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EFFECTIVENESS OF MOBILE HEALTH APPLICATIONS FOR HOME-BASED REHABILITATION IN PATIENTS WITH KNEE OSTEOARTHRITIS A SYSTEMATIC REVIEW

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Abstract
Background: Knee osteoarthritis (KOA) is a prevalent musculoskeletal condition that causes pain, disability and reduced quality of life. Mobile health (mHealth) apps are proposed as potential instruments for home rehabilitation, adherence to physical activity, self-management and remote monitoring.
Objective: The goal of this Systematic Review was to assess the effectiveness of mobile health interventions in home-based rehabilitation for patients with knee OA and its effect on pain, physical function, adherence to treatment, quality of life and patient engagement.
Methods: This systematic literature review was carried out in accordance with the guidelines of the PRISMA 2020. The keywords for knee osteoarthritis and digital health technologies were used to conduct a literature search on PubMed and Google Scholar. After screening and eligibility assessment, 12 studies published between 2025 and 2026 were included in the qualitative synthesis. Data were extracted on study design, sample characteristics, digital intervention type, and rehabilitation outcomes.
Results: The included studies assessed smartphone monitoring systems, telerehabilitation platforms, web-based rehabilitation programmes, digital exercise therapy and internet-based behavioural interventions. Reported challenges were related to limited digital literacy, issues of technology access and long term user retention.
Conclusion: Mobile health apps offer a promising avenue for supporting home-based rehabilitation in individuals with knee osteoarthritis. The combination of exercise advice, monitoring function, educational information and professional support could improve rehabilitation outcomes and enable patient-centred care.

KEYWORDS: Knee osteoarthritis; Mobile health; mHealth applications; Telerehabilitation; Home-based rehabilitation.

1. INTRODUCTION

Knee Osteoarthritis (KOA) is a common chronic musculoskeletal disorder worldwide. KOA is a major cause of pain, disability and a decreased quality of life in adults, especially in older people. The global burden of osteoarthritis has increased markedly in recent decades because of population ageing, obesity, sedentary lifestyles and increased life expectancy (Briggs et al., 2018). Epidemiologic projections indicate that the demand for knee health care services, including joint replacement procedures, will continue to increase significantly in the next years (Ackerman et al., 2019). Beyond the physical effects, KOA has significant socioeconomic impacts, including healthcare costs, lost productivity, and long-term disability (Allen et al., 2016). People with KOA frequently report pain, stiffness, limited mobility, balance problems and difficulty performing daily activities, all of which negatively impact physical functioning and overall well-being (Nelson, 2018). Arden (2021) provided consistent exercise therapy and patient education and self-management recommendations as first-line treatment for knee osteoarthritis (Arden et al., 2021). Exercise interventions have been proven to be effective in reducing pain, improving joint function, enhancing mobility and delaying the progression of disease (Dizaj et al., 2021; Fransen et al., 2015). However, it is hard to make a successful rehab if patients are not working the exercise program in the long-term. Yet, people can sometimes access rehabilitation services regularly, depending on a variety of factors such as access, transport, financial factors, lack of motivation and competing personal needs (Bennell et al., 2017). However, the traditional rehabilitation approach, which is based on face-to-face, may not be enough to sustain engagement with and treatment response for individuals residing outside of highly populated and accessible areas (Cottrell et al., 2017; Vina et al., 2026). The rapid development of digital technologies has resulted in mobile health applications emerging as new tools to support healthcare delivery and patient self-management. mHealth is the application of mobile devices, smartphones, wearable technologies and wireless communication systems to provide health-related services and information (Organization, 2022). For knee osteoarthritis, mHealth applications are increasingly integrating exercise instruction, education, symptom monitoring, progress tracking, goal setting, reminders, and communication with

healthcare professionals (Choi et al., 2019; Forero et al., 2018). These technologies enable easy access to rehabilitation resources for patients and help to increase participation in self-care activities. Digital platforms also provide remote monitoring and personalised feedback, which may improve motivation and adherence to rehabilitation programmes (Bini et al., 2020).

Home-based rehabilitation is receiving increasing interest as a practical way to deliver evidence-based care outside the traditional clinical setting. Recent developments in telehealth, telerehabilitation, and mobile applications have allowed the delivery of rehabilitation services remotely, maintaining communication between patients and healthcare providers (Agostini et al., 2015). Telerehabilitation interventions are as effective as conventional face-to-face rehabilitation for many musculoskeletal conditions (Cottrell et al., 2017). Moreover, the increasing prevalence of smartphone ownership and access to the internet has opened up further opportunities for implementing digital rehabilitation programmes at scale. Mobile applications can assist in exercise execution, physical activity monitoring, symptom evaluation, and behavioural modification, thus enabling ongoing rehabilitation in home settings (Paolucci et al., 2024). Emerging technologies such as virtual reality, exergames, artificial intelligence, and remote monitoring systems enhance the potential of digital rehabilitation for people with knee osteoarthritis (Di Curzio et al., 2025).

Mobile health technologies for musculoskeletal rehabilitation are increasingly common, but evidence of their effectiveness is dispersed across many different types of interventions, study designs, and outcome measures. The current research has explored several internet-delivered exercise programmes, tele-rehabilitation interventions, mobile applications and digital self-management tools, but the findings are dispersed across the literature and vary considerably in methodological quality (Jia et al., 2025; Nelligan et al., 2021). Moreover, although several studies have focused on specific digital interventions, there is a lack of comprehensive synthesis on the effectiveness of mobile health applications for home-based rehabilitation among patients with knee osteoarthritis.

Given this gap, the present systematic review target to assess the effectiveness of mobile health applications in home rehabilitation of patients with knee osteoarthritis. Specifically, the review aims to investigate the impact of mHealth interventions on pain relief, physical function, compliance with rehabilitation, quality of life, patient satisfaction and general rehabilitation outcomes. This review aims to summarise the current evidence and to provide an overall picture of the role of mobile health technologies in modern management of knee osteoarthritis as well as implications for future clinical practice and research.

2. METHODOLOGY

2.1 Research Design

The present study used a systematic literature review (SLR) design to summarise the evidence available on the efficacy of mobile health (mHealth) applications for home-based rehabilitation in patients with knee osteoarthritis (KOA). This review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines to ensure transparency, reproducibility, and methodological rigour in the identification, screening, eligibility, and inclusion steps.As digital health technologies in musculoskeletal rehabilitation are rapidly evolving, it was considered suitable to use the systematic review approach to summarise the current evidence and to identify any emerging trends with regards to mobile-based musculoskeletal rehabilitation interventions.

2.2 Search Strategy

A comprehensive literature search was carried out using Electronic Databases such as PubMed and Google Scholar. To try to maximise retrieval of relevant studies and minimise publication bias, additional articles were retrieved by manually screening the reference lists of eligible publications. The search strategy involved studies of knee OA and digital interventions such as mobile apps, telehealth, telemedicine, smartphone interventions, and web-based rehabilitation technology systems and other connected mHealth systems. The final search string was a total of terms used to describe knee osteoarthritis and mobile and digital health technologies. The search covered all publication years within the scope of the database, with a focus on the most recent studies, which reflect current developments in digital rehabilitation.

("Osteoarthritis, Knee"[Mesh] OR knee osteoarthritis[tiab] OR osteoarthritis[tiab]) AND ("Mobile Applications"[Mesh] OR "Telemedicine"[Mesh] OR "Smartphone"[Mesh] OR mobile health[tiab] OR mHealth[tiab] OR eHealth[tiab] OR digital health[tiab] OR mobile app*[tiab] OR smartphone*[tiab] OR telehealth[tiab] OR telemedicine[tiab] OR telerehabilitation[tiab] OR internet-based[tiab] OR web-based[tiab])

2.3 Study Identification

The selection of studies was performed according to PRISMA. Initially, 581 records were identified; 400 records were identified through electronic databases and other sources were screened systematically following duplicate removal. Titles and abstracts were screened for relevance to knee osteoarthritis, mobile health technologies and home-based rehabilitation. These potentially eligible studies were then reviewed in full against pre-specified inclusion and exclusion criteria. The final qualitative synthesis only included studies with relevant evidence for the digital health interventions, rehabilitation outcomes or mHealth implementation in osteoarthritis care.

2.4 Eligibility Criteria

Studies were considered for inclusion if they examined digital, mobile, web-based, telehealth, telemedicine, telerehabilitation, or smartphone-supported interventions relevant to osteoarthritis rehabilitation. Eligible studies included patients with osteoarthritis, mixed populations with hip and knee osteoarthritis, or healthcare systems directly supporting osteoarthritis rehabilitation. We included quantitative, qualitative, mixed-methods, observational, cohort, pilot validation, real-world evidence, and intervention studies published in peer-reviewed journals.

Studies were excluded if they did not include a digital health component, were not related to osteoarthritis rehabilitation, were conference abstracts or editorials, were not available in full text or were published in languages other than English. Some of the included studies looked at wider OA populations or other rehabilitation settings but were kept because they offered significant evidence on mobile health implementation, remote monitoring, digital adherence, rehabilitation delivery, or patient engagement.

2.5 Data Extraction

Data extraction was performed using a standardised extraction framework designed specifically for this review. Information extracted from each study included: author and year of publication; study design; sample characteristics; type of digital or mHealth intervention; primary outcome measures; key findings; and relevance to home-based rehabilitation in the management of osteoarthritis.

The included articles were retrospective comparative studies, observational cohort studies, protocol studies, cross-sectional survey studies, pilot validation studies, mixed-methods studies, registry-based cohort studies, real-world evidence studies, and secondary analyses of randomised controlled trials. This diversity of methodological approaches provided a broad overview of the current state of mHealth-supported rehabilitation and digital health implementation in osteoarthritis care.

2.6 Quality Assessment

The quality assessment was performed based on the assessment of the appropriateness of study design, adequacy of sample, clarity of intervention, validity of outcome measurement and relevance to review objectives due to the methodological heterogeneity of the included studies. Special attention was paid to the evaluation of digital rehabilitation interventions, smartphone-based monitoring systems, telerehabilitation platforms and patient-centered mHealth applications. Protocol papers and implementation-focused studies were retained for contextual analysis but interpreted with caution given the absence of effectiveness outcomes.

2.8 Outcome Measures

The main outcomes assessed in the included studies were pain reduction, physical function, gait performance, balance and postural control, adherence to rehabilitation, physical activity participation, self-efficacy, quality of life, and patient engagement. Secondary outcomes included user satisfaction, usability, healthcare provider perceptions, implementation barriers, digital literacy considerations, and system-level facilitators that might affect the adoption of mHealth technologies.

The range of outcomes allowed for a multidimensional evaluation of mobile health applications and their role in enabling home-based rehabilitation among patients with knee osteoarthritis and associated musculoskeletal conditions.

3. RESULTS

3.1 Study Selection

The systematic search resulted in 581 records, of which 400 were identified through electronic database searching and 181 records were identified through manual reference screening and supplementary sources. The initial search identified 581 studies, with 250 duplicates removed, leaving 331 studies for screening based on title and abstract. During the screening process, 231 studies were excluded because they did not meet the inclusion criteria. The full text of the remaining 100 articles was screened for eligibility. After careful evaluation, 88 studies were excluded because of non-relevant topics, unavailable full texts, non-healthcare domains, language restrictions or overlapping publications. Finally, 12 studies fulfilled all eligibility criteria and were included in the final qualitative synthesis. PRISMA 2020 flow diagram for study selection, including identification, screening, eligibility assessment and inclusion of studies finally reviewed in this systematic review is shown in Figure 1.

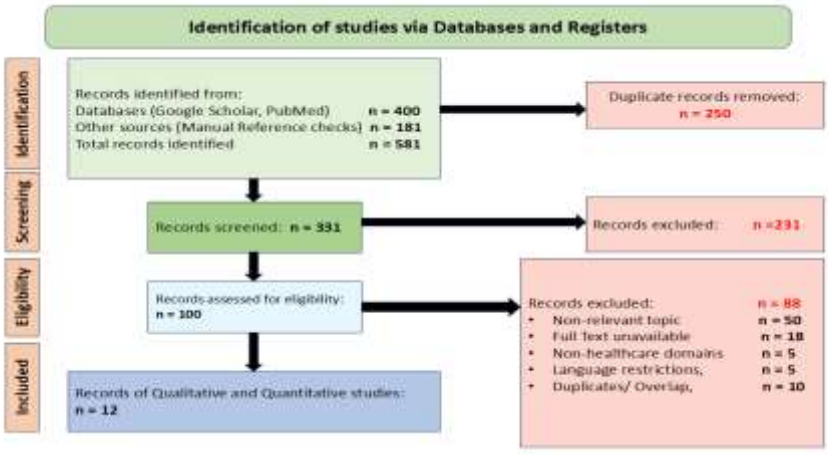

Figure 1. PRISMA-Based Identification and Selection of Studies Included in the Review

3.2 General Characteristics of Included Studies

Studies included were published between 2025 and 2026 and included a broad range of methodological approaches from observational cohorts, cross-sectional investigations, mixed-methods studies, pilot validation studies, real-world evidence

studies, protocol studies, and secondary analyses of randomised controlled trials. Sample sizes varied substantially, ranging from 14 participants in a pilot telerehabilitation validation study to 33,078 participants enrolled in a large-scale digital osteoarthritis rehabilitation program. The studies reviewed, collectively, examined a spectrum of digital health technologies such as smartphone-based monitoring systems, mobile rehabilitation applications, web-based follow-up platforms, telerehabilitation systems, internet-based behavioural interventions, artificial intelligence-assisted decision-support tools, and telehealth implementation pathways. This diversity reflects the expanding role of digital technologies in many aspects of osteoarthritis management and rehabilitation. The general characteristics of included studies in this systematic review are presented in Table 1. The Table provides a summary of the study designs, sample sizes and types of digital health interventions assessed.

Table 1. Characteristics of Included Studies

No.	Author (Year)	Study Design	Sample Size	Digital Component
1	(Aydilek & Erdem, 2026)	Retrospective comparative study	144	Smartphone gait analysis
2	(Taylor et al., 2026)	Observational cohort	1,875	Web-based PRO monitoring
3	(Lindsay & Astephen Wilson, 2026)	Protocol study	Planned participants	AI-based gait decision support
4	(González-Mendoza et al., 2026)	Pilot validation study	14	Rehabilitation telerehabilitation platform
5	(Erjavec et al., 2026)	Cross-sectional survey	300	Proposed KOA mHealth application
6	(Magony et al., 2026)	Cross-sectional study	262	Smartphone activity monitoring
7	(Dahlberg et al., 2025)	Registry cohort	33,078	Digital education and exercise therapy
8	(Chipon et al., 2025)	Real-world evidence study	156	Mobile app with coaching program
9	(Ezzat et al., 2025)	Mixed-methods study	52 GPs	Digital referral support intervention
10	(Van Denburg et al., 2025)	Secondary RCT analysis	55	Internet-based pain coping program
11	(Wang et al., 2025)	Mixed-methods study	498 professionals	Telehealth implementation pathway
12	(Albarello et al., 2025)	Cross-sectional study	40	Smartphone accelerometry

3.3 Types of Digital Health Technologies Identified

The studies included identified a number of categories of digital interventions. The most commonly reported intervention type was smartphone-based technologies used to monitor physical activity, gait characteristics, balance performance and rehabilitation progress. Digital rehabilitation platforms integrated exercise therapy, educational modules, progress monitoring and communication with healthcare professionals. Telerehabilitation systems incorporated motion analysis technologies to allow clinicians to remotely monitor patient performance beyond conventional clinical environments.

The web-based systems were mainly used for monitoring patient-reported outcomes and for follow-up assessments, while the internet-based behavioural interventions targeted self-management and coping with pain. Emerging technologies, such as artificial intelligence and markerless motion analysis, were also identified, reflecting the increasing sophistication of digital rehabilitation tools. Table 2 presents the types of digital health technologies identified in the included studies and demonstrates the range of mHealth approaches applied in knee osteoarthritis rehabilitation.

Table 2. Digital Health Technologies Identified Across Studies

Technology Type	Number of Studies	Representative Studies
Smartphone-based monitoring	4	(Albarello et al., 2025; Aydilek & Erdem, 2026; Erjavec et al., 2026; Magony et al., 2026)
Digital exercise therapy platforms	2	(Chipon et al., 2025; Dahlberg et al., 2025)
Telerehabilitation systems	1	(González-Mendoza et al., 2026)
Web-based rehabilitation monitoring	1	(Taylor et al., 2026)
Internet-based behavioral intervention	1	(Van Denburg et al., 2025)
AI-assisted rehabilitation support	1	(Lindsay & Astephen Wilson, 2026)
Telehealth implementation systems	1	(Wang et al., 2025)
Digital referral pathway intervention	1	(Ezzat et al., 2025)

3.4 Clinical Outcomes of mHealth Interventions

Overall, the results indicated that mobile health interventions were effective for rehabilitation. There was evidence of improvement in several domains, including adherence to rehabilitation programmes, pain management, physical function, quality of life, self-management and patient engagement.

Digital exercise and education programmes had a strong potential to keep patients engaged for extended periods of time. Those who used structured digital rehabilitation platforms were more likely to adhere and continue participation in prescribed rehabilitation activities. The findings indicate that remote exercise therapy and education could be an effective means of supporting long-term participation in rehabilitation.

Also significant improvement was observed in pain-related outcomes. Interventions using symptom monitoring apps, coaching and self-management resources were associated with reductions in pain severity and improvements in overall well-being. Benefits in pain reduction, quality of life, sleep quality and psychological health were reported, suggesting benefits beyond physical rehabilitation outcomes. The main clinical outcomes reported by the included studies are summarised in Table 3. Outcomes for pain management, rehabilitation compliance, physical activity, balance, self-efficacy, and patient-reported outcomes.

Table 3. Main Clinical Outcomes Reported

Study	Outcome Domain	Main Finding
(Dahlberg et al., 2025)	Adherence	Longer adherence observed among paracetamol users
(Chipon et al., 2025)	Pain and QoL	80.1% reported improvement; pain reduced by approximately 34%
(Magony et al., 2026)	Physical activity	Higher step counts associated with better function
(Albarello et al., 2025)	Balance	Increased sway is associated with poorer functional performance
(González-Mendoza et al., 2026)	Rehabilitation monitoring	Good agreement for knee motion assessment
(Van Denburg et al., 2025)	Self-efficacy	Social support improved pain-management confidence
(Taylor et al., 2026)	Patient-reported outcomes	Comparable outcomes across populations

3.5 Smartphone-Based Assessment and Monitoring

One major finding of the review was the growing use of smartphone technologies for objective assessment and monitoring. The use of accelerometry and gait analysis systems in smartphones allowed identification of functional impairments, balance deficits, and limitations in mobility of individuals with osteoarthritis. The technologies proved capable of delivering clinically meaningful information while reducing the reliance on specialised laboratory equipment. Remote monitoring systems were particularly helpful for assessment of postural control, physical activity, and rehabilitation. The collection of objective functional data using widely available mobile devices is an important step forward for home-based rehabilitation and may facilitate more personalised and continuous patient management. Table 4 shows the most frequently reported mobile health features that facilitated rehabilitation delivery and patient engagement across the interventions reviewed.

Table 4. Frequently Reported Features Supporting Rehabilitation

Feature	Number of Studies (n)	Percentage (%)	Supporting Studies
Remote monitoring/assessment (gait, balance, activity, ROM, PROs)	7	58.3	(Aydilek & Erdem, 2026; Dahlberg et al., 2025; González-Mendoza et al., 2026; Lindsay & Astephen Wilson, 2026; Magony et al., 2026)
Telehealth/telerehabilitation delivery	5	41.7	(González-Mendoza et al., 2026; Lindsay & Astephen Wilson, 2026; Taylor et al., 2026; Van Denburg et al., 2025; Wang et al., 2025)
Exercise/rehabilitation guidance	3	25.0	(Chipon et al., 2025; Dahlberg et al., 2025; González-Mendoza et al., 2026)
Educational/self-management support	3	25.0	(Dahlberg et al., 2025; Erjavec et al., 2026; Van Denburg et al., 2025)
Activity monitoring	2	16.7	(Albarello et al., 2025; Magony et al., 2026)
Coaching/behavioral support	2	16.7	(Chipon et al., 2025; Van Denburg et al., 2025)
AI-assisted or markerless motion analysis	2	16.7	(González-Mendoza et al., 2026; Lindsay & Astephen Wilson, 2026)
Patient-provider communication features	1	8.3	(Erjavec et al., 2026)

3.6 User Preferences and Engagement

Research exploring the views of patients and healthcare professionals found high acceptance of mobile health solutions with practical and interactive features. Participants strongly favoured applications that featured exercise demonstrations, educational materials, progress tracking, personalised goal setting, and direct communication with healthcare providers. The combination of several supportive features has improved the level of engagement and satisfaction of the users. Applications combining rehabilitation guidance with monitoring and feedback mechanisms were generally perceived as more useful and likely to foster sustained participation. These studies indicate that successful mobile health interventions should incorporate both clinical and behavioural dimensions of rehabilitation (Chipon et al., 2025; Van Denburg et al., 2025). Table 5 presents the main barriers and facilitators influencing the implementation and adoption of mHealth applications for home-based rehabilitation among people with osteoarthritis.

Table 5. Major Barriers and Facilitators Identified

Barriers	Facilitators	References
Poor adherence	Telehealth accessibility	(Dahlberg et al., 2025; Taylor et al., 2026)
Low digital literacy	Professional training	(Wang et al., 2025)
Limited multidisciplinary collaboration	Patient education resources	(Ezzat et al., 2025)
Inadequate reimbursement structures	Personalized rehabilitation services	(Chipon et al., 2025)
Lack of awareness of rehabilitation pathways	Positive patient feedback	(Ezzat et al., 2025)
Technical challenges	Community-based delivery systems	(González-Mendoza et al., 2026)
Healthcare system constraints	Remote monitoring capabilities	(Magony et al., 2026)

3.7 Overall Summary

Overall, the evidence indicates that mobile health technologies are a promising strategy for supporting home-based rehabilitation in people with knee osteoarthritis. Digital interventions had a positive effect on rehabilitation adherence, pain management, self-management, physical function and patient engagement. The use of smartphone-based monitoring technologies further improved the ability to remotely assess and provided for more continuous assessment of patient progress.

Notwithstanding the methodological heterogeneity observed across the included studies, the overall findings endorse the increasing role of mobile health applications as effective modalities to expand rehabilitation services beyond traditional clinical settings. The most successful interventions included exercise therapy, educational content, monitoring functions and continuous professional support, suggesting that comprehensive digital rehabilitation ecosystems may offer significant benefits for future osteoarthritis care.

4. DISCUSSION

The present study indicates that mobile health applications and digitally supported rehabilitation systems are increasingly promising in the management of knee osteoarthritis, especially for home-based rehabilitation. Overall findings suggest that mHealth interventions can facilitate pain reduction, functional recovery, adherence, patient engagement and self-management, provided they are designed around users needs and integrated with clinical guidance. These findings are in line with the broader evidence that osteoarthritis is a heterogeneous condition with different clinical phenotypes and needs flexible and individualised rehabilitation strategies (Dell'Isola et al., 2016). Knee osteoarthritis is still common, with a substantial burden of pain, disability, and impaired quality of life, and scalable digital approaches may help address gaps in conventional rehabilitation access (Cui et al., 2020; Mobasheri & Batt, 2016).

Pain management was one of the most important outcomes of mHealth-supported rehabilitation. Exercise remains a mainstay of conservative treatment of knee osteoarthritis, and evidence suggests that different types of exercise can improve pain, function, physical performance and quality of life (Goh et al., 2019). The potential to enhance these benefits on digital platforms could be through structured instructions for exercises, prompts, feedback and behavioural support. Internet-based pain coping skills training has also been found to be beneficial in enhancing pain-related functional outcomes and self-management skills in individuals with OA (Rini et al., 2015). These results suggest that – mobile applications are likely to be more effective when combining the physical rehabilitation with psychological and behavioural aspects than physical rehabilitation alone. Clinically relevant impact of mHealth applications on functional recovery is also evident. Telephysiotherapy and telerehabilitation provide exercise and monitoring of the exercises, without requiring frequent clinic visits, especially beneficial for those with limited mobility or access to services. Telerehabilitation research has demonstrated the effectiveness of telerehabilitation in physical and musculoskeletal therapy, with often similar outcomes to face-to-face therapy (Lee et al., 2018; Seron et al., 2021). In musculoskeletal care setting, delivery of digital services may be acceptable, with another study demonstrating positive patient-reported outcomes for remote orthopaedic consultations (Buvik et al., 2019). As a result, mHealth applications can help people improve their functioning by providing continuity of care and by enabling their patients to do their rehabilitation exercises at home.

Adherence is a critical problem with respect to osteoarthritis rehabilitation. Although there are some health benefits related to exercise and physical activity, sustained use of both is challenging (Posadzki et al., 2020). Remind patients to take their medication, track progress, offer personalised exercise programmes and provide motivational feedback with the help of mobile applications. It is not only a technological issue but also a matter of patient motivation, confidence, perceived usefulness and social context that is compliance. This highlights the need to implement patient-centred design, usability

and behaviour change approaches in digital rehabilitation. Considering the broader eHealth research, it emphasises that technology acceptance and user engagement are essential components for a successful implementation (Torp et al., 2022; Uribe-Toril et al., 2021)

Throughout the evidence, patient engagement and self-management emerged as key themes. Digital rehabilitation at home allows patients to be more involved in symptom management, tracking progress and adherence to exercises (Keesara et al., 2020). A rehabilitation-internet-of-things model may also support home exercise-training by integrating sensor, feedback systems and remote clinician oversight (Dobkin, 2017). Mobile health technologies can also develop patient-centered digital outcome measures which allow for more continuous and objective monitoring of functional status (Espay et al., 2019). Such systems may be particularly useful in OA where symptoms fluctuate and rehabilitation requires ongoing self-management over time (Khalifa & Ibrahim, 2025).

Access to digital rehabilitation may also be inequitable due to internet accessibility and device availability. With the evolution of telerehabilitation, ethical and equity considerations, such as unequal access, privacy, data security, and the potential to leave behind digitally disadvantaged patients, are gaining increasing attention (Veras et al., 2025). Another challenge is user retention, as patients may stop using the app if the intervention is not engaging, personalised, or clinically meaningful. Evidence of mHealth adherence in chronic disease management also points to usability, feedback and perceived benefit as important to sustained engagement (Hamine et al., 2015).

From a clinical point of view, mHealth apps should be considered complementary and not substitute for healthcare providers. They can enhance follow-up, facilitate collaboration with the patient in decision making and extend rehabilitation beyond the clinical setting. To deliver digital rehabilitation, healthcare professionals need new skills to conduct remote assessments, communicate with patients, analyze data, and coach patients. The COVID-19 pandemic has ushered an unprecedented transition to the digital era, the need for which is evident in the necessity of healthcare systems to adopt telehealth and digital rehabilitation as a part of their regular care. Future directions should encompass AI-powered rehabilitation, custom exercise prescriptions, incorporation of wearable sensors and live monitoring. There are ways to utilise artificial intelligence (AI) to support adaptive rehabilitation programmes and personalised decision making, and there are ways to use wearable technologies to provide objective information on movement and adherence. Lastly, mHealth application has the potential to facilitate the home rehabilitation of knee OA, but it will require integration into clinical practice, accessibility of the application, ability to customize, and sustained patient engagement.

5. CONCLUSION

Knee osteoarthritis continues to be a leading cause of pain, disability and poor quality of life in the world and need for simple and easily accessible rehabilitation services continues to grow. Mobile health (mHealth) applications offer a novel technology that could be used to support home-based rehabilitation, and this systematic review revealed that mHealth interventions have great potential for home-based rehabilitation in the management of osteoarthritis. The evidence presented suggests that mHealth technologies can be used as part of improved pain management, physical function, adherence to rehabilitation, patient self-care, patient involvement and remote patient monitoring and communication with health care providers. The outcomes demonstrate that digital interventions with exercise guidance and education, progress monitoring, personalized feedback and professional support are the most effective. These attributes encourage exercise participation during rehabilitation, and address some of the typical challenges to long-term exercise adherence. In addition, the use of telehealth, smartphone-based assessment and remote monitoring technologies are gaining momentum and will offer additional avenues to deliver rehab services in a convenient and patient-centred way. These are good outcomes but there are factors to take into account including digital literacy, access to technology and users' retention and equity in implementation. Needs to tackle these barriers to realize the potential benefits of rehabilitation using mHealth. Future research areas are high-quality clinical trials, long-term outcome evaluation, and the use of artificial intelligence, smart technology and individual rehabilitation programs. In conclusion, mHealth application use as an intervention to enhance home based care and outcomes for people with knee OA is an effective and innovative tool.

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