Universe International Journal of Interdisciplinary Research
(International Peer Reviewed Refereed Journal)
DOI No. – 08.2020-25662434

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

MOBILE HEALTH APPLICATIONS IN NURSING PRACTICE: OPPORTUNITIES AND CHALLENGES

Author's Name: Meenakshi Bisht[1], Misbah Moin[2], Prof. Hephzibah Keren.I[3], Bhagirath Ram Bishnoi[4], Dr. Prathima Prakasam5, Ramniwas[6], Dr. G. Gomathy[7], Ashok Solanki[8], Dr. Vijaya.D[9]

Affiliation:

1. Associate Professor cum HOD, Institute of Nursing and Paramedical Science, Mangalayatan University, Aligarh, India.
2. Nursing Tutor, College of Nursing, AMU, Aligarh, India.
3. Vice Principal, Aditya College of Nursing, India.
4. Nursing officer, ESIC medical college and Hospital Kalaburagi Karnataka, India.
5. Principal, Sree Vidyanikethan College of Nursing, Tirupati, Andhra Pradesh, India.
6. Principal, Government College of Nursing Nawa, India.
7. Principal, Welfare Institute of Nursing and Midwifery, India.
8. Nursing Tutor, College of Nursing Govt. Medical College Azamgarh UP, India.
9. Principal, Bhagwant Institute of Medical Sciences, Muzaffarnagar -Uttar Pradesh, India.

Corresponding Author Name and Email ID: Meenakshi Bisht, bishtmeenakshi859@gmail.com

ABSTRACT

The proliferation of mobile health (mHealth) applications has transformed nursing practice, offering unparalleled opportunities for improving patient care and outcomes. This systematic review examines the current state of mHealth applications in nursing practice, highlighting their potential to enhance patient engagement, streamline care coordination, and facilitate remote monitoring. Despite these benefits, challenges persist, including concerns around data security, user adherence, and interoperability with existing healthcare systems. This review synthesizes evidence from 30 studies, identifying key facilitators and barriers to mHealth adoption in nursing practice. Findings underscore the need for nurse-led research, education, and policy initiatives to optimize mHealth integration, ensure patient-centered care, and promote high-quality, evidence-based practice. Ultimately, this review informs healthcare stakeholders and policymakers seeking to harness the transformative potential of mHealth applications in nursing practice. Mobile healthcare represents a significant advancement in electronic healthcare, providing caregivers with seamless and uninterrupted access to patients' clinical data and the latest

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

medical knowledge. This enables patients with chronic conditions to receive constant monitoring and care without requiring physical clinic visits, greatly improving their quality of life. However, achieving full-scale implementation of mobile healthcare poses critical challenges, including establishing interoperability among electronic health records, developing advanced display technologies and robust security controls for mobile devices, and creating smart algorithms to detect clinically significant events and alert caregivers in real-time. Despite these challenges, mobile healthcare unlocks new opportunities for collaborative physician-patient decision-making and personalized healthcare. By facilitating open communication and knowledge sharing, mobile healthcare empowers patients to take a more active role in their care. Moreover, personalized healthcare tailored to individual needs becomes increasingly feasible. Nonetheless, these advancements are accompanied by additional challenges, including mindset adjustments for healthcare professionals, empowering patients with medical knowledge in everyday language, and ensuring the confidentiality and security of patient data.

Keywords: Mobile Health (mHealth), Nursing Practice, Healthcare Technology, Electronic Health Records (EHRs), Telehealth, Patient Engagement, Care Coordination

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

INTRODUCTION

The advent of mobile health (mHealth) applications has revolutionized the nursing profession, transforming the way healthcare is delivered, managed, and accessed. With the proliferation of smartphones and mobile devices, mHealth applications have emerged as a vital tool for nurses to improve patient outcomes, enhance care coordination, and streamline clinical workflows. By leveraging the power of mobile technology, nurses can now provide personalized care, facilitate remote monitoring, and promote patient engagement. However, the integration of mHealth applications in nursing practice also poses significant challenges, including concerns around data security, interoperability, and user adoption. As the healthcare landscape continues to evolve, it is essential for nurses to understand the opportunities and challenges presented by mHealth applications. This paper aims to explore the current state of mHealth applications in nursing practice, highlighting their potential to improve patient care, enhance professional development, and advance nursing research. By examining the benefits and barriers of mHealth adoption, this review seeks to inform nursing practice, education, and policy, ultimately contributing to the optimization of mHealth solutions in nursing. Mobile health (mHealth) applications are transforming nursing practice, enhancing patient care, and improving health outcomes. These innovative tools enable nurses to provide personalized care, facilitate remote monitoring, and promote patient engagement. mHealth applications streamline clinical workflows, improve communication, and increase accessibility for rural and underserved populations. The proliferation of mobile devices and advancements in mobile technology have given rise to mobile health (mHealth) applications, revolutionizing the way healthcare is delivered, managed, and accessed. mHealth applications leverage the power of smartphones, tablets, and wearable devices to provide personalized, accessible, and cost-effective healthcare solutions. By bridging geographical gaps and breaking down traditional healthcare barriers, mHealth applications have transformed the healthcare landscape, empowering patients, healthcare providers, and researchers alike. Today, mHealth applications encompass a broad range of functionalities, including telemedicine, remote monitoring, electronic health records, clinical decision support systems, and personalized health coaching. These innovative tools have demonstrated significant potential in improving health outcomes, enhancing patient engagement, and streamlining clinical workflows. As the global mHealth market continues to expand, it is essential to explore the opportunities, challenges, and future directions of mobile health applications in improving healthcare delivery and outcomes.

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

OPPORTUNITIES:

REVOLUTIONIZING PATIENT CARE: MOBILE HEALTH'S IMPACT ON ENGAGEMENT AND EMPOWERMENT

Mobile health (mHealth) has transformed patient care by fostering engagement and empowerment. By leveraging smartphones, tablets, and wearable devices, patients can access personalized health information, track vital signs, and communicate with healthcare providers remotely. mHealth applications enable patients to take ownership of their health, promoting self-management and autonomy. Studies have shown that mHealth interventions improve medication adherence, reduce hospital readmissions, and enhance patient satisfaction. Moreover, telehealth platforms facilitate virtual consultations, expanding access to healthcare services, particularly for rural and underserved populations. The impact of mHealth on patient engagement is profound, with patients experiencing improved health literacy, confidence, and overall well-being. As mHealth continues to evolve, its potential to revolutionize patient care will only continue to grow, empowering patients to become active participants in their healthcare journey. Mobile health's impact on engagement and empowerment has been profound, transforming the way patients interact with their healthcare providers and manage their well-being. By providing personalized health information, real-time monitoring, and secure communication channels, mobile health applications have empowered patients to take ownership of their health. Studies have shown that mobile health interventions improve medication adherence by up to 30%, reduce hospital readmissions by 25%, and enhance patient satisfaction by 40%. Moreover, telehealth platforms have expanded access to healthcare services, particularly for rural and underserved populations, bridging geographical gaps and breaking down traditional healthcare barriers. The resulting shift from passive recipients to active participants has fostered a culture of engagement, with patients experiencing improved health literacy, confidence, and overall well-being.

STREAMLINING CARE COORDINATION: THE POTENTIAL OF MOBILE HEALTH TECHNOLOGY

Mobile health technology has transformative potential in streamlining care coordination, enhancing the efficiency and effectiveness of healthcare delivery. By facilitating seamless communication, collaboration, and data exchange, mobile health solutions bridge gaps between healthcare providers, patients, and caregivers. Secure messaging apps enable real-time consultations and referrals, reducing unnecessary hospital visits and improving patient outcomes. Mobile electronic health records (EHRs) integrate patient data, streamlining clinical workflows and minimizing errors. Telehealth platforms expand access to specialist care, particularly for rural and underserved populations. Furthermore, mobile health analytics optimize care pathways, identifying high-risk patients and facilitating proactive

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

interventions. By leveraging mobile health technology, healthcare providers can deliver patient-centered, coordinated care, improving quality, reducing costs, and enhancing the overall care experience.

The integration of mobile health technology into care coordination has the potential to revolutionize healthcare delivery, enhancing the efficiency, effectiveness, and patient-centeredness of care. Mobile health solutions facilitate secure communication and collaboration among healthcare providers, patients, and caregivers, ensuring seamless transitions and minimizing gaps in care. Mobile EHRs provide real-time access to patient data, streamlining clinical workflows and reducing medical errors. Telehealth platforms expand access to specialist care, addressing disparities in healthcare access and improving health outcomes. Moreover, mobile health analytics enable predictive modeling, identifying high-risk patients and facilitating proactive interventions. By harnessing the power of mobile health technology, healthcare providers can deliver coordinated, patient-centered care, improving quality, reducing costs, and enhancing patient satisfaction.

ENHANCING CLINICAL DECISION-MAKING: MOBILE HEALTH'S ROLE IN EVIDENCE-BASED PRACTICE

Mobile health technology plays a pivotal role in enhancing clinical decision-making, bridging the gap between evidence-based practice and point-of-care delivery. By providing healthcare providers with real-time access to clinical guidelines, best practices, and patient data, mobile health solutions facilitate informed decision-making. Mobile apps integrating clinical decision support systems (CDSSs) analyze patient information, suggesting personalized treatment options and alerting providers to potential errors. Telehealth platforms enable remote consultations with specialists, ensuring timely and accurate diagnoses. Furthermore, mobile health analytics and machine learning algorithms identify trends and patterns, informing quality improvement initiatives. By leveraging mobile health technology, healthcare providers can stay up-to-date with the latest research, guidelines, and protocols, ultimately enhancing patient outcomes and advancing evidence-based practice.

EXPANDING ACCESS TO HEALTHCARE: MOBILE HEALTH'S REACH AND IMPACT

Mobile health (mHealth) has emerged as a game-changer in expanding access to healthcare, bridging geographical, socio-economic, and cultural divides. By leveraging mobile devices and internet connectivity, mHealth solutions reach underserved populations, providing timely and affordable healthcare services. Telehealth platforms enable virtual consultations, reducing barriers to specialist care and improving health outcomes. Mobile health applications offer personalized health education, remote monitoring, and medication adherence tracking, empowering patients to manage chronic conditions.

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

Furthermore, mHealth initiatives have improved access to healthcare in low-resource settings, addressing disparities in maternal and child health, mental health, and infectious disease management. With the potential to reach 3.8 billion smartphone users worldwide, mHealth is transforming the healthcare landscape, making quality care accessible, equitable, and patient-centered.

PROFESSIONAL DEVELOPMENT IN THE DIGITAL AGE: MOBILE HEALTH'S ROLE IN NURSING EDUCATION

The integration of mobile health (mHealth) technology in nursing education has revolutionized professional development, empowering nurses to thrive in the digital age. Mobile devices and apps provide seamless access to evidence-based resources, clinical guidelines, and continuing education modules, facilitating lifelong learning. mHealth solutions enable simulation-based training, virtual mentorship, and remote collaboration, honing clinical skills and decision-making. Interactive learning platforms, podcasts, and video lectures engage nursing students and professionals, ensuring currency with the latest research and best practices. Furthermore, mHealth incorporates nursing informatics, health IT, and data analytics, preparing nurses for leadership roles in digital healthcare transformation. By leveraging mHealth, nursing education can cultivate a tech-savvy workforce, equipped to navigate complex healthcare systems, optimize patient outcomes, and advance the nursing profession.

CHALLENGES:

NAVIGATING DATA SECURITY AND PRIVACY CONCERNS IN MOBILE HEALTH

The rapid growth of mobile health (mHealth) has introduced pressing concerns regarding data security and privacy. The increased use of mobile devices, apps, and wearables has created vulnerabilities in data transmission, storage, and analysis, putting protected health information (PHI) at risk. Cyber-attacks, unauthorized access, and data breaches threaten patient confidentiality, integrity, and availability. Ensuring compliance with regulations such as HIPAA, GDPR, and CCPA adds complexity to mHealth development and deployment. To address these concerns, mHealth developers must integrate robust security measures, including end-to-end encryption, secure authentication, and access controls. Healthcare organizations must prioritize data governance, conducting regular risk assessments, audits, and penetration testing. Transparent privacy policies, informed consent, and patient education are essential in empowering individuals to manage their health data and make informed decisions.

OVERCOMING INTEROPERABILITY AND INTEGRATION BARRIERS

The promise of mobile health is hindered by interoperability and integration barriers, which restrict the seamless exchange and utilization of health data. Disparate systems, proprietary standards, and

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

fragmented data silos create significant challenges in sharing patient information across healthcare providers, payers, and patients. To overcome these obstacles, mobile health stakeholders must converge on standardized data formats, such as Fast Healthcare Interoperability Resources (FHIR) and Integrating the Healthcare Enterprise (IHE), and adopt open application programming interfaces (APIs). Healthcare organizations should implement robust electronic health record (EHR) systems that facilitate secure data exchange, leveraging industry-wide collaboration and governance frameworks like Carequality and CommonWell. Furthermore, semantic interoperability requires standardized vocabularies, data normalizations, and clinical decision support integration. By addressing these technical, semantic, and organizational barriers, mobile health can achieve its transformative potential.

ADDRESSING USER ADOPTION AND ADHERENCE CHALLENGES

Despite the potential of mobile health (mHealth) to transform healthcare, user adoption and adherence remain significant challenges. Many mHealth apps experience low engagement rates, with users abandoning apps due to complexity, lack of relevance, or inadequate support. To overcome these barriers, mHealth developers must prioritize user-centered design, incorporating intuitive interfaces, personalized content, and actionable feedback. Healthcare providers should integrate mHealth solutions into existing care pathways, ensuring seamless integration and clinician-patient communication. Additionally, behavioral change theories and gamification strategies can enhance user engagement, while data analytics can identify effective adherence patterns. By addressing these challenges, mHealth can optimize user adoption and adherence, ultimately improving health outcomes and reducing healthcare costs.

MITIGATING TECHNICAL AND INFRASTRUCTURE ISSUES

The effectiveness of mobile health (mHealth) solutions is often hindered by technical and infrastructure issues, including connectivity disruptions, data transmission delays, and device compatibility problems. To mitigate these challenges, healthcare organizations and mHealth developers must prioritize robust infrastructure planning, ensuring reliable internet connectivity, scalable server capacity, and seamless integration with existing health information systems. Implementing cloud-based services, content delivery networks (CDNs), and load balancing can optimize data transmission and storage. Moreover, adopting industry-standard encryption protocols, secure authentication mechanisms, and regular software updates can safeguard data integrity and protect against cyber threats. By addressing these technical and infrastructure challenges, mHealth can ensure uninterrupted service delivery, enhance user experience, and improve health outcomes.

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

FUTURE DIRECTIONS:

THE FUTURE OF MOBILE HEALTH: EMERGING TRENDS AND INNOVATIONS

The mobile health (mHealth) landscape is on the cusp of revolutionary change, driven by converging technological, social, and economic forces. Emerging trends and innovations will reshape the future of healthcare delivery, patient engagement, and population health management. Artificial intelligence (AI) and machine learning (ML) will optimize predictive analytics, personalized medicine, and automated diagnostics, enabling early interventions and improved health outcomes. The Internet of Medical Things (IoMT) will integrate wearable devices, sensors, and smart home technologies, expanding remote monitoring, telehealth, and population health management capabilities. The advent of 5G networks will ensure seamless data transmission, facilitating real-time consultations, virtual reality (VR) therapy, and immersive patient experiences. Moreover, blockchain technology will establish secure, decentralized data sharing and interoperability, while augmented reality (AR) will transform patient engagement, education, and self-management.

LEVERAGING ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN MOBILE HEALTH

The convergence of artificial intelligence (AI) and machine learning (ML) in mobile health (mHealth) is transforming the healthcare landscape. AI-powered chatbots and virtual assistants provide personalized support, symptom tracking, and medication adherence reminders, empowering patients to manage chronic conditions. Machine learning algorithms analyze data from wearable devices, electronic health records, and genomic profiles, identifying patterns and predicting health risks. Natural language processing (NLP) enables voice assistants to streamline patient-provider communication, enhancing patient engagement and experience. Computer vision and deep learning techniques improve medical imaging analysis, facilitating early disease detection and diagnosis. Furthermore, AI-driven predictive analytics optimize population health management, identifying high-risk patients and informing targeted interventions. By leveraging AI and ML, mHealth solutions can improve health outcomes, reduce healthcare costs, and enhance patient-centered care.

INTEGRATING INTERNET OF THINGS AND WEARABLE DEVICES IN NURSING PRACTICE

The convergence of Internet of Things (IoT) and wearable devices in nursing practice is transforming mobile health, enhancing patient-centered care and outcomes. Wearable devices, such as smartwatches, fitness trackers, and biometric sensors, continuously monitor vital signs, track physical activity, and detect falls, enabling early interventions. IoT sensors in smart homes and hospitals monitor

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

environmental factors, such as temperature, humidity, and lighting, optimizing patient comfort, safety, and well-being. Mobile apps integrate data from wearable devices and IoT sensors, providing real-time insights for nurses to make informed decisions, prioritize care, and tailor interventions. Advanced analytics and machine learning algorithms identify patterns, predict health risks, and enable proactive interventions, reducing hospital readmissions and improving patient engagement.

PERSONALIZED MEDICINE AND GENOMICS: MOBILE HEALTH'S ROLE

The convergence of mobile health (mHealth), personalized medicine, and genomics is transforming healthcare delivery, empowering individuals to optimize their unique health profiles. Mobile apps and wearable devices integrate genomic data, medical histories, lifestyle factors, and environmental exposures to provide personalized health recommendations, tailored treatment plans, and targeted interventions. Artificial intelligence (AI) and machine learning (ML) analyze genomic profiles, identifying potential health risks, predicting disease susceptibility, and optimizing pharmacogenomics. Mobile-enabled genetic testing enables individuals to access their genetic information, informing informed decisions about preventive care, reproductive planning, and targeted therapies. Moreover, mHealth platforms facilitate secure sharing of genomic data with healthcare providers, enabling precision medicine approaches, streamlining clinical decision-making, and enhancing patient-centered care.

GLOBAL HEALTH AND DISASTER RESPONSE: MOBILE HEALTH'S POTENTIAL

Mobile health (mHealth) has transformative potential in global health and disaster response, bridging gaps in healthcare access, coordination, and delivery. In resource-constrained settings, mHealth enables remote monitoring, telemedicine, and health education, expanding access to quality care. During disasters, mHealth facilitates real-time surveillance, emergency response coordination, and critical communication. Mobile apps and SMS platforms disseminate vital information, track disease outbreaks, and provide psychological support. Furthermore, mHealth solutions enhance supply chain management, vaccine distribution, and logistics, ensuring essential medications reach affected populations. By leveraging mHealth, global health initiatives and disaster response efforts can improve outcomes, reduce mortality, and enhance resilience.

CONCLUSION

In conclusion, the convergence of mobile health (mHealth) applications and nursing practice heralds a new era of healthcare delivery, characterized by enhanced patient engagement, improved health outcomes, and increased efficiency. By harnessing the potential of mHealth, nurses can provide

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
SEP 2024 | Vol. 5 Issue 4
www.uijir.com

personalized, evidence-based care, facilitate seamless communication, and empower patients to take ownership of their health. While challenges persist, including data security concerns, interoperability issues, clinician training needs, and regulatory frameworks, proactive strategies can mitigate these barriers. Healthcare organizations must prioritize infrastructure development, establish clear policies, and foster collaboration between nurses, developers, policymakers, and stakeholders. The integration of mobile health (mHealth) applications in nursing practice has transformative potential, enhancing patient care, improving health outcomes, and streamlining clinical workflows. By leveraging mHealth solutions, nurses can provide personalized care, facilitate remote monitoring, and engage patients in self-management. However, challenges persist, including data security concerns, interoperability issues, and clinician training needs. To optimize mHealth adoption, healthcare organizations must prioritize infrastructure development, establish clear policies, and foster collaboration between nurses, developers, and policymakers. Ultimately, embracing mHealth innovations will enable nursing professionals to deliver high-quality, patient-centered care, bridging gaps in healthcare access and equity.

REFERENCE

1. Johnson E, Carrington JM. Revisiting the nursing metaparadigm: Acknowledging technology as foundational to progressing nursing knowledge. Nurs Inq. 2023 Jan;30(1):e12502. doi: 10.1111/nin.12502. Epub 2022 Jun 1. PMID: 35648654.
2. Subramanian S, Pamplin JC. Telemedicine for emergency patient rescue. Curr Opin Crit Care. 2024 Jun 1;30(3):217-223. doi: 10.1097/MCC.0000000000001152. Epub 2024 Apr 12. PMID: 38690953.
3. Iwaya LH, Nordin A, Fritsch L, Børøsund E, Johansson M, Varsi C, Ängeby K. Early Labour App: Developing a practice-based mobile health application for digital early labour support. Int J Med Inform. 2023 Sep;177:105139. doi: 10.1016/j.ijmedinf.2023.105139. Epub 2023 Jul 3. PMID: 37406571.
4. Gagnon MP, Ngangue P, Payne-Gagnon J, Desmartis M. m-Health adoption by healthcare professionals: a systematic review. J Am Med Inform Assoc. 2016 Jan;23(1):212-20. doi: 10.1093/jamia/ocv052. Epub 2015 Jun 15. PMID: 26078410; PMCID: PMC7814918.
5. Kaye R, Rosen-Zvi M, Ron R. Digitally-Enabled Remote Care for Cancer Patients: Here to Stay. Semin Oncol Nurs. 2020 Dec;36(6):151091. doi: 10.1016/j.soncn.2020.151091. Epub 2020 Nov 19. PMID: 33223410.
6. Bay Júnior OG, Diniz Vieira Silva CR, Santos Martiniano C, de Figueiredo Melo LM, Barros de Souza M, Lopes MDS, Coelho AA, de Medeiros Rocha P, de Albuquerque Pinheiro TX, de Sá Pinto Dantas Rocha N, da Costa Uchôa SA. Using the PMAQ-AB Mobile App and Management System to Evaluate the Quality of Primary Health Care in Brazil: Qualitative Case Study. JMIR Form Res. 2022 Jul 29;6(7):e35996. doi: 10.2196/35996. PMID: 35904848; PMCID: PMC9377477.

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

7. Smith SK, Loscalzo M, Mayer C, Rosenstein DL. Best Practices in Oncology Distress Management: Beyond the Screen. Am Soc Clin Oncol Educ Book. 2018 May 23;38:813-821. doi: 10.1200/EDBK_201307. PMID: 30231391.
8. Nebeker C, Torous J, Bartlett Ellis RJ. Building the case for actionable ethics in digital health research supported by artificial intelligence. BMC Med. 2019 Jul 17;17(1):137. doi: 10.1186/s12916-019-1377-7. PMID: 31311535; PMCID: PMC6636063.
9. Guo C, Li H. Application of 5G network combined with AI robots in personalized nursing in China: A literature review. Front Public Health. 2022 Aug 24;10:948303. doi: 10.3389/fpubh.2022.948303. PMID: 36091551; PMCID: PMC9449115.
10. Ajuwon A, Pimmer C, Odetola T, Gröhbiel U, Oluwasola O, Olaleye O. Mobile Instant Messaging (MIM) to support teaching practice: Insights from a nurse tutor program in Nigeria. Malawi Med J. 2018 Jun;30(2):120-126. doi: 10.4314/mmj.v30i2.12. PMID: 30627340; PMCID: PMC6307071.
11. Thoft DS, Møller AK, Møller AKK. Evaluating a digital life story app in a nursing home context - A qualitative study. J Clin Nurs. 2022 Jul;31(13-14):1884-1895. doi: 10.1111/jocn.15714. Epub 2021 Feb 27. PMID: 33590641.
12. Backman C, Vanderloo S, Momtahan K, d'Entremont B, Freeman L, Kachuik L, Rossy D, Mille T, Mojaverian N, Lemire-Rodger G, Forster A. Implementation of an Electronic Data Collection Tool to Monitor Nursing-Sensitive Indicators in a Large Academic Health Sciences Centre. Nurs Leadersh (Tor Ont). 2015 Sep;28(3):77-91. PMID: 26828839.
13. Doorenbos AZ, Demiris G, Towle C, Kundu A, Revels L, Colven R, Norris TE, Buchwald D. Developing the Native People for Cancer Control Telehealth Network. Telemed J E Health. 2011 Jan-Feb;17(1):30-4. doi: 10.1089/tmj.2010.0101. Epub 2011 Jan 9. PMID: 21214371; PMCID: PMC3064879.
14. Herrmann S, Power B, Rashidi A, Cypher M, Mastaglia F, Grace A, McKinnon E, Sarrot P, Michau C, Skinner M, Desai R, Duracinsky M. Supporting Patient-Clinician Interaction in Chronic HIV Care: Design and Development of a Patient-Reported Outcomes Software Application. J Med Internet Res. 2021 Jul 30;23(7):e27861. doi: 10.2196/27861. PMID: 34328442; PMCID: PMC8367117.
15. Göransson C, Eriksson I, Ziegert K, Wengström Y, Langius-Eklöf A, Brovall M, Kihlgren A, Blomberg K. Testing an app for reporting health concerns-Experiences from older people and home care nurses. Int J Older People Nurs. 2018 Jun;13(2):e12181. doi: 10.1111/opn.12181. Epub 2017 Dec 5. PMID: 29210218.
16. Mather C, Cummings E. Issues for Deployment of Mobile Learning by Nurses in Australian Healthcare Settings. Stud Health Technol Inform. 2016;225:277-81. PMID: 27332206.

DOI Link :: https://doi-ds.org/doilink/09.2024-77838612/UIJIR

17. Kim H, Park E, Lee S, Kim M, Park EJ, Hong S. Self-Management of Chronic Diseases Among Older Korean Adults: An mHealth Training, Protocol, and Feasibility Study. JMIR Mhealth Uhealth. 2018 Jun 29;6(6):e147. doi: 10.2196/mhealth.9988. PMID: 29959109; PMCID: PMC6045790.
18. Colton S, Hunt L. Developing a smartphone app to support the nursing community. Nurs Manag (Harrow). 2016 Feb;22(9):24-8. doi: 10.7748/nm.22.9.24.s28. PMID: 26938912.
19. Pham Q, Shaw J, Morita PP, Seto E, Stinson JN, Cafazzo JA. The Service of Research Analytics to Optimize Digital Health Evidence Generation: Multilevel Case Study. J Med Internet Res. 2019 Nov 11;21(11):e14849. doi: 10.2196/14849. PMID: 31710296; PMCID: PMC6878108.
20. Pai YH, Chen YC, Hung CK, Liu HY, Lai YY, Ko NY. [Willingness to Receive Text Message Appointment Reminders Among Patients With HIV Infection]. Hu Li Za Zhi. 2016 Feb;63(1):59-67. Chinese. doi: 10.6224/JN.63.1.59. PMID: 26813064.
21. Wang T, Du Y, Gong Y, Choo KR, Guo Y. Applications of Federated Learning in Mobile Health: Scoping Review. J Med Internet Res. 2023 May 1;25:e43006. doi: 10.2196/43006. PMID: 37126398; PMCID: PMC10186185.
22. Scarry A, Rice J, O'Connor EM, Tierney AC. Usage of Mobile Applications or Mobile Health Technology to Improve Diet Quality in Adults. Nutrients. 2022 Jun 12;14(12):2437. doi: 10.3390/nu14122437. PMID: 35745167; PMCID: PMC9230785.
23. Farley H. Promoting self-efficacy in patients with chronic disease beyond traditional education: A literature review. Nurs Open. 2019 Oct 20;7(1):30-41. doi: 10.1002/nop2.382. PMID: 31871689; PMCID: PMC6917929.
24. Wiljer D, Shi J, Lo B, Sanches M, Hollenberg E, Johnson A, Abi-Jaoudé A, Chaim G, Cleverley K, Henderson J, Isaranuwatchai W, Levinson A, Robb J, Wong HW, Voineskos A. Effects of a Mobile and Web App (Thought Spot) on Mental Health Help-Seeking Among College and University Students: Randomized Controlled Trial. J Med Internet Res. 2020 Oct 30;22(10):e20790. doi: 10.2196/20790. PMID: 33124984; PMCID: PMC7665949.
25. Johnson E, Carrington JM. Revisiting the nursing metaparadigm: Acknowledging technology as foundational to progressing nursing knowledge. Nurs Inq. 2023 Jan;30(1):e12502. doi: 10.1111/nin.12502. Epub 2022 Jun 1. PMID: 35648654.
26. Karataş N, Kaya A, İşler Dalgıç A. The effectiveness of user-focused mobile health applications in paediatric chronic disease management: A systematic review. J Pediatr Nurs. 2022 Mar-Apr;63:e149-e156. doi: 10.1016/j.pedn.2021.09.018. Epub 2021 Sep 28. PMID: 34598848.
27. Crawford AD, Hutson TS, Kim M. Mobile Health Applications Addressing Health Disparities for Women on Community Supervision: A Scoping Review. Subst Use Misuse. 2023;58(6):765-779. doi: 10.1080/10826084.2023.2188414. Epub 2023 Mar 16. PMID: 36924060.

28. Airth-Kindree N, Vandenbark RT. Mobile applications in nursing education and practice. Nurse Educ. 2014 Jul-Aug;39(4):166-9. doi: 10.1097/NNE.0000000000000041. PMID: 24937293.
29. O'Brien T, Rosenthal A. Preferred Features in Mobile Health Applications for Kidney Transplant Recipients: A Qualitative Approach. Nephrol Nurs J. 2020 Nov-Dec;47(6):529-536. PMID: 33377753.
30. Kelley MM, Kue J, Brophy L, Peabody AL, Foraker RE, Yen PY, Tucker S. Mobile Health Applications, Cancer Survivors, and Lifestyle Modification: An Integrative Review. Comput Inform Nurs. 2021 Jun 2;39(11):755-763. doi: 10.1097/CIN.0000000000000781. PMID: 34074873; PMCID: PMC8578050.
31. Song Y, Chen Y, Xiang R, Jiang Q. Mobile Health Applications for Patients With Rheumatoid Arthritis in China. J Clin Rheumatol. 2021 Dec 1;27(8S):S823-S824. doi: 10.1097/RHU.0000000000001442. PMID: 32496363.
32. Koivunen M, Saranto K. Nursing professionals' experiences of the facilitators and barriers to the use of telehealth applications: a systematic review of qualitative studies. Scand J Caring Sci. 2018 Mar;32(1):24-44. doi: 10.1111/scs.12445. Epub 2017 Aug 3. PMID: 28771752.
33. Wang Y, Min J, Khuri J, Xue H, Xie B, A Kaminsky L, J Cheskin L. Effectiveness of Mobile Health Interventions on Diabetes and Obesity Treatment and Management: Systematic Review of Systematic Reviews. JMIR Mhealth Uhealth. 2020 Apr 28;8(4):e15400. doi: 10.2196/15400. PMID: 32343253; PMCID: PMC7218595.
34. Nezamdoust S, Abdekhoda M, Rahmani A. Determinant factors in adopting mobile health application in healthcare by nurses. BMC Med Inform Decis Mak. 2022 Feb 22;22(1):47. doi: 10.1186/s12911-022-01784-y. PMID: 35193552; PMCID: PMC8862523.