Facilitators and Barriers to the Adoption of Lifestyle and Therapy Mobile Health Applications

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Abstract: This qualitative research examined the facilitators and the barriers to use of lifestyle and therapy mobile health (mHealth) applications in 30 adult users (P1-P30) in a semi-urban Indian environment, to fill the gaps in user trust, privacy issues, and features of the mobile health application that would determine long-term use. With semi-structured thematic analysis and in-depth semi-structured interviews, seven general themes were identified: general usage perceptions (ex: motivations to use stress reduction, sleep improvement), app design/usability (easy interfaces appreciated by P1-P3, P24-P29), technical access (crash, storage in P21-P27), social support (family sharing, unanimous doctor recommendation), motivation/engagement (gamification, progress tracking in P24-P25), therapy specific apps (mood tracking), and others. Deductive coding found 10 key barriers; validity (poor quality data), technology (incompatibility), usability (poor layouts), data privacy/security (data insecurity in P2, P4, P24-P30), use/adherence (poor engagement), knowledge/skills gaps, patient-physician issues, individuality, implementation (resistance of clinicians), costs. The main facilitators were personalization (individual reminders), user empowerment, social/professional validation and system integration. The results are in line with the TAM, DOI, and TDF recommendations and emphasize usability, trust, and cultural considerations to contribute to improved adoption through user-friendly design and privacy protection.

Keywords: mHealth apps, obstacles to adoption, facilitators, thematic analysis, privacy of data, usability.

Introduction

In the current world, the delivery of healthcare services has moved beyond the traditional face to face interactions due to the advent of the information and communication technology (ICT). ICT aids healthcare by availing healthcare electronic communication and system networking provisions, availing, exchanging, and facilitating the sharing of information related to healthcare. Mobile health (mHealth) was coined in 2003; Robert Istepanian uses the term to refer to the application of the emerging mobile communications and network technologies in healthcare. Mhealth services interact more with people and with greater adaptability as opposed to using desktops and laptops to provide web-based health services, which are restricted to time and place. Mobile technologies and the apps that utilize smartphones, in particular, can contribute to increasing the effectiveness of healthcare delivery, which will eventually result in making healthcare more efficient and assisting people in managing their chronic conditions more effectively. [1].

Mobile health (mHealth) applications have also turned out to be groundbreaking tools in healthcare, giving the patients better access to medical knowledge, monitoring functionality, and communicating with clinical personnel. Despite its potential, there are innumerable obstacles to the usage and further use of mHealth apps as seen through the eyes of the patients. These limitations include technological, usability, budget, and psychological ones that limit the effectiveness and availability of these devices. [2].
Among patients (in general terms, that is, people who want to attend to their health or improve its condition), tasks such as wellness management, behavioral change encouragement and monitoring, health data collection, disease management, self-diagnosis, medication reminders, and schedule management can be applied using mHealth apps.

The mHealth apps can be of different kinds; some of them gather health data about patients, and others are simply the guidelines on meeting the healthy lifestyle requirements and about certain diseases. One of such reasons is the worry about the security and privacy of health data that are considered to be vital to people who are not going to use mHealth apps in their own health care More precisely, people are not sure what kind of information are gathered and stored by mHealth applications, to whom can access the self-entered and sensor-recorded data, and what will the purposes in the use of data are when the problem is connected with stigma, social isolation, or discrimination like HIV/AIDS, sexual orientation, and mental illness.

None of these issues are new as in recent years, the health records of millions of patients have been compromised due to hacking or other incidents, and at the same time, most

smartphone users (patients and health care providers) lack the simplest prerequisite security functionality (the use of a passcode) to avoid access to their personal data on their phones.

Among the potential solutions to the problem of concerns about privacy by the users of the mHealth app could be to find out what concerns mHealth app users have, assess the relationship between these concerns and the features of the mHealth app users (like demographics, experience with technology, and health care needs) and finally finding out mHealth app features that can provide those users with the Trust they need in the apps that they will begin to use the mHealth apps in their own health care and management. That is, research into the obstacles and facilitators of the use of mHealth apps can result in the establishment of some means of making mHealth apps more widely adopted among the users. [3].

Medical applications are one of the types of mobile health (mHealth) tools that allow patients to take a more active role in being healthy. Medical information and health care services were traditionally associated with healthcare facilities. In the present day, patients can be monitored and self-engaged by reaching a huge number of target population members through the usage of mobile devices. This will provide the chance to target users who would otherwise be hard to reach in terms of health issues, including the older generation, the younger generation or residents of rural areas with limited healthcare facilities. During the rapid growth of the sphere of medical apps, besides patients, the phenomenon of a patient, physicians have also undergone a paradigm shift in their information behavior as they have been employing smartphones and apps to find web-based medical resources in their clinical routine over the last several years. Smart phones and medical applications also appear to be highly used by the trauma surgeons and orthopedic surgeons. Surgeons in Germany (mostly 79.1% of trauma and orthopedic surgeons) reported smartphone and medical apps (64.4% of them used in their daily clinical practice). Although the possibilities brought about by the use of this advancing technology are quite numerous, the evidence base is still limited and additional researches are required. [4].

mHealth apps can help in screening, monitoring and treatment of chronic diseases, and can help in self-management, such as physical activity. MyHeart Counts smartphone showed that it is possible to conduct a large-scale, rapid, real-world evaluation of physical activity, fitness and sleep in an app, and in this case more than 40,000 individuals were involved in the data collection within 8 months. My Heart Mate is a coronary heart disease game-based app that was acceptable to patients but failed to reduce CVD risk factors and lifestyle behaviors. An overview of mHealth applications to prevent CVD

found that there are features of apps that are applicable in various areas of life, but they had nothing to do with lifestyle changes. The researchers found that further studies are necessary to research on these features of applications. [5].

We are now able to do many things in a better efficient way due to some of the advanced technological innovations. The use of technology in healthcare is currently developing at a high rate and offers new avenues of self-management of health. Although older adults can be considered a technological laggard, the use of internet in this subpopulation has been reported to be growing at a rapid rate every year. Indicatively, older adults in the UK aged 65-74 years have slowly developed internet usage over the past 8 years that were 52 percent in 2011, and 83 percent in 2019. There is also the reported trend of increasing the number of smartphone owners across the globe. [6].

Much of the literature has demonstrated the usefulness of mHealth applications in enhancing self-care, self-management, self-efficacy, and medication adherence and the quality of sleep, diet, physical activity, and mental health. There are also many studies that showed the effectiveness of mHealth in older adults. Studies have shown that using mHealth technology with medical counseling by the medical practitioners can assist the older age segment to initiate good lifestyle with regard to improving their daily food consumption, quality sleep and exercise. This will in turn increase their self-efficacy to manage and monitor their health, especially when someone has a chronic disease. An example is that a web-based educational system in older adults was identified to be cost effective in self-perceived disability and informational support scale. Other advantages that have been reported include assisting in eliminating prevailing obstacles to the treatment like long queues at hospitals, inaccessibility of means of transport and high expense of healthcare. Although mHealth has a variety of advantages to older adults, barriers to its use have been cited that the subpopulation experiences. Usability problems, reduced senses and unfamiliarity with such technology were the most common obstacles cited in the literature. [6].

Analysis

A thematic analysis of the interview data identified seven overarching themes with multiple subthemes, as summarized in Table 1

Table 1: Themes and Subthemes Derived from Interview Data

Main Theme	Subtheme	Participants	Interpretation
General Usage and Perception	Motivation	"Reduce stress," "Better sleep," "Remain active" (P1, P23, P26)	Reflects use and adherence—participants motivated by well-being improvement.
	Desired Features	"Mental health tracking," "Exercise notifications" (P23–P24)	Linked to usability and individuality preferences for personalization.
	Reservations	"Privacy concerns," "Data sharing issues" (P2, P4, P24, P25, P30)	Falls under data privacy and security.
	Progress Monitoring	"Goal reminders," "Progress tracking helpful" (P24–P25)	Tied to use/adherence and motivation.
App Design and Usability	Intuitive Interface	"Very intuitive design" (P1–P3, P24–P25, P29)	Strong usability factor.
	In-App Use and Comprehension	"Sometimes confusing," "Average usability"	Indicates variable technical skill levels.
	Customization Preferences	"Prefer personalized settings" (P23–P27)	Linked to individuality and motivation.
Technical Access and Barriers	Technical Ability	"All participants confident in app use"	Reflects digital readiness but potential overestimation.
	Storage/Crashes	"Limited space," "App crashes" (P21–P27)	Technology-related issues.

	Privacy and Security	"Data leak concern," "No control over data" (P25–P30)	Data privacy & security.
Social Support and Integration	Family and Friends Connection	"Helpful for social sharing" (P1, P4, P22)	Social influence and patient-physician relationship.
	Healthcare Provider Influence	"Doctor recommendations matter" (All participants)	Implementation barrier and trust factor.
Motivation and Engagement	Reinforcements	"Encourages consistency" (P1–P4)	Use/adherence.
	Gamification	"Enjoyed rewards and challenges"	Motivational design.
Therapy-Specific Apps	Mood and Relaxation	"Track mental health," "Reduce stress" (P1–P4, P23–P24)	Validity and therapeutic impact.
	Virtual Therapy	"Prefer customization over live therapy"	Implementation challenge.
Others	Interface Design	"Needs better feedback system"	Usability and feedback gap.

The themes reflect participants' perceptions of lifestyle and therapeutic mHealth applications, covering aspects of usability, engagement, technical functionality, and perceived risks.

Trends emerging from the responses of the participants (P1-P30) showed both common and differing opinions on the motivation for using apps, design preferences, privacy issues, and external factors like social support and the role of healthcare providers.

General Usage and Perception: The participants had diverse motivations for using mHealth apps, such as stress management, sleep quality, and an active lifestyle. These findings suggest that intrinsic motivations for health and wellness are the fundamental drivers for app use and are in line with previous studies that have highlighted the

significance of self-management and behavioral reinforcement in sustaining app use. The participants had diverse preferences for app design. The mention of mental health tracking and fitness reminders highlighted the significance of personalization and overall health tracking. Data privacy and information sharing were significant concerns, particularly in P2, P4, P24, P25, and P30, which reflected a prudent attitude towards data management by app developers. Progress tracking functionalities, such as goal tracking and feedback reminders, were considered critical motivational components.

App Design and Usability: Design quality strongly influenced participants' satisfaction. Although some participants (P1-P3, P24, P25, and P29) found the interface user-friendly, others (P28 and P30) found it confusing and had little idea about the in-app instructions. Although the reminders and notifications were appreciated, the lack of customization options was emphasized to make them more relevant. It is clear that, although the usability of mHealth apps is satisfactory, personalization and accessibility of the interface are required for long-term use.

Technical Access and Barriers: The participants showed sufficient confidence in the use of mobile applications, but technical problems still existed. Some participants (P21-P27) complained about problems of storage capacity, application crashes, or slow updates. Issues of privacy and security also cropped up in this theme. The concerns raised by the participants (P25-P30) included leakage of data and unauthorized access. The barriers are in line with the categories of technology and data security outlined by Giebel et al. (2024), which include stability and transparency of functionality as prerequisites for adoption.

Social Support and Integration: When considering the topic of friend and family linkage, there was similarity between P1 and P4, as well as between P2 and P3, while there was partial agreement between P22 and P24, and no expression of this view from P29 and P30. The opinion of P23 was different, showing some variation among the participants. When considering the sharing of progress, there was similarity between P1 and P3, as well as between P2 and P4, while P26 and P27 found it very helpful, P29 found it useful, and P30 found it important, showing agreement among the P26 and P30 group of participants. When considering the impact of healthcare providers, all participants agreed, showing a uniform view among the participants.

Motivation and Engagement: The use of gamification and motivation techniques was generally viewed as helpful. The users mentioned that reward systems, progress charts, and encouragement messages are important for motivation. However, the level of engagement with the apps differed based on design and relevance, suggesting that

continuous engagement requires continuous updates. When used normally, there were no patterns of responses, and users felt that these factors are important or useful to them or their opinions were varied. P1, P2, and P4 gave similar answers about reinforcements, while P24, P25, and P27 gave answers related to customization or encouragement, with moderate overlap. There were consistent responses for all aspects of gamification.

Therapy-Specific Applications: In therapy-specific applications, the participants linked the mood tracking and relaxation services with psychological well-being, often pointing out stress management and sleep improvement services. Although some participants preferred virtual therapy services, others preferred indirect customization approaches rather than direct therapist engagement, indicating the impact of perceived therapy authenticity and appropriateness on user acceptance. In relation to mood tracking and coping strategies, P1-P4 demonstrated similar responses, with P23 and P24 pointing out mental health tracking, and P21, P22, and P24 pointing out stress management and enhanced sleep. Responses to virtual therapy were similar for P1-P4, while P23 and P24 preferred custom settings rather than virtual therapy, indicating partial similarity with other participants.

Other Observations: Some participants highlighted the lack of feedback loops for users and the inflexible design of the interface, emphasizing the importance of a continuous co-design process between developers and users. With regard to the key barriers to the use of the application, no patterns of responses were identified, including issues related to the design of the interface, key performance factors, and the use of feedback.

Barriers to mHealth App Adoption

The results of this study offer a thorough insight into the views of patients on the challenges and barriers related to the use of mHealth applications as presented in Table 2. By means of deductive coding, the ten main themes of barriers emerged: validity, usability, technology, use and adherence, data privacy and security, patient-physician relationship, knowledge and skills, individuality, implementation, and costs. These themes are in line with previous scoping reviews and provide a systematic approach to understanding the complexities of mHealth applications.

Table 2: Problem Categories and Associated Barriers

Problem Category	Definition	Observed Barriers (from Interviews)
Validity	Quality, accuracy, and clinical reliability of app content	Inaccurate data tracking, poor content quality
Technology	Hardware/software functioning, connectivity	Crashes, compatibility issues, update problems
Usability	Ease of navigation and interaction	Difficult layouts, inconsistent design
Use and Adherence	Motivation and behavioral consistency	Low engagement, time constraints
Data Privacy & Security	Trust in data protection and transparency	Fear of breaches, misuse of information
Knowledge & Skills	User technical literacy	Difficulty with advanced settings, lack of confidence
Implementation	Integration within health systems	Low acceptance from clinicians, unclear protocols
Costs	Financial or perceived economic limitations	Unwillingness to pay, hidden expenses

Validity: Concerns regarding validity were among the most frequently reported barriers. Participants highlighted poor content quality, absence of empirical evidence, inappropriate or incomplete material, broken links, and insufficient exercise instructions as factors undermining trust in app reliability. Additionally, issues with data accuracy and reliability were raised; for example, patients using obesity management apps reported that physical activity tracking was often overestimated, leading to a misperception of progress [7]. The absence of added value was also a key issue, as participants noted that apps failing to produce tangible health benefits were quickly abandoned in favor of alternative interventions. Furthermore, the lack of a therapeutic setting where apps function independently without professional guidance—was seen as limiting. Participants stressed that the apps could not, on their own, substitute human monitoring and interaction, especially when the use of apps over time sometimes resulted in symptom exaggeration or unhealthy practices, posing a potential threat to patient safety [7].

Technology: Technical difficulties were also a persistent theme, covering software, hardware, and connectivity issues. Software issues included the following: availability of apps only on web-based platforms and not on mobile-based platforms, unresponsiveness of apps, and crashing of apps. Hardware issues included the following: compatibility with devices, outdated operating systems, and lack of storage space, making it difficult to use the apps seamlessly. Connectivity and interoperability issues included the following: lack of ease in consolidating data from apps across different platforms and the need for stable internet connectivity. These technology-related issues pose a significant problem to patients with acute or chronic conditions, who need reliability and timeliness. While previous reviews have examined the factors of technological adoption, such as pre- and post-adoption factors, age-friendly design, and promotion, few have examined the role of cultural background in influencing adoption behaviors, which is a missing piece in the current literature [10].

Use and Adherence: The degree to which the apps were used was influenced by both intrinsic and extrinsic reasons. Lack of motivation, dislike of technology, and other demands such as work or family commitments were some of the reasons cited for not using the apps. Those apps that were considered too general, time-consuming, or inflexible, with no opportunity to pause, interrupt, or personalize use, were more likely to be abandoned. The influence of the environment and social context, such as household activities, distractions, and paternalistic design of the apps, also affected adherence [7].

Data Privacy and Security: The issue of privacy and security was recognized as a major hindrance. The group was concerned about the loss of personal information, poor protection mechanisms, and indiscriminate sharing of information with third parties. Lack of trust in app developers and operating systems was prevalent, which aligns with the principle of contextual integrity. It is significant to note that these concerns were not homogeneous across different demographic variables such as age, sex, education, income, and experience with mobile devices. This suggests that developers must implement flexible security measures tailored to diverse user needs [3].

Patient-Physician Relationship: The integration of mHealth apps into the patient-physician relationship also posed new challenges. The use of apps without expert advice, the misuse and misinterpretation of app recommendations, and the impact on the physician's role in patient care were some of the concerns raised by the participants. The importance of sustaining a collaborative relationship with healthcare providers was emphasized, as trust and expert advice have a great impact on the use of apps and their effectiveness[7].

Knowledge and Skills: Both patient and provider competencies were identified as barriers. Lack of technical skills, media literacy, and confidence in the efficacy of apps among patients constrained their effective use. Some patients were skeptical about the treatment effect of apps, found them complex, or averse to digital interventions. Healthcare professionals were also constrained due to a lack of ICT skills or familiarity with mHealth technology, thereby hindering their ability to effectively use apps in their practice [7].

Implementation: Barriers to implementation at the structural/systemic level were also common. Access-related barriers included language, device availability, and age-related issues. The acceptance of apps by healthcare providers was also variable, and this was influenced by perceived interference with clinical judgment, autonomy, and competition with existing pathways. High workload, budget allocation, and lack of strategic focus at the institutional/policy level also contributed to the hindrance of widespread adoption. Patients also felt that incorporating apps into their care pathways created additional burdens [7].

Costs: Financial issues were significant factors for both patients and healthcare providers. The cost of application purchase or subscription, as well as the cost of accessories, along with low willingness to pay, made it less accessible. Healthcare providers and payers were also influenced by the potential loss of revenue or alternative financing options. Even with increased costs relative to the traditional offline service, some patients, especially the elderly, were willing to adopt mHealth solutions if the perceived benefits of time savings, quality improvement, and simplification outweighed the cost [Xie et al., 2020].

External and Cultural Factors: External environmental and cultural factors further influenced the adoption process. High workloads, lack of legislative support, inadequate training in ICT, and communication between patients, providers, and ICT staff were identified as barriers. Cultural factors, especially in high uncertainty avoidance countries, affected risk, trust, and reliability. For instance, Egyptian respondents showed a higher level of resistance to adopting apps because of unpredictability and risk, which emphasized the significance of reputation, familiarity, and trust in facilitating adoption [13].

Adoption in Developing Environments: Although there is rapid development and the presence of mHealth services in countries like Bangladesh, the adoption rate is low. Young and technology-naive users do not adopt the services to their fullest potential, and

there is a lack of proper marketing of the apps and integration with the healthcare system, which leads to lower-than-expected adoption rates [15].

Facilitators

The thematic analysis also identified a number of facilitators that contribute to the adoption and use of lifestyle and therapeutic mHealth applications. These facilitators were in line with the categories identified in the contemporary literature and included a number of interrelated domains such as design and usability, personalization, empowerment, social influence, and system support.

Interface Design and Accessibility: The requirement of simplicity, clarity, and accessibility of the interface design of mHealth applications was emphasized by the participants. Simple interface design with large font sizes and easy navigation was found to be essential to ensure user engagement, particularly in the case of older people. The findings are consistent with the recommendations of Leung et al. (2025), who emphasized the need for adaptive interfaces and multimodal designs (text, audio, and video) to accommodate users with sensory or cognitive impairments.

Personalization and Customization: Personalization proved to be a very effective motivator for long-term engagement with the apps. The participants were more trusting and enjoying of the apps when they were able to provide personalized reminders, personalized workout plans, or personalized feedback based on individual progress. The sense of being treated in an individualized way helped the participants' autonomy and sense of control, thus supporting the previous findings that personalization is an effective way of promoting adherence and perceived therapeutic benefit (Shabir et al., 2022). In this respect, adaptive reminders, goal-setting platforms, and personalized dashboards were mentioned as features that help convert generic apps into effective and user-friendly tools.

User Empowerment and Engagement: The participants felt more engaged and empowered as users of apps that offered educational content, tracking of progress, and reinforcement tools such as badges or milestones. These tools were seen to encourage a sense of ownership and self-efficacy in the regulation of health behaviors. In line with the assertions by Asadollahi et al. (2025), it appears that mHealth technology can empower users from being passive beneficiaries of healthcare to active players in their healthcare management. The use of mHealth technology was seen as essential to the long-term success of these applications.

Social and Professional Support: Social relations were also identified as one of the major enablers. Participants were satisfied with the opportunity to share their health updates with their family, friends, or social groups, which they believed helped to instill a sense of accountability and motivation. Another major aspect was the professional validation of mHealth apps by healthcare professionals. When doctors or physiotherapists validated or monitored the use of mHealth apps, participants believed that they instilled more confidence in the authenticity and therapeutic safety of the app. This is supported by the findings of Anastasiadou et al. (2019), which highlighted the significance of professional validation and communication in improving user trust and compliance.

Effective Marketing and Communication: Some of the participants emphasized the role of effective communication of the benefits and credibility of the apps in influencing their decision to download and use health-related apps. Personal recommendations, visibility in the app stores, and the reputation of the app developer were seen to be important factors in influencing trust. The participants were more likely to use apps that were associated with reputable healthcare organizations or organizations that had been verified. This is in line with the opinions of Shabir et al. (2022), which emphasized that effective branding and communication of app functionality and data protection can have a significant influence on the adoption rate of the apps.

Affordability and Economic Accessibility: Affordability was also cited as a consideration that affects continued use. The participants were willing to use mHealth apps if they were either free or offered good value for money, such as saving time or convenience in monitoring health variables. As Alam et al. (2020) stated, people are willing to pay more for apps if they can enjoy the health benefits, which are more than the cost of the apps. Hence, reasonable pricing strategies, free trials, and inclusion in public health programs could help increase adoption, especially in semi-urban and developing regions.

Integration with the Healthcare System: Integration with the healthcare system: Facilitating integration with the healthcare system was also dependent on how easily the mHealth apps could be integrated into the existing healthcare system. The participants were grateful for the apps that allowed them to share information with their healthcare providers, which made it easy for them to monitor and provide feedback. This is in line with the opinions of Hengst et al. (2023), who stated that alignment and engagement at the system level are essential for successful implementation. Integration of the mHealth apps may facilitate continuous care, monitoring, and improved communication between

patients and healthcare providers, which will ultimately transform healthcare from episodic to continuous.

Discussion

The current study examined the facilitators and barriers to the adoption of lifestyle and therapeutic mobile health (mHealth) applications among adult users in a semi-urban environment. Using thematic analysis of thirty in-depth interviews, the current study found that a complex interplay of technological, behavioral, and contextual factors influenced mHealth adoption. The participants' motivation to use mHealth applications was closely tied to self-improvement purposes, such as stress management, sleep improvement, and physical activity, which was consistent with the perceived usefulness component of the Technology Acceptance Model (TAM). The provision of reminders and tracking of goal progress served to enhance self-efficacy and autonomy, which was consistent with the principles of reinforcement and behavioral regulation as outlined in the Theoretical Domains Framework (TDF).

Usability and quality of app design were found to be important determinants of user satisfaction and retention. Users called for intuitive and responsive designs, as well as adequate data synchronization. These findings are consistent with previous studies carried out by Giebel et al. (2024) and Hengst et al. (2023), which highlighted the significance of usability and stability as preconditions for user retention. However, issues such as software crashes, storage space, and delayed updates served as a deterrent for user retention. From a theoretical perspective, these design elements are associated with the constructs of relative advantage and compatibility within the Diffusion of Innovation (DOI) theory, which measure the degree to which the innovation is compatible with existing user routines.

Among the most frequently cited barriers were data privacy, trust, and risk. The participants expressed their concern regarding the misuse of their data and the lack of transparency in the storage and processing of their health data. These points are in line with the perceived risk component of TAM and emphasize the importance of trust in both the app developers and the respective healthcare organizations. The evidence offered by Aid (2023) indicates that reputation and familiarity are important in mediating the relationship between perceived risk and adoption, particularly in cultures that are high in uncertainty avoidance.

Social influence and endorsement also had an important role in shaping the participants' behavior in adopting the mHealth applications. The participants expressed that social feedback from family, friends, and healthcare professionals increased their motivation to

use mHealth applications. This is in line with the subjective norm component of TAM and the observability dimension of DOI, which indicate that observing benefits from others or professional endorsement increases adoption. In support of Anastasiadou et al. (2019), professional endorsement from healthcare professionals legitimates the use of mHealth applications and increases the reduction of uncertainty regarding the clinical validity of mHealth applications.

Economic accessibility and system integration were other facilitators that emerged in this study. The preference for apps that were free or that clearly demonstrated cost-benefit value was consistent with Alam et al. (2020), who found that perceived economic value was a predictor of continued use in low- and middle-income countries. Integration with healthcare systems, such as the ability to share data with healthcare providers or to interface with clinical monitoring systems, also increased perceived usefulness and use. Such integration is consistent with the constructs of compatibility and trialability in the DOI model, suggesting that mHealth tools that are integrated with healthcare systems may be more readily accepted by patients and healthcare providers.

Comparison with earlier studies reveals that the factors that act as barriers and facilitators in this study are in line with the findings of other global studies. The factors of validity, usability, and data security are in line with the findings of Giebel et al. (2024), while the factors of personalization, engagement, and gamification are in line with the findings of Shabir et al. (2022). It is pertinent to note that, unlike other Western studies, the participants in this semi-urban Indian setting have given importance to trust, privacy concerns, and social support as key factors for the adoption of mHealth, which may be due to the differences in digital maturity and trustworthiness of institutions in different settings. The results indicate that a combination of TAM, DOI, and TDF offers a comprehensive framework for understanding the adoption of mHealth.

Limitations

A major strength of this research is the qualitative nature of the study, which provides a rich insight into the perceptions of the participants. However, there are some limitations to this study. The small sample size of this study may not accurately represent the actual behavioral trends of the participants. The semi-urban location of this study may also affect the generalizability of the results. There may also be some cultural factors that could affect the perceptions of the participants in a manner that is different from other regions. Future studies could improve the causal inferences of the determinants of mHealth adoption.

Future Recommendations

Future research should focus on cross-cultural differences in mHealth perceptions and explore the role of sociotechnical factors such as digital infrastructure, literacy, and support policies in mHealth adoption. There is a need for standardized tools to assess perceived trust, usability, and clinical utility depending on the applications used. Moreover, the integration of machine learning-driven personalization and AI-driven behavioral nudges may also help in improving engagement and adherence. From a practical standpoint, it is important to highlight the importance of user-centric design, data sharing, professional integration, economic accessibility, and digital literacy initiatives to ensure sustainable adoption. These will play a crucial role in building an inclusive, efficient, and effective digital healthcare system.

Conclusion

In conclusion, this paper stresses the growing potential of mHealth technologies to democratize access to healthcare, self-management, and patient empowerment. Nevertheless, the actual potential of these technologies can only be realized through the development of trustworthy, inclusive, and integrated mHealth designs and implementations. By aligning technological innovation and human care values, mHealth technologies can be employed as a transformative force that can bridge the gap between healthcare providers and patients and make health monitoring, prevention, and treatment accessible, efficient, and sustainable in the digital age.

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