

Comparative Study of Hybrid Conventional In-Person Physiotherapy Convenience and Patient Preference

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ABSTRACT

Background: Telerehabilitation may improve access to physiotherapy by reducing travel burden, time constraints, and repeated outpatient visits; however, fully remote rehabilitation may not be suitable for all patients because physiotherapy often requires direct assessment, exercise correction, manual techniques, and patient–therapist interaction. A hybrid model combining initial in-person physiotherapy with online follow-up may provide a practical alternative. **Objective:** To assess patient preference and perceived convenience regarding hybrid telerehabilitation compared with conventional in-person physiotherapy among outpatient physiotherapy patients in Karachi. **Methods:** A cross-sectional observational survey was conducted among 200 physiotherapy outpatients recruited through non-probability purposive sampling from physiotherapy outpatient departments in Karachi. Data were collected using an adapted questionnaire covering demographics, technology access, telerehabilitation awareness, caregiver support, perceived convenience, preferred service-delivery model, reasons for preference, perceived care quality, and willingness for online follow-up. Descriptive statistics were reported as frequencies, percentages, means, and standard deviations. **Results:** Most participants were female (77.0%), and the mean age was 38.97 ± 11.80 years. Musculoskeletal conditions were the most common diagnosis (88.5%). Hybrid telerehabilitation was preferred by 57.0% of participants, compared with in-person visits by 32.0% and telerehabilitation alone by 11.0%. Travel convenience was the leading reason for preference (39.5%). Smartphone access was reported by 82.0%, caregiver support by 80.5%, perceived same quality of care by 67.5%, and willingness for online follow-up by 67.5%. **Conclusion:** Hybrid telerehabilitation was the most preferred model and was perceived as convenient by many outpatient physiotherapy patients, although future studies are needed to evaluate clinical effectiveness, safety, adherence, and cost outcomes. **Keywords:** Telerehabilitation; Hybrid Telerehabilitation; Physiotherapy; Patient Preference; Convenience; Outpatient Rehabilitation

INTRODUCTION

Rehabilitation is an essential component of health care that aims to optimize functioning, reduce disability, improve participation in daily life, and support recovery among individuals affected by acute, chronic, or long-term health conditions (1). Within rehabilitation services, physiotherapy plays a central role in restoring movement, reducing pain, improving functional independence, preventing secondary complications, and supporting patients with musculoskeletal, neurological, cardiopulmonary, and other functional limitations through exercise therapy, education, manual techniques, physical modalities, and individualized care planning (2,3). Despite its clinical importance, access to physiotherapy remains uneven, particularly in settings where patients face travel burden, cost constraints, long waiting times, limited specialist availability, and repeated visit requirements. These barriers may reduce continuity of

care and can be especially difficult for older adults, patients with mobility limitations, individuals living in distant areas, and those requiring prolonged rehabilitation follow-up (4,5).

Telerehabilitation has emerged as a service-delivery approach that uses telecommunication and digital technologies to provide rehabilitation assessment, education, monitoring, exercise instruction, and follow-up support remotely (6). Its relevance increased substantially during and after the COVID-19 pandemic, when health systems were required to maintain continuity of care while reducing unnecessary in-person contact and travel burden (7,8). In physiotherapy practice, telerehabilitation may improve accessibility, reduce indirect treatment costs, enhance scheduling flexibility, and support adherence by allowing patients to continue guided rehabilitation within their home environment. However, telerehabilitation alone may not be suitable for all patients or all phases of care because some conditions require hands-on assessment, manual therapy, supervised correction of movement patterns, physical examination, and use of clinic-based equipment or modalities (9,10). Patient satisfaction may also be influenced by digital literacy, internet availability, privacy, therapeutic rapport, perceived safety, and confidence in receiving care without direct physical contact.

A hybrid telerehabilitation model, in which initial in-person physiotherapy is combined with subsequent remote follow-up sessions, may offer a pragmatic balance between conventional face-to-face care and fully remote rehabilitation. The initial in-person component allows the therapist to assess the patient directly, establish therapeutic rapport, demonstrate exercises, identify safety concerns, and determine whether the patient can continue selected components of rehabilitation remotely. Subsequent telerehabilitation sessions may then reduce travel frequency, improve convenience, and allow continuity of care for patients who are clinically stable and able to follow home-based instructions. This model may be particularly relevant in urban referral settings such as Karachi, where patients may travel from distant areas for physiotherapy services and may discontinue treatment because of transport cost, time demands, household responsibilities, or difficulty attending repeated clinic visits.

Previous studies have reported that telerehabilitation and hybrid rehabilitation models can be feasible and acceptable across several clinical populations, including patients with musculoskeletal disorders, chronic respiratory disease, cardiac conditions, neurological conditions, and older adults (11–13). Evidence from interventional and review-based literature suggests that remotely supported rehabilitation may produce comparable outcomes to conventional care in selected populations, particularly when programs are structured, monitored, and supported by trained professionals. Nevertheless, much of the existing literature focuses on clinical effectiveness, adherence, or cost outcomes in disease-specific populations, while less attention has been given to patient preference and perceived convenience in routine outpatient physiotherapy settings. In Pakistan, and particularly in Karachi, local evidence remains limited regarding whether physiotherapy patients prefer a hybrid model over conventional in-person physiotherapy and which factors influence this preference.

Understanding patient preference is important because acceptability influences uptake, adherence, satisfaction, and the practical implementation of new service-delivery models. A hybrid model may only be clinically and operationally useful if patients have access to basic technology, feel comfortable attending online sessions, perceive remote follow-up as time-saving, and trust that quality of care can be maintained for appropriate components of rehabilitation. Conversely, limited awareness of telerehabilitation, lack of digital access, low health literacy, absence of caregiver support, and concerns about treatment quality may restrict adoption. Therefore, patient-centered evidence is required before hybrid telerehabilitation can be recommended as a routine adjunct to conventional physiotherapy services in local outpatient settings.

This study was conducted to assess patient preference and perceived convenience regarding hybrid telerehabilitation compared with conventional in-person physiotherapy among patients attending physiotherapy outpatient departments in Karachi. The study specifically examined access to technology, familiarity with telerehabilitation, prior participation in telerehabilitation, availability of caregiver

support, perceived time effectiveness and comfort of online sessions, preferred mode of physiotherapy service delivery, reasons for preference, perceived quality of remote care, and willingness to receive follow-up through telerehabilitation. The research question was whether patients attending physiotherapy outpatient departments prefer a hybrid telerehabilitation model over conventional in-person physiotherapy, and which convenience-related factors are associated with that preference.

MATERIALS AND METHODS

This cross-sectional observational survey was conducted to assess patient preference and perceived convenience regarding hybrid telerehabilitation compared with conventional in-person physiotherapy among patients attending physiotherapy outpatient departments in Karachi, Pakistan. The cross-sectional design was selected because the objective was to measure patient perceptions, preferences, and convenience-related factors at a single point in time rather than to evaluate treatment effectiveness, clinical outcomes, or longitudinal adherence. Data collection was carried out over approximately six months after approval of the study synopsis in physiotherapy outpatient departments of Jinnah Postgraduate Medical Centre and The Care Medical Center, Karachi.

The study population comprised adult physiotherapy patients attending outpatient services during the data-collection period. Participants were eligible if they were aged 18–60 years, were male or female, and were receiving or seeking physiotherapy care for musculoskeletal, soft-tissue, cardiopulmonary, or neurological conditions requiring outpatient rehabilitation. Patients were excluded if they had impaired cognitive ability, significant visual or auditory limitations that prevented questionnaire completion, or insufficient ability to understand and respond to the questionnaire. Eligible participants were selected using a non-probability purposive sampling technique. Patients who fulfilled the eligibility criteria were approached in the outpatient setting, informed about the study purpose, and included after consent. Participation was voluntary, and responses were collected for research purposes without altering the clinical care received by the participants.

The sample size was calculated using the OpenEpi online sample size calculator, version 3.01, for estimation of a single proportion. Using an expected proportion of 55.7% for agreement toward teleconsultation, a 6.9% margin of error, and a 95% confidence level, the minimum required sample size was calculated as 200 participants (14). A total sample of 200 patients was therefore recruited for the final analysis.

Data were collected using an adapted questionnaire for which permission had been obtained from the original author. The questionnaire contained 14 items organized into three domains: demographic and clinical characteristics, convenience-related factors, and preference-related factors. Demographic and clinical variables included age, gender, marital status, diagnosis, type of treatment, and duration of treatment. Convenience-related variables included access to technology, familiarity with telerehabilitation, previous participation in telerehabilitation sessions, availability of a family member or caregiver to assist during sessions, perceived time effectiveness of hybrid telerehabilitation compared with only in-person visits, and comfort in attending physiotherapy sessions online from home. Preference-related variables included preferred service-delivery approach, main reason for preference, perceived satisfaction with hybrid telerehabilitation compared with telerehabilitation alone, perceived quality of care through telerehabilitation compared with in-person care, and willingness to receive follow-up visits through online telerehabilitation sessions.

For this study, telerehabilitation was operationally defined as the delivery of rehabilitation-related services through telecommunication or digital technology. Conventional in-person physiotherapy was defined as physiotherapy delivered through face-to-face visits in a clinical setting. Hybrid telerehabilitation was defined as a combined model in which patients receive initial or periodic in-person physiotherapy sessions along with subsequent or follow-up sessions delivered remotely through telecommunication technology. Convenience was assessed through patient-reported indicators related

to technology access, caregiver support, time effectiveness, and comfort with home-based online sessions. Preference was assessed by asking participants to select their preferred approach among conventional in-person visits, hybrid telerehabilitation sessions, and telerehabilitation alone, and by identifying the main reason for that preference.

Completed questionnaires were coded and entered into IBM Statistical Package for the Social Sciences, version 23.0, for statistical analysis. Categorical variables were summarized as frequencies and percentages, while continuous variables, including age and duration of treatment, were summarized as mean and standard deviation. Descriptive analysis was used to summarize demographic characteristics, clinical characteristics, convenience-related responses, and preference-related responses. Associations between gender and selected convenience-related and preference-related variables were examined using Pearson chi-square tests where assumptions were met. For categorical comparisons with small expected cell counts, Fisher's exact test was considered more appropriate. A p-value of less than 0.05 was treated as the threshold for statistical significance. The analysis was interpreted as an assessment of association between patient characteristics and reported perceptions, not as evidence of clinical effectiveness or causality because of the cross-sectional design.

To reduce information bias, the questionnaire was administered using the same item structure for all participants, and eligibility criteria were applied before recruitment. To limit selection-related variability, participants were recruited from defined outpatient physiotherapy settings during the study period. Data were reviewed for completeness before analysis, and categorical responses were coded according to predefined response options. The study maintained participant confidentiality during data handling and analysis, and no personally identifying information was reported in the results.

RESULTS

A total of 200 physiotherapy outpatients were included in the analysis. The demographic distribution of the participants is presented in Table 1.

Table 1. Demographic Characteristics of Study Participants

Variable	Category	n	%
Gender	Male	46	23.0
	Female	154	77.0
Marital status	Single	45	22.5
	Married	135	67.5
	Divorced	3	1.5
	Widowed	17	8.5

The study sample was predominantly female, with 154 participants representing 77.0% of the total sample, while males accounted for 23.0%. Most participants were married, comprising 67.5% of the sample, followed by single participants at 22.5%. Divorced and widowed participants represented smaller proportions of the sample, at 1.5% and 8.5%, respectively.

Table 2. Age and Duration of Treatment Among Study Participants

Variable	Mean	SD
Age, years	38.97	11.80
Duration of treatment, months	1.63	2.67

The mean age of participants was 38.97 ± 11.80 years, indicating that the sample mainly represented adult physiotherapy patients within the working-age population. The mean duration of treatment was 1.63 ± 2.67 months, suggesting that most participants were surveyed during the early phase of outpatient physiotherapy care.

Table 3. Clinical Diagnosis of Study Participants

Diagnosis	n	%
Musculoskeletal condition	177	88.5

Diagnosis	n	%
Soft tissue injury	18	9.0
Cardiopulmonary condition	2	1.0
Neurological condition	3	1.5

Musculoskeletal conditions constituted the largest diagnostic category, accounting for 88.5% of the sample. Soft tissue injuries were reported in 9.0% of participants, while cardiopulmonary and neurological conditions were less frequent, representing 1.0% and 1.5% of the sample, respectively. This distribution indicates that patient perceptions regarding hybrid telerehabilitation in this study were mainly derived from individuals receiving physiotherapy for musculoskeletal complaints.

Table 4. Convenience-Related Responses Toward Hybrid Telerehabilitation

Variable	Response	n	%
Access to technology	Computer	4	2.0
	Smartphone	164	82.0
	Conventional	1	0.5
	Internet connection	31	15.5
Familiarity with telerehabilitation	Yes	16	8.0
	No	184	92.0
Previous participation in telerehabilitation	Yes	9	4.5
	No	191	95.5
Availability of family member or caregiver support	Yes	161	80.5
	No	39	19.5
Perceived time effectiveness of hybrid telerehabilitation compared with only in-person visits	Strongly agree	49	24.5
	Agree	93	46.5
	Not sure	7	3.5
	Strongly disagree	11	5.5
	Disagree	40	20.0
Comfort level for attending physiotherapy sessions online at home	Very comfortable	21	10.5
	Somewhat comfortable	101	50.5
	Neutral	22	11.0
	Somewhat uncomfortable	49	24.5
	Very uncomfortable	7	3.5
Perceived comfort in attending physiotherapy sessions online at home	Strongly agree	38	19.0
	Agree	95	47.5
	Not sure	17	8.5
	Strongly disagree	2	1.0
	Disagree	48	24.0

Most participants reported access to a smartphone, with 164 participants representing 82.0% of the sample, while 15.5% reported internet connection as their main access category. Despite this level of technology access, familiarity with telerehabilitation was low; only 8.0% of participants were familiar with the concept, and only 4.5% had previously participated in telerehabilitation sessions. Caregiver or family support during sessions was available to 80.5% of participants. Regarding time effectiveness, 71.0% of participants either agreed or strongly agreed that hybrid telerehabilitation would be more time-effective than only in-person visits. In terms of comfort, 61.0% reported being very or somewhat comfortable attending physiotherapy sessions online at home, and 66.5% agreed or strongly agreed that online home-based physiotherapy sessions would be comfortable.

Table 5. Preference-Related Responses Toward Physiotherapy Service Delivery Models

Variable	Response	n	%
Preferred physiotherapy approach	In-person visits	64	32.0
	Hybrid telerehabilitation sessions	114	57.0
	Telerehabilitation alone	22	11.0
Main reason for preference	Cost	31	15.5
	Travel convenience	79	39.5
	Effectiveness	36	18.0
	Privacy at home	12	6.0
	Other reasons	42	21.0

Variable	Response	n	%
Perceived satisfaction with hybrid telerehabilitation compared with telerehabilitation alone	Agree	8	4.0
	Disagree	7	3.5
	Not sure	21	10.5
	Somewhat dissatisfied	39	19.5
	Somewhat satisfied	108	54.0
	Strongly agree	7	3.5
	Very satisfied	9	4.5
Perceived same quality of care via telerehabilitation as in-person care	Yes	135	67.5
	No	65	32.5
Preference for online telerehabilitation follow-up visit	Yes	135	67.5
	No	65	32.5

Hybrid telerehabilitation was the most preferred physiotherapy service-delivery approach, selected by 114 participants, representing 57.0% of the total sample. Conventional in-person visits were preferred by 32.0%, while telerehabilitation alone was preferred by 11.0%. Travel convenience was the most frequently reported reason for preference, identified by 39.5% of participants, followed by other reasons at 21.0%, perceived effectiveness at 18.0%, cost at 15.5%, and privacy at home at 6.0%. More than half of the participants reported being somewhat satisfied with hybrid telerehabilitation compared with telerehabilitation alone. A majority of participants also perceived that telerehabilitation could provide the same quality of care as in-person care, with 67.5% responding yes. The same proportion, 67.5%, indicated willingness to receive follow-up visits through online telerehabilitation sessions.

The gender-based association analyses reported in the original draft were not retained in the revised results because the cross-tabulated counts were internally inconsistent with the descriptive results. For example, previous participation in telerehabilitation was reported descriptively as 9 participants, but the gender association table reported 46 participants in the corresponding “yes” category. Similarly, some gender-stratified percentages did not match the reported denominators. Therefore, inferential statistics for gender-based associations should be regenerated from the original SPSS dataset before inclusion in the final manuscript. Once corrected, association tables should report valid gender-stratified frequencies, percentages based on correct denominators, the appropriate test statistic, and exact p-values, using Fisher’s exact test where expected cell counts are small.

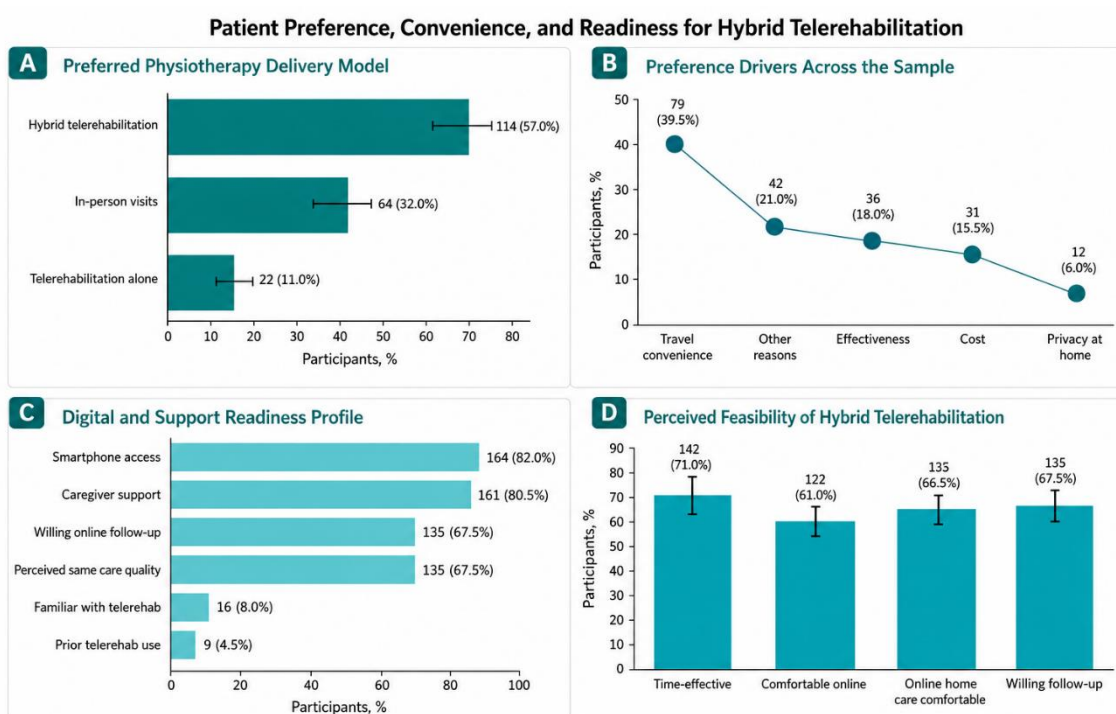


Figure 1. Patient Preference, Convenience, and Readiness for Hybrid Telerehabilitation

The panelled figure shows that hybrid telerehabilitation was the most preferred physiotherapy delivery model, selected by 114 of 200 participants (57.0%), compared with conventional in-person visits in 64 participants (32.0%) and telerehabilitation alone in 22 participants (11.0%). Travel convenience was the leading driver of preference, reported by 79 participants (39.5%), followed by other reasons in 42 participants (21.0%), perceived effectiveness in 36 participants (18.0%), cost in 31 participants (15.5%), and privacy at home in 12 participants (6.0%). The readiness profile demonstrated high smartphone access in 164 participants (82.0%) and caregiver support in 161 participants (80.5%), while prior exposure to telerehabilitation remained limited, with only 16 participants (8.0%) familiar with the concept and 9 participants (4.5%) having previous telerehabilitation experience. Perceived feasibility indicators were favorable: 142 participants (71.0%) considered hybrid telerehabilitation time-effective, 122 participants (61.0%) were comfortable attending online sessions at home, 133 participants (66.5%) agreed that home-based online physiotherapy would be comfortable, and 135 participants (67.5%) were willing to receive online follow-up sessions. Collectively, the figure indicates a clinically relevant gap between low prior telerehabilitation exposure and relatively high readiness for hybrid follow-up, suggesting that patient education and structured implementation may improve acceptability in outpatient physiotherapy services.

DISCUSSION

The present study evaluated patient preference and perceived convenience regarding hybrid telerehabilitation compared with conventional in-person physiotherapy among outpatient physiotherapy patients in Karachi. The main finding was that hybrid telerehabilitation was the most preferred service-delivery approach, selected by 57.0% of participants, whereas 32.0% preferred conventional in-person visits and only 11.0% preferred telerehabilitation alone. This pattern suggests that patients may not view remote rehabilitation as a complete replacement for face-to-face physiotherapy, but many appear receptive to a blended model in which in-person assessment and therapeutic contact are retained while follow-up or selected components of care are delivered remotely. This interpretation is clinically relevant because hybrid models may preserve the perceived safety and relational benefits of in-person care while reducing repeated travel demands and improving service accessibility.

Travel convenience emerged as the most frequently reported reason for preference, identified by 39.5% of participants, followed by other reasons, perceived effectiveness, cost, and privacy at home. This finding is consistent with the practical barriers commonly encountered in outpatient physiotherapy, where repeated clinic attendance may be difficult for patients with pain, restricted mobility, work responsibilities, household commitments, transport limitations, or residence far from specialized rehabilitation services. The finding that 71.0% of participants agreed or strongly agreed that hybrid telerehabilitation would be time-effective further supports the view that convenience and time saving are central to patient acceptability. However, these findings should be interpreted as patient-reported perceptions rather than evidence that hybrid telerehabilitation improves clinical outcomes or reduces treatment costs.

The readiness profile in this study provides an important implementation signal. Although only 8.0% of participants were familiar with telerehabilitation and only 4.5% had previously participated in telerehabilitation sessions, 82.0% had smartphone access, 80.5% had caregiver or family support, 67.5% believed that telerehabilitation could provide the same quality of care as in-person care, and 67.5% were willing to receive follow-up visits through online telerehabilitation. This contrast between low prior exposure and relatively high willingness suggests that lack of awareness, rather than lack of acceptability, may be a major barrier to adoption in this setting. Educational orientation before initiating online follow-up, demonstration of digital platforms during the first in-person visit, and clear patient instructions may therefore improve confidence and uptake.

The preference for a hybrid model rather than telerehabilitation alone is consistent with the clinical nature of physiotherapy practice. Many patients require initial hands-on assessment, observation of posture and movement, correction of exercise technique, manual therapy, and condition-specific risk screening before safe transition to home-based or remotely supervised rehabilitation. A hybrid approach may be particularly suitable for patients with stable musculoskeletal conditions, soft tissue injuries, postoperative follow-up needs, and maintenance-stage exercise programs, provided that the therapist determines that remote follow-up is clinically appropriate. Conversely, patients requiring complex manual assessment, frequent physical reassessment, specialized modalities, neurological handling, or close cardiopulmonary monitoring may require a greater proportion of in-person care. Therefore, hybrid telerehabilitation should be understood as a flexible delivery model rather than a universal substitute for conventional physiotherapy.

The present findings are broadly aligned with emerging evidence suggesting that hybrid telerehabilitation can improve access and acceptability while maintaining continuity of rehabilitation care in selected populations. Wuyts and colleagues reported that hybrid pulmonary rehabilitation showed high adherence and better accessibility when compared with conventional pulmonary rehabilitation, supporting the feasibility of blended service delivery in chronic respiratory care (35). Similarly, qualitative evidence from service users, caregivers, and health professionals in neurological rehabilitation has indicated positive perceptions of telerehabilitation while also recommending hybrid delivery, with in-person rehabilitation used especially in early stages and telerehabilitation used later for follow-up and continuity (36). Evidence from pediatric cerebral palsy rehabilitation during the COVID-19 period also highlights the potential role of telerehabilitation in maintaining rehabilitation access when conventional attendance is disrupted (37). The current study extends this literature by providing local outpatient physiotherapy data from Karachi, with a specific focus on patient preference and perceived convenience rather than disease-specific treatment outcomes.

The findings should also be considered in relation to the broader telerehabilitation literature on musculoskeletal disorders. Recent evidence has suggested that telerehabilitation may be a useful option when optimal face-to-face rehabilitation is not feasible, particularly because it can reduce time and indirect costs while supporting access to therapeutic exercise and follow-up (33). However, the present study did not directly measure pain reduction, functional improvement, adherence over time, cost-effectiveness, quality-adjusted outcomes, or patient safety. Therefore, while participants expressed preference and perceived feasibility, the study cannot establish that hybrid telerehabilitation is clinically equivalent or superior to conventional physiotherapy. Future interventional or prospective studies should evaluate whether the reported preference translates into improved attendance, adherence, satisfaction, functional recovery, and cost-related outcomes.

This study has several limitations that should be acknowledged. The use of non-probability purposive sampling limits generalizability beyond the included outpatient departments. The sample was predominantly female and mainly represented patients with musculoskeletal conditions, so the findings may not apply equally to neurological, cardiopulmonary, pediatric, geriatric, or highly complex rehabilitation populations. The questionnaire-based design relied on self-reported perceptions, which may be influenced by social desirability, limited understanding of telerehabilitation, or hypothetical expectations rather than actual experience. The very low proportion of participants with previous telerehabilitation experience further indicates that many responses reflected anticipated rather than experienced convenience. In addition, the original gender-based association tables contained internally inconsistent counts and percentages and should not be interpreted until the cross-tabulations are regenerated from the original dataset. The study also did not include validated clinical outcome measures, treatment adherence tracking, therapist workload assessment, cost analysis, or long-term follow-up.

Despite these limitations, the study contributes useful local evidence by identifying a preference pattern that favors hybrid telerehabilitation over fully remote or fully in-person models among outpatient physiotherapy patients. Its practical strength lies in showing that many patients have basic technological access and caregiver support but limited prior knowledge of telerehabilitation. This combination suggests that implementation efforts should focus on patient education, structured triage, digital orientation, privacy safeguards, and clear clinical criteria for selecting patients who can safely transition from in-person sessions to online follow-up. Future research should use validated questionnaires, probability-based or multicenter sampling, corrected inferential analysis, and prospective designs to examine whether hybrid telerehabilitation improves continuity of care, patient adherence, clinical outcomes, cost efficiency, and patient satisfaction in different physiotherapy populations.

CONCLUSION

This cross-sectional survey found that hybrid telerehabilitation was preferred by most outpatient physiotherapy participants, with travel convenience, time effectiveness, comfort with home-based online sessions, perceived quality of care, and willingness for online follow-up emerging as important acceptability indicators. The findings suggest that patients may be receptive to a blended physiotherapy model that retains initial or periodic in-person care while using telerehabilitation for appropriate follow-up and home-based rehabilitation support. However, because the study measured preference and perceived convenience rather than clinical outcomes, the results should not be interpreted as evidence of therapeutic superiority or equivalence. Hybrid telerehabilitation may be a feasible patient-centered adjunct to conventional physiotherapy in outpatient settings, but further prospective and interventional studies are needed to evaluate its clinical effectiveness, safety, adherence, cost-effectiveness, therapist workload, and long-term implementation outcomes.

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