challenges faced by Brazilian physiotherapists during the COVID-19 pandemic and innovative solutions: lessons learned and to be shared with other countries. *Physiother Theory Pract.* 2020;36(10):1069–76. doi: 10.1080/09593985.2020.1818486

103. Bernado, J. ABS-CBN News. 2021. Fewer learners with disabilities enroll during pandemic: DepEd. Available: https://news.abs-cbn.com/news/12/09/21/fewer-learners-with-disabilities-enroll-during-pandemic-deped [Accessed: 14.07.2023]

104. Mbazzi, F.B., Nalugya, R., Kawesa, E., *et al.* The impact of COVID-19 measures on children with disabilities and their families in Uganda. *Disabil Soc.* 2022;37(7):1173–96. doi: 10.1080/09687599.2020.1867075

105. Angode, C. The impact of COVID-19 pandemic on students with special needs: a case study of Kakamega county, Kenya. *Insights Learn Disabil.* 2021;18(12):121-141. Available: https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=The+Impact+of+COVID-19+Pandemic+on+Students+With+Special+Needs%3A+A+Case+St&btnG=

106. Gallagher-Mackay, K., Srivastava, P., Underwood, K., *et al.* COVID-19 and education disruption in Ontario: emerging evidence on impacts. *Science Briefs of the Ontario COVID-19 Science Advisory Table*. 2021;2(34). Available: https://covid19-sciencetable.ca/wp-content/uploads/2021/06/Science-Brief_Education_v.1.1_20210616_published.pdf

107. Salas-Vallina, A., Ferrer-Franco, A. & Herrera, J. Fostering the healthcare workforce during the COVID-19 pandemic: shared leadership, social capital, and contagion among health professionals. *Int J Health Plann Manage*. 2020;35(6):1606–10. doi: 10.1002/hpm.3035

108. Wang, A., Liu, L., Zhu, J., *et al.* The experiences of cooperation among healthcare workers who participated in COVID-19 aid mission in China: a qualitative study. *J Clin Nurs.* 2021;30(17–18):2696–707. doi: 10.1111/jocn.15774

109. da Costa Belarmino, A., Rodrigues, M., Anjos, S., *et al.* Collaborative practices from health care teams to face the covid-19 pandemic. *Rev Bras Enferm.* 2020;73:e20200470. doi: 10.1590/0034-7167-2020-0470

110. Khurshid, Z., McAuliffe, E. & De Brún, A. Exploring healthcare staff narratives to understand the role of quality improvement methods in innovative practices during COVID-19. *BMC Health Serv Res*. 2021;21(1):1271. doi: 10.1186/s12913-021-07297-0

111. Fernandes, S.F., Trigueiro, J.G., Barreto, M.A., *et al.* Interprofessional work in health in the context of the COVID-19 pandemic: a scoping review. *Rev Esc Enferm USP*. 2021;55:e20210207. doi: 10.1590/1980-220x-reeusp-2021-0207

112. Franz, L., Howard, J., Viljoen, M., *et al.* Pragmatic adaptations of telehealth-delivered caregiver coaching for children with autism in the context of COVID-19: perspectives from the United States and South Africa. *Autism.* 2022;26(1):270-275. doi: 10.1177/13623613211022585 journals.sagepub.com/home/aut

113. Maleka, N.H. & Matli, W. A review of telehealth during the COVID-19 emergency situation in the public health sector: challenges and opportunities. *J Sci Technol Policy Manag.* 2022;ahead-of-print(ahead-of-print). doi: 10.1108/JSTPM-08-2021-0126

114. Dixit, N., Van Sebille, Y., Crawford, G.B., *et al.* Disparities in telehealth use: how should the supportive care community respond? *Support Care Cancer*. 2022;30(2):1007–10. doi: 10.1007/s00520-021-06629-4

115. Independent Communications Authority of South Africa. 2020. State of the ICT sector in South Africa - 2020 report. Available: https:// www.icasa.org.za/legislation-and-regulations/state-of-theict-sector-in-south-africa-2020-report [Accessed 07.07.2023]

116. Kumm, A.J., Viljoen, M. & de Vries, P.J. The digital divide in technologies for autism: feasibility considerations for low- and middle-income countries. *J Autism Dev Disord*. 2022;52(5):2300–13. doi: 10.1007/s10803-021-05084-8

117. Louw, Q.A., Conradie, T., Xuma-Soyizwapi, N., *et al.* Rehabilitation capacity in South Africa—a situational analysis. *Int J Environ Res Public Health*. 2023;20(4):3579. doi: 10.3390/ijerph20043579

118. Olu, O., Muneene, D., Bataringaya, J.E., *et al.* How can digital health technologies contribute to sustainable attainment of universal health coverage in Africa? A perspective. *Front Public Health.* 2019;7. doi: 10.3389/fpubh.2019.00341

119. Ray, S. & Mash, R. Innovation in primary health care responses to COVID-19 in sub-Saharan Africa. *Prim Health Care Res Dev.* 2021;22:e44. doi: 10.1017/S1463423621000451

120. Saverino, A., Baiardi, P., Galata, G., *et al.* The challenge of reorganizing rehabilitation services at the time of COVID-19 pandemic: a new digital and artificial intelligence platform to support team work in planning and delivering safe and high quality care. *Front Neurol.* 2021;12. doi: 10.3389/fneur.2021.643251

121. Boldrini, P., Kiekens, C., Bargellesi, S., *et al.* First impact of COVID-19 on services and their preparation. “Instant paper from the field” on rehabilitation answers to the COVID-19 emergency. *Eur J Phys Rehabil Med*. 2020;56(3). doi: 10.23736/S1973-9087.20.06303-0

122. Maccarone, M.C. & Masiero, S. The important impact of COVID-19 pandemic on the reorganization of a rehabilitation unit in a national healthcare system hospital in Italy: lessons from our experience. *Am J Phys Med Rehabil.* 2021;100(4):327. doi: 10.1097/PHM.0000000000001707

123. Bearne, L.M., Gregory, W.J. & Hurley, M.V. Remotely delivered physiotherapy: can we capture the benefits beyond COVID-19? *Rheumatol.* 2021;60(4):1582–4. doi: 10.1093/rheumatology/keab104

124. Rausch, A.K., Baur, H., Reicherzer, L., *et al.* Physiotherapists' use and perceptions of digital remote physiotherapy during COVID-19 lockdown in Switzerland: an online cross-sectional survey. *Arch Physiother*. 2021;11(1):18. doi: 10.1186/s40945-021-00112-3

125. Brunton, C., Arensberg, M.B., Drawert, S., et al. Perspectives of registered dietitian nutritionists on adoption of telehealth for nutrition care during the COVID-19 pandemic. *Healthc.* 2021;9(2):235. doi: 10.3390/healthcare9020235

126. Gnagnarella, P., Ferro, Y., Monge, T., *et al.* Telenutrition: changes in professional practice and in the nutritional assessments of Italian dietitian nutritionists in the COVID-19 era. *Nutrients.* 2022;14(7):1359. doi: 10.3390/nu14071359

127. Marino, J.D., Poropatich, R.K., Straatmann, J.A., *et al.* Telerehabilitation innovation in response to Covid-19. *Technol Innov*. 2022;22(2):225–32. doi: 10.21300/22.2.2021.11

128. Nakarmi, K.K., Mehta, K., Shakya, P., *et al.* Online speech therapy for cleft palate patients in rural nepal: innovations in providing essential care during COVID-19 pandemic. *J Nepal Health Res Counc*. 2022;20(01):154-159. doi: 10.33314/jnhrc.v20i01.3781

129. Calvo-Paniagua, J., Díaz-Arribas, M.J., Valera-Calero, J.A., *et al.* A tele-health primary care rehabilitation program improves self-perceived exertion in COVID-19 survivors experiencing post-COVID fatigue and dyspnea: a quasi-experimental study. *PLoS One.* 2022;17(8):e0271802. doi: 10.1371/journal.pone.0271802

130. Frigerio, P., Del Monte, L., Sotgiu, A., *et al.* Parents' satisfaction of tele-rehabilitation for children with neurodevelopmental disabilities during the COVID-19 pandemic. *BMC Prim Care.* 2022;23(1):146. doi: 10.1186/s12875-022-01747-2

131. Kotera, Y., Ozaki, A., Miyatake, H., *et al.* Qualitative investigation into the mental health of healthcare workers in Japan during the COVID-19 pandemic. *Int J Environ Res Public Health.* 2022;19(1):568. doi: 10.3390/ijerph19010568

132. das Neves Martins Pires, P.H., Macaringue, C., Abdirazak, A., *et al.* Covid-19 pandemic impact on maternal and child health services access in Nampula, Mozambique: a mixed methods research. *BMC Health Serv Res.* 2021;21(1):860. doi: 10.1186/s12913-021-06878-3

133. Ricee, S. 2020. Social desirability bias - definition and examples, and how to reduce it. Available: https://diversity.social/social-desirability-bias/ [Accessed 26.04.2021]

134. Spencer, E.A., Brassey, J. & Mahtani, K. 2017. Recall bias. In: Catalog of Bias Collaboration. Available: https://catalogofbias.org/biases/recall-bias/ [Accessed 26.04.2021]

135. South Africa. Children's Act No. 38 of 2005.

APPENDICES A – J

Appendix A: Additional qualitative data

OBJECTIVE 2, THEME 1: QUESTIONING THE MEANING OF ESSENTIAL SERVICES	
Sub-theme	**Quotations**
Protectiveness of doctors towards therapeutic services HCWs	… in the beginning… the doctors also became like, paranoid. So they actually at one stage, very early on, um, kicked therapists out of wards. I think they got a fright. (HCW 15) And then we had to convince the doctors that it was actually okay for us to see the patients. The doctors were trying to protect the physios from going into the COVID wards. (HCW 16) So just like inviting, convincing doctors that, you know what - actually do allow us in - was in response to when we realised you know what - they're actually trying to protect us. (HCW 16)
Service cancellation, reduced caseloads and referrals	So we stopped all our outpatients. But that was the directive of the hospital as well. All MDT sessions were stopped, um, inpatients and outpatients. So ja, I would say for level five, we would only see walk-in patients - so patients who were coming into the hospital for something else would pop in to say "My hearing aid is not working", or "I'm having this kind of problem". So if someone came in, we would see them. (HCW 6) I think it dipped quite a bit, um, because obviously the hospitals were also not admitting, um, what they should be admitting. They were only admitting priorities and I know, paediatrics, um, they were very strict as to who came into contact with babies. Like if you don't need to see them, then rather not see them. So the referrals weren't coming in as much. (HCW 14) Um, and we have a service where we screen. So you go from patient to patient screening. So we had to stop that because that was just a contact precaution. If you're just going from patient to patient, you don't know what you're spreading. So we had to stop that. So obviously, our patient load was affected by that as well. (HCW 14) So basically now, uh, we had to red reduce drastically the amount of patients we were seeing. So I think according to the levels, like, I'm going from eight patients for a diagnostic clinic, we were maybe seeing three. (HCW 7)
Missed opportunities and backlogs	Particularly I think for me the, the worrying areas are like hands injuries, you know, where it's like got to be contracted and, and burns and stuff. And also PG's because your keloid scar and whatever, what's going to happen over the six months of the year. (HCW 3)

OBJECTIVE 2, THEME 2: HEALTHCARE WORKERS CARRIED ADDITIONAL LOADS DURING THE PANDEMIC, SOMETIMES OUTSIDE OF THEIR SCOPE OF PRACTICE	
Sub-theme	**Quotations**
Adjustment and change brought on by the pandemic	There were ward rounds, and due to COVID, the ward rounds had to stop. And this means whatever that was achieved within ward rounds in a multidisciplinary team is difficult as now people are communicating from their own desk to the other desk. (HCW 13) … and now I suppose… the norm is like we never see each other's faces. And in the tea room that used to have like 25 people all sitting together, there's now max of five, you know, and people had to go and, and spread out and… So there's like physical, there's structural changes. And I don't know, to be honest, if we'll ever go back to a full lunch room, because sort of the psychology has changed so much now. (HCW 3)
Additional duties and increased administrative responsibilities	…if you were going to the wards, you had your, your visor, cleaning your phone and cleaning all of the things that you used in the ward and stuff like that, which takes more time to do... (HCW 9) So we always had to have one person in reception screening patients, which is temperature, asking about symptoms, taking their details down, sanitising hands, making sure they sit socially distant. So we essentially lost, uh, a clinical person because there had to be someone there the whole time. (HCW 3) So we've got like two files just chock a block of people's risk assessments, and then this one's high risk, so they must go here and get swabbed on day four. And this one on when your symptoms started that like it was just trying to stay on top of that, for me initially was like a full time thing. (HCW 3)
The mental health of HCWs	And you would go on to every single webinar to try and just get as much information as possible. And I think it was information overload… (HCW 9) …just having the fear of my parents may get it and what may happen to them when they got it and not being able to travel to see them. (HCW 14) But in the time, it was just survival mode… and literally just coping day to day… and trying to get the team to cope day to day. (HCW 3) … and that was me going around - "There's too many people in a room", "The window's not open", "You're not wearing your mask properly", "You're not doing this" - maybe wasn't the most liked person at that time. Um, but that I kind of felt that I needed to do that to protect the team. (HCW 5)

OBJECTIVE 2, THEME 3: STRUCTURAL BARRIERS FACED BY HCWs AFFECTING SERVICE DELIVERY	
Sub-theme	**Quotations**
Closure of partner organisations	Even though sometimes when you go to the police station, because we're using a Diepkloof police station, you may find that they're closed instead because of one of the member, it's infected with COVID… (HCW 11) … other departments are going to lock down and then you saying health is not gonna go lockdown – let it operate. But certain sections within health require certain departments outside to be working as well. But that those ones are shut down, so it's sort of i-disconnect there. (HCW 12) …the burden that we had, we do, we did have backlog when it came to movement of children from the wards. For instance, if there were when there are those children that are, that were abandoned, we as healthcare workers do not remove, we refer to Child Protection Organisations outside and those Child Protection organisations outside unfortunately, were not operating like we were. Most of their employees were at home. They would close the whole office for the week or two once they have found a COVID case. Then that would mean children had to stay, babies had to overstay in the wards while at the same time there were standing the risk of contracting COVID. (HCW 13)
Challenges with patient follow-up	I think there were a lot of patients we weren't able to get hold of, in order to let them know services are starting up again, or that we had this MDT service. Um, so there were a lot of patients, I would say that we were not able to contact, um, and bring back into the caseload. (HCW 5) And we have lost patients through the cracks. We have lost patients that we cancelled in that hard lockdown, and we never could get hold of again, you know. (HCW 3) I think we've lost a lot of kids to follow up because especially in that time, they didn't want to come to the hospital. So also nutrition is not something that they're going to be like is a massive emergency… until they being admitted with the severe SAM and dehydration and hyperglycemia's and those kinds of things. So… it is one of the things that falls to the wayside when, when you don't want to come to the hospital. So we, we had far fewer SAM's and MAM's admitted, so severe acute malnutrition and moderately acute malnutrition, that were coming to the hospital for admission and following up in our outpatient clinic as well and then sort of when everything started settling and everything started opening up again, we saw a massive influx of them because they weren't coming for follow up… so… the knock on effect has been that we've seen some severe malnutrition cases and an increase in the general number of malnutrition cases. (HCW 8)

Challenges with the availability and use of resources	If, for instance, we want to do home visits… we're not going the usual way. Now it meant that we need… upgraded connectivity… with the community… More creative way of connecting can be gadgets, computers and other things. And not just there, even meetings now, we can no longer go and sit in a meeting… With stakeholders outside… So we also needed i-upgrade on connect with connectivity. (HCW 12) …PPE was like gold dust… Degerm was like gold. You strapped them down and they still got removed. (HCW 16) … it was difficult because we struggled to get PPE. So that was a hindrance to therapy because no one wanted to go into a ward to treat a patient if they weren't completely covered, as the government wanted us to be… And I remember – firstly, a lot of us started buying our own PPE, which was a cost to us. (HCW 2) Convincing supply chain, that yes, physios indeed need PPE the same as doctors – that we're actually at more risk, because we hug patients for extended periods of time as part of our bread and butter – we can't just stand at, stand at the foot end of the bed, look at the monitor and walk up, write in the file and walk away. We are actually up close and personal. And we are the people who ask people to cough while we with them, and then inspect what comes out… If you need to teach somebody to walk with crutches, you hold onto them. You help them with exercises, you in their faces for extended periods of time, and you can't not be. (HCW 16) I found it quite hard and I don't know if it was just in my mind but I felt more exhausted at the end of each day. It might have just been the stress and everything but I don't know – I think we've gotten so used to the masks. But I just remember always feeling like yoh, either having a bit of a headache or just feeling like, you know, it's putting a bit more, um ja strain on your body... (HCW 4)
Lack of leadership and communication	I think that communication could have been better. Um, just in terms of what's happening where, how, when. So, cause what was happening were major barrier for us, was that therapists would go to wards only to be told at the door that now this is a COVID ward. Or, or they'd go to the ward and go in and then someone would say, oh, there's a COVID patient waiting for transport, trance, transfer, um, but then they're not kitted out in the PPE. So it was very, like, um, uh, it sometimes felt like everyone was just doing whatever to survive but no one knew what anyone was doing kind of thing. (HCW 3) What was disappointing for me was the lack of communication from management. (HCW 16)

	… for me the communication was the biggest barrier. And I didn't know what to tell staff when they come to you with questions, because I also didn't know. (HCW 3) … you just get emails forwarded to you the whole time. (HCW 9) … but to this day from the National Department of Health, there are no rehab guidance or guidelines. (HCW 16) After spending those billions, what do we have? Because my thinking is, i-system itself should have been redefined. To prepare for diseases, similar diseases of the future. (HCW 12)

OBJECTIVE 3, THEME 1: A SYSTEMS APPROACH TO DECISION-MAKING DURING THE PANDEMIC	
Sub-theme	**Quotations**
Role release	I think… also making sure that whatever you offering within that session, it needs to be something that that parent then can continue to facilitate at home and shouldn't just be that, um, during that session that, um, no, that's when when the therapy happens, it has to happen at home as well. (HCW 4) … and we were doing all our services over the telephone with the nurses or WhatsApp with the nurses and with the doctors. So, then what we did is we, um, just, uh, gave them like a PDF of how to refer, when to refer, as well as what products we had available for them. So, and the indication for those products and when to use those products and for who to use those products. (HCW 9) But because there's quite an overlap between what OT and physio do in terms of developmental care, we would alternate days. So a Monday, Wednesday, Friday, I would do the transitional ICU. And then a Tuesday and a Thursday, we would go to Ward 66… and then the other discipline did the other days, because there's no point you and I both doing the same thing and waking up a little small baby who should be sleeping… (HCW 15)
Inter-professional communication and coordination	And we have to communicate virtually. WhatsApp started working so much that... Yes, we will say that it is one of the good things that has happened, but it comes with a cost because one should have data. If you do not have data, you will not know what is happening around you. So that is one extra cost that, uh, COVID has also brought that each of us, technology now had to increase. (HCW 13)

Restructured MDT services	Our MDT services where we would have to go see patients, allied, allied MDT. We just now book them separately for ourselves, only those high-risk patients, um, who we feel like need a very intensive session will we book for all three, or will we be involved in the clinics with the allieds. And I found that it's not a great percentage, actually, that needed, um, all three of us to be there. (HCW 14) So we also restructured quite a lot of MDT services to more, um, staggered appointments where you go from me to you to somebody else on the same day. So we still try to cluster them, but not in the same place in the same room. (HCW 16)
Changed models of service delivery	… COVID forced us to to really look at different models of service delivery, um, therapists are able to go back to that to say, which models worked well, what didn't work well, what can we adjust, and how do we continue forward with that? (HCW 5) … I think what we as a department did very early on is we started telehealth. And that continued, uh, post COVID and it's something that we're doing now. So very different to just, um, because I think other departments sort of did telephonic context, but we were doing full on, um, synchronous. (HCW 6) So I would say we kind of reduced some appointments, but then tried to make up with telehealth, um, and then saw, saw children a lot more as walk ins. I mean, we do a lot of walk ins in our department anyway, a huge number of our OPD's just work, work on walk ins on the day of the clinic, then the doctor sends them you know, and you get them straightaway. So, but we did a lot more, especially for your kind of like your more chronic. I mean, I mean, walk ins for acute ortho make sense. But it was more the chronic, you know, like your CP and, and that type of thing. (HCW 15) So we found that with our hearing aid patients, so those that get fitted, um, those are the patients we now targeting to do telerehab with. So we, they get seen for a first fit, and then two weeks later, we call them and we just find out how are they doing with the hearing aids? Um, is there any challenges they are facing? Um, we refer them to our hearing aid repairs clinic if there is a a problem with the hearing aids, so this is, so repairs clinic is a – um, it occurs every Monday besides a public holiday. So it's a walk in service, so if anything was going wrong with the hearing aid, they could come to that service instead of waiting for their appointment which is in another month or two. (HCW 7)

	Um, we, I think, uh, the fact that we are now able to open more services. Um, we're more flexible in terms of now we kind of got forced into the whole telerehab thing. So now, right now, we have two sort of services we can – we did up our game a little bit. (HCW 7)

OBJECTIVE 3, THEME 2: WORKING SMARTER	
Sub-theme	**Quotations**
Service evaluation	So two of those clinics, we no longer do that we've now incorporated those patients into our general OPD just because, um, where that clinics are situated… there is no space for the dietitian anymore. (HCW 9) And then, like for me, I started looking at stats to see, even like past stats to see, is it really worth having this kind of clinic? Um, what impact are we making with this clinic? Would it make a difference if we, we scrapped off the clinic and those patients came up to OPD. (HCW 10) … during COVID, we also had to reevaluate a lot of things all the time. So usually, you all take some time before you re-evaluate the service. But during COVID, we had to kind of almost on a monthly basis, if not a weekly basis, re-evaluate what's happening and how we should change it. (HCW 14) … we had to stop a lot like a lot of the clinics, for example, we haven't gone back to that. We've kind of found a more efficient way of running services. Um, so ja, services that we mostly stopped, because of COVID have still not yet started. But we have either, like say for, either stopped them completely, or just found alternatives. (HCW 14)
Patient prioritisation	We had to really prioritise ward patients as well. (HCW 2) And it was difficult, it was difficult because it didn't altogether seem ethical. But at the same time, we didn't know is it ethical to see fifteen and maybe spread it and then thirty more get it? Or is it unethical you know, to choose because you can't say one patient is more important than the other one. (HCW 2) We've started down referring a lot of patients. Because we started looking at the level of care packages, is it worth having that patient come in just to dietetics, um, when there are dieticians in the district? We don't have enough, but at least we are referring to clinics where there are dieticians. (HCW 10)
Innovations in patient care	So we, we would.. work more like on a plinth kind of thing, rather than on the floor, you know, when the kids more on you, but it's very difficult because you use your body when you treat children as well. So then… you used to stabilise certain parts, and then you do whatever. So now you can't… So ja, I think those were some of the the real adaptations. (HCW 15)

	So then we started seeing them every two months or every three months. (HCW 14) … so what we've done is, um, through our professional associations, through stuff that we develop here at Bara, between provinces and between institutions, we share information. (HCW 16) So it was really like thinking like what is crucial for today? Whereas now if I go to the ward, and I want to spend an hour with the child, and I have the time for the day, I can do it whereas they wanted us to kind of limit sessions. So if we were with a child for 15 minutes or the mom for 15 minutes, what's the crucial things that we can say? Um... And what will really get across to them? (HCW 1) … we try to also lessen our contact time with them by maybe doing case history over the phone. And then when they come in we sort of went straight into the test battery… (HCW 7) … one other thing that we started to do was we started to do specific notes. So like for an example. So instead of writing out all your soap notes you actually have, and that we started to do to also reduce patient time with patients. (HCW 15)
Patient education, remote monitoring and follow-up	Previously, for instance, in outpatients, our volumes were just so overwhelmingly big that we never had the time, but… during that peak of the pandemic, we actually had the opportunity to follow up on, um, non-arrivals. Where you could call and say, "What's happened? Can we reschedule?" So that in that sense, it was good… (HCW 16) So I think we tried to look at where where could we connect with people - we also did a lot of phone calls just to check in with our patients to explain to them about COVID. (Speech-language therapist) But we'd looked at how we could provide information to caregivers when they weren't able to visit, um, calling them, letting them that we had seen them, how they were doing with their feeding. Um, and I think that as part of telehealth, that was the aspect of remote monitoring and following up with patients that we've continued to do. (HCW 5)

Appendix B: Plagiarism policy

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY

I Robyn Lesley McGrath (Student number: 305490) am a student registered for the degree of Master of Public Health in the academic year 2024.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: RLMcGrath Date: 27 February 2024

Appendix C: Turnitin cover page

305490 Robyn McGrath Research report.docx 25/10/2023

ORIGINALITY REPORT

8%	7%	5%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	wiredspace.wits.ac.za Internet Source	1%
2	citeseerx.ist.psu.edu Internet Source	<1%
3	covid19dataportal.es Internet Source	<1%
4	stud.epsilon.slu.se Internet Source	<1%
5	www.mdpi.com Internet Source	<1%
6	sajcd.org.za Internet Source	<1%
7	www.health.govt.nz Internet Source	<1%
8	hdl.handle.net Internet Source	<1%
9	www.frontiersin.org Internet Source	<1%

Appendix D: HREC clearance certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research and Innovation)

TO: Ms R McGrath
School of Public Health
Division of Community Paediatrics
Medical School
University

E-mail: mcg.robyn@gmail.com

CC: Supervisor: Dr W Slemming
<Wiedaad.Slemming@wits.ac.za>
and <HREC-Medical Research Office@wits.ac.za>

FROM: Mr Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 2022/03/24

REF: R14/49

PROTOCOL NO: **M220122** (This is your ethics application reference number. Please quote it in all enquiries, oral or written, relating to this study.)

PROJECT TITLE: *The effects of COVID-19 on paediatric therapeutic services at Chris Hani Baragwanath Academic Hospital*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to Government funding of the University.

MSWorks2000/Iain0007/Clearscan.wps

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

R49 Ms R McGrath

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M220122

NAME: (Principal Investigator)	Ms R McGrath
DEPARTMENT:	School of Public Health Division of Community Paediatrics Medical School University
PROJECT TITLE:	*The effects of COVID-19 on paediatric therapeutic services at Chris Hani Baragwanath Academic Hospital*
DATE CONSIDERED:	2022/01/28
DECISION:	Approved unconditionally
CONDITIONS:	
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR:	Dr W Slemming
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2022/03/24

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **January** and therefore reports and re-certification will be due in the month of **January** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator

25.03.2022
Date

Appendix E: Medical Advisory Committee permission letter

GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

MEDICAL ADVISORY COMMITTEE

CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL

PERMISSION TO CONDUCT RESEARCH

Date: 8th March 2022

TITLE OF PROJECT:

The effects of Covid-19 on Paediatric therapeutic services at Chris Hani Baragwanath Academic Hospital.

UNIVERSITY: Witwatersrand

Principal Investigator: Robyn McGrath

Department: Public Health

Supervisor : Dr W Slemming.

Permission Head Department (where research conducted): Yes

NHRD No. GP 202201_018

The Medical Advisory Committee recommends that the said research be conducted at Chris Hani Baragwanath Academic Hospital. The CEO / management of Chris Hani Baragwanath Academic Hospital is accordingly informed and the study is subject to:-

- **Permission having been granted by the Committee for Research on Human Subjects of the University of Witwatersrand.**
- The Hospital will not incur extra costs as a result of the research being conducted on its patients within the hospital
- The MAC will be informed of any serious adverse events as soon as they occur
- Permission is granted for the duration of the Ethics Committee Approval.

Received By : Robyn MGrath
Date : 14.03.2022

Recommended
(On behalf of the MAC)
Date: 08/03/2022

Approved/~~Not Approved~~
Hospital Management
Date: 08/03/2022

Appendix F: Study information document

STUDY INFORMATION DOCUMENT

Study title:
The effects of COVID-19 on paediatric therapeutic services at Chris Hani Baragwanath Academic Hospital

Introduction:
Hello. My name is Robyn McGrath, and I am an occupational therapist. I am doing research to understand the effect that COVID-19 has had on therapeutic services at Chris Hani Baragwanath Academic Hospital (CHBAH). I am conducting this research as part of my Masters course in Public Health at the University of Witwatersrand.

I am particularly interested in the opinions of healthcare workers working in paediatrics, and I will be interviewing healthcare workers from a range of therapeutic disciplines (occupational therapy, physiotherapy, speech-language therapy and audiology, dietetics and social work). The questions I would like to ask relate to the challenges healthcare workers have experienced in delivering services to children during the COVID-19 pandemic and the solutions and innovations they have used to overcome these challenges.

Invitation:
I would like to invite you to participate in this research study through an individual interview.

What is involved:
The interview will last between 45 and 60 minutes and will be conducted in English. The interview will be done face-to-face, observing all COVID-19 protocols; however, if you would prefer, I can arrange to do the interview online (MS Teams or Zoom) or telephonically. I would like to ask your permission to record this interview, so that I can go back to it at a later stage during the research process. The recording will be stored on my computer in a password-protected folder. If, at a later stage, I find that there is information missing or I need clarity on something you have said during the interview, I may need to conduct a brief follow-up interview with you telephonically.

Risks of being involved in the study: There are no direct risks of participating in this study; however, some of the questions I will be asking are sensitive and may cause some psychological

distress. Participants will be able to discontinue the interview or withdraw from the study at any time should they wish to.

Benefits of being in the study: There is no direct benefit to you if you choose to participate in this study. However, it is hoped that this research will possibly inform future planning and decision-making about therapeutic services nationally, which could have important implications for the upcoming National Health Insurance system.

Participation is voluntary:
Participation in this study is voluntary and all participants will need to sign an informed consent form, stating that they are willing to take part in the study. Participants may withdraw from the study at any time, without reason and without penalty.

Cost of participation:
There is no cost involved in participating in this study and no reimbursement will be offered.

Confidentiality:
All the information you share with me will only be used for the purpose of this research study which I am planning to publish as an academic article. Everything you say will be kept confidential and will not be shared with anyone besides my research supervisor. However, it is important to note that by agreeing to participate in this study, you will form part of an identifiable group of people, i.e., it will be mentioned that participants were paediatric healthcare workers from the following disciplines: occupational therapy, physiotherapy, speech-language therapy and audiology, social work, and dietetics.

Your name or job title will not be used so that no one can link you with any of your answers.
The only exceptions - and all of them are rare - would normally be:

1. personal information may be disclosed if required by law
2. the Human Research Ethics Committees of the University may exceptionally require personal data to respond to a formal complaint, or for a compliance audit

I would like to ask your permission to record this interview, so that I can go back to it at a later stage during the research process. The recording will be stored on my computer in a password-protected folder.
If results are published, this may, exceptionally, lead to cohort, or more rarely, individual identification. All data collected during the study will be securely retained for two (2) years, if a scientific publication arises from the study and six (6) years, if there is no publication. Thereafter it will be destroyed accordingly.

Contact details of researcher/s:
If you require any additional information about this study, please direct any questions to:
Principal Investigator: Robyn McGrath - 0765901767 / mcg.robyn@gmail.com
Research Supervisor: Dr. Wiedaad Slemming - 011-717-2292 / wiedaad.slemming@wits.ac.za

Outputs:
I am planning to publish the results of this study as an academic article, which I will share with you once completed.

Contact details of HREC administrator and chair:
This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg ("Committee"). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.
Date: December 2021

Appendix G: Participant consent form

PARTICIPANT CONSENT SHEET

The effects of COVID-19 on paediatric therapeutic services at Chris Hani Baragwanath Academic Hospital

1. I have been given a Participant Information Sheet which explains the nature and processes involved in this study, which is attached hereto;
2. I was given time to read it, or had it read to me, in the language I best understand;
3. I was given time to ask any questions I wanted to and found any answers given to me to be reasonable and satisfactory;
4. I believe I fully understand why the study is being conducted and what the intended outcomes will be;
5. I understand that there will be no immediate benefit to me, should I agree to participate, nor will I receive any payment; conversely, participation will not cost me anything but my time;
6. I understand that, even if I initially consent to take part in the study, I may subsequently withdraw at any time and would not be required to give any reasons; if that happened, any data collected about me for the purposes of the study would immediately be destroyed, unless I give consent for it to be retained
7. I have been given a range of contact details, listed below. If I require further information or become concerned about any aspect of this study I am free to speak to any of these contacts.
8. I understand that the interview will be conducted in English, either face-to-face in a quiet room at Chris Hani Baragwanath Academic Hospital, or online (MS Teams/Zoom) or telephonically (or via Whatsapp call) depending on COVID-19 restrictions and my own preference.
9. I understand that the interview will last between 45 – 60 minutes.
10. I understand that the researcher my need to conduct a follow-up interview with me telephonically if gaps are identified or further clarity is needed.

Contact details:

Robyn McGrath, Principal Investigator:
Telephone no: 076 590 1676
E-mail: mcg.robyn@gmail.com

Wiedaad Slemming, Supervisor:
Telephone no: 011 717 2292
E-mail: wiedaad.slemming@wits.ac.za

Professor CB Penny, Chairperson of the Human Research Ethics Committee (Medical) at the University of Witwatersrand
Telephone no: 011 717 2301,
E-mail: Clement.Penny@wits.ac.za.

Ms. Z Ndlovu or Mr Rhulani Mkansi, Committee Secretariat, telephone nos.: 011 717 2700 or 1234, or by e-mail at: Zanele.Ndlovu@wits.ac.za or Rhulani.Mkansi@wits.ac.za

Name of Participant: _____

Date: _____

Place: _____

Signature or mark _____

Witnessed by:

Name of Witness: _____

Signature: _____

Date: _____

Appendix H: Consent form for audio recording

CONSENT FORM FOR AUDIO RECORDING OF STUDY PARTICIPATION

The effects of COVID-19 on paediatric therapeutic services at Chris Hani Baragwanath Academic Hospital

I hereby consent to audio recording of the interview.

I understand that:

- The recording will be stored in a secure location (a locked cupboard or password protected computer) with restricted access to the researcher and the research supervisor.
- The recording will be transcribed and any information that could identify me will be removed,
- The recordings will be erased within either (a) two (2) years of the publication of the research findings, or (b) six (6) years, if no publications arise from this research
- Anyone wishing to access this information in the future will first have to obtain the approval of the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg
- Direct quotes from my interview, without any information that could identify me, may be cited in the research report or other write-ups of research.

Name of Participant: _____

Date: _____

Place: _____

Signature or mark _____

Witnessed by:

Name of Witness: _____

Signature: _____

Date: _____

Appendix I: Indepth interview guide

Interview guide

Background information
No. of interview:
Consent provided:
Contact number:
Job title:
Years of experience in this profession:
Length of time employed at CHBAH:
Length of time working in paediatrics at CHBAH:

Opening questions

1. Can you tell me about the paediatric team in your department?
   Probe: how many therapists/healthcare workers, roles, management

2. **For chief healthcare workers:**
   Can you tell me about the different paediatric services offered in your department?
   Probe: different clinics, inpatient, outpatient, assistive devices

3. Can you tell me about a normal workday in your department before COVID-19?
   Probe: work routine, patient care, groups, admin time

Key questions
Personal/individual questions

4. Have you had COVID-19?
   Probe: symptoms, recovery

Thinking back to the initial level 5 lockdown and the first level 4 lockdown in 2020 (March – June 2020):

5. How did the COVID-19 pandemic affect you personally during this period?
   Probe: family, finances, childcare, housework

6. How did COVID-19 change your normal work routine?
   Probe: MDT work, use of PPE, contact sessions, groups

7. What barriers or challenges did you personally experience in your work during this hard lockdown period?
   Probe: stress, mental health, PPE, patient load, MDT work, increased admin

8. Have you, at any point during the pandemic, performed additional roles or tasks outside of your usual duties?

Probe: task teams, patient screening

Team questions

9. Have any of your paediatrics team members had COVID-19?
   Probe: number of healthcare workers

10. How has the pandemic affected your paediatrics team?
    Probe: service provision, team dynamics, staff quarantine

On the 1st June 2020 we moved to lockdown level 3 and since then, lockdown levels have fluctuated based on the different waves of the pandemic:

11. Since then, how has the pandemic affected you personally? What has changed?
    Probe: family, finances, childcare, housework

12. What has changed in your work since that hard lockdown period in 2020?
    Probe: stress, mental health, PPE, patient load, MDT work

13. Has anything changed in your paediatrics team since the hard lockdown period in 2020?
    Probe: service provision, team dynamics, staff quarantine

Many paediatric healthcare workers across the world have reported making adaptations or adjustments to the way they deliver paediatric services as a result of the COVID-19 pandemic.

14. Did you personally make any adaptations or come up with any solutions to the problems that you experienced?
    Probe: home programs, telehealth, therapy kits, videos

15. What adaptations/adjustments have you made as a team to maintain or improve service delivery during the pandemic?
    Probe: MDT work, shortened sessions, home programs, telehealth, therapy kits, videos

16. What barriers or challenges are you currently experiencing in your work?
    Probe: staff, patient load, groups

17. Do you have any possible solutions of how you could overcome these challenges?
    Probe: home programs, telehealth, therapy kits, videos

18. How would you describe your current paediatric services?
    Probe: running at full capacity, still reduced

Healthcare workers were given the option of being vaccinated at the beginning of 2021:

19. Did you personally receive the vaccine? What was your experience like?
    Probe: side effects

20. What effect has vaccination had on paediatric services?
    Probe: stress of healthcare workers, risk of severe disease

21. Would you say that things are easier at work now compared to the original hard lockdown period?
    Probe: why or why not?

22. How would you describe the level of support that you have received from your seniors and the hospital management during the COVID-19 pandemic?
    Probe: information, communication, psychological support
23. Are there any changes that have been made during the pandemic which you think have significantly improved the way your team functions or which you think should continue after the COVID-19 pandemic?
    Probe: telehealth, home programs, use of technology, patient management

24. For Heads of Department:
What are some of the management challenges that you have experienced during the COVID-19 pandemic?
Probe: protocols, quarantine, staff, mental health

Closing questions

25. What would you like to see change in your department as the COVID-19 pandemic continues?
    Probe: work roles, patient care, use of technology, PPE

26. Is there anything else you would like to ask or add?

Thank you for participating in this interview.

Appendix J: COREQ guidelines

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	Pg 28
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	Pg 28
Occupation	3	What was their occupation at the time of the study?	Pg 28
Gender	4	Was the researcher male or female?	Pg 28
Experience and training	5	What experience or training did the researcher have?	Pg 28
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	Pg 28
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Pg 28
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Pg 28
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Pg 27
Participant selection			

Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Pg 24
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	Pg 26
Sample size	12	How many participants were in the study?	Pg 26
Non-participation	13	How many people refused to participate or dropped out? Reasons?	Pg 26
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	Pg 26
Presence of nonparticipants	15	Was anyone else present besides the participants and researchers?	Pg 26
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	Pg 41
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Pg 26
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	Pg 26
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	Pg 26
Field notes	20	Were field notes made during and/or after the interview or focus group?	Pg 26
Duration	21	What was the duration of the inter views or focus group?	Pg 26
Data saturation	22	Was data saturation discussed?	Pg 26
Transcripts returned	23	Were transcripts returned to participants for comment and/or	N/A
Topic	**Item No.**	**Guide Questions/Description**	**Reported on Page No.**
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	Pg 27
Description of the coding tree	25	Did authors provide a description of the coding tree?	Pg 27
Derivation of themes	26	Were themes identified in advance or derived from the data?	Pg 27

Software	27	What software, if applicable, was used to manage the data?	Pg 27
Participant checking	28	Did participants provide feedback on the findings?	N/A
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Pg 43 - 71
Data and findings consistent	30	Was there consistency between the data presented and the findings?	Pg 43 - 71
Clarity of major themes	31	Were major themes clearly presented in the findings?	Pg 43 - 71
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	Pg 43 - 71