International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Operating Publisher
SciFormat Publishing Inc.
ISNI: 0000 0005 1449 8214

2734 17 Avenue SW,
Calgary, Alberta, T3E0A7,
Canada
+15878858911
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ARTICLE TITLE	DIGITAL HEALTH INTERVENTIONS FOR CHRONIC PAIN SELF-MANAGEMENT: A NARRATIVE REVIEW OF EVIDENCE, IMPLEMENTATION BARRIERS AND SOCIETAL IMPACT
DOI	https://doi.org/10.31435/ijitss.2(50).2026.5665
RECEIVED	24 March 2026
ACCEPTED	23 June 2026
PUBLISHED	29 June 2026
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DIGITAL HEALTH INTERVENTIONS FOR CHRONIC PAIN SELF-MANAGEMENT: A NARRATIVE REVIEW OF EVIDENCE, IMPLEMENTATION BARRIERS AND SOCIETAL IMPACT

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ABSTRACT

Chronic pain affects an estimated 20–30% of the global adult population and constitutes a major driver of long-term disability and diminished well-being across populations. Despite the recognized need for comprehensive, multimodal pain management, access to specialist care remains limited across many healthcare systems. Digital health interventions (DHIs) — including mobile health applications (mHealth), telemedicine platforms, wearable devices, virtual reality (VR), internet-based cognitive behavioral therapy (iCBT), and artificial intelligence (AI)-powered tools — have emerged as scalable and accessible options for supporting chronic pain self-management.

This narrative review synthesizes evidence from 58 studies identified across PubMed/MEDLINE, Cochrane Library, Scopus, CINAHL, and JMIR publications (2013–2023), examining the effectiveness, implementation barriers, and societal implications of DHIs in chronic pain care. Findings indicate that mHealth applications and iCBT demonstrate the most consistent positive effects on pain intensity, quality of life, and functional disability. VR, wearables, and AI-driven tools show promise but require further high-quality investigation. Key barriers to implementation include limited digital health literacy, insufficient integration with electronic health records, fragmented regulatory frameworks, and data privacy concerns. Critically, uncritical DHI adoption risks widening existing health inequalities, as access to digital tools remains unevenly distributed across age, socioeconomic, and geographic groups.

Digital health technologies represent a promising complement to conventional chronic pain management. Realizing their full potential requires coordinated action addressing equity, regulatory standardization, clinical integration, and patient-centered design.

KEYWORDS

Chronic Pain, Digital Health Interventions, mHealth, Mobile Applications, Telemedicine, Wearable Devices, Virtual Reality, Self-Management, Health Inequity, Artificial Intelligence, Cognitive Behavioral Therapy, Pain Management

CITATION

Aleksandra Stępka, Maria Wieczorek, Wojciech Janikowski, Lena Jaworowicz, Weronika Plichtowicz-Kordowska, Agnieszka Jóźwicka, Ewa Bąkowska, Karina Lewandowska. (2026) Digital Health Interventions for Chronic Pain Self-Management: a Narrative Review of Evidence, Implementation Barriers and Societal Impact. *International Journal of Innovative Technologies in Social Science*. 2(50). doi: 10.31435/ijitss.2(50).2026.5665

1. Introduction

Chronic pain is one of the most prevalent and disabling health conditions worldwide, affecting an estimated 20–30% of the global adult population and imposing substantial individual, social, and economic burdens [1]. Defined by the International Association for the Study of Pain (IASP) as pain persisting beyond three months, chronic pain involves interacting biological, psychological, and social processes that cannot be reduced to tissue damage alone, and requires comprehensive, multimodal management integrating pharmacological, rehabilitative, and psychological approaches [2]. Despite this recognized complexity, access to specialist multidisciplinary pain care remains deeply unequal across healthcare systems, with patients frequently encountering long waiting times, geographic barriers, and high financial costs [3].

The rapid expansion of digital health technologies over the past decade has opened new possibilities for supporting self-management of chronic pain outside traditional clinical settings. Digital health interventions (DHIs) — encompassing mobile health applications (mHealth), telemedicine platforms, wearable monitoring devices, virtual reality (VR), internet-based cognitive behavioral therapy (iCBT), and artificial intelligence (AI)-powered tools — offer theoretical advantages of remote accessibility, scalability, personalization, and continuous real-world use [4]. The COVID-19 pandemic further accelerated the adoption of these technologies while simultaneously exposing critical inequalities in digital literacy and connectivity, raising important questions of equity and inclusion [5,6].

Growing evidence supports the clinical effectiveness of DHIs in reducing pain intensity, improving quality of life, and decreasing functional disability across a range of chronic pain conditions [7,8]. However, published studies tend to examine single DHI categories in isolation, and few reviews have addressed both the

clinical evidence and the broader societal implications — including digital inequalities, data privacy, and health policy — within a single synthesis. This gap is particularly relevant for interdisciplinary readerships concerned with the social and ethical dimensions of technology adoption in healthcare.

The present narrative review therefore aims to: (1) classify and describe the major categories of DHIs applied in chronic pain self-management; (2) synthesize available evidence regarding their clinical effectiveness; (3) identify key barriers to implementation at the patient, clinical, and systemic levels; and (4) examine the societal and ethical implications of integrating digital technologies into chronic pain care, with particular relevance to health policy and digital equity.

2. Methodology

This narrative review was designed to synthesize evidence on digital health interventions (DHIs) for chronic pain self-management across clinical, implementation, and societal dimensions. A narrative rather than systematic design was selected to accommodate the substantial heterogeneity of available evidence and to enable integration of ethical and policy-oriented perspectives [9,10].

A structured search was conducted across five databases — PubMed/MEDLINE, Cochrane Library, Scopus, CINAHL, and JMIR — covering the period from January 2013 to December 2023. Search terms combined MeSH headings and free-text keywords across three domains: chronic pain conditions, DHI modality types, and self-management outcomes, using Boolean operators. Filters were applied for the English language and adult populations (≥18 years).

Eligible studies included systematic reviews, meta-analyses, RCTs, scoping reviews, and qualitative studies reporting on DHIs in adults with chronic non-cancer pain persisting more than three months [2]. Studies focused exclusively on acute or cancer pain, technical-only tool validation, and inaccessible full texts were excluded. Following deduplication, 847 records were screened in accordance with PRISMA 2020 guidelines [26]; 58 studies met the inclusion criteria and were included in the final synthesis.

Data were extracted using a structured template that captured the study design, population, DHI type, outcomes, and implementation findings. Synthesis followed the narrative framework proposed by Popay et al. [11], organizing findings thematically across four domains: DHI classification, clinical effectiveness, implementation barriers, and societal implications.

3. Results

3.1. Overview of Included Studies

The database search yielded 847 records following deduplication. After title, abstract, and full-text screening against eligibility criteria, 58 studies were included in the final narrative synthesis. These comprised 19 systematic reviews and meta-analyses, 24 randomized controlled trials (RCTs), 8 scoping reviews, and 7 qualitative studies. The majority of studies originated from the United States, the United Kingdom, Australia, Spain, and the Netherlands. The most frequently investigated chronic pain conditions were chronic low back pain, fibromyalgia, chronic musculoskeletal pain, osteoarthritis, and chronic neck pain. Six DHI categories were identified across included studies: mobile health applications (mHealth), telemedicine and telerehabilitation platforms, wearable monitoring devices, virtual reality (VR), internet-based cognitive behavioral therapy (iCBT), and artificial intelligence (AI)-powered tools and chatbots.

3.2. Classification of Digital Health Interventions in Chronic Pain Management

Mobile health applications (mHealth) represent the most extensively studied DHI category, offering pain monitoring, guided exercise, mindfulness modules, psychoeducational content, and medication reminders. Applications have been developed specifically for chronic low back pain, fibromyalgia, and osteoarthritis, with some incorporating personalized feedback algorithms [7,8].

Mobile health applications vary considerably in their design philosophy and therapeutic focus. Some platforms, such as those developed for chronic low back pain, function primarily as exercise coaches — delivering physiotherapy programs, tracking adherence, and providing automated feedback on progress. Others, developed for conditions such as fibromyalgia or irritable bowel syndrome, incorporate symptom diaries, mood tracking, and flare-up prediction algorithms based on patient-reported data. A growing number of applications integrate multiple functions within a single platform, combining education, self-monitoring, and behavioral support in ways that more closely replicate the experience of multidisciplinary care. The diversity of available tools reflects both the heterogeneity of chronic pain as a condition and the expanding capabilities of consumer mobile technology [7,8].

Telemedicine and telerehabilitation platforms deliver physiotherapy, occupational therapy, and multidisciplinary pain management remotely via video consultation and structured digital programs. Adoption accelerated markedly during the COVID-19 pandemic, demonstrating the potential of these platforms to support patients with limited mobility or those in geographically underserved areas [5].

Beyond their role during the pandemic, telerehabilitation platforms have demonstrated sustained utility in routine chronic pain care. Structured programs delivered via video conferencing have been applied to conditions including chronic low back pain, fibromyalgia, and chronic neck pain, with sessions typically replicating the content and duration of in-person physiotherapy or occupational therapy consultations. The asynchronous component of many platforms — allowing patients to access pre-recorded exercise videos, educational modules, and symptom tracking tools between live sessions — has been particularly valued by patients with fatigue-related limitations, a common feature of many chronic pain conditions [5,7].

Wearable monitoring devices — including smartwatches, activity trackers, and biosignal sensors — enable continuous real-time collection of pain-relevant parameters such as physical activity, sleep quality, heart rate variability, and muscle tension [12,13]. While valuable for longitudinal assessment, wearables have been less thoroughly evaluated for direct clinical effectiveness in chronic pain than other DHI modalities.

Recent advances in wearable sensor technology have expanded the range of physiological signals that can be monitored continuously in real-world settings. Beyond step counts and sleep duration, newer devices are capable of detecting subtle changes in skin conductance, skin temperature, and heart rate variability — signals that have been associated with pain-related stress responses and autonomic nervous system dysregulation. Several research groups have explored the integration of these multimodal data streams with machine learning algorithms to develop predictive models of pain flares, with the aim of enabling preemptive behavioral or pharmacological intervention before pain intensity escalates. Although these predictive applications remain at an experimental stage, they point toward a clinically meaningful shift — from reactive pain management, triggered by patient-reported flares, toward anticipatory intervention guided by continuous physiological monitoring [12,13].

Virtual reality (VR) interventions operate primarily through attentional distraction and immersive sensory engagement, and have been applied both as analgesic tools during painful procedures and as components of rehabilitation programs targeting pain-related fear and avoidance [14].

Internet-based cognitive-behavioral therapy (iCBT) provides patients with evidence-based psychological strategies, such as reframing unhelpful thoughts, gradually increasing activity levels, and practicing stress-reduction methods. These are delivered through web-based platforms, either as fully automated programs or with varying degrees of therapist support [15,25].

Artificial intelligence and chatbot-based tools represent the most recent DHI category, leveraging machine learning and natural language processing to deliver personalized, continuous behavioral support and symptom monitoring [16]. The evidence base for this modality in chronic pain specifically remains in early stages of development.

3.3. Evidence of Clinical Effectiveness

Pain intensity was the most consistently reported outcome across the included studies, typically measured using the Numeric Rating Scale (NRS) or the Visual Analog Scale (VAS). A systematic review by Moreno-Ligero et al. [7], encompassing 22 RCTs with 2,641 patients, reported significant reductions associated with mHealth interventions across fibromyalgia, osteoarthritis, and chronic neck pain. A 25-year systematic review by Shi and Sit [8] included 89 studies with 26,429 participants and confirmed consistent improvements in pain outcomes with mHealth use in chronic musculoskeletal pain. For iCBT, the Cochrane review by Williams et al. [15] reported small but statistically significant improvements in pain intensity across 75 trials. VR demonstrated short-term analgesic effects in clinical settings, though evidence for sustained outcomes in naturalistic populations remains limited [14].

It is important to note that the magnitude of pain reduction reported across DHI trials, while statistically significant, is generally modest in absolute terms. Most studies report mean reductions in pain intensity of one to two points on a ten-point NRS or VAS scale — a level of improvement that meets conventional thresholds for clinical significance but falls short of the substantial relief that many patients with severe chronic pain seek. This finding is consistent with the broader literature on non-pharmacological pain management and should be interpreted in the context of chronic pain as a complex, multidimensional condition that rarely responds to any single intervention with large, sustained effects. The value of DHIs may therefore lie not in dramatic pain reduction, but in their capacity to shift patients toward more active self-management, reduce healthcare

utilization, and improve psychological well-being — outcomes that carry substantial long-term significance for both patients and healthcare systems [7,15].

Quality of life and psychological well-being improved significantly following mHealth and iCBT interventions across multiple chronic pain conditions. iCBT demonstrated consistent reductions in pain catastrophizing, depression, and anxiety — psychological conditions known to sustain and intensify persistent pain over time [15]. Wearable-based interventions improved sleep quality and physical activity, which are recognized as mediators of pain experience.

Several studies have specifically examined the impact of DHIs on sleep quality, which represents a critical but often underaddressed dimension of chronic pain management. Disrupted sleep is both a consequence and a driver of chronic pain, with poor sleep quality amplifying pain sensitivity through central sensitization mechanisms. mHealth applications incorporating sleep hygiene modules and wearable devices monitoring sleep architecture have demonstrated modest but consistent improvements in sleep duration and efficiency in patients with fibromyalgia and chronic musculoskeletal pain. These findings support the hypothesis that DHIs targeting sleep as a primary outcome may indirectly contribute to pain reduction through neurobiological pathways, representing a promising avenue for future intervention development [12,15].

Functional disability was significantly reduced in patients using mHealth interventions incorporating structured exercise and behavioral activation, across conditions including chronic low back pain, osteoarthritis, and chronic neck pain [7]. Telerehabilitation demonstrated outcomes comparable to in-person physiotherapy in several RCTs.

The impact of DHIs on healthcare utilization — including frequency of primary care visits, specialist consultations, and analgesic prescriptions — has been examined in a smaller number of studies but represents an outcome of growing policy relevance. Preliminary evidence suggests that patients engaged with structured mHealth or telerehabilitation programs may reduce their frequency of unplanned healthcare contacts, including emergency department visits related to pain crises. If replicated in larger, longer-term trials, this finding would have significant implications for the economic case for DHI investment at the healthcare system level, potentially offsetting the costs of technology development and implementation through reductions in downstream healthcare expenditure [7,8].

Patient adherence varied substantially across DHI types, ranging from below 40% in unguided mHealth programs to above 80% in therapist-supported iCBT, suggesting that human involvement in program delivery significantly moderates engagement [17]. Long-term adherence beyond three months was rarely reported, representing a critical gap in the evidence base.

3.4. Barriers to Implementation

At the patient level, limited digital health literacy — understood broadly as the ability to locate, interpret, and act on health-related information delivered through digital platforms — emerged as the most frequently cited barrier to DHI engagement, particularly among older adults and those with lower socioeconomic status [18]. Concerns regarding data privacy and security, motivational challenges related to chronic pain-related fatigue, and low perceived benefit were additional obstacles to sustained engagement [19].

At the clinical and systemic level, insufficient integration of DHIs with electronic health record (EHR) systems limits the clinical utility of patient-generated data. Insufficient clinician training in digital health tools, the lack of established reimbursement pathways, and the practical constraints of routine consultations collectively limit the uptake of DHIs in day-to-day clinical practice [18].

At the regulatory level, fragmented certification frameworks across jurisdictions prevent patients and clinicians from reliably distinguishing evidence-based tools from unvalidated commercial products [20,21]. Limited broadband connectivity in rural and low-income settings, along with the high cost of certain wearable technologies, further constrain equitable access.

3.5. Societal and Ethical Implications

Access to digital health tools is unevenly distributed across age, socioeconomic status, ethnicity, and geographic location — the same social determinants driving existing inequalities in chronic pain prevalence and treatment access [6]. Uncritical adoption of DHI may inadvertently deepen the existing divide in healthcare access, making digitally enabled self-management available primarily to younger, more affluent, and digitally literate patients [24].

The granular behavioral and health data generated by chronic pain apps and wearables carry significant commercial value, yet patients frequently lack transparency regarding data storage, sharing, and secondary use

by third parties [19]. A related concern is algorithmic bias — where AI tools trained on datasets that inadequately represent older, lower-income, or non-Western populations may generate recommendations that are less accurate or appropriate for precisely those groups who face the greatest barriers to conventional pain care [16].

While DHIs have the potential to empower patients and extend the reach of care, their promotion as autonomous self-management tools risks reducing meaningful patient–clinician contact — a relational element that remains central to effective chronic pain treatment, particularly for patients with complex psychosocial needs [22].

4. Discussion

This narrative review addressed four questions: how digital health interventions in chronic pain can be classified, what the evidence says about their effectiveness, what prevents their widespread adoption, and what their broader societal implications are. Across all four domains, the findings collectively support a cautiously optimistic assessment: digital health technologies represent a clinically meaningful and increasingly evidence-supported complement to conventional chronic pain care, but their translation into equitable, routine practice remains incomplete.

The most important clinical finding is not simply that DHIs work, but that their effectiveness is strongly modality- and context-dependent. mHealth applications and iCBT consistently outperform other modalities across diverse chronic pain conditions and outcome measures — a pattern that likely reflects their direct targeting of the cognitive, behavioral, and emotional dimensions of chronic pain, consistent with the biopsychosocial model endorsed by the IASP [2,15]. By contrast, the modest, predominantly short-term effects observed with VR and the nascent evidence base for AI-driven tools suggest that technological sophistication does not automatically translate into clinical effectiveness [14,16]. For the field, this implies a need to shift focus from innovation for its own sake toward rigorous evaluation of which specific components of digital interventions drive meaningful outcomes for which patient populations — a priority that requires adoption of standardized core outcome sets such as those recommended by the IMMPACT initiative [23].

The substantial variability in patient adherence — ranging from below 40% in unguided mHealth programs to above 80% in therapist-supported iCBT — carries a particularly important implication: the degree of human involvement in DHI delivery is itself a therapeutic variable [17]. This finding challenges the assumption that fully automated digital tools can replicate the benefits of human-guided intervention, and suggests that the most effective DHI models may be those that strategically integrate human support rather than eliminate it. Hybrid models combining digital self-management with periodic clinician or health coach contact may therefore represent the most promising pathway toward achieving both the scalability of digital health and the therapeutic value of human relationships in chronic pain care [22,7].

The implementation barriers identified in this review collectively point to a structural misalignment between the pace of DHI development and the readiness of healthcare systems to absorb these technologies. DHIs are being developed and marketed faster than regulatory frameworks, reimbursement systems, and clinical workflows can accommodate them. For researchers, this underscores the importance of moving beyond efficacy trials toward implementation science — studying not only whether DHIs work, but how, for whom, and under what systemic conditions they can be sustainably deployed [18,21]. The fragmented regulatory landscape for medical applications across jurisdictions further compounds this challenge, creating uncertainty for both clinicians and patients regarding the quality and safety of available tools [20].

The societal findings of this review are significant and extend beyond clinical practice into health policy. The consistent association between digital exclusion and the social determinants of chronic pain — age, socioeconomic disadvantage, and geographic isolation — means that the populations with the greatest need for accessible pain management are precisely those least able to benefit from current DHI models [6]. This inequity is not an inevitable consequence of digital health, but a design and policy failure that can be addressed through inclusive co-design principles, targeted digital literacy programs, and equity-explicit commissioning frameworks. Equally, the data privacy implications of chronic pain apps and wearables — including the potential for secondary commercial use of sensitive health data without meaningful patient consent — represent an ethical imperative that must be embedded in regulatory standards rather than treated as an afterthought [19]. For the interdisciplinary readership of this journal, these findings reinforce that the social dimensions of technology adoption are not peripheral concerns but central determinants of whether digital health innovations deliver genuine public benefit.

This review carries several inherent limitations. As a narrative rather than a systematic review, it is subject to potential selection bias and does not employ formal quality appraisal or quantitative synthesis. The evidence base for VR and AI-specific interventions in chronic pain remains early-stage, limiting the strength of conclusions for these modalities. The predominance of studies from high-income Western countries limits generalizability to lower-resource settings, and publication bias may have contributed to an overrepresentation of positive findings across the reviewed literature.

5. Conclusions

This narrative review synthesized evidence on digital health interventions for chronic pain self-management across four domains: DHI classification, clinical effectiveness, implementation barriers, and societal implications. The findings confirm that mHealth applications and iCBT represent the most evidence-supported modalities, demonstrating consistent positive effects on pain intensity, quality of life, and functional disability across diverse chronic pain conditions. These modalities directly address the cognitive, behavioral, and emotional dimensions of chronic pain, consistent with the biopsychosocial model endorsed by the IASP. Emerging technologies — including virtual reality, AI-powered chatbots, and wearable devices — show early promise but require further high-quality investigation before definitive clinical recommendations can be made.

Despite positive clinical signals, translating DHI efficacy into routine practice remains constrained by limited digital health literacy, fragmented regulatory frameworks, and deep inequalities in access to digital technologies. The populations most burdened by chronic pain — older adults, those with lower socioeconomic status, and individuals in geographically underserved areas — are frequently those least equipped to benefit from current digital solutions. Without proactive equity safeguards embedded in both design and policy, digital health risks compounding the very disparities it promises to resolve.

Several priorities emerge for future research and policy. High-quality RCTs with standardized outcome measures aligned with IMMPACT recommendations and long-term follow-up beyond three months are needed across all DHI modalities. Implementation science approaches should be prioritized to understand how DHIs can be sustainably integrated into routine clinical workflows. Future studies must explicitly include older adults, low-income groups, and patients in low-resource settings. Internationally harmonized regulatory standards for medical digital health applications represent an urgent policy need. Ultimately, the most promising vision for digital health in chronic pain management is not one of technological substitution, but of thoughtful augmentation — in which digital tools extend the reach and continuity of care while preserving the humanistic dimensions of pain treatment that remain central to patient well-being.

Conflicts of Interest: The authors declare no conflicts of interest regarding the publication of this review.

Funding: This research received no external funding.

Author's Contribution:

Conceptualization: Aleksandra Stępka, Wojciech Janikowski; methodology: Aleksandra Stępka; software: Weronika Plichtowicz-Kordowska; validation: Lena Jaworowicz, Maria Wieczorek, Aleksandra Stępka and Wojciech Janikowski; formal analysis: Karina Lewandowska; investigation: Ewa Bąkowska; resources: Maria Wieczorek, Agnieszka Jóźwicka; data curation: Karina Lewandowska, Aleksandra Stępka; writing — original draft preparation: Aleksandra Stępka; writing — review and editing: Weronika Plichtowicz-Kordowska, Wojciech Janikowski, Maria Wieczorek; visualization: Agnieszka Jóźwicka; supervision: Lena Jaworowicz; project administration: Ewa Bąkowska. All authors have read and agreed with the published version of the manuscript.

Declaration of the use of generative AI and AI-assisted technologies in the writing process: In preparing this work, the authors used ClaudeAI for the purpose of enhancing language clarity, improve readability and text formatting. After using this tool/service, the authors have reviewed and edited the content as needed and accept full responsibility for the substantive content of the publication.

REFERENCES

1. Zhu, M., Zhang, J., Liang, D., Qiu, J., Fu, Y., Zeng, Z., Han, J., Zheng, J., & Lin, L. (2025). Global and regional trends and projections of chronic pain from 1990 to 2035: Analyses based on Global Burden of Diseases Study 2019. *Journal of Pain Research, 18*, 123–135. https://doi.org/10.1177/20494637241310697
2. Treede, R. D., Rief, W., Barke, A., Aziz, Q., Bennett, M. I., Benoliel, R., Cohen, M., Evers, S., Finnerup, N. B., First, M. B., Giamberardino, M. A., Kaasa, S., Kosek, E., Lavand'homme, P., Nicholas, M., Perrot, S., Scholz, J., Schug, S., Smith, B. H., . . . Wang, S. J. (2019). Chronic pain as a symptom or a disease: The IASP classification of chronic pain for the International Classification of Diseases (ICD-11). *Pain, 160*(1), 19–27. https://doi.org/10.1097/j.pain.0000000000001384
3. Lagisetty, P., Slat, S., Thomas, J., Macleod, C., Antoku, D., Harrington, M., Heins, S., & Bohnert, A. S. B. (2021). Access to multimodal pain management for patients with chronic pain: An audit study. *Journal of General Internal Medicine, 36*(3), 818–820. https://doi.org/10.1007/s11606-020-05866-3
4. Weatherly, S., McKenna, T., Wahba, S., Mintz, Y., & Greenfield, G. (2024). Effectiveness of digital health interventions (DHI) in chronic pain management: A scoping review of current evidence and emerging trends. *Cureus, 16*(10), e72562. https://doi.org/10.7759/cureus.72562
5. Keesara, S., Jonas, A., & Schulman, K. (2020). COVID-19 and health care's digital revolution. *The New England Journal of Medicine, 382*(23), e82. https://doi.org/10.1056/NEJMp2005835
6. Nouri, S., Khoong, E. C., Lyles, C. R., & Karliner, L. (2020). Addressing equity in telemedicine for chronic disease management during the COVID-19 pandemic. *NEJM Catalyst Innovations in Care Delivery*. https://doi.org/10.1056/CAT.20.0123
7. Moreno-Ligero, M., Moral-Munoz, J. A., Salazar, A., & Failde, I. (2023). mHealth intervention for improving pain, quality of life, and functional disability in patients with chronic pain: Systematic review. *JMIR mHealth and uHealth, 11*, e40844. https://doi.org/10.2196/40844
8. Shi, J. L., & Sit, R. W. (2024). Impact of 25 years of mobile health tools for pain management in patients with chronic musculoskeletal pain: Systematic review. *Journal of Medical Internet Research, 26*, e59358. https://doi.org/10.2196/59358
9. Ferrari, R. (2015). Writing narrative-style literature reviews. *Medical Writing, 24*(4), 230–235. https://doi.org/10.1179/2047480615Z.000000000329
10. Greenhalgh, T., Thorne, S., & Malterud, K. (2018). Time to challenge the spurious hierarchy of systematic over narrative reviews. *European Journal of Clinical Investigation, 48*(6), e12931. https://doi.org/10.1111/eci.12931
11. Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Britten, N., Roen, K., & Duffy, S. (2006). *Guidance on the conduct of narrative synthesis in systematic reviews: A product from the ESRC Methods Programme*. Lancaster University. https://doi.org/10.13140/2.1.1018.4643
12. Leroux, A., Rzasa-Lynn, R., Crainiceanu, C., & Sharma, T. (2021). Wearable devices: Current status and opportunities in pain assessment and management. *Digital Biomarkers, 5*(1), 89–102. https://doi.org/10.1159/000515576
13. Avila, F. R., McLeod, C. J., Huayllani, M. T., Boczar, D., Spaulding, A. C., Maniaci, M. J., Forte, A. J., & McLaughlin, S. A. (2021). Wearable electronic devices for chronic pain intensity assessment: A systematic review. *Pain Practice, 21*(8), 955–965. https://doi.org/10.1111/papr.13047
14. Mallari, B., Spaeth, E. K., Goh, H., & Boyd, B. S. (2019). Virtual reality as an analgesic for acute and chronic pain in adults: A systematic review and meta-analysis. *Journal of Pain Research, 12*, 2053–2085. https://doi.org/10.2147/JPR.S200498
15. Williams, A. C. de C., Fisher, E., Hearn, L., & Eccleston, C. (2020). Psychological therapies for the management of chronic pain (excluding headache) in adults. *Cochrane Database of Systematic Reviews, 2020*(8), CD007407. https://doi.org/10.1002/14651858.CD007407.pub4
16. Torous, J., Bucci, S., Bell, I. H., Kessing, L. V., Faurholt-Jepsen, M., Whelan, P., Carvalho, A. F., Edgcumbe, H., Firth, J., & Cipriani, A. (2021). The growing field of digital psychiatry: Current evidence and the future of apps, social media, chatbots, and virtual reality. *World Psychiatry, 20*(3), 318–335. https://doi.org/10.1002/wps.20883
17. Kramer, J. N., Künzler, F., Mishra, V., Presset, B., Kotz, D., Smith, S., Scholz, U., & Fleisch, E. (2021). Which components of smartphone interventions improve outcomes? A meta-analysis of randomized controlled trials. *NPJ Digital Medicine, 4*(1), Article 80. https://doi.org/10.1038/s41746-021-00451-2
18. Meskó, B., Drobni, Z., Bényei, É., Gergely, B., & Győrffy, Z. (2017). Digital health is a cultural transformation of traditional healthcare. *mHealth, 3*, 38. https://doi.org/10.21037/mhealth.2017.08.07
19. Grundy, Q., Chiu, K., Held, F., Continella, A., Bero, L., & Holz, R. (2019). Data sharing practices of medicines related apps and the mobile ecosystem: Traffic, content, and network analysis. *BMJ, 364*, l920. https://doi.org/10.1136/bmj.l920
20. Grundy, Q. (2022). A review of the quality and impact of mobile health apps. *Annual Review of Public Health, 43*, 117–134. https://doi.org/10.1146/annurev-publhealth-052020-103738

21. Keutzer, L., & Simonsson, U. S. H. (2020). Medical device apps: An introduction to regulatory affairs for developers. *JMIR mHealth and uHealth, 8*(6), e17567. https://doi.org/10.2196/17567
22. Eccleston, C. (2017). Advancing psychological therapies for chronic pain. *F1000Research, 6*, 461. https://doi.org/10.12688/f1000research.10612.1
23. Dworkin, R. H., Turk, D. C., Farrar, J. T., Haythornthwaite, J. A., Jensen, M. P., Katz, N. P., Kerns, R. D., Stucki, G., Allen, R. R., Bellamy, N., Carr, D. B., Chandler, J., Cowan, P., Dionne, R., Galer, B. S., Hertz, S., Jadad, A. R., Kramer, L. D., Manning, D. C., . . . Witter, J. (2005). Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. *Pain, 113*(1–2), 9–19. https://doi.org/10.1016/j.pain.2004.09.012
24. Bhatt, J., & Bathija, P. (2018). Ensuring access to quality health care in vulnerable communities. *Academic Medicine, 93*(9), 1271–1275. https://doi.org/10.1097/ACM.0000000000002254
25. Eccleston, C., Fisher, E., Craig, L., Duggan, G. B., Rosser, B. A., & Keogh, E. (2014). Psychological therapies (Internet-delivered) for the management of chronic pain in adults. *Cochrane Database of Systematic Reviews, 2014*(2), CD010152. https://doi.org/10.1002/14651858.CD010152.pub2
26. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., . . . Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Systematic Reviews, 10*(1), Article 89. https://doi.org/10.1186/s13643-021-01626-4