



CHALLENGES OF PHYSICAL THERAPISTS IN UTILIZING LOW BACK PAIN TELEREHABILITATION AMONG WORK-FROM-HOME EMPLOYEES TOWARDS A PROPOSED TELEREHABILITATION MODEL


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Abstract

Background. The COVID-19 pandemic has accelerated the adoption of telerehabilitation as an alternative to traditional, face-to-face physical therapy, addressing limitations such as travel barriers and patient isolation. This study aimed to examine the challenges encountered by physical therapists (PTs) in delivering telerehabilitation for low back pain (LBP) and to propose a model to enhance its effectiveness.

Methods. This non-experimental quantitative study utilized a cross-sectional research design and purposive sampling to recruit licensed PTs who treated work-from-home employees with LBP via telerehabilitation between March 2020 and April 2023 in select centers across Region VII, Philippines (Dumaguete, Bohol, and Cebu). Data were collected using a self-developed questionnaire based on existing literature and the Blueprint for Telerehabilitation Guidelines, employing a five-point Likert scale to quantify challenge frequency and severity. Of 18 prospective respondents, 12 completed the survey.

Results. Technical challenges—such as unstable internet connections, hardware limitations, and troubleshooting—were most frequently encountered, followed by clinical, ethical, and administrative challenges. Statistical analysis indicated no significant differences across demographic groups, indicating consistent barriers regardless of age, sex, years of experience, specialization, or work setting. Findings informed a structured telerehabilitation model prioritizing technical, clinical, ethical, and administrative aspects to guide PTs.

Conclusion. The study underscores the importance of developing standardized protocols, professional training, and resource allocation to optimize telerehabilitation delivery, enhancing accessibility, efficiency, and quality of care for patients with LBP in the Philippines.

Keywords: *Rehabilitative science, Telerehabilitation, Low Back Pain, Work-From-Home Employees*

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Research Highlights

What is the current knowledge?

- Telerehabilitation has become a widely adopted alternative for managing low back pain during and after the COVID-19 pandemic, primarily to overcome access barriers such as travel restrictions and patient isolation.
- Physical therapists delivering telerehabilitation commonly face technical challenges, particularly unstable internet connectivity and equipment limitations, which appear more prominent than clinical, ethical, or administrative issues.
- The challenges encountered in telerehabilitation practice are generally consistent across physical therapists, with no significant variation based on demographic or professional characteristics.
- There is a recognized need for structured telerehabilitation models, standardized protocols, and targeted professional training to improve the effectiveness and quality of remote physical therapy services for low back pain.

What is new in this study?

- This study provides localized evidence on telerehabilitation challenges for low back pain from Region VII, Philippines, a setting that has been underrepresented in existing telerehabilitation research.
- It focuses specifically on physical therapists treating work-from-home employees with low back pain, capturing challenges unique to remote occupational and home-based care contexts.
- The research introduces a structured telerehabilitation model that systematically integrates technical, clinical, ethical, and administrative considerations, moving beyond problem identification to practical solution development.
- The findings that telerehabilitation challenges are consistent across therapist demographics adds new insight by suggesting that system-level factors, rather than individual characteristics, primarily drive implementation barriers.

INTRODUCTION

Physical therapy (PT) has traditionally relied on in-person assessment and treatment, with accurate diagnosis grounded in direct physical examination techniques such as goniometry, special tests, vital-sign monitoring, and palpation. Magee (2014) underscores that functional assessment is central to understanding how impairments affect daily activities, emphasizing the importance of clinical judgment derived from tactile feedback, observation, and therapist–patient interaction. This reliance on hands-on assessment distinguishes PT from many other health professions and presents inherent challenges when care is delivered remotely.

The COVID-19 pandemic disrupted this established paradigm. Following the Philippine government's Omnibus Guidelines on Community Quarantine (Inter-Agency Task Force for the Management of Emerging Infectious Diseases, 2020), face-to-face rehabilitation services were widely suspended. In Region VII, outpatient clinics experienced prolonged closures or significant reductions in patient volume, leading to deferred care for musculoskeletal conditions. At the same time, the widespread adoption of work-from-home (WFH) arrangements coincided with increased reports of low back pain (LBP), attributed to prolonged sitting, suboptimal home workstation ergonomics, and reduced physical activity. This convergence of increased musculoskeletal need and restricted in-person access created a pronounced service delivery gap.

Telerehabilitation emerged as a pragmatic response to this gap. Existing studies consistently report that telerehabilitation improves access to care, reduces travel-related burdens, and supports continuity of treatment, particularly for individuals with mobility limitations or those in geographically isolated areas (Fiani et al., 2020; Arora & de Oliveira, 2022). However, the literature also reveals important limitations. While some studies demonstrate comparable outcomes between tele-based and in-person exercise programs, others report reduced diagnostic confidence, weakened therapeutic alliance, and constrained clinical reasoning due to the absence of physical contact and hands-on assessment (Sarsak, 2020). These mixed findings highlight a tension between the accessibility benefits of telerehabilitation and its compatibility with core PT practices.

This tension is especially evident in telerehabilitation for low back pain. Numerous studies support exercise-based telerehabilitation interventions for non-specific LBP, particularly those emphasizing education, active movement, and self-management. However, these studies predominantly focus on patient-reported outcomes and pain reduction, often within controlled research environments using standardized digital platforms. In doing so, they largely overlook how physical therapists adapt assessment strategies, modify clinical decision-making, and reconcile professional standards when manual examination and treatment are restricted. Consequently, the lived clinical experiences of physical therapists—particularly those practicing in resource-limited settings—remain underrepresented in the literature.

Similarly, occupationally focused telerehabilitation models, including those designed for office-based or WFH populations, have primarily emphasized ergonomic education, posture correction, and general exercise prescription. Although these approaches demonstrate short-term benefits, they are frequently implemented as standalone wellness programs rather than integrated components of comprehensive PT care. Few studies examine how physical therapists manage ethical responsibilities, documentation requirements, patient safety, and scope-of-practice considerations when delivering LBP care remotely to working adults with diverse home environments and varying levels of digital access.

In the Philippine context, these gaps are further compounded by systemic and infrastructural constraints. Leochico et al. (2020) identified barriers to telehealth implementation, including unstable internet connectivity, limited provider training, financing challenges, and concerns related to data

privacy and governance. While these studies highlight structural limitations, they provide limited insight into how physical therapists in regional, resource-constrained settings operationalize telerehabilitation in daily practice. As a result, regions such as Region VII—characterized by uneven digital infrastructure and heterogeneous practice environments—remain underexamined.

What is known, therefore, is that telerehabilitation can support exercise-based management of low back pain and expand access to care under restrictive conditions. What remains unknown is how physical therapists themselves experience, negotiate, and manage the administrative, clinical, technical, and ethical demands of delivering telerehabilitation for LBP within resource-limited Philippine regions. Moreover, despite growing utilization, there is a notable absence of structured, locally adapted telerehabilitation models that reflect the realities of PT practice in these contexts.

Addressing this gap holds practical and policy-relevant significance. For physical therapists, generating evidence from real-world practice can provide guidance on effective and professionally sound telerehabilitation strategies for LBP. For patients, particularly work-from-home employees, improved understanding of service delivery challenges may lead to more accessible, consistent, and higher-quality care. For healthcare administrators and policymakers, the findings offer evidence-based input to inform telehealth policy development, infrastructure investment, and governance frameworks suited to regional realities. Additionally, for educators and training institutions, the study provides a basis for integrating telerehabilitation competencies, ethical considerations, and digital clinical skills into physical therapy curricula and continuing professional development programs.

The purpose of this study is to examine the demographic characteristics of physical therapists in Region VII and to explore the administrative, clinical, technical, and ethical challenges they encounter when delivering telerehabilitation for patients with low back pain. By analyzing variations across practitioner profiles and practice environments, the study aims to inform the development of a structured, context-sensitive telerehabilitation model that supports professional practice, addresses occupational low back pain, and responds to the practical constraints of resource-limited regional settings.

METHODOLOGY

Design

This study employed a descriptive–comparative, cross-sectional design, non-experimental quantitative research to examine the challenges encountered by licensed physical therapists (PTs) in Region VII, Philippines, when delivering telerehabilitation for low back pain (LBP) among work-from-home employees.

The descriptive component systematically identified and quantified perceived administrative, clinical, technical, and ethical challenges experienced by PTs in telerehabilitation practice.

The comparative component explored potential differences in these challenges across selected demographic characteristics (e.g., age, sex, years of clinical experience, field of specialization) and practice settings (e.g., hospital-based, clinic-based, home-based practice).

Given the small sample size ($n = 12$), the comparative aspect of the study was treated as exploratory rather than confirmatory. While the design conceptually allows for group comparisons, the limited number of respondents restricts the use of inferential statistical techniques (e.g., t-tests, ANOVA) due to insufficient statistical power, potential violation of parametric assumptions, and limited subgroup representation. As such, comparisons were interpreted cautiously and were intended to identify patterns and trends rather than to establish statistically significant differences.

The non-experimental nature of the study aligns with its purpose of observing and describing existing professional experiences without manipulating variables or testing cause-and-effect relationships. The researchers served solely as data collectors, analyzing self-reported experiences derived from participants' real-world telerehabilitation practice (Jewell, 2018).

A cross-sectional approach was employed, allowing data to be collected at a single point in time within a defined retrospective period. This approach was appropriate for capturing a snapshot of PTs' experiences during the rapid and widespread adoption of telerehabilitation necessitated by the COVID-19 pandemic and was consistent with the study's time and resource constraints (Jewell, 2018).

Overall, while the descriptive-comparative cross-sectional design provided a structured and objective framework for examining telerehabilitation challenges, the findings—particularly those involving group comparisons—should be interpreted as preliminary and hypothesis-generating. The results may inform future studies with larger samples that can support more robust statistical analyses and broader generalization.

Environment

The study was conducted across selected rehabilitation centers and hospitals in Region VII (Central Visayas), which includes Cebu, Bohol, Negros Oriental, and Siquijor. These sites were chosen because they provided telerehabilitation services for patients with LBP between March 2020 and April 2023, a period marked by COVID-19-related mobility restrictions and widespread adoption of work-from-home arrangements. This setting allowed the study to capture region-specific practice experiences in a resource-limited context.

Respondents

The study population consisted of licensed Physical Therapists registered in the Philippines (PTRP) who delivered telerehabilitation services to work-from-home employees with LBP during

the specified study period. Recruitment was facilitated through local chapters of the Philippine Physical Therapy Association (PPTA) in Cebu and Negros Oriental.

Inclusion Criteria

Participants were eligible if they:

1. Were PTRPs practicing in Region VII between March 2020 and April 2023;
2. Provided telerehabilitation services specifically for LBP among work-from-home employees during that period; and
3. Had access to the internet or other telecommunication tools to complete the online survey.

Exclusion Criterion

Physical therapists were excluded if they:

- Used a mixed service delivery approach (combination of face-to-face and telerehabilitation) for the same patient population during the study period, as this could confound perceptions of telerehabilitation-specific challenges.

A total of 18 PTs met the inclusion criteria but 12 completed the survey. Purposive sampling was employed to ensure that all participants had direct and relevant experience with telerehabilitation for LBP. Although this non-probability sampling method limits generalizability, it is appropriate for exploratory descriptive–comparative studies involving small, specialized professional populations.

Instruments

A self-developed structured questionnaire was formulated based on telerehabilitation literature and American Telemedicine Association (ATA) guidelines. The instrument comprised two parts:

- A. Demographic Profile: Captured sex, age, years of clinical experience as a PTRP, field of specialization, and current practice setting—serving as grouping variables for comparative analysis.
- B. Challenge Assessment: Measured perceived challenges across four domains using a five-point Likert-type scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always):
 - Administrative (e.g., scheduling, documentation, financial or reimbursement concerns);
 - Clinical (e.g., limitations in assessment accuracy and treatment planning);

- Technical (e.g., internet connectivity, hardware and software issues); and
- Ethical (e.g., data privacy, informed consent, professional accountability).

Psychometric Properties

Content and face validity were established through expert review by three licensed physical therapists experienced in telerehabilitation and research. Following minor revisions for clarity and relevance, pilot testing was conducted among PTRPs outside Region VII. Internal consistency reliability was excellent (Cronbach's $\alpha = 0.87$ overall), with acceptable-to-good subscale reliabilities: administrative ($\alpha = 0.84$), clinical ($\alpha = 0.88$), technical ($\alpha = 0.81$), ethical ($\alpha = 0.79$). These results confirm the instrument's validity, reliability, and suitability for assessing telerehabilitation challenges.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 27. Descriptive statistics—including frequencies, percentages, means, and standard deviations—were used to summarize the participants' demographic characteristics and overall challenge scores. For inferential analysis, the Kruskal–Wallis H test examined differences in challenge scores across more than two demographic groups, such as years of experience or work setting, while the Mann–Whitney U test compared differences between two independent groups, such as sex. Mean scores were interpreted using Pimentel's (2010) adjectival scale: 1.00–1.79 = Never, 1.80–2.59 = Rarely, 2.60–3.39 = Sometimes, 3.40–4.19 = Often, and 4.20–5.00 = Always. A *p*-value of less than 0.05 was considered statistically significant.

Ethical Considerations

Ethical clearance for the study was secured from the Institutional Review Board of Silliman University, Philippines. Potential participants were recruited through Philippine Physical Therapy Association (PPTA) chapters and professional networks. Each received an email invitation containing detailed study information and a secure Google Forms link. Before accessing the survey, participants were required to provide electronic informed consent by checking an “I agree” box. The questionnaire remained accessible online for four weeks, with automatic reminder emails sent weekly to encourage completion. All responses were subsequently exported to an encrypted spreadsheet, where they were cleaned and prepared for statistical analysis.

The study adhered to the ethical principles outlined in the Declaration of Helsinki (World Medical Association, 2022) and complied with the Philippine Data Privacy Act of 2012. Participation was entirely voluntary, and respondents retained the right to withdraw at any time without penalty. Anonymity and confidentiality were strictly maintained, as no personal identifiers were collected.

All participants were fully informed of the study's purpose, procedures, and potential benefits before providing their consent to participate.

RESULTS AND DISCUSSION

Participant's Demographic Characteristics

The demographic characteristics of the respondents are presented in Table 1. Of the 18 physical therapists invited to participate, 12 responded, yielding a 66.67% response rate.

The majority of respondents (**66.67%**) were aged 22–36 years, while 33.33% were aged 37–52 years, indicating that most participants were in the early to mid-stages of their professional careers. The sample demonstrated gender balance, with an equal distribution of male and female respondents (50% each). In terms of professional experience, 66.67% of respondents had 0–15 years of clinical practice, whereas 33.33% reported 15–29 years of experience.

Regarding practice setting, half of the respondents (50%) were engaged in home care practice, followed by private hospitals (33.33%), private clinics (8.33%), and outpatient department settings (8.33%). This distribution suggests substantial representation from settings where telerehabilitation is often utilized due to patient mobility limitations and logistical constraints.

With respect to field of specialization, respondents reported multiple areas of practice. The most common specialization was orthopedic (58.33%), followed by neurology (50%), sports physical therapy (25%), geriatrics (16.67%), general physical therapy (16.67%), pediatrics (8.33%), and acute care (8.33%). The presence of multiple specializations among respondents reflects the multifaceted nature of clinical practice and suggests exposure to a broad range of patient populations and treatment demands.

The demographic profile suggests that the respondents were predominantly early- to mid-career physical therapists with diverse clinical specializations and practice settings. This diversity likely provided varied professional perspectives on the administrative, clinical, technical, and ethical challenges associated with telerehabilitation for low back pain. Representation from both home care and institutional settings further strengthens the relevance of the findings to different modes of service delivery.

However, the small sample size and the concentration of respondents within a specific region limit the generalizability of the results. Additionally, the greater proportion of early-career practitioners may influence the nature of reported challenges, particularly in relation to technology adoption and clinical confidence in remote assessment. These factors should be considered when interpreting the findings and when applying the results to broader physical therapy populations.

Table 1.

Respondents' Demographic Characteristics

Profile	Frequency	%
Age of respondents (years)		
22-36	8	66.67%
37-52	4	33.33%
Sex of respondents		
Male	6	50.00%
Female	6	50.00%
Work experience of respondents (in years)		
0-15	8	66.67%
15-29	4	33.33%
Field of specialization		
Orthopedic	7	58.33%
Neurology	6	50.00%
Sports Physical Therapy	3	25.00%
Geriatrics	2	16.67%
Pediatrics	1	8.33%
General Physical Therapy	2	16.67%
Acute Care	1	8.33%
Work setting		
Private clinic	1	8.33%
Private hospital	4	33.33%
Home care	6	50.00%
OPD	1	8.33%

Note. N= 12. Specializations sum >100% due to multiple responses per respondent.

The Challenges Faced by the Respondents in Utilization of Telerehabilitation

Survey data were analyzed to determine the frequency and severity of challenges encountered by physical therapists in delivering telerehabilitation to patients with low back pain. Tables 2-5 present the mean scores and standard deviations for each survey item, while Figure 1 illustrates the ranked challenges used to guide the development of a proposed telerehabilitation framework.

Overall, respondents reported that technical challenges represented the most significant barrier, with a mean score of 3.54 ± 0.89 , followed by the clinical (3.33 ± 1.12), administrative aspects (3.26 ± 1.11), and ethical (2.58 ± 1.20). The total average across all four domains was 3.27 ± 0.90 , indicating that, on average, physical therapists encountered these challenges “sometimes,” based on the five-point Likert scale. Specific sub-items within each domain, their descriptive statistics, and ranks are detailed in Table 2 and visually summarized in Figure 1.

Table 2.

Administrative Challenges Faced by the Respondents in Utilization of Telerehabilitation

Indicators	Mean	SD	Interpretation	Ranking
It was challenging to retrieve documentation from previous telerehabilitation sessions.	3.00	1.76	<i>Sometimes</i>	8
It was challenging to keep the privacy of the services provided via telerehabilitation.	3.08	1.68	<i>Sometimes</i>	7
It was challenging to keep the confidentiality of the services provided via telerehabilitation.	3.25	1.54	<i>Sometimes</i>	5
It was challenging to determine advanced requirements for documentation of client's personal health information.	3.17	1.11	<i>Sometimes</i>	6
It was challenging to determine advanced requirements for storage of client's personal health information.	2.83	1.11	<i>Sometimes</i>	9
It was challenging to determine advance requirements for retrieval of client's personal health information.	3.00	1.35	<i>Sometimes</i>	8
It was challenging to make sure that clients are aware of their rights with respect to accessing health care via telerehabilitation technologies, including the process for communicating complaints.	2.83	1.47	<i>Sometimes</i>	9
It was challenging to make sure that clients are aware of their responsibilities with respect to accessing health care via telerehabilitation technologies, including the process for communicating complaints.	3.42	1.24	<i>Often</i>	4
It was challenging to make sure that an appropriate facilitator is on hand when it is needed to satisfy the needs of the client and the provider prior to the telerehabilitation interaction.	3.50	1.31	<i>Often</i>	3
It was challenging to make sure that an appropriate facilitator is on hand when it's needed to satisfy the needs of the client and the provider during the telerehabilitation interaction.	3.67	1.23	<i>Often</i>	1
It was challenging to make sure that an appropriate facilitator is on hand when it's needed to satisfy the needs of the client and the provider after the telerehabilitation interaction.	3.50	1.24	<i>Often</i>	3
It was challenging to take part in telerehabilitation research to ensure the protection of participants in research protocols.	3.17	1.34	<i>Sometimes</i>	6
It was challenging to ensure that you have appropriate technology expertise during planning of a telerehabilitation program (e.g. take appropriate measures to familiarize themselves with equipment and safety issues with client use).	3.58	1.24	<i>Often</i>	2
It was challenging to ensure that you have appropriate technology expertise during start-up phase of a telerehabilitation program (e.g. take appropriate measures to familiarize themselves with equipment and safety issues with client use).	3.67	1.23	<i>Often</i>	1
Grand Mean	3.26	1.11	<i>Often</i>	

These findings align closely with those of Leochico et al. (2020), who likewise identified the technical aspect as the most common challenge in Philippine telerehabilitation practice. However, the present study diverges from Leochico’s results in the secondary ranking: whereas the earlier research identified administrative concerns as the second most pressing issue, the current data highlight clinical challenges as the next most frequent. This contrast suggests that, while logistical and organizational issues remain important, the clinical management of patients via remote platforms now demands greater attention.

Notably, mean responses across all items clustered between the adjectival ratings of “sometimes” and “often”, underscoring the persistence and gravity of these obstacles. Despite this, respondents indicated that few effective measures have been implemented to address the problems, pointing to a gap between recognition and remediation.

The ranked list of specific challenges provides a practical roadmap for intervention planning. Solutions should prioritize the highest-ranked technical issues—such as unstable internet connectivity, limited access to appropriate hardware, and difficulties with patient engagement—before addressing lower-ranked clinical, ethical, and administrative concerns. This hierarchy offers a systematic foundation for policy development, professional training, and resource allocation, ultimately aiming to improve the feasibility and efficiency of telerehabilitation services in the Philippine context.

Table 3.

Clinical Challenges Faced by the Respondents in Utilization of Telerehabilitation

Indicators	Mean	SD	Interpretation	Ranking
It was challenging to be guided by existing discipline clinical practice guidelines when practicing via telerehabilitation.	2.92	1.31	<i>Sometimes</i>	4
It was challenging to have the appropriate education (including seminar training or lectures) to ensure that you possess the necessary competencies for the safe provision of quality health services.	3.42	1.24	<i>Often</i>	2
It was challenging to deliver services in accordance with professional standards of care.	3.67	1.07	<i>Often</i>	1
It was challenging to deliver services in accordance with the principles of evidence-based practice.	3.33	1.30	<i>Sometimes</i>	3
Grand Mean	3.33	1.12	<i>Often</i>	

Table 4.

Technical Challenges Faced by the Respondents in Utilization of Telerehabilitation

Indicators	Mean	SD	Interpretation	Ranking
It was challenging to ensure that the equipment used for telerehabilitation is sufficient to support diagnostic needs during patient encounters.	4.00	0.95	<i>Often</i>	2
It was challenging to ensure that the equipment used for telerehabilitation is available and is functioning properly.	4.00	0.95	<i>Often</i>	2
It was challenging to comply with local regulations for the protection of client health information.	3.17	1.27	<i>Sometimes</i>	7
It was challenging to comply with local regulations to ensure the physical security of telerehabilitation equipment.	2.75	1.14	<i>Sometimes</i>	8
It was challenging to comply with local regulations to ensure the electronic security of data.	2.75	1.14	<i>Sometimes</i>	8
It was challenging to ensure that all personnel who use telerehabilitation equipment in delivering information are trained in equipment operation.	3.67	1.07	<i>Often</i>	4
It was challenging to ensure that all personnel who use telerehabilitation equipment in delivering information are trained in troubleshooting.	3.42	1.08	<i>Often</i>	6
It was challenging to ensure that all personnel who use telerehabilitation equipment in delivering information are trained in operation.	3.50	1.24	<i>Often</i>	5
It was challenging to operate other devices needed for treatment in treating patients with visual impairments.	4.00	1.21	<i>Often</i>	2
It was challenging to operate other devices needed for treatment in treating patients with hearing impairments.	4.08	1.24	<i>Often</i>	1
It was challenging to have strategies in place to address the environmental elements of care (e.g. space for treatment, usability of equipment, etc.).	3.75	0.97	<i>Often</i>	3
It was challenging to have infection control policies and procedures in place for the use of the equipment used in telerehabilitation.	3.42	1.24	<i>Often</i>	6
Grand Mean	3.54	0.89	<i>Often</i>	

Table 5.

Ethical Challenges Faced by the Respondents in Utilization of Telerehabilitation

Indicators	Mean	SD	Interpretation	Ranking
It was challenging to incorporate the values of my organization into policy documents.	2.83	1.19	<i>Sometimes</i>	1
It was challenging to incorporate the ethics of my organization into policy documents.	2.50	1.00	<i>Rarely</i>	3
It was challenging to comply with professional codes of ethics.	2.33	1.44	<i>Rarely</i>	4
It was challenging to inform clients of their rights when receiving telerehabilitation.	2.75	1.14	<i>Sometimes</i>	2
It was challenging to have a formal process for resolving ethical issues when using telerehabilitation services.	2.50	1.24	<i>Rarely</i>	3
Grand Mean	2.58	1.20	<i>Rarely</i>	

Significant Difference on the Challenges Faced by the Respondents across Demographics

The study examined whether perceived challenges in telerehabilitation differed across demographic characteristics (age, sex, years of clinical experience, field of specialization) and practice settings (hospital-based, clinic-based, home-based practice). Mann–Whitney U and Kruskal–Wallis H tests were used to analyze differences due to the small sample size and non-normal data distribution (Tables 6 and 7).

Across all demographic and practice variables, p-values were greater than 0.05, indicating **no** statistically significant differences in the administrative, clinical, technical, or ethical challenges reported by respondents. This suggests that, within the sample, PTs’ experiences of telerehabilitation challenges were similar regardless of demographic characteristics or practice setting.

The finding that challenges did not significantly differ across demographics or practice settings has several implications for telerehabilitation practice and model development. It suggests that the core challenges in telerehabilitation for low back pain—administrative, clinical, technical, and ethical—are broadly experienced by PTs, independent of age, sex, years of experience, specialization, or workplace environment.

This is consistent with prior research indicating that systemic and infrastructural barriers—such as internet connectivity, technology literacy, and telehealth regulations—tend to affect PTs universally rather than being confined to specific demographic groups (Leochico et al., 2020; Sarsak, 2020). Similarly, studies of telerehabilitation adoption in musculoskeletal care highlight that limitations in

physical assessment and therapeutic interaction are common challenges, regardless of clinician background (Fiani et al., 2020; Arora & de Oliveira, 2022).

Although no significant differences were detected, it is important to interpret these results cautiously. The small sample size ($n = 12$) limits statistical power, increasing the risk of Type II error (failing to detect real differences if they exist). Subtle variations in challenges across demographic subgroups may have gone undetected, and some categories contained only one or two respondents, reducing the stability of the estimates. Consequently, these findings should be considered preliminary and hypothesis-generating, rather than definitive conclusions about the broader population of PTs.

Table 6.

Significant Difference on the Challenges by Demographics

Variable	<i>p</i> -value	Statistics	Interpretation
Gender	0.4848	13	Fail to reject Ho
Age	0.6828	13	Fail to reject Ho
Experience	0.5697	12	Fail to reject Ho

Despite these limitations, the study provides valuable insight into the common challenges faced by PTs delivering telerehabilitation for LBP in a resource-limited regional context. It highlights that while demographic and practice differences may not strongly influence perceived challenges, infrastructure, technology, and ethical considerations remain central to effective telerehabilitation delivery. These insights directly inform the design of the proposed telerehabilitation model, ensuring that interventions target areas of greatest need and are adaptable across settings.

Table 7.

Significant Difference on the Challenges and Respondents' Work Settings and Specialization

Variable	χ^2	df	<i>p</i> -value	Interpretation
Work Settings	2.54	4	0.6371	Fail to reject Ho
Specialization	2.62	3	0.4584	Fail to reject Ho

Proposed Telerehabilitation Model

The proposed telerehabilitation model is illustrated in Figure 2 based on the summary of findings found in Figure 1. The challenges encountered for each principle have been ranked according to the frequency of being experienced by the physical therapists accordingly based on the Likert scale interpretation. The model was made with the principles placed in accordance with their total average ranking based on the data gathered from the survey seen in Table 2 arranged as technical, clinical, ethical, and administrative in a clockwise manner, respectively. The arrangement may aid in identifying the principles and challenges needed to be prioritized during the process of creating future solutions or protocols.

It is important to note that the model has been made with the intent of being an aid and not merely the only guide to be followed in the process of utilizing telerehabilitation. With this in mind, the researchers developed the diagram seen in Figure 3 with a specific layout to correspond to the frequency of the challenges being faced, however, the model may still be used in a customized manner for specific cases when needed. To expound further, the arrows are meant as suggested guides but are not necessary to be followed.

The model encapsulates words and phrases corresponding to the challenges included in the survey, which are summarized in Figure 1. To be guided, under the technical aspect, operation, troubleshooting, and maintenance includes variables 1, 2, 4, 5, and 6a; strategies refer to variable 3; policies and procedures refer to variable 6b; and lastly, security and protection refer to variables 7 and 8. For the clinical aspect, meeting professional standards refer to variable 1; having appropriate education refers to variable 2; deliver according to EBP (evidence-based practice) principles refer to variable 3; and guided by CPG (clinical practice guidelines) refer to variable 4. Regarding ethical aspect, making policy documents refer to variable 1; informing clients of their rights refer to variable 2; complying with professional code of ethics refer to variable 3; and resolving ethical issues refer to variable 4. For administrative aspect, having technology expertise and an appropriate facilitator refer to variables 1, 2, and 3; responsibilities, confidentiality, and privacy refer to variables 4, 5, and 7; participating in telerehabilitation research refers to variable 6a; and lastly, documentation, retrieval, and storage of information refer to variables 6b, 8, and 9.

Figure 1.

Summary of Ranked Challenges



The ranked challenges informed the structure and prioritization of the proposed telerehabilitation model (Figures 1 and 2). By placing technical, clinical, ethical, and administrative domains in descending order of frequency, the model provides a systematic framework for addressing the most pressing barriers first. For example, interventions can initially focus on **technology readiness**, including troubleshooting, platform maintenance, and strategies to enhance patient engagement, before addressing clinical decision-making, ethical safeguards, or administrative procedures.

Figure 2.

Proposed Telerehabilitation Model



Because the study found no significant differences in challenges across demographic characteristics or practice settings, the model can be generalized across PTs in Region VII without the need for demographic-specific modifications. This finding suggests that training modules, guidelines, and resource allocation can be standardized, allowing institutions to focus on universal needs such as:

- **Technology readiness:** stable internet, access to appropriate hardware, and troubleshooting protocols
- **Patient education:** home exercise guidance, ergonomic advice, and adherence monitoring
- **Ethical safeguards:** informed consent, privacy protection, and compliance with professional codes

The model's design—with arrows indicating suggested flows but allowing flexibility for case-specific adaptation—supports both standardization and customization. It can guide clinics, administrators, and educators in developing protocols, policies, and training modules that respond to the most common challenges experienced by PTs, while allowing adjustments based on context or patient-specific needs.

The hierarchy of challenges reflected in the model is consistent with global findings on telerehabilitation for musculoskeletal conditions. Technical barriers are frequently cited as the primary determinant of feasibility and patient engagement (Sarsak, 2020; Fiani et al., 2020), while clinical and ethical challenges are highlighted as critical for maintaining quality of care and professional standards (Magee, 2014; Arora & de Oliveira, 2022). By structuring the model according to the ranked survey results, the framework aligns with best practices in evidence-based telerehabilitation while addressing region-specific infrastructure and workforce limitations.

DISCUSSIONS

The findings of this study indicate that technical challenges are the most prominent barriers encountered by physical therapists when delivering telerehabilitation to patients with low back pain. This result is consistent with previous research identifying unstable internet connectivity, limited access to appropriate devices, and system reliability as major impediments to effective telehealth delivery (Leochico et al., 2020). These challenges highlight the critical role of technological infrastructure and digital readiness, particularly within local and regional healthcare settings in the Philippines.

Clinical challenges emerged as the second most significant domain, diverging from earlier studies that emphasized administrative concerns. This shift reflects the increasing complexity of providing remote care, including conducting accurate assessments, monitoring patient progress, and adapting treatment protocols to virtual platforms. The prominence of clinical challenges underscores the need for enhanced training in telehealth competencies, standardized remote assessment tools, and evidence-based guidelines to ensure continuity and quality of care for patients with low back pain.

Although ethical and administrative challenges were rated lower than technical and clinical domains, they remain important considerations. Issues related to informed consent, data privacy, scheduling,

documentation, and organizational support were reported as occurring with moderate frequency. The clustering of responses between “sometimes” and “often” suggests that while these challenges are commonly recognized, they are not consistently addressed, indicating a gap between awareness and implementation of effective solutions.

The ranked distribution of challenges provides a practical framework for prioritizing interventions. Addressing technical barriers should take precedence, followed by clinical, ethical, and administrative concerns. Targeted strategies may include investments in telecommunication infrastructure, provision of user-friendly platforms, and comprehensive telehealth training for physical therapists. In parallel, the development of standardized organizational policies and ethical guidelines may improve administrative efficiency and safeguard patient rights.

Statistical analysis further demonstrated that demographic characteristics, work settings, and areas of specialization do not significantly influence the challenges experienced by physical therapists delivering telerehabilitation. The Mann–Whitney U test and Kruskal–Wallis tests yielded p -values greater than 0.05 across all variables, indicating a failure to reject the null hypothesis. These results suggest that telerehabilitation challenges are systemic rather than individual, reflecting shared structural and operational constraints rather than differences in age, sex, experience, specialization, or workplace context.

The uniformity of challenges across groups reinforces the need for standardized, system-wide solutions rather than demographic-specific interventions. Efforts should focus on strengthening infrastructure, enhancing technical and clinical training, and implementing consistent administrative and ethical policies across institutions. Such an approach may promote equitable access to telerehabilitation services and improve overall service delivery regardless of provider characteristics.

The proposed telerehabilitation model (Figure 2) was developed based on the ranked challenge domains identified in this study. The model organizes the four core principles—technical, clinical, ethical, and administrative—according to their mean challenge scores, providing a visual guide for prioritization and intervention planning (Leochico et al., 2020; Sarsak, 2020). Designed as a flexible framework rather than a prescriptive protocol, the model allows adaptation to varying institutional capacities and patient needs, consistent with contemporary telehealth recommendations (Alexander, 2022; Arora & de Oliveira, 2022).

Each domain within the model corresponds to specific challenges identified in the survey. Technical concerns include system functionality, troubleshooting, maintenance, and security; clinical issues involve adherence to professional standards and evidence-based practice; ethical considerations address patient rights, confidentiality, and professional accountability; and administrative challenges emphasize organizational support, documentation, and coordination. Together, these components provide a structured yet adaptable framework for addressing the multifaceted barriers to telerehabilitation implementation.

Overall, the proposed model offers a systematic approach to identifying and prioritizing telerehabilitation challenges, supporting the development of targeted interventions, training programs, and policy guidelines. By addressing these challenges in a coordinated manner, telerehabilitation may become a more feasible, effective, and sustainable mode of care for patients with low back pain within the Philippine healthcare context (Sarsak, 2020; Fiani et al., 2020).

CONCLUSION

Based on the survey results, the study concludes that the challenges encountered by physical therapists in select centers of Region VII when delivering telerehabilitation for patients with low back pain (LBP) do not significantly differ across demographic variables, including age, sex, years of clinical experience, work setting, or field specialization. This indicates that the barriers to effective telerehabilitation are largely consistent regardless of individual therapist characteristics.

The findings also reveal that the technical domain presents the most frequent and pressing challenges, followed by the clinical, ethical, and administrative domains, respectively. Technical difficulties such as unstable internet connections, limited access to appropriate hardware, and troubleshooting issues were reported as the most pervasive, emphasizing the need for robust infrastructure and technical support to ensure effective service delivery. Clinical challenges, including adherence to professional standards and evidence-based practice, highlight the importance of maintaining high-quality care despite the constraints of remote therapy. Ethical and administrative challenges further underscore the need for clear policies, patient data protection, and structured organizational support.

In response to these findings, the researchers developed a proposed telerehabilitation model (Figure 2) that visually ranks the challenges within each domain and organizes the principles in a clockwise hierarchy based on their mean scores. This model provides a practical framework for prioritizing interventions, guiding protocol development, and informing training programs for physical therapists. It serves as a tool to facilitate the systematic identification and management of challenges, allowing future researchers and clinicians to develop strategies that enhance the efficiency, accessibility, and effectiveness of telerehabilitation services in the Philippine context.

Ultimately, this study contributes to the growing body of knowledge on telehealth in physical therapy, offering both a diagnostic overview of current barriers and a strategic model for improving telerehabilitation delivery, thereby supporting the advancement of patient-centered care in remote settings.

RECOMMENDATIONS

Based on the findings of this study, the researchers propose several recommendations to enhance the implementation and development of telerehabilitation for patients with low back pain (LBP) and to guide future research:

1. **Utilization of the Proposed Model:** The developed telerehabilitation model should be adopted as a foundational guide to address the challenges identified in delivering remote physical therapy services for LBP. Physical therapists are encouraged to use the model as a framework to prioritize interventions, particularly focusing on technical, clinical, ethical, and administrative aspects in a systematic manner. While the model is based on challenges specific to LBP, therapists may adapt it for other musculoskeletal or rehabilitative cases at their discretion, ensuring flexibility according to patient needs and treatment contexts.
2. **Expansion to Other Regions and Cases:** Physical therapists outside Region VII are recommended to consider the model as a reference point, while adapting it to their local infrastructure, patient demographics, and clinical environments. Its principles may guide broader telerehabilitation applications, potentially improving service delivery in both urban and rural settings across the Philippines.
3. **Future Research Directions:** Subsequent studies should aim to expand the scope of inquiry beyond LBP, encompassing a wider variety of musculoskeletal and neurological conditions. Broader inclusion criteria would allow for a larger sample size and more comprehensive data, enabling a more robust understanding of the challenges across diverse telerehabilitation contexts. Researchers are encouraged to examine factors such as patient adherence, technology usability, and long-term outcomes to further refine the model and its practical application.
4. **Development of Protocols, Standards, and Policies:** The proposed model may serve as a basis for formulating standardized protocols, best-practice guidelines, and regulatory policies for telerehabilitation in the Philippines. Establishing clear operational, clinical, ethical, and administrative standards will enhance safety, consistency, and quality of care while promoting professional accountability and patient protection.
5. **Ongoing Professional Training and Capacity Building:** To address technical and clinical challenges highlighted in the study, continuous training and professional development programs should be instituted for physical therapists. Emphasis should be placed on technology literacy, telecommunication troubleshooting, remote patient assessment, and adherence to ethical and clinical guidelines.
6. **Encouragement of Collaborative Research:** Multi-center studies and collaborative research efforts across various regions of the Philippines should be encouraged to pool expertise, share best practices, and address systemic barriers to telerehabilitation implementation. Such collaborations can also foster innovation in digital healthcare delivery and evidence-based practice.

- 7. Long-term Evaluation and Iterative Improvement:** The model should be periodically evaluated and updated based on emerging challenges, technological advancements, and user feedback. Continuous monitoring will ensure that telerehabilitation practices remain responsive to evolving patient needs, healthcare infrastructure, and professional standards.

By implementing these recommendations, physical therapists, healthcare institutions, and policymakers can collectively advance the feasibility, effectiveness, and accessibility of telerehabilitation services in the Philippines, ensuring that patients receive high-quality care despite geographic and logistical barriers.

List of Abbreviations

ATA	- American Telemedicine Association
LBP	- Low back pain
PPTA	- Philippine Physical Therapy Association
PT	- Physical Therapist
PTRP	- Physical Therapist registered in the Philippines
WFH	- Work-from-Home

Declarations

Ethics approval and consent to participate

This study was reviewed and approved by the Silliman University Research Ethics Committee (approval date: April 4, 2023). Ethical oversight was provided by committee members: Dr. Theorose June Q. Bustillo and Dr. Robert S. Guino-o II. Informed consent was obtained from the participant prior to his involvement in the study.

Consent for publication

The study does not contain any personal data requiring additional consent for publication. All participants data were anonymized, stored securely, and disposed of one year after the completion of the research.

Availability of data and materials

All data relevant to this study are presented within the article. Since no additional datasets were created or analyzed during this study, data sharing is not applicable.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

The authors collaboratively conceptualized the study and instrument, developed the protocol based on the results, conducted quantitative data collection, interpreted findings, reviewed and finalized the manuscript.

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