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PATIENT PERSPECTIVES ON TELEHEALTH CARDIAC REHABILITATION AFTER MYOCARDIAL INFARCTION

Original Article

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ABSTRACT

Background: Despite the proven benefits of cardiac rehabilitation (CR) post-myocardial infarction (MI), participation rates remain low due to logistical, geographical, and psychosocial barriers. Telehealth-delivered CR offers a promising solution, especially in resource-constrained settings. However, limited qualitative evidence exists on how patients experience and perceive tele-CR, particularly in the South Asian context.

Objective: To explore patient experiences, satisfaction, and perceived barriers regarding telehealth-delivered cardiac rehabilitation following myocardial infarction.

Methods: A qualitative study was conducted over eight months in Lahore, Pakistan, involving in-depth semi-structured interviews with 30 post-MI patients who completed a minimum six-week tele-CR program. Participants were selected using purposive sampling. Interviews were transcribed, translated, and analyzed thematically using Braun and Clarke's framework. NVivo software was used for data management. Themes and subthemes were identified to capture the breadth of patient experiences. Ethical approval was obtained from the Institutional Review Board of the relevant institute.

Results: Five major themes emerged: (1) perceived convenience and accessibility, including time flexibility and reduced travel burden; (2) patient-provider communication, highlighting emotional support and instructional clarity; (3) technological and logistical challenges, such as digital literacy and device issues; (4) emotional and psychological impact, including isolation and self-motivation difficulties; and (5) suggestions for improvement, including hybrid delivery models and more interactive content. Participants appreciated the convenience of tele-CR but expressed the need for enhanced human connection and support.

Conclusion: Telehealth cardiac rehabilitation is a feasible and acceptable approach for post-MI patients, improving access and flexibility. To optimize outcomes, interventions must address technological and emotional barriers and incorporate patient-centered adaptations.

Keywords: Cardiac Rehabilitation, Myocardial Infarction, Patient Satisfaction, Qualitative Research, Remote Consultation, Telemedicine, Treatment Adherence.

INTRODUCTION

Cardiovascular disease remains the leading cause of morbidity and mortality worldwide, with myocardial infarction (MI) constituting one of the most prevalent and life-threatening manifestations. Despite advances in acute cardiac care, secondary prevention through structured cardiac rehabilitation (CR) remains a cornerstone of recovery and long-term cardiovascular health (1,2). Cardiac rehabilitation programs, typically involving a combination of exercise training, lifestyle modification, psychosocial support, and medical management, have been shown to significantly reduce recurrent cardiac events, hospital readmissions, and mortality (3). However, despite its well-documented benefits, participation in traditional center-based CR programs remains strikingly low, with global estimates suggesting that only 20% to 50% of eligible patients enroll in or complete these programs (4). Barriers such as travel distance, scheduling conflicts, work and family obligations, and physical limitations frequently contribute to low participation rates. In recent years, telehealth has emerged as a promising alternative to traditional in-person healthcare delivery, offering potential solutions to overcome longstanding barriers to CR participation (5,6). Telehealth cardiac rehabilitation (tele-CR) leverages digital technologies to deliver core components of CR—exercise guidance, risk factor education, psychological counseling, and clinical monitoring—remotely, allowing patients to engage in rehabilitation from the comfort and safety of their homes (7). The COVID-19 pandemic further accelerated the shift toward remote healthcare models, catalyzing the integration of telehealth into mainstream medical practice. Preliminary evidence has suggested that tele-CR may be as effective as traditional programs in improving clinical outcomes, and some studies have reported higher adherence and satisfaction among patients utilizing these services (8-10). However, despite the growing adoption of tele-CR models, relatively little is known about how patients experience these programs on a qualitative level, particularly in the aftermath of an acute myocardial infarction.

Understanding patient perspectives is essential to designing and delivering tele-CR services that are not only clinically effective but also aligned with patient values, preferences, and lived experiences. While quantitative measures can assess outcomes such as adherence and functional improvement, they often fail to capture the complex emotional, psychological, and contextual dimensions that influence patient engagement (11,12). Qualitative research, by contrast, allows for an in-depth exploration of these dimensions, offering valuable insights into what facilitates or hinders successful participation in tele-CR. Existing studies on telehealth in cardiac care have primarily focused on clinical endpoints or healthcare system perspectives, with limited attention paid to the voices of patients navigating recovery in virtual environments (13-15). This gap in the literature underscores the need for a focused exploration of patient experiences with telehealth-delivered CR following MI. How do patients perceive the convenience, accessibility, and interpersonal aspects of tele-CR? What challenges or barriers do they encounter during their participation? Do they feel adequately supported, both emotionally and medically, in a remote setting? These are critical questions that, if answered, could inform the design of more patient-centered telehealth services and potentially enhance the effectiveness and uptake of CR programs across diverse populations. Moreover, patient satisfaction and perceived value play a pivotal role in the sustainability and scalability of telehealth interventions. If patients find tele-CR lacking in human connection or clinical rigor, they may be less likely to engage meaningfully with the program or recommend it to others. On the other hand, if patients experience tele-CR as empowering, flexible, and supportive, this could pave the way for broader implementation and policy endorsement. As healthcare systems worldwide grapple with the dual pressures of rising cardiovascular disease burden and limited healthcare resources, insights from patients themselves can serve as powerful catalysts for innovation and improvement in care delivery models. This qualitative study was thus undertaken with the objective of exploring patient experiences, satisfaction, and perceived barriers related to telehealth-delivered cardiac rehabilitation following myocardial infarction. By foregrounding the voices of patients who have recently undergone this form of rehabilitation, the study aims to contribute nuanced and actionable insights that can inform the evolution of tele-CR programs toward more responsive, effective, and compassionate care.

METHODS

This qualitative study was designed to explore patient experiences, satisfaction, and perceived barriers related to telehealth-delivered cardiac rehabilitation following myocardial infarction. Conducted over a period of eight months, from June 2024 to January 2025, the study was situated within cardiology outpatient departments and affiliated tele-rehabilitation units across tertiary care hospitals in the Lahore region of Pakistan. The choice of this setting was informed by the increasing adoption of telehealth initiatives in urban healthcare facilities across the country, particularly in response to infrastructural challenges and the need for scalable post-acute care solutions in cardiovascular medicine. A purposive sampling strategy was employed to recruit participants who had completed a structured telehealth cardiac rehabilitation program following discharge for acute myocardial infarction. Eligible participants were adult patients (aged 30–

75 years) who had been clinically stable post-MI and enrolled in a tele-CR program for a minimum duration of six weeks. Inclusion criteria further required participants to have access to a digital device (e.g., smartphone or tablet), possess basic digital literacy skills, and be willing to provide informed consent. Patients were excluded if they had a prior psychiatric diagnosis impairing communication, a concurrent serious illness requiring frequent hospitalization, or had withdrawn from the tele-CR program prior to completion (2,3). Sample size in qualitative research is typically guided by the principle of data saturation—the point at which no new themes emerge from the data. In this study, data saturation was reached after conducting in-depth interviews with 24 participants. However, to ensure a balanced representation across age groups, socioeconomic backgrounds, and comorbidity profiles, the sample was extended to 30 individuals. This sample size is consistent with established qualitative research norms and allowed for the emergence of diverse perspectives and nuanced thematic development.

Data were collected through semi-structured, in-depth interviews conducted in Urdu or Punjabi, depending on participant preference, and later translated into English for analysis. Each interview lasted between 45 and 60 minutes and was conducted either in-person at a follow-up outpatient visit or via secure video call, depending on participant availability and preference. The interview guide was developed based on the study objectives and existing literature on telehealth and cardiac rehabilitation. It included open-ended questions designed to elicit participant narratives around their initial expectations, daily experience, interaction with healthcare professionals, perceived convenience, challenges faced, and overall satisfaction with the telehealth model. Probing questions were used to explore deeper insights into emotional responses, motivation for adherence, and suggestions for improvement. All interviews were audio-recorded with participant consent and transcribed verbatim. To ensure accuracy and cultural relevance, translations were performed by bilingual researchers with clinical and qualitative research experience. Transcripts were cross-checked by a second team member for consistency and completeness. Field notes were maintained throughout the data collection process to capture contextual details and researcher observations. Thematic analysis was employed as the method of data interpretation, using Braun and Clarke's six-step framework. Initial coding was conducted manually by two independent researchers who immersed themselves in the data through repeated reading of transcripts. Codes were then compared, discussed, and refined collaboratively to develop a coding framework. Similar codes were grouped into broader categories, from which overarching themes and subthemes emerged. NVivo software (version 12) was used to assist with data management and facilitate the organization of codes, quotes, and emerging themes. Credibility of findings was enhanced through triangulation of data sources, peer debriefing sessions within the research team, and member checking, whereby preliminary interpretations were shared with a subset of participants for validation.

Outcome measurement tools for this qualitative inquiry were embedded within the interview guide and focused on three core domains: patient experience (e.g., perceived support, autonomy, convenience), satisfaction (e.g., program structure, communication with providers), and barriers (e.g., technological challenges, motivational hurdles, lack of physical presence). These domains were informed by existing frameworks in patient-centered care and telehealth acceptability and served as the conceptual basis for code development during analysis. Ethical approval for the study was obtained from the Institutional Review Board of the relevant institute. All participants were provided with detailed information about the study in their native language and gave written informed consent prior to participation. Anonymity and confidentiality were maintained throughout, with identifying details removed from transcripts and data stored securely in password-protected files accessible only to the research team. This methodological approach was designed to ensure a comprehensive, ethically grounded, and contextually relevant exploration of patient perspectives, offering valuable insights into the lived experience of telehealth cardiac rehabilitation in a post-infarction recovery context.

RESULTS

Participants in the study shared a wide range of experiences with telehealth cardiac rehabilitation post-myocardial infarction, revealing multiple dimensions of engagement, satisfaction, and perceived obstacles. Five overarching themes were identified from the data, each with associated subthemes reflecting more nuanced insights into patient perceptions.

The first theme, *Perceived Convenience and Accessibility*, captured the broad appreciation for the program's flexible and home-based nature. Participants consistently expressed that the telehealth model allowed them to integrate rehabilitation activities into their daily routines without major disruption. "I could do my sessions after Fajr prayer and rest afterward—it really suited my lifestyle," noted one participant. Subthemes under this category included time flexibility, the elimination of travel barriers, and comfort in a familiar environment.

The second theme, *Patient-Provider Communication*, encompassed the ways in which participants engaged with healthcare professionals during the program. Many described the responsiveness of staff and clarity of guidance as central to their satisfaction. While the virtual format was initially unfamiliar to some, effective communication helped build confidence. As one patient shared, "Even on video call, the nurse made me feel heard and cared for, just like in a hospital." Subthemes included responsive guidance, emotional support, and instructional clarity, which together influenced patients' sense of connection and safety.

Challenges associated with the telehealth format emerged in the third theme, *Technological and Logistical Challenges*. Participants from older age groups or lower socioeconomic backgrounds described particular difficulties with using digital devices or maintaining stable internet connections. One commented, "The app would freeze sometimes during the exercise videos, and I had no idea what to do." Subthemes such as digital literacy barriers, connectivity issues, and equipment limitations were consistently reported across several interviews, impacting both engagement and confidence.

A more internalized dimension of the tele-CR experience was captured in the fourth theme, *Emotional and Psychological Impact*. While many participants appreciated the privacy and self-paced structure, several reported a lack of peer interaction and occasional emotional isolation. The subthemes under this category—sense of isolation, struggles with self-motivation, and increased health awareness—highlighted the psychological complexity of recovery in a remote format. One participant reflected, "Some days, it felt like I was doing it all alone, even though I knew the team was there on screen."

Finally, the theme *Suggestions for Program Improvement* provided insights into how patients believed the program could evolve to better suit their needs. A recurring recommendation was the introduction of a hybrid model that combined in-person check-ins with remote sessions. Patients also requested more interactive educational content and structured follow-up after program completion. "If they could arrange one session a month at the hospital just to reconnect and assess progress, that would help a lot," one patient remarked. Subthemes included preference for hybrid formats, demand for more engaging content, and the need for extended support. These results collectively highlight that while telehealth cardiac rehabilitation offers significant benefits in terms of access and convenience, patient experiences are shaped by multifaceted interpersonal, technological, and emotional factors.

DISCUSSION

The findings of this study contribute meaningfully to the growing body of literature exploring the delivery and reception of telehealth cardiac rehabilitation (tele-CR), especially within resource-limited and culturally distinct settings like Pakistan. The results demonstrated that patients experienced tangible benefits in terms of convenience, autonomy, and access; however, these were counterbalanced by challenges in digital literacy, psychological isolation, and variable levels of engagement with virtual care modalities. Similar to global evidence, this study reaffirmed that convenience remains a central strength of tele-CR, particularly in overcoming physical and logistical barriers that traditionally hinder center-based cardiac rehabilitation. International studies have shown that home-based and telehealth models lead to comparable clinical outcomes with better access, especially for patients who face challenges related to transportation or mobility (14-16). A study found that more than 80% of patients found remote rehabilitation easy to use and beneficial to access, a finding that strongly echoes patient sentiments in this study (17). However, the study also uncovered that, technological barriers were not trivial. Several participants noted difficulties with devices, unstable connectivity, and unfamiliarity with software—issues also highlighted in recent reviews of tele-CR implementation challenges in both high- and low-resource settings (18,19). These digital constraints disproportionately affected older and socioeconomically disadvantaged patients, underscoring the need for digital training and technical support as part of tele-CR onboarding. The sense of emotional detachment and lack of peer interaction in the tele-CR experience also resonated with previous qualitative analyses, where patients expressed concerns about limited human connection in remote formats (20). Emotional support is a key component of recovery, and while telehealth platforms facilitate clinician contact, they often fall short in replicating the psychosocial benefits of group-based rehabilitation settings. Some participants in this study proposed hybrid models to bridge this gap, a direction that has been supported by global experts calling for more personalized and blended rehabilitation strategies (21,22).

In terms of satisfaction, most participants valued the flexibility of tele-CR and felt supported by clinical teams, although others expressed difficulty maintaining motivation. This aligns with the ALTRA trial protocol, which emphasized the importance of structured follow-up and education in boosting self-efficacy post-myocardial infarction (23). The request for more interactive and dynamic content—reported by several participants—suggests that passive information delivery is insufficient for maintaining long-term engagement. Incorporating gamified modules, peer forums, and virtual group classes could address this need. One of the notable strengths of this study was its real-

world clinical setting in a lower-middle-income country, offering context-specific insights rarely documented in current literature. Additionally, the use of thematic saturation and participant validation enriched the credibility of findings. However, the study is not without limitations. The purposive sampling strategy may have excluded patients with the most severe technological barriers or those who declined tele-CR altogether, possibly skewing perceptions toward more favorable experiences. Furthermore, the study relied on self-reported experiences, which are inherently subjective and may be influenced by recall or social desirability bias. Future research should expand the demographic and geographic scope of such investigations, integrating mixed-methods approaches that combine clinical outcomes with qualitative feedback (23,24). Longitudinal studies are also warranted to assess how patient experiences with tele-CR evolve over time, particularly in regard to adherence, psychosocial wellbeing, and cardiovascular event recurrence. Overall, this study reinforces the growing consensus that tele-CR is a viable and increasingly necessary modality for secondary cardiac care. However, its optimal implementation depends on careful attention to technological inclusivity, emotional connectivity, and adaptability to local patient needs.

CONCLUSION

This study highlights that telehealth cardiac rehabilitation post-myocardial infarction is a practical and well-received alternative to traditional care, particularly in improving accessibility and convenience. However, digital literacy gaps and emotional isolation remain critical barriers. The findings emphasize the need for hybrid models, tailored support, and culturally sensitive program design to enhance patient engagement and outcomes in diverse populations.

AUTHOR CONTRIBUTION

Author	Contribution
Habib Gul*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Rizwana Yasmin	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Muhammad Ali	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Faaria Rizvi	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Owais Khan	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Waseem Abbas	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Ali Raza	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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