PHYSIOTHERAPISTS' PERSPECTIVES ON USE OF TELEREHABILITATION FOR PHYSICAL MODALITIES IN PATIENTS CARE

BY

AGBONAVBARE DESTINY

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CERTIFICATION

This dissertation by **AGBONAVBARE DESTINY** is accepted in its present form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Sciences, College of Medical Sciences of the University of Benin.

DR. NICHOLAS OGHUMU _____

SUPERVISOR **SIGNATURE AND DATE**

EXTERNAL SUPERVISOR _____

SIGNATURE AND DATE

APPROVED

_____

DR. (MRS) C.O. OBASEKI

HEAD

DEPARTMENT OF PHYSIOTHERAPY

COLLEGE OF MEDICAL SCIENCES

UNIVERSITY OF BENIN

DEDICATION

To the Lord God Almighty, for His faithfulness, His boundless kindness and love towards me and for making me successfully complete my project work.

To my dearly beloved parents, Mr Aimienogieduwa Agbonavbare (Frank Odion) and Pastor (Mrs) Grace Tessy Agbonavbare for being great sources of help, kindness, encouragement and for their constant presence throughout my undergraduate programme. I could not have come this far without you all by my side. I am truly grateful.

To myself, Destiny Agbonavbare, for being resilient, steadfast and mentally strong despite all the odds which were stacked against me.

ABSTRACT

Background: The adoption of telerehabilitation is increasingly recognized as a vital component of modern physiotherapy, yet its application for physical modalities remains underexplored, particularly in low-resource settings like Nigeria. Understanding the perspectives of physiotherapists is crucial for the successful integration of this technology into patient care.

Aim: This study aimed to examine the perspectives of physiotherapists in the South-South region of Nigeria on the use of telerehabilitation for physical modalities.

Methods: This cross-sectional study recruited 80 licensed physiotherapists (56 males, 24 females) practicing in South-South Nigeria. An online, self-administered questionnaire was used to collect data on sociodemographic, perspectives on telerehabilitation, perceived strengths and barriers, and the use and administration of physical modalities in telerehabilitation. Data was summarized using descriptive statistics. Chi-square test was used to determine associations between sociodemographic variables and respondents' perspectives. Alpha level was set at $p<0.05$.

Results: The respondents were predominantly male (70.0%), young (38.8% aged 23–30 years), and had less than five years of experience (38.8%). Most of them held positive perceptions, believing telerehabilitation improves patient care (92.5%). Key strengths identified were flexible timetables (70.0%) and easy access (67.5%). However, significant barriers were noted for pediatric and mentally handicapped populations (97.5%). The use of physical modalities showed a high use of self-administered modalities like cold packs (75.0%) and TENS (57.5%), and very limited use of equipment-dependent modalities like mechanical traction (3.8%). Significant associations were found between perspectives and age ($p=0.030$), gender ($p=0.007$), years of experience ($p=0.020$), level of education ($p=0.002$), and area of specialization ($p=0.003$).

Conclusion: Physiotherapists in South-South Nigeria hold positive perceptions on using telerehabilitation for physical modalities. While they recognize its potential to improve access, significant ethical concerns exist. Targeted training and the development of national guidelines are recommended to support its broader implementation.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

There is a growing interest in utilizing technological advancements, computing, and mobile applications in various fields, especially in healthcare (Odole et al., 2024). One effective way to harness these technological advancements is through the use of telehealth. Telehealth, is simply define as the application of telecommunications and digital technologies to provide healthcare services, including patient rehabilitation (Snoswell et al., 2023). A major advantage of telehealth is its capacity to eliminate geographical limitations, thus improving access and aiding in the continuity of care. Hence, the World Confederation for Physical Therapy (WCPT) in 2022 has actively endorsed the use of telerehabilitation to enhance service accessibility, particularly during the COVID-19 pandemic, with numerous national organizations providing guidance and resources to support its implementation (Estel et al., 2022). Telerehabilitation, a branch of telehealth, specifically utilizes information and communication technologies to enable the rehabilitation of patients in their own homes (Klamroth-Marganska et al., 2022).

Telerehabilitation has increasingly established itself as a fundamental aspect of patient care due to its capacity to address gaps in healthcare delivery, particularly during global disruptions like the COVID-19 pandemic (Seid et al., 2022; Odole et al., 2024). Throughout the pandemic, conventional in-person physiotherapy services faced significant restrictions due to lockdowns, social distancing requirements, and the necessity to reduce exposure risks, leading to a swift transition to virtual care (Odetunde et al., 2024). Telerehabilitation emerged as a viable and

effective option, enabling physiotherapists to continue administering physical modalities, track patient progress, and offer remote guidance (Seron et al., 2021; Suso-Marti et al., 2021; Baroni et al., 2023). Its effectiveness in ensuring continuity of care during this time highlighted its importance beyond emergency scenarios. The convenience, affordability, and ability to reach underserved or remote populations have further reinforced telerehabilitation's position as a vital and enduring element of contemporary physiotherapy practice (Odetunde et al., 2023).

Emerging technologies like virtual reality (VR), robotics, and other physical modalities are progressively reshaping rehabilitation (Nizamis et al., 2021). These innovations provide engaging, immersive environments that boost patient involvement and enhance functional results, especially in neurorehabilitation and musculoskeletal treatments. Virtual reality allows physiotherapists to replicate real-world tasks within a motivating context, facilitating motor learning and neuroplasticity (Levin et al., 2015; Aderinto et al., 2023). Robotic-assisted therapy delivers accurate, repetitive movement patterns that are essential for recovery, particularly in stroke and spinal cord injury rehabilitation (Khalid et al., 2023). By adopting physical modalities and robotic medicine, physiotherapists position themselves at the leading edge of modern, technologically-enhanced rehabilitation, broadening their professional scope and emphasizing their vital role in multidisciplinary care teams.

For physiotherapists, physical modalities are fundamental elements of their practice and it is commonly used for managing pain, reducing inflammation, alleviating muscle spasms, and facilitating tissue healing and functional recovery. These modalities encompass treatments like electrical stimulation, ultrasound therapy, heat and cold applications, and laser therapy, which typically necessitate direct application and careful oversight by the physiotherapist (Rahmansyah and Anggiat, 2022; Bracciano, 2024). Historically, these techniques have been provided in

clinical environments where therapists can physically evaluate patients and modify parameters based on immediate feedback. However, the transition to virtual care raises concerns about the practicality, safety, and effectiveness of administering such hands-on treatments remotely (Krzyzaniak et al., 2023). As telerehabilitation becomes more prevalent, it is crucial to investigate how physical modalities integrate into this care model and how physiotherapists view their use in an online setting.

The American Physical Therapist Association (APTA) has shown that telerehabilitation offers various potential benefits to the physiotherapists which include but not limited to: improved access to care due to long distance or when the in-person services are unavailable, improved continuity of care, greater flexibility in care model and ability to monitor the patient during treatment as well (Lee et al., 2024). For individuals with mobility issues or chronic illnesses, virtual healthcare offers a convenient substitute for face-to-face appointments (Lee et al., 2024). Nevertheless, numerous challenges persist. Technological obstacles such as inconsistent internet access, inadequate availability of digital devices, and limited digital skills especially among older populations can impede effective execution (Pol et al., 2023). Moreover, the remote administration of physical therapies raises concerns regarding safety, accuracy, and the lack of hands-on support or tactile feedback, which are often essential for proper application and patient results (Stampa et al., 2024; Erturan et al., 2024). In Nigeria, Odole et al. (2015), in a previous study, highlighted obstacles to the adoption of tele-physiotherapy in Nigeria, including inadequate or weak infrastructure, ethical concerns, the need for training for physiotherapists, educating patients, interactions between physiotherapists and patients during treatment, cultural impediments, and financial issues.

Considering the available opportunities and challenges, physiotherapists are crucial in determining the effectiveness of telerehabilitation. Their insights are vital for assessing the feasibility, efficacy, and sustainability of administering physical therapies remotely. Research has indicated that physiotherapists generally have a favorable perception and are inclined to utilize telerehabilitation to improve patients' access to physiotherapy services (Albahrouh and Buabbas, 2021; Tsekoura et al., 2022; Sia et al., 2024). Nevertheless, a study conducted in Nigeria by Odetunde et al. (2024) revealed that physiotherapists exhibited moderate acceptance of telerehabilitation and had low levels of adoption of these practices.

1.2 Statement of the Problem

Telerehabilitation has emerged as a transformative approach in physiotherapy, offering a remote means of delivering care, especially during times when traditional in-person services are limited or inaccessible (Odole et al., 2024; Odetunde et al., 2024; Sia et al., 2024). In Nigeria, physical modalities are fundamental to physiotherapy practice and are commonly used in various clinical environments to alleviate pain, decrease inflammation, encourage healing, and improve functional recovery. Their frequent use demonstrates both their therapeutic benefits and the trust that physiotherapists have in their efficacy for patient treatment (Rahmansyah and Anggiat, 2022; Bracciano, 2024).

Although there is an increasing trend towards telehealth solutions globally, there remains a notable shortage of research investigating how these commonly utilized modalities are regarded and modified for use in telerehabilitation, especially in Nigeria. To the best of the researcher’s knowledge, there is no study that explores physiotherapists’ views on implementing telerehabilitation for delivering physical modalities in patient care within South-South, Nigeria.

Hence, the aim of the study is to explore physiotherapist perspective on use of telerehabilitation for physical modalities in patients care in South-South Nigeria region.

1.3 Research Questions

This present study, therefore, sought to answer the following research questions raised:

i. What are the perspectives of physiotherapists on the use of telerehabilitation for delivering physical modalities in patient care?
ii. What perceived benefits and challenges do physiotherapists associate with the use of telerehabilitation for physical modalities?
iii. What is the association between sociodemographic factors (age, gender, years of experience, rank, workplace and specialty) and physiotherapists' perception on telerehabilitation for physical modalities in Nigeria?

1.4 Aim of study

The aim of the study was to examine physiotherapists perspective on use of telerehabilitation for physical modalities in patients care in South-South Nigeria region.

1.4.1 Specific Objectives

The specific objectives of this study were:

i. To explore the perspectives of physiotherapists on the use of telerehabilitation for delivering physical modalities in patient care.
ii. To identify the perceived benefits and challenges physiotherapists associate with the use of telerehabilitation for physical modalities in patient's care.

iii. To investigate the association between sociodemographic factors (age, gender, years of experience, rank, workplace and specialty) and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

1.5 Main Hypothesis

There would be no significant association between sociodemographic factors and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

1.5.1 Sub Hypotheses

1. There would be no significant association between age and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.
2. There would be no significant association between gender and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.
3. There would be no significant association between year of experience and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.
4. There would be no significant association between rank and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.
5. There would be no significant association between workplace and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.
6. There would be no significant association between specialty and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

1.6 Significance of Study/Justification of Study

To the Body of Research

i. The study addressed a critical gap in the literature by exploring physiotherapists' perspectives on the use of telerehabilitation for administering physical modalities, particularly within the Nigerian context. Findings from this research would enrich the global discourse on digital health interventions and provide a contextual understanding of how physical therapy practice is evolving in the face of technological advancements.

To Physiotherapists

i. This research would help physiotherapists better understand the opportunities and limitations of incorporating telerehabilitation into their clinical practice, especially for physical modalities that traditionally require in-person application.
ii. It may also inform continuing professional development and training needs, build confidence in digital health delivery, and encourage wider adoption of evidence-based remote care strategies.

To Policy Makers and Health Administrators

i. The study would provide valuable insights that can guide health policy decisions, resource allocation, and infrastructure development to support telerehabilitation services in Nigeria and similar settings.

1.7 Scope/Delimitations of Study

The study encompassed male and female physiotherapists currently practicing in South-South Nigeria while the study was delimited to questionnaire on physical modalities for physiotherapists perspectives on telerehabilitation.

1.8 Definition of Terms/Operational definition of terms

i. **Perspective:** In the context of this study, perspective refers to the beliefs, opinions, attitudes, and experiences held by physiotherapists regarding the use of telerehabilitation for delivering physical modalities in clinical practice (Odetunde et al., 2024).

ii. **Physiotherapy:** Physiotherapy is a healthcare profession concerned with the promotion of physical function, prevention of physical impairments, and rehabilitation of patients through evidence-based techniques, including exercise, manual therapy, and the use of physical modalities (American Physical Therapy Association, 2018).

iii. **Telerehabilitation:** Telerehabilitation refers to the use of telecommunications and digital technologies to provide rehabilitation services remotely (Klamroth-Marganska et al., 2022).

iv. **Physical Modalities:** Physical modalities are therapeutic interventions commonly used in physiotherapy to manage pain, enhance healing, reduce inflammation, and restore physical function. Examples include ultrasound therapy, electrical stimulation, heat and cold therapy, and laser therapy (Bellew et al., 2016).

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of Telerehabilitation

Tele-rehabilitation is used to describe the delivery of rehabilitation services through the use of telecommunications technology as the service delivery medium. Tele-physiotherapy which is a subset of telemedicine basically employs the use of information and communication technologies to facilitate the rehabilitation of patients within their own homes (Klamroth-Marganska et al., 2022). This method of rehabilitation is suitable for patients who live at a distance and therefore find it difficult to attend clinic regularly due to time factor and the cost of transportation (WHO, 2022).

As a telemedicine subset, telerehabilitation is an emerging technology that uses electronic means in remotely conducting evaluation, consultation, therapy, and monitoring to provide rehabilitation care for patients in various locations, such as home, community, nearby health

facility, and workplace. Telehealth is vital because it provides therapeutic interventions such as exercises to populations living in rural areas that are otherwise unavailable for clients (Peretti et al., 2022). Telerehabilitation includes both occupational and physical therapy, and this can serve as a solution to the health care disparity individuals in rural areas face (Betts et al., 2023).

In recent years, technology has been consistently changing in all aspects of medical rehabilitation which cuts across assessment to the actual delivery of the therapeutic interventions (Brennan et al, 2020). According to American of Telemedicine Association, they defined telerehabilitation as the delivery of rehabilitation services by utilizing information and communication technologies such as the use of mobile phone, laptop, to adults and children by a broad range of professionals. Telerehabilitation is the development of tele-monitoring systems to facilitate independent rehabilitation of patients within their own comfortable environment. There has been growing evidence of research that the use of videoconferencing has been successfully used in the diagnosis and management of clients in the developed world (Chen et al., 2022).

2.1.2 Current Evidence of Telerehabilitation in Nigeria, Africa and the World

The awareness of telerehabilitation in developing is still not well established as it in other developed countries. There is a lot of work to be done to start integrating telerehabilitation in the scope of practice in Nigeria and Africa at large. The recent COVID-19 outbreak has changed the whole world at large and the health sector is not spared and this raised the awareness of telerehabilitation in the whole world at large. Physiotherapy as a medical profession is one that involves a lot of physical interaction for therapeutic purposes but this pandemic has forced healthcare decision makers to consider the high risks associated with the high increase in the reduction of rehabilitation services for people who are non-covid patients and are being forced to

stay at home because of the lockdown, as well as to consider alternative modes for delivering healthcare using telehealth (Agostini et al., 2020).

Extensive telehealth activities have been shown to occur in about 31 of the world's 238 United Nations recognized countries within the last 15 years (Scott et al., 2012). In Asia, recent growth in application of telehealth has been seen in both China and India, with continued growth expected in the coming decade and also many countries in Africa also exhibit similar activities but not at the level of the developed countries. Many studies have demonstrated the standpoints and acceptance of healthcare providers as regard to telerehabilitation use. An overall positive impressions and high rates among healthcare providers were reported in the studies carried out by these studies. A previous study also indicated that the confidence of physiotherapists in providing evaluation and treatment via the use of telerehabilitation influences their use of the technology; moreover, as an example, patient–clinician rapport in a spinal care clinic significantly improved as the clinicians gained experience in telerehabilitation (Niknejad et al., 2021).

The American Speech-Language-Hearing Association (ASHA), the American Physical Therapy Association (APTA), the American Occupational Therapy Association (AOTA), and the Commission on Rehabilitation Counselor Certification (CRCC) all have distinct definitions of telerehabilitation. Telerehabilitation is still new in use, and the degree to which each organization has recognized and supported it, as well as their level of engagement and involvement in telehealth activities, differs. In the case of telerehabilitation, there has to be more coordination and cohesion among professional rehabilitation organisations.

Despite the growing body of literature and scope of services in mostly developed countries, tele-rehabiliation continues to face challenges and many barriers to his emergence in developing countries like in most countries in Africa. There has been some development in the awareness of telemedicine in some African countries such as South Africa, owing to the formation of the South African Telemedicine Associations that was formed in 2010 and includes different membership in various health sectors which include physiotherapists. One of the major factors that is affecting the rise of tele-physiotherapy in Nigeria is patient's literacy (Odole et al., 2015). Aside from patient literacy, educating Nigeria physiotherapists about the field of telerehabilitation is very important and the inclusion of tele-physiotherapy in some related courses in the Nigerian university curriculum and training at various platforms such as seminars can bring about development of tele-physiotherapy in Nigeria (Odole et al., 2015).

Telerehabilitation have been administered using various technologies such as hardware videoconferencing systems, videophone, PC- based video conferencing systems with a dedicated software tool.

2.1.3 Benefits of Telerehabilitation

i. Increased Accessibility to Care: Telerehabilitation breaks down geographical and mobility barriers, allowing patients especially those in rural or underserved areas to access rehabilitation services from the comfort of their homes (Seron et al., 2021). This is particularly helpful for individuals with limited mobility, chronic conditions, or post-surgical recovery needs.

ii. Cost-Effectiveness: Telerehabilitation reduces travel costs, time off work, and facility overheads. Both patients and healthcare systems benefit from reduced expenses without compromising the quality of care.

iii. Continuity of Care During Crises: During public health emergencies like the COVID-19 pandemic, telerehabilitation ensures uninterrupted access to essential rehabilitation services when in-person visits are not possible. According to Prvu Bettger & Resnik (2020), telerehabilitation was vital in maintaining rehabilitation care during the pandemic, helping to prevent deterioration in patients' functional status.

iv. Improved Patient Engagement and Adherence: Patients using telerehabilitation often report higher satisfaction and engagement. The flexibility of scheduling and the comfort of being at home can enhance adherence to prescribed exercises and treatment plans. Del-Pino et al. (2022) reported that telerehabilitation users showed similar or improved adherence compared to traditional rehabilitation settings.

v. Personalized and Real-Time Monitoring: Telerehabilitation platforms often integrate wearable sensors, video feedback, and mobile applications that allow real-time monitoring of patient progress. Clinicians can adjust interventions immediately based on patient performance. Seron et al. (2021) emphasized the value of real-time biofeedback and remote monitoring tools in enhancing the effectiveness of telerehabilitation programs.

The opportunities that is provided by telerehabilitation cuts across both the provider of the rehabilitation service and also the receiver of the service which is the patient. The use of telerehabilitation provides patient with a sense of personal autonomy and enables them to take full control of the management of their condition under the supervision of a clinician that is far away from the patient (Stampa et al, 2024). They become active partakers in their own care and

this can have a positive effect on them getting better. The clinical opportunities presented by the use of telerehabilitation in the treatment of patient. Telerehabilitation provides the physiotherapist with an avenue on how to manage patient with similar conditions through the use of group exercise programs. It reduces the occurrence of patients cancelling scheduled appointments which can result in loss of avenue.

2.1.4 Barriers to Implementing use of Telerehabilitation

There are multiple obstacles and potential barriers to the implementation of telerehabilitation services in everyday clinical practice (Stampa et al., 2024). These following factors are potential factors that are likely to limit the use of telerehabilitation, they are classified under three factors which are: Human Factors, Technical Factors and Organizational Factors (Odetunde et al., 2024).

Human Factors

Human Factors is majorly concerned with the application of what we know about people, their abilities and characteristics. The human factors who can affect the use of telerehabilitation are:

i. Skepticism or lack of acceptance of the approach of using social media or videos for exercises.

ii. Lack of technical or digital knowledge and skills.

iii. Concerns about costs.

iv. Lack of awareness.

v. Poor telecommunication skills.

vi. Lack of technology acceptance, there are some people who are adamant about technology and what it can be used to achieve especially among the older populations.

vii. Concern about effectiveness and efficiency

viii. Inability to follow proper instructions display.

A lot of issues have been raised on the confidentiality, patient privacy, internet fraud, quackery and abuse of use by patients as a potential challenge to the use of tele-physiotherapy in Nigeria (Odole et al., 2015). It was reported that some patient may abuse this platform by calling their clinicians at inappropriate times which might bring discomfort to the clinician.

Technical Factors

Technical factors refer to the ways equipment or technology instruments such as smartphones, Network providers can affect Telerehabilitation. These factors include:

i. Slow Internet

ii. Limited Internet Coverage

iii. Dependence on Electricity

iv. Dependence on Internet

v. Inability to operate an application or smartphone

vi. Unclear Video display

vii. Software Inadequacies

According to a study conducted by Odole et al. (2015), the participants of the study highlighted that the issues of inadequate infrastructures such as poor internet coverage, poor power supply and unavailability of telecommunication gadgets. Poor and erratic power supply was identified by all the participants as a major challenge.

Organization Factors

These are majorly factors that are from the provider or physiotherapist's end. They include:

i. Lack of e-health resources

ii. Lack of Exercise equipment

iii. Lack of technical supports

iv. Time consuming process

v. Inability to monitor patient progress

According to Franco and colleagues (2024), they identified various reasons why clinicians might be dissatisfied with the use of telerehabilitation. One of the reasons pointed out was that most health care providers are used to practicing in an environment they have full control over and are already used to rather than introducing an external environment into the clinical service (Franco et al. 2024).

2.1.5 Applications of Telerehabilitation

a. Virtual Reality (VR) in Telerehabilitation: Virtual reality (VR) is an emerging modality in telerehabilitation that provides immersive environments for physical and cognitive

therapy. In musculoskeletal and neurological rehabilitation, VR allows patients to interact with simulated environments that mimic real-life scenarios, promoting functional recovery. Through headsets or motion sensors, users engage in guided exercises that enhance balance, coordination, and motor skills. One of the key advantages of VR-based telerehabilitation is that it transforms repetitive therapeutic tasks into engaging, game-like experiences, increasing patient motivation and adherence (Li et al., 2025). Moreover, VR allows therapists to monitor patient progress remotely in real time, adjusting interventions based on data collected from movement sensors. This is particularly useful for stroke survivors, patients with cerebral palsy, and individuals recovering from orthopedic surgeries. VR platforms can also include feedback mechanisms that reinforce correct movement patterns while discouraging compensatory strategies. Despite its benefits, barriers such as high costs, need for technological literacy, and hardware limitations remain challenges to widespread adoption, especially in low-resource settings.

b. Online Video-Based Telerehabilitation: Online video-based telerehabilitation involves delivering therapy sessions through pre-recorded or live-streamed videos accessible via computers or mobile devices (Li et al., 2025). This approach enables healthcare providers to guide patients in performing therapeutic exercises while ensuring proper technique and consistency. Video-based telerehabilitation is especially useful for home exercise programs, post-surgical recovery, and chronic condition management. It offers flexibility, reduces the need for travel, and is cost-effective for both providers and patients (Franco et al., 2024). Recorded videos can be tailored to patient-specific conditions and made available on demand, promoting independent practice. Live video sessions, on the other hand, allow real-time interaction between therapists and patients, enabling immediate

feedback and corrections. This mode of delivery is commonly used in physiotherapy, occupational therapy, and speech-language rehabilitation. In musculoskeletal care, for instance, it has been shown to improve range of motion, reduce pain, and enhance function comparably to in-person therapy. Furthermore, video-based platforms support continuity of care during disruptions such as pandemics or mobility restrictions.

c. Mobile Health (mHealth) Applications: These are smartphone or tablet-based apps designed to deliver rehabilitation exercises, reminders, educational materials, and progress tracking. mHealth apps can be interactive and often include push notifications, daily goals, and gamified components to enhance adherence.
d. Chatbots and AI-Driven Rehabilitation Platforms: Artificial intelligence tools, such as chatbots and virtual assistants, are being integrated into telerehabilitation to offer automated exercise guidance, patient education, and emotional support (Su et al., 2022). These tools can assess symptoms, suggest routines, and respond to patient queries.

2.2 Physical Modalities

Physical modalities refer to therapeutic interventions that use physical agents or mechanical means to promote healing, relieve pain, reduce inflammation, and restore function (Bellow et al., 2020). These modalities are commonly employed in musculoskeletal rehabilitation and are often integrated with exercise therapy and manual therapy. They can be applied in both traditional and telerehabilitation settings, though some require direct clinical supervision or specialized equipment.

Thermotherapy, involving the application of heat (e.g., hot packs or paraffin baths), increases blood circulation, reduces muscle stiffness, and improves tissue extensibility, making it

beneficial for chronic pain and arthritis management ((Bracciano, 2024). In contrast, cryotherapy uses cold agents (e.g., ice packs or cold compresses) to minimize inflammation, reduce swelling, and alleviate acute pain, especially following injuries (Bracciano, 2024).

Electrical stimulation techniques, including Transcutaneous Electrical Nerve Stimulation (TENS) and Neuromuscular Electrical Stimulation (NMES), help in pain modulation and muscle strengthening, particularly in post-stroke or post-surgical rehabilitation ((Bracciano, 2024). Ultrasound therapy and low-level laser therapy (LLLT) are also widely used to stimulate tissue repair and reduce inflammation through sound or light energy (Bracciano, 2024).

Spinal traction is another modality that alleviates nerve compression in conditions such as disc herniation and cervical radiculopathy (Bracciano, 2024). These modalities, when appropriately applied, play a critical supportive role in achieving functional recovery and improving quality of life.

Professional physiotherapy bodies generally hold the position that physical modalities should not be used in isolation, but rather as adjuncts to active therapy such as exercise, education, and manual therapy. Their role is primarily to reduce pain, inflammation, muscle spasm, and enhance tissue healing, especially in the early phases of injury. However, they should be integrated judiciously and individualized based on clinical assessment and patient goals.

The American Physical Therapy Association (APTA) (2022) and World Confederation for Physical Therapy (WCPT) (2022) emphasize that passive modalities should not replace active participation or delay functional recovery. Over-reliance on them may reduce patient engagement and slow progress. Instead, modalities are most effective when used as part of a

comprehensive treatment plan tailored to the patient's condition, evidence-based guidelines, and clinical judgment.

Additionally, robotic medicine is now an emerging trend in telerehabilitation. Robotic medicine, particularly in the form of robot-assisted therapy and devices, has emerged as a powerful tool in modern rehabilitation (relerehab), especially for individuals recovering from conditions such as stroke, spinal cord injuries, Parkinson's disease, and musculoskeletal impairments (Yip et al., 2023)

2.3 Physiotherapist Perspectives on Telerehabilitation

The integration of telerehabilitation into physiotherapy practice has seen accelerated attention worldwide, particularly following the COVID-19 pandemic. However, several technological, infrastructural, and sociocultural barriers continue to limit its effectiveness, especially in low- and middle-income countries (LMICs). Globally, technological challenges such as inconsistent internet connectivity, limited access to digital devices, and low digital literacy especially among older adults have been cited as major barriers to telerehabilitation (Pol et al., 2023). These limitations are more pronounced in LMICs, where digital divides are often wider due to systemic underinvestment in health and information infrastructure.

In high-income countries like Canada, Australia, and several parts of Europe, telerehabilitation has been widely accepted and integrated into standard care with notable success. For instance, studies from Australia and the UK report high satisfaction rates among both patients and physiotherapists, with clear protocols established for remote assessment and treatment (Tsekoura

et al., 2022). In these regions, healthcare systems are typically supported by robust broadband infrastructure and digital health literacy campaigns, facilitating smooth implementation.

In contrast, sub-Saharan African countries—including Nigeria—face unique challenges. Odole et al. (2024) identified key barriers to the adoption of tele-physiotherapy in Nigeria, including inadequate infrastructure, ethical concerns, lack of training among physiotherapists, limited patient education, cultural resistance, and financial constraints. Similarly, a study in South Africa by Mokwena and Duma (2021) highlighted infrastructure deficits and regulatory gaps as primary obstacles, despite a growing interest in digital health.

Despite these regional disparities, there is emerging evidence that physiotherapists across diverse contexts recognize the potential of telerehabilitation to expand access to care. Albahrouh and Buabbas (2021) in Kuwait, and Sia et al. (2024) in Singapore, reported favorable perceptions among physiotherapists and increasing willingness to incorporate remote therapy into their practice. However, such willingness does not always translate into high adoption. For example, Odetunde et al. (2024) found that although Nigerian physiotherapists demonstrated moderate acceptance of telerehabilitation, actual implementation and utilization remained limited—likely due to persistent infrastructural and systemic barriers.

Overall, while high-income regions are steadily moving toward mainstreaming telerehabilitation, many LMICs, including Nigeria, remain in the early stages of adoption. Bridging this gap requires targeted investment in digital infrastructure, workforce training, patient education, and policy development to ensure equitable access and sustainable implementation of telerehabilitation across diverse settings.

2.4 **Empirical literature review on physiotherapy perspectives on telerehabilitation**

AUTHOR/ YEAR/COUNTRY	TITLE	SAMPLE SIZE	AIM OF STUDY	STUDY TYPE	OUTCOME/MEASURE	FINDINGS
Odole et al./2015/Nigeria	Tele-physiotherapy in Nigeria: perceived challenges by physiotherapists to its implementation.	6 physiotherapists were recruited	To explore physiotherapists challenges of using telerehabilitation	Qualitative study design	Focus group study. Themes were generated using grounded theory, and content thematic analysis was applied to transcribed interview data.	Key challenges to tele-physiotherapy in Nigeria included poor infrastructure, ethical concerns, limited training and digital literacy among physiotherapists and patients, the need for physical therapist–patient interaction, cultural barriers, and financial constraints.

Sia et al./2024/Singapore	Exploring physiotherapists' perceptions of telerehabilitation for musculoskeletal disorders: Insights from focus groups.	24 physiotherapists were recruited	To explore physiotherapists perceptions of telerehabilitation for musculoskeletal disorders	Qualitative study design	Focus group study	The analysis of the data revealed three principal themes: (1) perceived benefits, (2) barriers, and (3) recommendations. Within the theme of perceived benefits, four subthemes emerged: reduced time and financial costs, increased convenience, enhanced client responsibility in treatment, and (1d) suitability as an alternative during infectious disease outbreaks.
Odole et al./2024/Nigeria	Patients' perspectives of tele-physiotherapy in a Nigerian low-resource setting.	152 physiotherapists	To determine the patients' perspectives of tele-physiotherapy in a Nigerian low-resource setting.	Mixed-method study	Quantitative (cross-sectional) and phenomenological qualitative. Their knowledge, awareness, and perception (KAP) of tele-physiotherapy were assessed using a standard questionnaire	Nearly all participants (150, 99.3%) demonstrated limited knowledge, attitudes, and practices (KAP) regarding tele-physiotherapy, with many indicating they were unfamiliar with the term "tele-physiotherapy." The analysis generated five main themes, each

						further categorized into subthemes that structured the subsequent discussion.
Tsekoura et al./2022/Greece	Physiotherapists' perceptions and willingness to use telerehabilitation in Greece: a cross-sectional study.	213 physiotherapists	The aim of this study was to investigate physiotherapists' knowledge, beliefs, and willingness to use telerehabilitation in Greece during the COVID-19 pandemic.	Cross sectional design	The questionnaire involved 26 items on demographic background, use of technology, overall perceptions, the experience of telerehabilitation, and their opinion on the future of telerehabilitation.	Overall, the majority of participants (55%) indicated an increased use of telerehabilitation strategies during the COVID-19 pandemic. Over half of the physiotherapists (61.3%) believed that telerehabilitation could serve as a beneficial supplement to traditional patient management. In Greece, physiotherapists primarily utilized low-cost and readily available digital tools, such as mobile phones and online platforms like Skype and Zoom. While a large proportion (79.8%) expressed interest in gaining more knowledge about digital technology and telerehabilitation, only 42.1% intended to continue remote practice after the pandemic.

Albahrouh & Buabbas/2021/ Kuwait	Physiotherapists' perceptions of and willingness to use telerehabilitation in Kuwait during the COVID-19 pandemic.	747 physiotherapists	This study aimed to explore physiotherapists' perceptions and willingness to adopt telerehabilitation in Kuwait during the COVID-19 pandemic, as well as to identify the key barriers that may impede its implementation within the physiotherapy sector.	Mixed method study	The following methods were used: (1) a cross-sectional survey and (2) face-to-face semi-structured interviews.	The majority of respondents (86.8%) viewed telerehabilitation as a viable method for delivering healthcare during the COVID-19 pandemic. Despite challenges related to limited access to information and communication technology (57.1%), a significant proportion (89%) expressed willingness to incorporate telerehabilitation into their routine practice. Additionally, cultural and social norms were not perceived as barriers to the adoption of telerehabilitation systems.

Odetunde et al./2024/Nigeria	Acceptance and adoption of tele-rehabilitation by physiotherapists from Nigeria, a low resource setting: a mixed-method study	331 physiotherapists	To examine the acceptance and adoption of telerehabilitation by physiotherapists from Nigeria, a low resource setting	Mixed method study	The following methods were used: (1) a cross-sectional survey and (2) face-to-face semi-structured interviews.	A portion of respondents (17.2%) expressed confidence that telerehabilitation could complement traditional physiotherapy, while 21.8% continued its use post-lockdown. Digital technology was most frequently used for patient education, particularly in managing musculoskeletal conditions. Statistically significant associations were found between respondents' age and their professional duties before and after lockdown, as well as their use of digital health technologies. Similarly, years of practice were significantly linked to post-lockdown responsibilities and the adoption of digital tools. Qualitative findings identified key facilitators for telerehabilitation adoption, including patient education,

						physiotherapist training, access to evidence-based guidelines, and availability of appropriate software and hardware. Identified barriers included limited technological infrastructure, financial constraints, lack of support from hospital management, and inadequate ICT knowledge.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Materials

3.1.1 Population

The participants in this study comprised of licensed male and female physiotherapists currently practicing in South-South Nigeria, including professionals working in public and private healthcare facilities, rehabilitation centers, teaching hospitals, and private practices.

3.1.2 Selection Criteria

3.1.2.1 Inclusion Criteria

i. Licensed physiotherapists currently practicing in South-South Nigeria.
ii. Both male and female physiotherapists.
iii. Physiotherapists with at least one year of post-qualification clinical experience.
iv. Those involved in the administration or supervision of physical modalities in patient care.

3.1.2.2 Exclusion Criteria

This study excluded:

i. Physiotherapists not currently engaged in clinical practice (e.g., academics without patient contact, retired professionals).
ii. Interns' physiotherapists still undergoing training.

3.1.3 List of Instruments

The following instruments was used for the study:

i. Sociodemographic form
ii. An adapted questionnaire on telerehabilitation and the use of physical modalities in physiotherapy practice.

3.1.4 Description of instruments

i. **Sociodemographic form:** A proforma was designed and used to collect sociodemographic variables such as age, gender, and year of practice of each licensed physiotherapist.

ii. **An adapted self-structured questionnaire**: Data for this study was collected using a structured questionnaire composed of two major sections. The first section is an adapted, self-structured questionnaire based on Ali et al. (2024), designed to evaluate telerehabilitation services among physiotherapy professionals. This section contained 10 items that assess key domains such as awareness, accessibility, barriers, perceived effectiveness, challenges, and overall satisfaction with telerehabilitation practices. The second section comprises items adapted from the Physical Modalities Questionnaire developed by Seto and Walberg (2002). This part focused on physiotherapists' experiences and perspectives on using various physical modalities (e.g., electrotherapy, ultrasound, thermotherapy) in telerehabilitation settings. It explored aspects such as

feasibility, clinical relevance, safety, and perceived outcomes when such modalities are administered remotely.

3.2 Methods

3.2.1 Research Design

This study employed a cross sectional study design.

3.2.2 Sampling Technique

The study was conducted in the South-South geopolitical zone of Nigeria, which comprises six states: Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers. For logistical feasibility and accessibility, three states (Edo, Rivers, and Delta) was purposively selected based on their geographical proximity to the researcher and availability of practicing physiotherapists. Furthermore, stratified sampling technique was used to select physiotherapists in these three states.

List of physiotherapists practicing in each state and their contacts was obtained from the executives of the state chapter of the Nigerian Society of Physiotherapy and the Academic and Clinical Physiotherapists Association of Nigeria. Physiotherapists were selected randomly based on the proportion of physiotherapists in each stratum which ensured physiotherapists in South South Nigeria had equal chances of participating and are well represented.

3.2.3 Sample size

Sample Size Calculation:
The sample size for this study was calculated using the Cochran formula:

n = (Z^2 * p * (1-p)) / e^2

e = desired level of precision, the margin of error

p=the fraction of the population (as percentage) that displays the attribute

z: the z-value. extracted from a z-table

z = 1.96, p=0.5, e=0.05

Correcting for a finite population

N=100 (estimated), n=80

The minimum sample size for this study was 80 participants.

3.2.4 Ethical Considerations

Ethical approval was sought and obtained from the Research and Ethics Committee of the Univeristy of Benin Teaching Hospital, Benin City, Edo State, Nigeria (Protocol Number: ADM/E22/A/VOL.VII/2025/232; Registration Number: NHREC-UBTH-HREC/24/12/2022B) before the commencement of this study. Physiotherapists were properly informed about the purpose of the study, participation was voluntary and they were all asked to sign a written informed consent, before the research study began properly

3.2.5 Procedure for data collection

Data for this study was collected using an online survey to enhance accessibility and facilitate participation from physiotherapists across the selected states (Edo, Rivers, and Delta) in South-South Nigeria. A structured online questionnaire was developed using a survey platform such as Google Forms, and the survey link was distributed through professional physiotherapy networks, WhatsApp groups, and social media platforms commonly used by Nigerian physiotherapists.

The questionnaire was accompanied by an introductory cover letter explaining the purpose of the study, the voluntary nature of participation, and assurance of confidentiality and anonymity. Participants were required to indicate their informed consent before proceeding to complete the questionnaire. To improve response rates, follow-up reminders were sent periodically to eligible participants.

3.2.6 Data Analysis

The data was analysed using the International Business Machine (IBM) Statistical Package for Social Sciences (SPSS) version 26.0. Descriptive statistics of frequency and percentages was used to summarize participant's socio-demographic variables (gender, age, and year of practice etc.) and perspectives of physiotherapists' towards use of telerehabilitation for physical modalities. Inferential statistics of Chi square was used to determine the association between perspectives of physiotherapists and selected sociodemographics with level of significance, p, set at less than 0.05.

CHAPTER FOUR

RESULTS

4.1 Results

4.1.1 Sociodemographic Characteristics of Respondents

The gender distribution of the respondents in this study showed a majority of males, who constituted 70.0% of the sample, while females accounted for the remaining 30.0%. Regarding the age of the respondents, the largest group were those aged 23–30 years, representing 38.8% of the sample. This was followed by the 31–40 years age bracket at 30.0%. In terms of professional experience, respondents with less than 5 years of experience comprised the largest single group at 38.8%, followed by those with 5–10 years of experience at 31.3%. The vast majority of respondents, 60.0%, held a Bachelor's degree as their highest educational qualification. The primary area of professional practice for most respondents was Neurology, with 43.8% identifying this as their specialty. The workplace distribution shows that the most common setting was a Teaching Hospital, where 52.5% of the participants were employed.

Table 1: Descriptive Statistics of Respondents' Sociodemographic Characteristics

Variable	Category	Frequency	Percentage (%)
Gender	Female	24	30.0
	Male	56	70.0
Age	23–30 years	31	38.8
	31–40 years	24	30.0
	41–50 years	19	23.8
	51–60 years	6	7.5
State of Practice	Akwa-ibom	8	10.0
	Cross river state	3	3.8
	Delta state	12	15.0
	Edo state	41	51.2
	River state	16	20.0
Highest Educational Level	Bachelor's	48	60.0
	Doctor of Philosophy	4	5.0
	Doctor of Physiotherapy	12	15.0
	Master's	16	20.0
Area of Expertise	Sports	6	7.5
	Orthopaedics	18	22.5
	Neurology	35	43.8
	Ergonomics	5	6.3
	Skin and burns	1	1.3
	Oncology	5	6.3
	Nutrition	2	2.5
	Paediatrics	8	10.0
Work Setting	Teaching hospital	42	52.5
	Specialist hospital	3	3.8
	General hospital	19	23.8
	University	5	6.3
	Private hospital	8	10.0
	Other	3	3.8
Years of experience	11-15 years	15	18.8
	5–10 years	25	31.3
	>15 years	9	11.3
	< 5 years	31	38.8
Work hours per week	10-20	2	2.5
	21-30	4	5.0
	31-40	38	47.5
	>40	24	30.0
	<10	12	15.0

4.1.2 Respondents' Perspectives on Telerehabilitation

Majority of the respondents (92.5%) believed that the inclusion of telerehabilitation would improve the quality of patient care. Similarly, 86.3% of the physiotherapists felt that telerehabilitation provides reliable outcome measures, and 83.8% believed it provides valid outcome measures.

Regarding the feasibility of telerehabilitation, most respondents (66.3%) strongly disagreed that it is not feasible or effective for certain patients. When asked about the role of patient expectations, 43.8% of respondents strongly disagreed that expectations play a key role. A majority (73.8%) agreed that telerehabilitation enhances patient communication. Furthermore, there was a split opinion on whether digital health tools will play an essential role in the future of the profession, with 45.0% agreeing and 45.0% disagreeing. Lastly, an overwhelming 87.5% of respondents would recommend digital health tools and telerehabilitation to other physiotherapists.

Table 2: Respondents' Perspectives on Telerehabilitation

Variable	Response	Frequency	Percentage (%)
Do you believe that the inclusion of telerehabilitation would improve the quality of patient care?	No	6	7.5
	Yes	74	92.5
Do you believe that telerehabilitation provides reliable outcome measures?	No	11	13.8
	Yes	69	86.3
Do you believe that telerehabilitation provides valid outcome measures?	No	13	16.3
	Yes	67	83.8
Do you agree that telerehabilitation is NOT feasible or effective for certain patients?	Strongly disagree	53	66.3
	Disagree	3	3.8
	Neutral	10	12.5
	Agree	4	5.0
	Strongly agree	10	12.5
Do you agree that the expectations of the patients play a key role in shaping the effect of telerehabilitation results?	Strongly disagree	35	43.8
	Disagree	2	2.5
	Neutral	19	23.8
	Agree	24	30.0
Do you think that telerehabilitation enhances your communication with your patients?	No	21	26.3
	Yes	59	73.8
Do you agree that digital health tools/telerehabilitation will play an essential role in the future of the profession?	Disagree	36	45.0
	Neutral	8	10.0
	Agree	36	45.0
Do you recommend digital health tools/telerehabilitation to other physiotherapists?	No	10	12.5
	Yes	70	87.5

4.1.3 Respondents' Perceived Strengths of Telerehabilitation

The most frequently reported strength was "Easy access," with 67.5% of respondents affirming it. This was followed by "Cost savings" at 60.0%. "Treatment adherence" and "Outcome expectations" were also seen as strengths by 51.2% of the participants. In contrast, "Better continuity of care" was identified as a strength by the fewest respondents (21.3%).

Table 3: Respondents' Perceived Strengths of Telerehabilitation

Variable	Yes n (%)	No n (%)
Cost savings	48 (60.0)	32 (40.0)
Easy access	54 (67.5)	26 (32.5)
Flexible timetable	56 (70.0)	24 (30.0)
Treatment adherence	41 (51.2)	39 (48.8)
Better continuity of care	17 (21.3)	63 (78.8)
Outcome expectations	41 (51.2)	39 (48.8)

4.1.4 Respondents' Perceived Barriers to Telerehabilitation

"Mentally handicapped" and "Paediatrics" were identified as major barriers by 97.5% of respondents for both categories. "Provider willingness" (68.8%), "Patient privacy/relationship" (67.5%), "Inadequate Staff skills" (62.5%), and "Patients' adherence" (62.5%) were also frequently reported barriers. Conversely, "Low technology literacy" (17.5%) and "Internet connectivity" (17.5%) were the least cited barriers.

Table 4: Respondents' Perceived Barriers to Telerehabilitation

Variable	Yes n (%)	No n (%)
Provider willingness	55 (68.8)	25 (31.3)
Low technology literacy	14 (17.5)	66 (82.5)
Internet connectivity	14 (17.5)	66 (82.5)
Lack of awareness	20 (25.0)	60 (75.0)
Lack of connection/ICT for clinicians	28 (35.0)	52 (65.0)
Inadequate Staff skills	50 (62.5)	30 (37.5)
Patients' difficulty explaining	45 (56.3)	35 (43.8)
Patient privacy/relationship	54 (67.5)	26 (32.5)
Patients' adherence	50 (62.5)	30 (37.5)
Elderly or poorly educated	34 (42.5)	46 (57.5)
High costs	39 (48.8)	41 (51.2)
Mentally handicapped	78 (97.5)	2 (2.5)
Paediatrics	78 (97.5)	2 (2.5)

4.1.5 Use of Thermotherapy Modalities in Telerehabilitation among Respondents

"Cold packs" (75.0%) and "Ice massage" (67.5%) were the most commonly used modalities. In contrast, modalities requiring more specialized equipment and direct supervision, such as "Fluidotherapy" (5.0%), "Diathermy (non-Thermotherapy)" (6.3%), and "Phonophoresis" (5.0%), were the least used.

Table 5: Use of Thermotherapy Modalities in Telerehabilitation among Respondents

Variable	Used n (%)	Not Used n (%)
Hot packs	32 (40.0)	48 (60.0)
Cold packs	60 (75.0)	20 (25.0)
Ice massage	54 (67.5)	26 (32.5)
Paraffin	25 (31.3)	55 (68.8)
Vapocoolant spray	24 (30.0)	56 (70.0)
Infrared radiation (lamp)	21 (26.3)	59 (73.8)
Fluidotherapy	4 (5.0)	76 (95.0)
Diathermy (Thermotherapy)	8 (10.0)	72 (90.0)
Diathermy (non-Thermotherapy)	5 (6.3)	75 (93.8)
Ultrasound (Thermotherapy)	11 (13.8)	69 (86.3)
Ultrasound (non-Thermotherapy)	5 (6.3)	75 (93.8)
Phonophoresis	4 (5.0)	76 (95.0)

4.1.6 Use of Electrotherapeutic Modalities in Telerehabilitation among Respondents

"TENS" (57.5%) and "Biofeedback" (55.0%) were the most frequently reported modalities used in telerehabilitation. In contrast, modalities such as "MENS (Micro Current Stimulator)" (5.0%), "Point locator/stimulator" (6.3%), and "Direct current (for wound healing)" (7.5%) were the least used.

Table 6: Use of Electrotherapeutic Modalities in Telerehabilitation among Respondents

Variable	Used n (%)	Not Used n (%)
TENS	46 (57.5)	34 (42.5)
FES/NMES	14 (17.5)	66 (82.5)
Interferential Current	6 (7.5)	74 (92.5)
MENS (Micro Current Stimulator)	4 (5.0)	76 (95.0)
Biofeedback	44 (55.0)	36 (45.0)
High-voltage pulsed current	2 (2.5)	78 (97.5)
Point locator/stimulator	5 (6.3)	75 (93.8)
Direct current (for wound healing)	6 (7.5)	74 (92.5)
Hot quartz (UVA)	5 (6.3)	75 (93.8)
Hot quartz (UVB)	7 (8.8)	73 (91.3)
Cold quartz (UVC)	10 (12.5)	70 (87.5)

FES/NMES = Neuromuscular Electrical Stimulation/Functional Electrical Stimulation, TENS = Transcutaneous Electrical Nerve Stimulation.

4.1.7 Use of Mechanical Modalities in Telerehabilitation among Respondents

The findings show very limited use of these modalities. "Intermittent Pneumatic Compression" was the most frequently used at 6.3%, while "Mechanical traction (cervical)" and "Mechanical traction (lumbar)" were each used by only 3.8% of respondents.

Table 7: Use of Mechanical Modalities in Telerehabilitation among Respondents

Variable	Used n (%)	Not Used n (%)
Mechanical traction (cervical)	3 (3.8)	77 (96.3)
Mechanical traction (lumbar)	3 (3.8)	77 (96.3)
Intermittent Pneumatic Compression	5 (6.3)	75 (93.8)

4.1.8 Use of Hydrotherapy in Telerehabilitation among Respondents

The results showed that "Whirlpool" (71.3%), "Therapeutic pool" (70.0%), and "Contrast bath" (67.5%) were the most commonly used hydrotherapy modalities. Conversely, "Non immersion irrigation device" (8.8%) and "Other" (5.0%) were the least frequently used.

Table 8: Use of Hydrotherapy in Telerehabilitation among Respondents

Variable	Used n (%)	Not Used n (%)
Whirlpool	57 (71.3)	23 (28.7)
Hubbard tank	15 (18.8)	65 (81.3)
Contrast bath	54 (67.5)	26 (32.5)
Therapeutic pool	56 (70.0)	24 (30.0)
Non immersion irrigation device	7 (8.8)	73 (91.3)
Other	4 (5.0)	76 (95.0)

4.1.9 Administration of Thermotherapy Modalities in Telerehabilitation among Respondents

For modalities such as “Hot packs,” “Cold packs,” and “Ice massage,” the most frequent response among applicable methods was patient-administered (43.8%, 51.2%, and 43.8%, respectively). PT-supervised administration was reported by 7.5% for hot packs, 12.5% for cold packs, and 15.0% for ice massage. In contrast, for "Vapocoolant spray," PT-supervised was the most selected method at 47.5% of respondents.

Table 9: Administration of Thermotherapy Modalities in Telerehabilitation among Respondents

Variable	PT n (%)	Patient n (%)	PT & patient n (%)	NA n (%)
Hot packs	6 (7.5)	35 (43.8)	7 (8.8)	32 (40.0)
Cold packs	10 (12.5)	41 (51.2)	7 (8.8)	22 (27.5)
Ice massage	12 (15.0)	35 (43.8)	7 (8.8)	26 (32.5)
Paraffin	5 (6.3)	16 (20.0)	0 (0.0)	59 (73.8)
Vapocoolant spray	38 (47.5)	6 (7.5)	8 (10.0)	28 (35.0)
Infrared radiation (lamp)	8 (10.0)	9 (11.3)	4 (5.0)	59 (73.8)
Fluidotherapy	4 (5.0)	0 (0.0)	0 (0.0)	76 (95.0)
Diathermy (Thermotherapy)	5 (6.3)	3 (3.8)	0 (0.0)	72 (90.0)
Diathermy (non-Thermotherapy)	5 (6.3)	0 (0.0)	0 (0.0)	75 (93.8)
Ultrasound (Thermotherapy)	7 (8.8)	4 (5.0)	0 (0.0)	69 (86.3)
Ultrasound (non-Thermotherapy)	3 (3.8)	2 (2.5)	0 (0.0)	75 (93.8)
Phonophoresis	2 (2.5)	2 (2.5)	0 (0.0)	76 (95.0)

Key: PT: PT Supervised Administration, Patient: Patient Administered, PT & patient: Both Patient Administered and PT Supervised Administration, NA: Not applicable.

4.1.10 Administration of Electrotherapeutic Modalities in Telerehabilitation among Respondents

For "TENS," PT-supervised was the most frequent response among application methods (15.0%), followed by a combination of both (10.0%) and patient-administered (7.5%). Similarly, for "Biofeedback," PT-supervised was the most common method at 17.5%, with 7.5% reporting a combination and 5.0% selecting patient-administered. Table 10

Table 10: Administration of Electrotherapeutic Modalities in Telerehabilitation among Respondents

Variable	PT n (%)	Patient n (%)	PT & patient n (%)	NA n (%)
TENS	12 (15.0)	6 (7.5)	8 (10.0)	54 (67.5)
FES/NMES	2 (2.5)	4 (5.0)	4 (5.0)	70 (87.5)
Interferential Current	4 (5.0)	2 (2.5)	0 (0.0)	74 (92.5)
MENS (Micro Current Stimulator)	0 (0.0)	2 (2.5)	2 (2.5)	76 (95.0)
Biofeedback	14 (17.5)	4 (5.0)	6 (7.5)	56 (70.0)
High-voltage pulsed current	0 (0.0)	2 (2.5)	0 (0.0)	78 (97.5)
Point locator/stimulator	1 (1.3)	2 (2.5)	2 (2.5)	75 (93.8)
Direct current (for wound healing)	4 (5.0)	2 (2.5)	0 (0.0)	74 (92.5)
Hot quartz (UVA)	1 (1.3)	4 (5.0)	0 (0.0)	75 (93.8)
Hot quartz (UVB)	3 (3.8)	4 (5.0)	0 (0.0)	73 (91.3)
Cold quartz (UVC)	6 (7.5)	4 (5.0)	0 (0.0)	70 (87.5)

Key: PT = PT Supervised Administration, Patient = Patient Administered, PT & patient = Both Patient Administered and PT Supervised Administration, NA = Not applicable, FES/NMES = Neuromuscular Electrical Stimulation/Functional Electrical Stimulation, TENS = Transcutaneous Electrical Nerve Stimulation

4.1.11 Administration of Mechanical Modalities in Telerehabilitation among Respondents

Among the respondents who used these modalities in telerehabilitation, PT supervised administration was the sole method for "Mechanical traction (cervical)" and "Mechanical traction (lumbar)" (3.8%). For "Intermittent Pneumatic Compression," patient-administered was chosen by 2.5% of respondents, while PT-supervised was selected by 1.3% of them. Table 11

Table 11: Administration of Mechanical Modalities in Telerehabilitation among Respondents

Variable	PT n (%)	Patient n (%)	PT & patient n (%)	NA n (%)
Mechanical traction (cervical)	3 (3.8)	0 (0.0)	0 (0.0)	77 (96.3)
Mechanical traction (lumbar)	3 (3.8)	0 (0.0)	0 (0.0)	77 (96.3)
Intermittent Pneumatic Compression	1 (1.3)	2 (2.5)	0 (0.0)	77 (96.3)

Key: PT: PT Supervised Administration, Patient: Patient Administered, PT & patient: Both Patient Administered and PT Supervised Administration, NA: Not applicable.

4.1.12 Administration of Hydrotherapy Modalities in Telerehabilitation among Respondents

Among the respondents who used these modalities in telerehabilitation, patient-administered was the most common method for "Whirlpool" (18.8%) and "Hubbard tank" (16.3%). For "Contrast bath," patient-administered was the most frequent method (20.0%), followed by a combination of both (5.0%) and PT-supervised (5.0%). Table 12

Table 12: Administration of Hydrotherapy Modalities in Telerehabilitation among Respondents

Variable	PT n (%)	Patient n (%)	PT & patient n (%)	NA n (%)
Whirlpool	2 (2.5)	15 (18.8)	0 (0.0)	63 (78.8)
Hubbard tank	2 (2.5)	13 (16.3)	0 (0.0)	65 (81.3)
Contrast bath	4 (5.0)	16 (20.0)	4 (5.0)	56 (70.0)
Therapeutic pool	4 (5.0)	15 (18.8)	3 (3.8)	58 (72.5)
Nonimmersion irrigation device	3 (3.8)	3 (3.8)	0 (0.0)	74 (92.5)
Other	0 (0.0)	2 (2.5)	0 (0.0)	78 (97.5)

Key: PT: PT Supervised Administration, Patient: Patient Administered, PT & patient: Both Patient Administered and PT Supervised Administration, NA: Not applicable.

4.2: Association Between Sociodemographic Variables and Respondents' Perceptions of Telerehabilitation

4.2.1: Association Between Age and Respondents' Perceptions of Telerehabilitation

Chi-square test was used to determine the relationship between age and respondents' perceptions of telerehabilitation. Regarding whether telerehabilitation enhances patient communication, a significant association was found ($X^2 = 7.92$, $p = 0.048$). A notable proportion of physiotherapists in the 31–40 years age group (52.4%) disagreed that communication was enhanced, which was higher than any other age group. Conversely, a large number of respondents across all age groups, particularly those aged 23–30 (42.4%), agreed that it does enhance communication.

A significant association was also observed concerning the recommendation of telerehabilitation to other physiotherapists ($X^2 = 8.97$, $p = 0.030$). The vast majority of those who would not recommend it were in the youngest age bracket of 23–30 years (80.0%). However, a substantial number of physiotherapists in this same age group (32.9%) indicated they would recommend it, showing a division of opinion.

Furthermore, perceptions of whether patient expectations are a key factor in telerehabilitation outcomes were significantly associated with age ($X^2 = 23.84$, $p = 0.005$). A high percentage of therapists who agreed with this statement were in the 23-30 years age group (70.8%). In contrast, no significant associations were found between age and perceptions of whether telerehabilitation improves care quality ($p=0.847$), provides reliable outcome measures ($p=0.249$), or provides valid outcome measures ($p=0.458$).

Table 13: Association between Age and Respondents' Perceptions of Telerehabilitation

Variable	Response	23-30 years n (%)	31–40 years n (%)	41–50 years n (%)	51–60 years n (%)	X^2	p
Improved quality of care	Yes	29 (39.2)	22 (29.7)	17 (23.0)	6 (8.1)	0.81	0.847
	No	2 (33.3)	2 (33.3)	2 (33.3)	0 (0.0)		
Reliable outcome measures	Yes	28 (40.6)	18 (26.1)	17 (24.6)	6 (8.7)	4.12	0.249
	No	3 (27.3)	6 (54.5)	2 (18.2)	0 (0.0)		
Valid outcome measures	Yes	28 (41.8)	20 (29.9)	15 (22.4)	4 (6.0)	2.60	0.458
	No	3 (23.1)	4 (30.8)	4 (30.8)	2 (15.4)		
Not feasible for certain patients	Disagree	19 (33.9)	18 (32.1)	13 (23.2)	6 (10.7)	16.16	0.184
	Neutral	6 (60.0)	0 (0.0)	4 (40.0)	0 (0.0)		
	Agree	6 (42.9)	6 (42.9)	2 (14.3)	0 (0.0)		
Patient expectations are key	Disagree	9 (24.3)	13 (35.1)	13 (35.1)	2 (5.4)	23.84	0.005
	Neutral	5 (26.3)	6 (31.6)	6 (31.6)	2 (10.5)		
	Agree	17 (70.8)	5 (20.8)	0 (0.0)	2 (8.3)		
Enhances patient communication	Yes	25 (42.4)	13 (22.0)	15 (25.4)	6 (10.2)	7.92	0.048
	No	6 (28.6)	11 (52.4)	4 (19.0)	0 (0.0)		
Essential for the future	Disagree	12 (33.3)	13 (36.1)	11 (30.6)	0 (0.0)	11.53	0.073
	Neutral	4 (50.0)	0 (0.0)	2 (25.0)	2 (25.0)		
	Agree	15 (41.7)	11 (30.6)	6 (16.7)	4 (11.1)		
Recommend to other physiotherapists	Yes	23 (32.9)	22 (31.4)	19 (27.1)	6 (8.6)	8.97	0.030
	No	8 (80.0)	2 (20.0)	0 (0.0)	0 (0.0)		

4.2.2: Association Between Gender and Respondents' Perceptions of Telerehabilitation

Chi-square test was used to determine if there was a statistically significant association between gender and respondents' perceptions of telerehabilitation. A significant association was found between gender and the belief that telerehabilitation provides valid outcome measures ($X^2 = 7.35$, $p = 0.007$). A higher proportion of female respondents (61.5%) disagreed with this statement compared to their male counterparts (38.5%). Similarly, there was a significant association regarding whether telerehabilitation enhances patient communication ($X^2 = 6.79$, $p = 0.009$), with a larger percentage of females (52.4%) disagreeing compared to males (47.6%).

Perceptions about the feasibility of telerehabilitation for certain patients also showed a significant association with gender ($X^2 = 9.76$, $p = 0.045$). A large majority of those who agreed that it is not feasible for certain patients were male (71.4%). Furthermore, the role of patient expectations in telerehabilitation outcomes was significantly associated with gender ($X^2 = 8.88$, $p = 0.031$), with a large majority of those who disagreed with its importance being male (78.4%). In contrast, no significant association was found between gender and the belief that telerehabilitation improves the quality of care ($p=0.853$) or provides reliable outcome measures ($p=0.056$).

Table 14: Association between Gender and Respondents' Perceptions of Telerehabilitation

Variable	Response	Female n (%)	Male n (%)	X^2	p
Improved quality of care	Yes	22 (29.7)	52 (70.3)	0.03	0.853
	No	2 (33.3)	4 (66.7)		
Reliable outcome measures	Yes	18 (26.1)	51 (73.9)	3.66	0.056
	No	6 (54.5)	5 (45.5)		
Valid outcome measures	Yes	16 (23.9)	51 (76.1)	7.35	0.007
	No	8 (61.5)	5 (38.5)		
Not feasible for certain patients	Disagree	14 (25.0)	42 (75.0)	9.76	0.045
	Neutral	6 (60.0)	4 (40.0)		
	Agree	4 (28.6)	10 (71.4)		
Patient expectations are key	Disagree	8 (21.6)	29 (78.4)	8.88	0.031
	Neutral	8 (42.1)	11 (57.9)		
	Agree	8 (33.3)	16 (66.7)		
Enhances patient communication	Yes	13 (22.0)	46 (78.0)	6.79	0.009
	No	11 (52.4)	10 (47.6)		
Essential for the future	Disagree	10 (27.8)	26 (72.2)	1.69	0.429
	Neutral	4 (50.0)	4 (50.0)		
	Agree	10 (27.8)	26 (72.2)		
Recommend to other physiotherapists	Yes	20 (28.6)	50 (71.4)	0.54	0.461
	No	4 (40.0)	6 (60.0)		

4.2.3: Association Between Years of Experience and Respondents' Perceptions of Telerehabilitation

Chi-square test was used to determine the relationship between years of experience and respondents' perceptions of telerehabilitation. A significant association was found regarding the belief that telerehabilitation provides valid outcome measures ($X^2 = 8.69$, $p = 0.034$). A large proportion of those who disagreed were in the <5 years experience bracket (46.2%).

Perceptions of patient expectations as a key factor also showed a significant association with years of experience ($X^2 = 24.23$, $p = 0.004$). A high percentage of those with more than 15 years of experience (70.8%) agreed with the statement. Statistically significant association was observed in the recommendation of telerehabilitation to other physiotherapists ($X^2 = 9.89$, $p = 0.020$), with a high percentage of those with more than 15 years of experience (80.0%) not recommending it. No significant associations were found between years of experience and perceptions of improved quality of care ($p=0.677$), reliable outcome measures ($p=0.252$), or whether telerehabilitation enhances patient communication ($p=0.055$).

Table 15: Association between Years of Experience and Respondents' Perceptions of Telerehabilitation

Variable	Response	<5 years n (%)	5-10 years n (%)	11-15 years n (%)	>15 years n (%)	X^2	p
Improved quality of care	Yes	13 (17.6)	23 (31.1)	9 (12.2)	29 (39.2)	1.52	0.677
	No	2 (33.3)	2 (33.3)	0 (0.0)	2 (33.3)		
Reliable outcome measures	Yes	11 (15.9)	21 (30.4)	9 (13.0)	28 (40.6)	4.09	0.252
	No	4 (36.4)	4 (36.4)	0 (0.0)	3 (27.3)		
Valid outcome measures	Yes	9 (13.4)	23 (34.3)	7 (10.4)	28 (41.8)	8.69	0.034
	No	6 (46.2)	2 (15.4)	2 (15.4)	3 (23.1)		
Not feasible for certain patients	Disagree	9 (16.1)	17 (30.4)	9 (16.1)	21 (37.5)	13.81	0.313
	Neutral	2 (20.0)	4 (40.0)	0 (0.0)	4 (40.0)		
	Agree	4 (28.6)	4 (28.6)	0 (0.0)	6 (42.9)		
Patient expectations are key	Disagree	8 (21.6)	15 (40.5)	5 (13.5)	9 (24.3)	24.23	0.004
	Neutral	5 (26.3)	7 (36.8)	2 (10.5)	5 (26.3)		
	Agree	2 (8.3)	3 (12.5)	2 (8.3)	17 (70.8)		
Enhances patient communication	Yes	8 (13.6)	17 (28.8)	9 (15.3)	25 (42.4)	7.62	0.055
	No	7 (33.3)	8 (38.1)	0 (0.0)	6 (28.6)		
Essential for the future	Disagree	4 (11.1)	15 (41.7)	3 (8.3)	14 (38.9)	7.87	0.248
	Neutral	2 (25.0)	0 (0.0)	2 (25.0)	4 (50.0)		
	Agree	9 (25.0)	10 (27.8)	4 (11.1)	13 (36.1)		
Recommend to other physiotherapists	Yes	13 (18.6)	25 (35.7)	9 (12.9)	23 (32.9)	9.89	0.020
	No	2 (20.0)	0 (0.0)	0 (0.0)	8 (80.0)		

4.2.4: Association Between Work Setting and Respondents' Perceptions of Telerehabilitation

Chi-square test was used to determine the relationship between work setting and respondents' perceptions of telerehabilitation. A significant association was found between work setting and the belief that telerehabilitation improves the quality of patient care (X^2 = 13.56, p = 0.019). A high percentage of those who disagreed with this statement were from private hospitals (33.3%). In contrast, a large proportion of those who agreed were from teaching hospitals (55.4%).

No significant associations were found between work setting and perceptions of reliable outcome measures (p=0.390), valid outcome measures (p=0.087), the feasibility of telerehabilitation for certain patients (p=0.765), the importance of patient expectations (p=0.604), enhanced patient communication (p=0.422), the future role of telerehabilitation (p=0.286), or the recommendation of telerehabilitation to other physiotherapists (p=0.174).

Table 16: Association between Work Setting and Perceptions of Telerehabilitation

Variable	Response	Teaching hospital n (%)	Specialist hospital n (%)	General hospital n (%)	University n (%)	Private hospital n (%)	Other n (%)	X^2	p
Improved quality of care	Yes	41 (55.4)	2 (2.7)	19 (25.7)	4 (5.4)	6 (8.1)	2 (2.7)	13.56	0.019
	No	1 (16.7)	1 (16.7)	0 (0.0)	1 (16.7)	2 (33.3)	1 (16.7)		
Reliable outcome measures	Yes	37 (53.6)	3 (4.3)	17 (24.6)	4 (5.8)	5 (7.2)	3 (4.3)	5.21	0.390
	No	5 (45.5)	0 (0.0)	2 (18.2)	1 (9.1)	3 (27.3)	0 (0.0)		
Valid outcome measures	Yes	35 (52.2)	3 (4.5)	18 (26.9)	4 (6.0)	4 (6.0)	3 (4.5)	9.60	0.087
	No	7 (53.8)	0 (0.0)	1 (7.7)	1 (7.7)	4 (30.8)	0 (0.0)		
Not feasible for certain patients	Disagree	29 (51.8)	2 (3.6)	15 (26.8)	4 (7.1)	5 (8.9)	1 (1.8)	15.20	0.765
	Neutral	5 (50.0)	1 (10.0)	2 (20.0)	0 (0.0)	1 (10.0)	1 (10.0)		
	Agree	8 (57.1)	0 (0.0)	2 (14.3)	1 (7.1)	2 (14.3)	1 (7.1)		
Patient expectations are key	Disagree	17 (45.9)	2 (5.4)	11 (29.7)	1 (2.7)	4 (10.8)	2 (5.4)	12.98	0.604
	Neutral	12 (63.2)	1 (5.3)	4 (21.1)	2 (10.5)	0 (0.0)	0 (0.0)		
	Agree	13 (54.2)	0 (0.0)	4 (16.7)	2 (8.3)	4 (16.7)	1 (4.2)		
Enhances patient communication	Yes	30 (50.8)	3 (5.1)	15 (25.4)	4 (6.8)	4 (6.8)	3 (5.1)	4.95	0.422
	No	12 (57.1)	0 (0.0)	4 (19.0)	1 (4.8)	4 (19.0)	0 (0.0)		
Essential for the future	Disagree	20 (55.6)	2 (5.6)	8 (22.2)	2 (5.6)	3 (8.3)	1 (2.8)	11.99	0.286
	Neutral	6 (75.0)	0 (0.0)	0 (0.0)	2 (25.0)	0 (0.0)	0 (0.0)		
	Agree	16 (44.4)	1 (2.8)	11 (30.6)	1 (2.8)	5 (13.9)	2 (5.6)		
Recommend to other physiotherapists	Yes	38 (54.3)	3 (4.3)	18 (25.7)	4 (5.7)	5 (7.1)	2 (2.9)	7.70	0.174
	No	4 (40.0)	0 (0.0)	1 (10.0)	1 (10.0)	3 (30.0)	1 (10.0)		

4.2.5: Association Between Area of Specialization and Perceptions of Telerehabilitation

Chi-square test was used to determine the relationship between area of specialization and respondents' perceptions of telerehabilitation. A significant association was found between the area of expertise and the perception that telerehabilitation is not feasible for certain patients ($X^2 = 52.49$, $p = 0.003$). A large proportion of those who agreed were in the neurology specialty (64.3%).

No significant associations were found between the area of expertise and perceptions of improved quality of care (p=0.686), reliable outcome measures (p=0.384), valid outcome measures (p=0.337), the importance of patient expectations (p=0.665), enhanced patient communication (p=0.125), the future role of telerehabilitation (p=0.899), or the recommendation of telerehabilitation to other physiotherapists (p=0.387).

Table 17: Association between Area of Expertise and Respondents' Perceptions of Telerehabilitation

Variable	Res	SP n (%)	OT n (%)	NEU n (%)	ERG n (%)	CT n (%)	BUR n (%)	GER n (%)	ONC n (%)	WH n (%)	NUT n (%)	PED n (%)	NA n (%)	X^2	p
Improved quality of care	Yes	6 (8.1)	18 (24.3)	31 (41.9)	5 (6.8)	0 (0.0)	1 (1.4)	0 (0.0)	4 (5.4)	0 (0.0)	2 (2.7)	0 (0.0)	7 (9.5)	4.79	0.686
	No	0 (0.0)	0 (0.0)	4 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (16.7)		
Reliable outcome measures	Yes	4 (5.8)	18 (26.1)	29 (42.0)	4 (5.8)	0 (0.0)	1 (1.4)	0 (0.0)	5 (7.2)	0 (0.0)	2 (2.9)	0 (0.0)	6 (8.7)	7.44	0.384
	No	2 (18.2)	0 (0.0)	6 (54.5)	1 (9.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (18.2)		
Valid outcome measures	Yes	5 (7.5)	18 (26.9)	27 (40.3)	5 (7.5)	0 (0.0)	1 (1.5)	0 (0.0)	4 (6.0)	0 (0.0)	1 (1.5)	0 (0.0)	6 (9.0)	7.96	0.337
	No	1 (7.7)	0 (0.0)	8 (61.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	0 (0.0)	1 (7.7)	0 (0.0)	2 (15.4)		
Not feasible for certain patients	D	3 (5.4)	18 (32.1)	19 (33.9)	4 (7.1)	0 (0.0)	1 (1.8)	0 (0.0)	3 (5.4)	0 (0.0)	2 (3.6)	0 (0.0)	6 (10.7)	52.49	0.003
	N	0 (0.0)	0 (0.0)	7 (70.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (10.0)		
	A	3 (21.4)	0 (0.0)	9 (64.3)	1 (7.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.1)		
Patient expectations are key	D	2 (5.4)	9 (24.3)	16 (43.2)	3 (8.1)	0 (0.0)	0 (0.0)	0 (0.0)	3 (8.1)	0 (0.0)	2 (5.4)	0 (0.0)	2 (5.4)	17.74	0.665
	N	1 (5.3)	3 (15.8)	9 (47.4)	1 (5.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (10.5)	0 (0.0)	0 (0.0)	0 (0.0)	3 (15.8)		
	A	3 (12.5)	6 (25.0)	10 (41.7)	1 (4.2)	0 (0.0)	1 (4.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (12.5)		
Enhances patient communication	Yes	4 (6.8)	17 (28.8)	25 (42.4)	4 (6.8)	0 (0.0)	1 (1.7)	0 (0.0)	3 (5.1)	0 (0.0)	2 (3.4)	0 (0.0)	3 (5.1)	11.32	0.125
	No	2 (9.5)	1 (4.8)	10 (47.6)	1 (4.8)	0 (0.0)	0 (0.0)	0 (0.0)	2 (9.5)	0 (0.0)	0 (0.0)	0 (0.0)	5 (23.8)		
Essential for the future	D	3 (8.3)	7 (19.4)	16 (44.4)	2 (5.6)	0 (0.0)	0 (0.0)	0 (0.0)	4 (11.1)	0 (0.0)	1 (2.8)	0 (0.0)	3 (8.3)	7.82	0.899
	N	1 (12.5)	2 (25.0)	5 (62.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)		
	A	2 (5.6)	9 (25.0)	14 (38.9)	3 (8.3)	0 (0.0)	1 (2.8)	0 (0.0)	1 (2.8)	0 (0.0)	1 (2.8)	0 (0.0)	5 (13.9)		
Recommend to other physiotherapists	Yes	5 (7.1)	17 (24.3)	30 (42.9)	5 (7.1)	0 (0.0)	1 (1.4)	0 (0.0)	5 (7.1)	0 (0.0)	2 (2.9)	0 (0.0)	5 (7.1)	7.42	0.387
	No	1 (10.0)	1 (10.0)	5 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (30.0)		

KEY: Res=Response, SP=Sports, OT=Orthopedics, NEU=Neurology, ERG=Ergonomics, CT=Cardiothoracic, BUR=Integumentary and post-burn rehabilitation, GER=Gerontology, ONC=Oncology, WH=Women's health, NUT=Nutrition, PED=Pediatrics, NA=Not Applicable, D=Disagree, N=Neutral, A=Agree

4.2.6: Association Between Level of Education and Respondents' Perceptions of Telerehabilitation

Chi-square test was used to determine the relationship between level of education and respondents' perceptions of telerehabilitation. A significant association was found between the level of education and the perception that telerehabilitation is not feasible for certain patients ($X^2 = 30.70$, $p = 0.002$). A high proportion of those who agreed held a Bachelor's degree (57.1%). A statistically significant association was also found regarding the importance of patient expectations in telerehabilitation outcomes ($X^2 = 20.62$, $p = 0.014$). A high percentage of those with a Master's degree (75.0%) agreed with this statement.

No significant associations were found between the level of education and perceptions of improved quality of care ($p=0.373$), reliable outcome measures ($p=0.173$), valid outcome measures ($p=0.142$), enhanced patient communication ($p=0.492$), the future role of telerehabilitation ($p=0.088$), or the recommendation of telerehabilitation to other physiotherapists ($p=0.055$).

Table 18: Association between Level of Education and Respondents' Perceptions of Telerehabilitation

Variable	Response	Bachelor's n (%)	PhD n (%)	DPT n (%)	Master's n (%)	X^2	p
Improved quality of care	Yes	44 (59.5)	4 (5.4)	10 (13.5)	16 (21.6)	3.12	0.373
	No	4 (66.7)	0 (0.0)	2 (33.3)	0 (0.0)		
Reliable outcome measures	Yes	43 (62.3)	4 (5.8)	8 (11.6)	14 (20.3)	4.99	0.173
	No	5 (45.5)	0 (0.0)	4 (36.4)	2 (18.2)		
Valid outcome measures	Yes	43 (64.2)	4 (6.0)	8 (11.9)	12 (17.9)	5.45	0.142
	No	5 (38.5)	0 (0.0)	4 (30.8)	4 (30.8)		
Not feasible for certain patients	Disagree	34 (60.7)	2 (3.6)	8 (14.3)	12 (21.4)	30.70	0.002
	Neutral	6 (60.0)	0 (0.0)	0 (0.0)	4 (40.0)		
	Agree	8 (57.1)	2 (14.3)	4 (28.6)	0 (0.0)		
Patient expectations are key	Disagree	20 (54.1)	0 (0.0)	4 (10.8)	13 (35.1)	20.62	0.014
	Neutral	10 (52.6)	2 (10.5)	4 (21.1)	3 (15.8)		
	Agree	18 (75.0)	2 (8.3)	4 (16.7)	0 (0.0)		
Enhances patient communication	Yes	34 (57.6)	4 (6.8)	10 (16.9)	11 (18.6)	2.41	0.492
	No	14 (66.7)	0 (0.0)	2 (9.5)	5 (23.8)		
Essential for the future	Disagree	25 (69.4)	0 (0.0)	2 (5.6)	9 (25.0)	11.02	0.088
	Neutral	4 (50.0)	0 (0.0)	2 (25.0)	2 (25.0)		
	Agree	19 (52.8)	4 (11.1)	8 (22.2)	5 (13.9)		
Recommend to other physiotherapists	Yes	42 (60.0)	4 (5.7)	8 (11.4)	16 (22.9)	7.62	0.055
	No	6 (60.0)	0 (0.0)	4 (40.0)	0 (0.0)		

4.3 Hypotheses Testing

Hypothesis 1: There would be no significant association between age and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

Test: Chi-square test of association

P-value: 0.05

Observed p-value: <0.05

DECISION: The observed p-value is less than 0.05; the null hypothesis is therefore REJECTED.

Hypothesis 2: There would be no significant association between gender and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

Test: Chi-square test of association

P-value: 0.05

Observed p-value: <0.05

DECISION: The observed p-value is less than 0.05; the null hypothesis is therefore REJECTED.

Hypothesis 3: There would be no significant association between year of experience and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

Test: Chi-square test of association

P-value: 0.05

Observed p-value: <0.05

DECISION: The observed p-value is less than 0.05; the null hypothesis is therefore REJECTED.

Hypothesis 4: There would be no significant association between level of education and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

Test: Chi-square test of association

P-value: 0.05

Observed p-value: <0.05

DECISION: The observed p-value is less than 0.05; the null hypothesis is therefore REJECTED.

Hypothesis 5: There would be no significant association between workplace and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

Test: Chi-square test of association

P-value: 0.05

Observed p-value: <0.05

DECISION: The observed p-value is less than 0.05; the null hypothesis is therefore REJECTED.

Hypothesis 6: There would be no significant association between specialty and physiotherapists' perspectives on telerehabilitation for physical modalities in patient's care.

Test: Chi-square test of association

P-value: 0.05

Observed p-value: <0.05

DECISION: The observed p-value is less than 0.05; the null hypothesis is therefore REJECTED.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Sociodemographic Characteristics

The finding that there was a predominance of male respondents (70.0%) in the present study suggests that there is a higher proportion of male physiotherapists in South-South Nigeria. This finding is comparable to the finding of a report by World Physiotherapy (WPT, 2024) which reported that 60% of physiotherapists in Nigeria are males. The present study's finding that is contrary to the results of a nationwide study in Nigeria by Odetunde et al. (2024), who found a slight majority of female physiotherapists, a trend that is also mirrored in international studies from Greece (Tsekoura et al., 2022) and Malaysia (Sia et al., 2024), which both reported a higher proportion of female physiotherapy practitioners. The discrepancy in the present study may be due to regional variations within Nigeria where the physiotherapy profession is dominated by male practitioners

The present study's results showed that the largest age group of respondents was the 23–30 years age bracket, which implies a relatively young physiotherapy workforce in South-South Nigeria. This finding is in agreement with a study by Awotidebe et al. (2023), which also reported a young cohort of Nigerian physiotherapists with a mean age of 29.76 years. The similarity in age distribution across these studies indicates a trend of younger professionals, often termed "digital natives," entering the physiotherapy field in Nigeria. This demographic is significant, as younger professionals are frequently found to be more adaptable to and comfortable with new technologies (Mbada et al., 2021), which could serve as a key facilitator for the broader adoption

of telerehabilitation.

Consistent with the young age demographic of the respondents, the results of the present study showed that majority of respondents had less than five years of professional experience. This finding is similar to that of Odetunde et al. (2024), where a considerable portion of respondents also reported limited years of practice, suggesting that a large segment of the physiotherapy workforce in Nigeria is in the early stages of their careers. While this may imply less ingrained traditional practice patterns and a greater openness to innovation, it also highlights a potential need for targeted training, as professional experience has been shown to be a significant factor influencing the knowledge and skills related to telemedicine (Barnawi et al., 2024).

The finding that a bachelor's degree was the highest educational qualification for most respondents (60.0%) indicates that this remains the primary entry-level qualification for physiotherapy practice in Nigeria. This result is corroborated by the findings of Odetunde et al. (2024). The lower prevalence of postgraduate degrees observed in both studies may reflect limited access to, or availability of, advanced physiotherapy education programs within the country. This could, in turn, impact the development of the specialized knowledge and skills required for the effective and evidence-based implementation of telerehabilitation services.

The results of the present study showed that Neurology was the primary area of practice for the majority of respondents (43.8%). This finding differs from the study by Odetunde et al. (2024), where musculoskeletal conditions were the most commonly reported area of focus. This variance might be explained by the specific clinical settings from which the participants were recruited; the present study's focus on teaching hospitals likely accounts for the higher concentration of neurology specialists, as these institutions often function as major referral centers for more

complex neurological cases requiring specialized care.

5.1.2 Perspectives on Telerehabilitation

The finding that a vast majority of respondents believed that telerehabilitation would improve the quality of patient care suggests a strong and positive perception of this technology among Nigerian physiotherapists. This aligns with the results of studies in Nigeria by Odetunde et al. (2024) and Awotidebe et al. (2023), which reported similar favorable views. A study in Pakistan by Saeed et al. (2024) found that 89.7% of physiotherapists held a positive stance, and a study in Malaysia by Sia et al. (2024) revealed that 76.3% agreed on its potential benefits. This widespread optimism appears to be driven by the recognized potential of telerehabilitation to overcome geographical barriers and improve access to care, a key advantage highlighted in the Nigerian physiotherapy practice by Odole et al. (2015).

The result of the present study showed that a high percentage of physiotherapists felt that telerehabilitation provides reliable and valid outcome measures. This finding suggests a growing confidence in the clinical utility of remote assessment and monitoring tools. This finding is supported by a study in Saudi Arabia by Aloyuni et al. (2020), which reported a similar level of trust in the reliability and validity of telerehabilitation among physiotherapists. This confidence may be attributed to the expanding body of evidence, as noted in the scoping review by Sia et al. (2024), which confirms the effectiveness of telerehabilitation across various conditions and likely contributes to this positive perception among clinicians.

The finding of the present study that a majority of respondents strongly disagreed with the statement that telerehabilitation is not feasible or effective for certain patients indicates a perception of broad applicability for this technology. However, this optimism is tempered by the

identification of specific barriers in the present study, as conditions affecting pediatric and mentally handicapped populations were seen as significant challenges. This divide is in tandem with the results of a qualitative study by Sia et al. (2024), who found that while physiotherapists in Malaysia saw clear benefits in telerehabilitation, they also identified significant technological, organizational, and personal barriers that limit its application in certain scenarios.

The present study's results showed that there was split opinion on whether digital health tools will play an essential role in the future of the profession suggests a degree of ambivalence among physiotherapists in South-South Nigeria. This may reflect a generational or experiential divide regarding the long-term impact of technology on their practice. This uncertainty is not unique to Nigeria. A study on physiotherapists in Greece by Tsekoura et al. (2022) found that while nearly 80% desired more training in telerehabilitation, only 42% intended to continue using remote services post-pandemic, indicating similar ambivalence. The reasons for this could be multifaceted, including persistent concerns about infrastructure, the need for adequate training, and a professional-cultural apprehension that technology might devalue the essential hands-on aspects of physiotherapy.

Despite the divided opinion on its future role, the overwhelming willingness of respondents to recommend telerehabilitation to other physiotherapists suggests a strong endorsement of the technology's current utility and benefits. This finding is consistent with the results of a study by Awotidebe et al. (2023), who also found a high willingness among Nigerian physiotherapists to use and recommend digital physical therapy. This indicates that the present advantages of telerehabilitation are widely recognized, even if its ultimate place and role within the profession are still being debated.

5.1.3 Perceived Strengths of Telerehabilitation

The finding that "Easy access" (67.5%), "Flexible timetable" (70.0%), and "Cost savings" (60.0%) were the most frequently reported strengths of telerehabilitation is highly consistent with the broader literature. Studies conducted in Nigeria (Odole et al., 2015; Odetunde et al., 2024), Kuwait (Albahrouh & Buabbas, 2021), and Malaysia (Sia et al., 2024) all converge on these points as primary benefits. A qualitative study by Sia et al. (2024), identified "saving time and money" and "convenience" as key subthemes of telerehabilitation's perceived advantages. This cross-cultural consensus underscores the universal appeal of telerehabilitation's potential to make healthcare more convenient, accessible, and affordable for patients.

The present study's result showed that "Treatment adherence" and "Outcome expectations" are also identified as strengths by a significant portion of respondents which suggests that physiotherapists in Nigeria believe that telerehabilitation can positively influence patient engagement and subsequent clinical outcomes. This is a promising finding, as empowering patients to take a more active role in their recovery is a cornerstone of modern rehabilitation. A qualitative study by Sia et al. (2024) supports this finding, with participants noting that telerehabilitation encourages clients to be "responsible for their own progression," thereby fostering greater patient autonomy.

The findings of the present study showed that "Better continuity of care" was identified as a strength by the fewest respondents. This finding is contrary to the results of a review by Sia et al. (2024), which found that continuity of care was often cited as a major benefit of telerehabilitation. This finding might reflect a pragmatic concern among Nigerian physiotherapists that the potential for technological or logistical challenges such as poor internet

connectivity or a lack of patient digital literacy could disrupt the seamless continuity of care that telerehabilitation promises in theory (Odole et al., 2015).

5.1.4 Perceived Barriers to Telerehabilitation

The identification of specific patient populations, such as those who are "Mentally handicapped" and "Paediatrics" as major barriers to telerehabilitation suggests that there is perceived limitations of this technology for individuals who may require significant hands-on assistance or have difficulty engaging with technology. This concern is in tandem with the results of a qualitative study by Odole et al. (2015), who found that the need for direct physical support for certain patient groups is a major challenge. A scoping review by Sia et al. (2024) further supports this, identifying client-related concerns, including technological illiteracy, as a significant global barrier to telerehabilitation.

The finding that "Provider willingness" (68.8%) and "Patient privacy/relationship" (67.5%) were frequently reported as barriers suggests that human and ethical factors are critical considerations in the implementation of telerehabilitation. The issue of provider willingness is complex and may be influenced by factors such as age, experience, and comfort with technology, as suggested by the statistical associations found in the present study. A qualitative study by Sia et al. (2024) unpacks this by identifying "Personal barriers," which include the loss of hands-on assessment capabilities and fears of miscommunication. Furthermore, concerns for patient privacy are a universal issue in telemedicine and are highlighted as a key challenge in studies from Nigeria (Odole et al., 2015) to Malaysia (Sia et al., 2024).

The result of the present study found that "Low technology literacy" (17.5%) and "Internet connectivity" (17.5%) were the least reported. This finding contrasts with the results of studies

by Odole et al. (2015) in Nigeria, Sia et al. (2024) in Malaysia, and Barnawi et al. (2024) in Saudi Arabia, which all identified inadequate infrastructure (such as poor connectivity and power supply) and a lack of training or literacy as top barriers. The most likely explanation for this discrepancy in the present study may be due to the specific demographic of the respondents: a young, urban, and university-hospital-based population, for whom consistent internet access and digital literacy may be the norm.

5.1.5 Use and Method of Administration of Physical Modalities in Telerehabilitation

The finding that modalities that are easily self-administered or require minimal supervision, such as "Cold packs", "Ice massage", "TENS", and "Biofeedback", were the most commonly used in telerehabilitation implies a pragmatic adaptation of clinical practice to remote care. This approach is logical, as it prioritizes modalities that are safe and feasible for patients to manage at home. This result shows an evolution from traditional clinical practice. A survey by Seto and Walberg (2002) of in-person modality use found that while cold and hot packs were also highly utilized, TENS was among the least frequently used electromodalities in the clinic. The high use of TENS in the present study might confirm the theory proposed by Seto and Walberg (2002) that TENS is increasingly a modality for home use. Telerehabilitation appears to be a natural catalyst for this trend, empowering patients to self-manage their symptoms with appropriate remote guidance.

The results of the present study showed very limited use of modalities requiring specialized equipment and direct professional supervision, such as "Fluidotherapy" (5.0%), "Diathermy" (6.3%), and "Mechanical traction" (3.8%). This finding is entirely expected, given the context of

telerehabilitation. This contrasts with in-person clinical settings where such equipment, while sometimes used infrequently, is at least available. A study by Seto and Walberg (2002) found that even in traditional clinic settings, modalities like diathermy and fluidotherapy were among the least used thermomodalities, though mechanical traction saw moderate use. The near-total absence of these modalities in telerehabilitation is a clear reflection of the logistical and equipment-related constraints of a home-based care model, as physiotherapists exclude treatments that are impossible to deliver without access to a clinical facility.

5.1.6 Influence of Sociodemographic Factors on Telerehabilitation Perspectives

The results of the present study showed that age was significantly associated with physiotherapists' perspectives on telerehabilitation, particularly regarding patient communication, the role of patient expectations, and the willingness to recommend its use. This suggests that a physiotherapist's age and generational experience may shape their approach to and confidence in remote care. This finding is comparable to the results of a study by Odetunde et al. (2024), who also found a significant link between age and the adoption of digital health technology. However, it contrasts with the findings of Barnawi et al. (2024), who found no significant association between age and overall telemedicine awareness, knowledge, attitude, or skills. This discrepancy may be due to differences in the study populations and healthcare systems; the more standardized telemedicine training in the Saudi Arabian context of Barnawi's study may mitigate the generational differences observed in a sample of physiotherapist in South-South Nigeria.

The present study found a significant association between gender and several perceptions of telerehabilitation, with female respondents expressing more doubt about the validity of outcome

measures and the enhancement of patient communication. This finding contrasts with the findings of a nationwide study by Odetunde et al. (2024), which found no significant association between gender and the acceptance or adoption of telerehabilitation. The difference in these findings might be due to the fact that the population sampled in the present study was dominated by male physiotherapists.

Years of professional experience was a significantly associated with physiotherapists' perspectives on telemedicine. The present study's finding that physiotherapists with less than five years of experience were more likely to doubt the validity of telerehabilitation outcomes suggests that a lack of clinical confidence may translate into a lack of confidence in remote assessment tools. This aligns with the findings of a study by Barnawi et al. (2024), who demonstrated a significant association between years of experience and the levels of telemedicine knowledge and skills.

The work setting and area of specialization of the physiotherapists also had a significant influence on their perspectives of telerehabilitation. The finding that specialists in Neurology were more likely to believe telerehabilitation is not feasible for certain patients is clinically logical. This is corroborated by qualitative studies, such as Sia et al. (2024) and Odole et al. (2015), which highlight the indispensable nature of hands-on assessment and tactile feedback in neurological rehabilitation. Similarly, the finding that physiotherapists in private hospitals were less convinced that telerehabilitation improves the quality of care may reflect market-driven concerns, where the perceived value of physiotherapy is closely linked to in-person, hands-on interaction.

5.2 Conclusion

Physiotherapists practicing in South-South Nigeria hold predominantly positive perceptions towards telerehabilitation and the use of physical modalities in telerehabilitation. They are optimistic about the potential of telerehabilitation to improve the quality and accessibility of patient care, viewing it as a valuable tool to enhance their practice. There perceptions of telerehabilitation are influenced by Age, Gender, years of experience, area of specialization and level of education.

5.3 Recommendations

Develop Targeted Education and Training Programs: Given the young demographic of the workforce and the identified need for enhanced skills, it is recommended that professional bodies and educational institutions collaborate to develop and implement comprehensive training on telerehabilitation. This training should be integrated into undergraduate physiotherapy curricula and offered as continuous professional development (CPD) for practicing clinicians. The curriculum should focus on practical digital skills, ethical considerations for remote practice, and evidence-based protocols for selecting and instructing patients on the use of physical modalities at home.

Establish National Guidelines and Policies: To address concerns about patient privacy, provider willingness, and scope of practice, it is crucial for the Nigeria Society of Physiotherapy (NSP) and the Medical Rehabilitation Therapists (Registration) Board of Nigeria (MRTBN) to establish clear national guidelines for telerehabilitation. These guidelines should provide a framework for ethical conduct, data security, informed consent, patient selection criteria, and the appropriate use of physical modalities in a remote context, thereby building confidence among

both clinicians and patients.

Invest in and Advocate for Infrastructure: While the sampled population did not perceive infrastructure as a primary barrier, broader literature confirms it as a significant challenge in Nigeria. Therefore, healthcare institutions should be encouraged to invest in the necessary technological infrastructure, such as secure telehealth platforms and reliable internet connectivity. Furthermore, the physiotherapy profession should advocate for government and private sector investment to improve the national digital infrastructure, particularly in rural and underserved areas, to ensure equitable access to telerehabilitation services.

Promote Research and Development of Clinical Protocols: There is a need to develop and validate clear clinical protocols for the remote use and instruction of physical modalities. This will help standardize practice, ensure patient safety, and clarify ambiguities, such as those identified in the use of hydrotherapy. Research should focus on determining which modalities are safest and most effective for patient-administered use and developing best-practice guides for their application.

5.4 Implications for Further Study

Broaden the Scope of Research to a National and More Diverse Sample: This study was geographically restricted to the South-South region and drew from a sample that was predominantly young, male, and based in urban teaching hospitals. Future research should employ a nationwide sampling strategy to capture a more representative view of physiotherapists across different geopolitical zones, work settings (private, primary care, rural), and demographics (age, gender, years of experience). This would help to validate the current findings and provide a more comprehensive understanding of the opportunities and challenges for

telerehabilitation across Nigeria, particularly regarding the critical barrier of infrastructure.

Incorporate Patient and Caregiver Perspectives: The current study was limited to the perspectives of physiotherapists. A significant gap in understanding remains regarding the experiences, satisfaction, preferences, and challenges of patients and their caregivers with telerehabilitation in the Nigerian context. Further studies are needed to explore the patient's perspective, as their acceptance and ability to engage with the technology are paramount to its success.

Employ Qualitative and Mixed-Methods Approaches: While this quantitative study identified key trends, it could not explore the underlying reasons for certain findings, such as the ambivalence towards the future role of telerehabilitation or the complex issue of provider willingness. Future studies should use qualitative methods, such as in-depth interviews and focus groups, to delve deeper into the nuances of physiotherapists' perceptions and experiences. A mixed-methods approach would provide a richer and more complete picture of the telerehabilitation landscape.

Evaluate Clinical and Economic Outcomes: This study focused on perspectives and did not assess the clinical effectiveness or cost-effectiveness of telerehabilitation for physical modalities. There is a clear need for robust clinical trials and economic analyses to be conducted within the Nigerian healthcare system. Such studies would provide the necessary evidence to guide practice, inform policy, and justify investment in telerehabilitation services by demonstrating their impact on patient outcomes and healthcare costs.

REFERENCES

Aderinto, N., Olatunji, G., Abdulbasit, M. O., Edun, M., Aboderin, G., & Egbunu, E. (2023). Exploring the efficacy of virtual reality-based rehabilitation in stroke: a narrative review of current evidence. *Annals of medicine*, *55*(2), 2285907.

Agostini, F., Mangone, M., PAOLUCCI, T., SANTILLI, V., & BERNETTI, A. (2020). Rehabilitation settings during and after covid-19: an overview of recommendations. *Journal of rehabilitation medicine*, *53*(1), 2737.

Albahrouh, S. I., & Buabbas, A. J. (2021). Physiotherapists' perceptions of and willingness to use telerehabilitation in Kuwait during the COVID-19 pandemic. *BMC medical informatics and decision making*, *21*, 1-12.

Aloyuni, S., Alharbi, R., Kashoo, F., Alqahtani, M., Alanazi, A., Alzhrani, M. and Ahmad, M. (2020). Knowledge, Attitude, and Barriers to Telerehabilitation-Based Physical Therapy Practice in Saudi Arabia. *Healthcare*, 8(4), p.460.

Argenis, G., Juárez, M. S., & Ft, P. S. S. (2023). Physical Agents and Therapeutic Modalities: Main concepts implicated in Physiotherapy treatment prescription and into advanced physical therapy practice. *Practice*, *19*(6), 176.

Awotidebe, T.O., Fasakin, O.M., Oyewole, O.O., Bello, U.E., Ademoyegun, A.B., Onigbinde, A.T., Mbada, C.E., Odunlade, A.J. and Adedoyin, R.A. (2023). Nigerian physiotherapists' knowledge, attitude, and practice of digital physical therapy: a cross-sectional study. *Bulletin of Faculty of Physical Therapy*, 28(1), pp.1-8.

Barnawi, N.A., Al-Otaibi, H., Alkhudairy, A.I., Alajlan, M.A., Alajlan, R.A., Alay, S.M., Alqahtani, S.M., Bushnak, I.A. and Abolfotouh, M.A. (2024). Awareness, Knowledge, Attitude, and Skills (AKAS) of Telemedicine and Its Use by Primary Healthcare Providers. *International Journal of General Medicine,* 17, pp.1047-1058.

Baroni, M. P., Jacob, M. F. A., Rios, W. R., Fandim, J. V., Fernandes, L. G., Chaves, P. I., ... & Saragiotto, B. T. (2023). The state of the art in telerehabilitation for musculoskeletal conditions. *Archives of physiotherapy*, *13*(1), 1.

Bellew, J. W., Michlovitz, S. L., & Nolan Jr, T. P. (2023). *Michlovitz's modalities for therapeutic intervention*. FA Davis.

Betts, S., Feichter, L., Kleinig, Z., O'Connell-Debais, A., Thai, H., Wong, C., & Kumar, S. (2023). Telerehabilitation versus standard care for improving cognitive function and quality of life for adults with traumatic brain injury: A systematic review. *Internet Journal of Allied Health Sciences & Practice,* 16(3), 21.

Bleakley, C. M., & Costello, J. T. (2013). Do thermal agents affect range of movement and mechanical properties in soft tissues? Archives of Physical Medicine and Rehabilitation, 94(1), 149–163.

Bracciano, A. G. (2024). Physical agent modalities. In *Occupational Therapy Essentials for Clinical Competence* (pp. 501-519). Routledge.

Chen, P. V., Helm, A., Caloudas, S. G., Ecker, A., Day, G., Hogan, J., & Lindsay, J. (2022). Evidence of phone vs video-conferencing for mental health treatments: a review of the literature. *Current Psychiatry Reports*, *24*(10), 529-539.

Del Pino, R., Díez-Cirarda, M., Ustarroz-Aguirre, I., Gonzalez-Larragan, S., Caprino, M., Busnatu, S., ... & Gómez-Esteban, J. C. (2022). Costs and effects of telerehabilitation in neurological and cardiological diseases: A systematic review. *Frontiers in Medicine*, *9*, 832229.

Erturan, S., Burak, M., & Elbasan, B. (2024). Breaking barriers: exploring physiotherapists' willingness and challenges in embracing telerehabilitation in a developing country. *Irish Journal of Medical Science (1971-)*, *193*(3), 1359-1367.

Estel, K., Scherer, J., Dahl, H., Wolber, E., Forsat, N. D., & Back, D. A. (2022). Potential of digitalization within physiotherapy: a comparative survey. *BMC health services research*, *22*(1), 496.

Franco, J. B., Maximino, L. P., Secchi, L. L. B., Antonelli, B. C., & Blasca, W. Q. (2024). What are the barriers to telerehabilitation in the treatment of musculoskeletal diseases?. *Portuguese Journal of Public Health*, *42*(1), 33-42.

Khalid, S., Alnajjar, F., Gochoo, M., Renawi, A., & Shimoda, S. (2023). Robotic assistive and rehabilitation devices leading to motor recovery in upper limb: a systematic review. *Disability and Rehabilitation: Assistive Technology*, *18*(5), 658-672.

Klamroth-Marganska, V., Giovanoli, S., Easthope, C. A., & Schönhammer, J. G. (2022). Telerehabilitation technology. In *Neurorehabilitation Technology*, 23 (1), 563-594.

Knight, K., Knight, K. L., & Draper, D. O. (2012). *Therapeutic modalities: the art and science*. Lippincott Williams & Wilkins.

Krzyzaniak, N., Cardona, M., Peiris, R., Michaleff, Z. A., Greenwood, H., Clark, J., ... & Glasziou, P. (2023). Telerehabilitation versus face-to-face rehabilitation in the management of musculoskeletal conditions: a systematic review and meta-analysis. *Physical Therapy Reviews*, *28*(2), 71-87.

Li, X., Nakagawa, T., Ren, X., & Gondo, Y. (2025). The Design of Visual, Cognitive, and Physical Modalities in VR Games for Older Adults: A Systematic Review. *International Journal of Human–Computer Interaction*, 1-26.

Mbada, C.E., Baderinwa, T.A., Sanuade, C.T., Ademoyegun, A.B., Fatoye, C., Maikudi, L. and Fatoye, F. (2021). Awareness, Attitude and Expectations of Physiotherapy Students on Telerehabilitation. *Medical Science Educator*, 31(2), pp.627-636.

Niknejad, N., Ismail, W., Bahari, M., & Nazari, B. (2021). Understanding telerehabilitation technology to evaluate stakeholders' adoption of telerehabilitation services: a systematic literature review and directions for further research. *Archives of Physical Medicine and Rehabilitation*, *102*(7), 1390-1403

Nizamis, K., Athanasiou, A., Almpani, S., Dimitrousis, C., & Astaras, A. (2021). Converging robotic technologies in targeted neural rehabilitation: a review of emerging solutions and challenges. *Sensors*, *21*(6), 2084.

Odetunde, M. O., Okonji, A. M., Adeoye, A. P., & Onigbinde, A. T. (2024). Acceptance and adoption of tele-rehabilitation by physiotherapists from Nigeria, a low resource setting: a mixed-method study. *Bulletin of Faculty of Physical Therapy*, *29*(1), 23.

Odole, A. C., Odunaiya, N. A., Ojo, O. D., & Afolabi, K. (2015). Tele-physiotherapy in Nigeria: perceived challenges by physiotherapists to its implementation. *International Journal of Telemedicine and Clinical Practices*, *1*(2), 186-196.

Odole, A. C., Odunaiya, N. A., Oyewole, O. O., Akinola, O. S., Ogunlana, M. O., Mbada, C. E., ... & Akinpelu, A. O. (2024). Patients' perspectives of tele-physiotherapy in a Nigerian low-resource setting. *Bulletin of Faculty of Physical Therapy*, *29*(1), 60.

Odole, A.C., Odunaiya, N.A., Ojo, O.D. and Afolabi, K. (2015). Tele-physiotherapy in Nigeria: perceived challenges by physiotherapists to its implementation. *International Journal of Telemedicine and Clinical Practices,* 1(2), pp.186-196.

Peretti, A., Amenta, F., Tayebati, S. K., Nittari, G., & Mahdi, S. S. (2022). Telerehabilitation: review of the state-of-the-art and areas of application. *JMIR rehabilitation and assistive technologies*, *4*(2), e7511.

Pol, M., Qadeer, A., van Hartingsveldt, M., & Choukou, M. A. (2023). Perspectives of rehabilitation professionals on implementing a validated home telerehabilitation intervention for older adults in geriatric rehabilitation: multisite focus group study. *JMIR rehabilitation and assistive technologies*, *10*, e44498.

Prvu Bettger, J., & Resnik, L. J. (2020). Telerehabilitation in the Age of COVID-19: An Opportunity for Learning Health System Research. *Physical therapy*, *100*(11), 1913–1916.

Rahmansyah, B., & Anggiat, L. (2022). Availability And Usage Of Electro Physical Agent Modality By Physiotherapist In East Jakarta. *International Journal of Medical Excercise Science*, *8*(1), 1228-1237.

Saeed, W., Asif, N., Malik, M., Amjad, A., Aslam, M., Fatima, K., Butt, A.F., Saleem, A., Rafique, H. and Aslam, I. (2024). Knowledge, Attitude and Skills of Physiotherapists Towards Tele-Rehabilitation. *Journal of Health and Rehabilitation Research*, 4(2).

Seid, A. A., Aychiluhm, S. B., & Mohammed, A. A. (2022). Effectiveness and feasibility of telerehabilitation in patients with COVID-19: a systematic review and meta-analysis. *BMJ open*, *12*(10), e063961.

Seron, P., Oliveros, M. J., Gutierrez-Arias, R., Fuentes-Aspe, R., Torres-Castro, R. C., Merino-Osorio, C., ... & Sanchez, P. (2021). Effectiveness of telerehabilitation in physical therapy: a rapid overview. *Physical therapy*, *101*(6), pzab053.

Sia, L. L., Sharma, S., Kumar, S., & Ajit Singh, D. K. (2024). Exploring physiotherapists' perceptions of telerehabilitation for musculoskeletal disorders: Insights from focus groups. *Digital Health*, *10*, 20552076241248916.

Sia, L.L., Sharma, S., Ing, J.B.M., Kumar, S. and Singh, D.K.A. (2024). Physiotherapists' perceptions, readiness, enablers, and barriers to use telerehabilitation: A scoping review. *Journal of Back and Musculoskeletal Rehabilitation,* 37(1), pp.1441-1454.

Sia, L.L., Sharma, S., Kumar, S. and Singh, D.K.A. (2024). Physiotherapists' Perception of and Readiness to Use, Telerehabilitation for Musculoskeletal Disorders in Malaysia: A Cross-Sectional Study. *Telemedicine and e-Health*, 30(12), pp.2842-2850.

Snoswell, C. L., Chelberg, G., De Guzman, K. R., Haydon, H. M., Thomas, E. E., Caffery, L. J., & Smith, A. C. (2023). The clinical effectiveness of telehealth: a systematic review of meta-analyses from 2010 to 2019. *Journal of telemedicine and telecare*, *29*(9), 669-684.

Stampa, S., Thienel, C., Tokgöz, P., Razum, O., & Dockweiler, C. (2024). Factors Facilitating and Inhibiting the Implementation of Telerehabilitation—A Scoping Review. *In Healthcare MDPI*, 12 (6), p. 619.

Su, J., Zhang, Y., Ke, Q. Q., Su, J. K., & Yang, Q. H. (2022). Mobilizing artificial intelligence to cardiac telerehabilitation. *Reviews in Cardiovascular Medicine*, *23*(2), 45.

Suso-Martí, L., La Touche, R., Herranz-Gómez, A., Angulo-Díaz-Parreño, S., Paris-Alemany, A., & Cuenca-Martínez, F. (2021). Effectiveness of telerehabilitation in physical therapist practice: an umbrella and mapping review with meta–meta-analysis. *Physical therapy*, *101*(5), pzab075.

Tsekoura, M., Fousekis, K., Lampropoulou, S., Xergia, S., Bania, T., Tsepis, E., & Billis, E. (2022). Physiotherapists' perceptions and willingness to use telerehabilitation in Greece: a cross-sectional study. *Cureus*, *14*(12).

Tsekoura, M., Fousekis, K., Lampropoulou, S., Xergia, S., Bania, T., Tsepis, E. and Billis, E. (2022). Physiotherapists' Perceptions and Willingness to Use Telerehabilitation in Greece: A Cross-Sectional Study. *Cureus*, 14(12).

Wade, V. A., Eliott, J. A., & Hiller, J. E. (2014). Clinician acceptance is the key factor for sustainable telehealth services. *Qualitative health research*, *24*(5), 682-694.

World Confederation for Physical Therapists. (2022). Report sets out future of digital physical therapy practice. Accessed on 9th, June, 2025 from https://world.physio/news/report-sets-out-future-digital-physical-therapy-practice

Yip, M., Salcudean, S., Goldberg, K., Althoefer, K., Menciassi, A., Opfermann, J. D., ... & Lee, I. C. (2023). Artificial intelligence meets medical robotics. *Science*, *381*(6654), 141-146.

APPENDIX I

INFORMED CONSENT FORM

Title of study: Physiotherapists' perspective on use of telerehabilitation for physical modalities in patient care.

Investigator: Destiny Agbonavbare

Supervisors: Dr. Nicholas Oghumu.

Financial Sponsorship: This research project is self-sponsored

Purpose of the research: The purpose of the research is to determine the physiotherapists' perspective on use of telerehabilitation for physical modalities in patient care.

Procedures and protocol involved in the study

You are politely approached to respond to an interviewer-administered questionnaire interview.

This questionnaire would only be used for research purpose and will determine the physiotherapists' perspective on use of telerehabilitation for physical modalities in patient care

Compensation

There will be no financial compensation for participating in this study.

Voluntary Participation

Please note that your participation in this research is entirely voluntary. No form of discrimination will be meted to you, should you decide not to participate in this study; You are entirely free to change your mind and stop participating even if you agreed earlier.

Side Effects

There is no anticipated adverse effect associated with participating in this study.

Benefits

The purpose of the research is to assess physiotherapists' perspective on use of telerehabilitation for physical modalities in patient ca

Confidentiality

All information and data obtained in the course of this study will be treated confidentially. The names of the participants will not be written on the questionnaire, and all information collected will be encoded in a file in my personal computer and passworded. Thereafter the questionnaires will be shelved and locked in my personal document cabinet.

CONTACT INFORMATION

AGBONAVBARE DESTINY

PROJECT STUDENT

Email: destinyagbwat@gmail.com

Ethics and Research Committee

University of Benin Teaching Hospital

Benin City.

Phone Number: 07063331337

CERTIFICATE OF CONSENT

have read the above information (or it has been read to me). I had the opportunity to ask questions about it and the questions were answered to my satisfaction.

I consent voluntarily to take part as a participant in this study

I do not consent to participate in this study.

Signature of participant: _____

Date:_____

APPPENDIX II

QUESTIONNAIRE: FOR THE EVALUATION OF TELEREHABILITATION SERVICES IN SOUTH-SOUTH, NIGERIA.

Instruction: Tick on the most appropriate answer to you

Sociodemographic Data

1. Gender:

O Male

O Female

2. Age:

O 23-30 years

O 31–40 years

O 41–50 years

O 51–60 years

O ≥60 years

3. Which state do you reside in:

O Edo state

O Delta state

O Akwa-ibom

O Bayelsa

O Cross river state

O River state

4. Highest Physical Therapy Degree (Level of Education):

O Bachelor's

O Master's

O Doctor of Philosophy (PhD)

O Doctor of Physical Therapy (DPT)

5. Work setting (Multiple answers allowed):

O Teaching hospitals/ institute

O General hospital

O Private

O Other

6. Area of expertise (Multiple answers allowed):

O Cardiothoracic

O Ergonomics

O Geriatric rehabilitation

O Integumentary and post-burn rehabilitation

O Neurology

O Nutrition

O Oncology

O Orthopaedics

O Paediatrics

O Sports

O Women's Health

O Not applicable

7. Working experience:

O < 5 years

O 5–10 years

O 11-15 years

O >15 years

8. How many actual hours per week do you work?

O <10

O 10-20

O 21-30

O 31-40

O >40

Awareness and Perception

9. Do you believe that the inclusion of tele-rehabilitation would improve the quality of patient care?

O Yes

O No

10. Do you believe that tele-rehabilitation provides reliable outcome measures?

O Yes

O No

11. Do you believe that tele-rehabilitation provides valid outcome measures?

O Yes

O No

12. Do you agree that tele-rehabilitation is NOT feasible or effective for certain patients?

O Strongly agree.

O Agree

O Neutral

O Disagree

O Strongly disagree.

13. What are the strengths or advantages of using digital health tools/ Tele-rehabilitation? (Multiple answers allowed)

O Cost savings

O Easy access to a physiotherapist, particularly for patients who live in rural and remote areas.

O Flexible timetable

O Treatment adherence

O Outcome expectations

O Better continuity of care for patients traveling (traveling patients)

O Others

14. What could be a barrier for using digital health tools/ tele-rehabilitation in NIGERIA? (Multiple answers allowed)

O Provider willingness.

O Low technology literacy

O Internet connectivity issues

O Lack of awareness about digital health tools/tele-rehabilitation in society

O Lack of connection between ICT (Information and Communication Technology) experts and clinicians

O Inadequate Staff skills

O High costs.

O Patients have difficulty in explaining their conditions to the therapist.

O Patient privacy and difficulty in developing a relationship with the therapist

O Patients' adherence

O Elderly or poorly educated patients

O Others

15. Do you agree that the expectations of the patients play a key role in shaping the effect of tele-15 rehabilitation results?

O Strongly agree.

O Agree

O Neutral

O Disagree

O Strongly disagree.

16. Do you think that tele-rehabilitation enhances your communication with your patients and allows you to have a more transparent interaction with them?

O Yes

O No

17. Do you agree that digital health tools/ tele-rehabilitation will play an essential role in the future of the profession?

Strongly agree.

O Agree

O Neutral

O Disagree

Strongly disagree.

18. Do you recommend digital health tools/tele-rehabilitation to other physiotherapists?

O Yes

O No

PART: B

SURVEY OF PHYSICAL AGENT & THERAPEUTIC MODALITY USE IN PHYSICAL THERAPY

THERMOMODALITIES	Indicate frequency of use (times/day, or times/week, or ...) Please Choose The Most Appropriate One: times/day	times/wk	times/mo	times/yr	Was this modality covered in school?		Was it covered adequately?	
hot pack					yes	no	yes	no
cold pack					yes	no	yes	no
ice massage					yes	no	yes	no
paraffin					yes	no	yes	no
vapocoolant spray					yes	no	yes	no
infrared radiation (lamp)					yes	no	yes	no
fluidotherapy					yes	no	yes	no
diathermy (thermal)					yes	no	yes	no
diathermy (non-thermal)					yes	no	yes	no
ultrasound (thermal)					yes	no	yes	no
ultrasound (non-thermal)					yes	no	yes	no
phonophoresis					yes	no	yes	no
other _____					yes	no	yes	no
ELECTROMODALITIES								
TENS					yes	no	yes	no
FES/NMES (Functional/Neuromuscular Stimulator)					yes	no	yes	no
IFC (Interferential Current)					yes	no	yes	no
MENS (Micro Current Stimulator)					yes	no	yes	no
biofeedback					yes	no	yes	no
iontophoresis					yes	no	yes	no
high-voltage pulsed current					yes	no	yes	no
point locator/stimulator (electroacupuncture)					yes	no	yes	no
direct current (for wound healing)					yes	no	yes	no
hot quartz (UVA)					yes	no	yes	no
hot quartz (UVB)					yes	no	yes	no
cold quartz (UVC)					yes	no	yes	no
other _____					yes	no	yes	no
MECHANICAL AGENTS								
mechanical traction (cervical)					yes	no	yes	no
mechanical traction (lumbar)					yes	no	yes	no
Intermittent Pneumatic Compression (i.e. JOBST)					yes	no	yes	no
other _____					yes	no	yes	no

HYDROMODALITIES	Indicate frequency of use (times/day, or times/week, or ...) Please Choose The Most Appropriate One times/day	times/wk	times/mo	times/yr	Was this modality covered in school?		Was it covered adequately?	
whirlpool	_____	_____	_____	_____	yes	no	yes	no
Hubbard tank	_____	_____	_____	_____	yes	no	yes	no
contrast bath	_____	_____	_____	_____	yes	no	yes	no
therapeutic pool	_____	_____	_____	_____	yes	no	yes	no
nonimmersion irrigation device	_____	_____	_____	_____	yes	no	yes	no
other _____	_____	_____	_____	_____	yes	no	yes	no

OPEN-ENDED QUESTIONS

What is (are) the most important factor(s) you consider when deciding which modality to use? **Please rank them in order of importance (1,2,3, etc..).**

_____
_____
_____

What were some positives of your educational coverage pertaining to physical agents and therapeutic modalities?

_____
_____
_____

If a modalitity was not covered adequately above, what suggestions do you have that could have made the coverage better?

_____
_____

DEMOGRAPHIC INFORMATION

Gender: M F

Age: _____ years

Type of entry-level PT degree: Bachelors Masters Doctorate Other _____

Year of graduation with entry level P.T. degree: _____

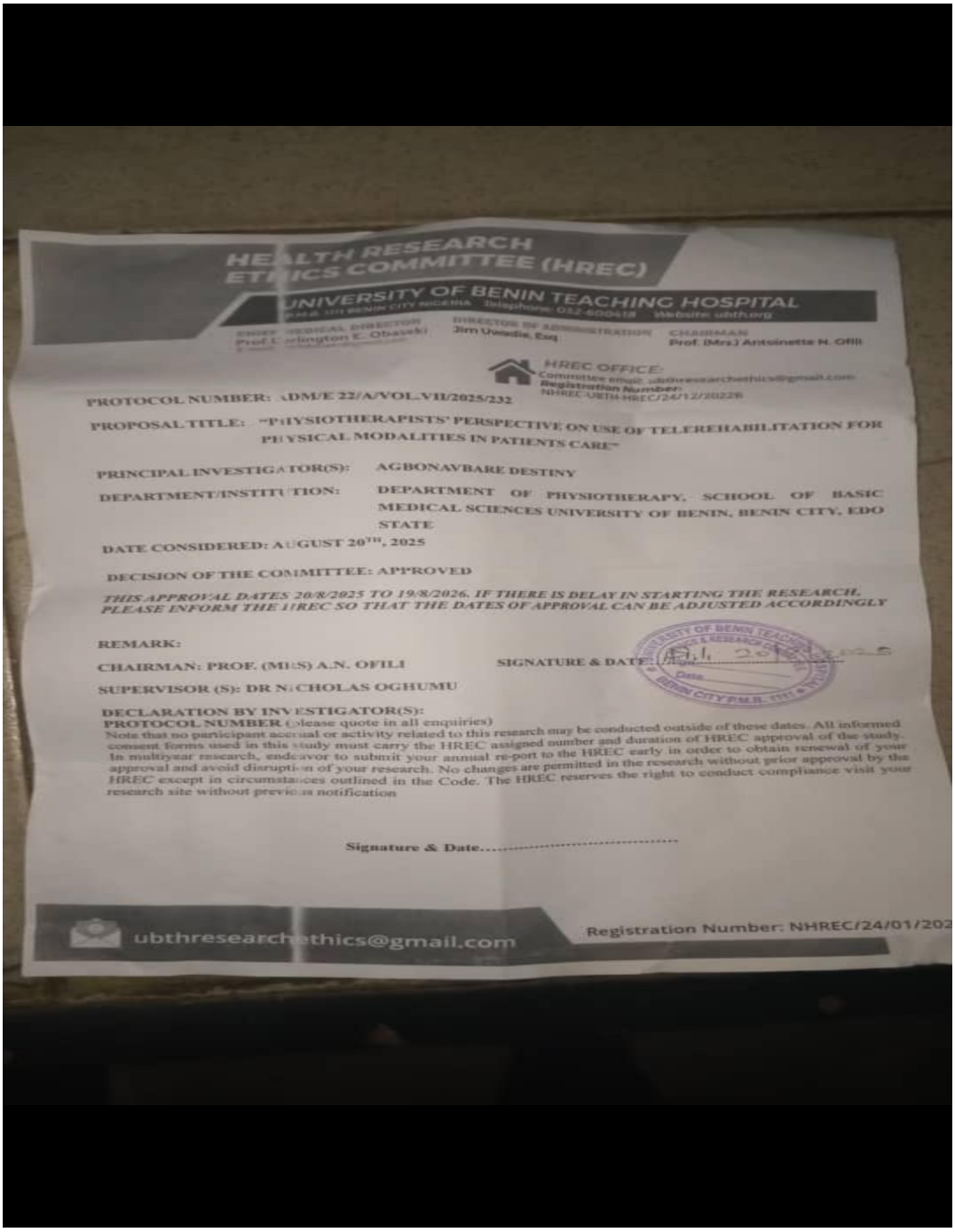
Clinical experience (in years): _____ years

State of residence where currently practicing: _____

Primary Practice Setting (e.g. acute, rehab, SNF, outpatient, etc): _____
(**Only** put more than one setting, if you spend an equal amount of time in each setting)

APPENDIX III

ETHICAL APPROVAL



HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHAIRMAN
Prof. (Mrs.) Antoinette N. Ofili

HREC OFFICE:
Committee email: ubthresearchethics@gmail.com
Registration Number:
NHREC/UBTH-HREC/24/12/20228

PROTOCOL NUMBER: UBTH/DM/E 22/A/VOL.VII/2025/232

PROPOSAL TITLE: "PHYSIOTHERAPISTS' PERSPECTIVE ON USE OF TELEREHABILITATION FOR PHYSICAL MODALITIES IN PATIENTS CARE"

PRINCIPAL INVESTIGATOR(S): AGBONAVBARE DESTINY

DEPARTMENT/INSTITUTION: DEPARTMENT OF PHYSIOTHERAPY, SCHOOL OF BASIC MEDICAL SCIENCES UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DATE CONSIDERED: AUGUST 20TH, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 20/8/2025 TO 19/8/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI SIGNATURE & DATE

SUPERVISOR (S): DR NICHOLAS OGHUMU

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date.....

ubthresearchethics@gmail.com Registration Number: NHREC/24/01/202