Robotics use in the care and management of people living with diabetes mellitus: A scoping review

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Statement of the Problem: Diabetes prevalence is rising and projected to affect 783 million globally by 2045. Effective diabetes selfmanagement relies on diabetes knowledge, lifestyle modifications, and disease management, yet global healthcare workforce shortages pose challenges to providing adequate support. Socially assistive technologies, such as robots or artificial intelligence, are proposed as potential solutions to help meet these rising demands. Aim and Methods: This review aimed to map the current literature on Socially Assistive Robotic interventions for diabetes care, identifying intervention types, barriers and enablers to use, and their impact on health-related outcomes. A scoping review using Arskey and Omalley's framework was conducted, screening studies published between January 2013 and December 2023 across key databases (CINAHL, Medline, PubMed Central, Web of Science, Ovid Emcare, Ovid Nursing, Proquest SciTech Collection, IEEE Xplore, ACM Digital Library, Proquest Social Science Premium Collection, and grey literature databases), with data extracted using COVIDENCE®. Findings: Nineteen studies met inclusion criteria, mostly focused on children with type 1 diabetes. Studies were largely conducted in Europe, cross sectional in design, and with small sample sizes. Socially assistive robots demonstrated high acceptability, especially among younger children, positively effecting knowledge acquisition, self-management, and self-efficacy. Personalized interactions, gamified features, and emotional responsiveness were key enablers that enhanced engagement. However, engagement waned over time, particularly when participants practical and emotional expectations were unmet. Barriers included usability challenges, privacy concerns, and lack of customization. Economic and sustainability evaluations were notably absent. Conclusion & Significance: Although evidence for robotics in diabetes care is growing, current research is methodologically limited and focuses primarily on younger populations. Future studies should include adults, employ multi-faceted robotics designs, and be adequately powered to assess acceptability and efficacy across diverse patient groups facilitating broader application in diabetes care.

Biography

Amani Al Bayrakdar is a healthcare researcher and a nursing Lecturer at the School of Health and Social Care, Edinburgh Napier University, Scotland, UK. She holds a PhD with a research focus on diabetes care and management. Her work emphasizes innovative approaches to improving care for individuals living with diabetes, particularly through technological advancements such as insulin pump therapy and their impact on health outcomes and quality of life in young adults withtype 1 diabetes. Dr. Al Bayrakdar has conducted research into the experiences and self-care practices of young people living with diabetes. She is an active member of several professional organizations such as Diabetes UK, Psychosocial Aspects of Diabetes Study Group (PSAD), and the International Society for Pediatric andAdolescent Diabetes (ISPAD). Her expertise lies in advancing diabetes research to drive innovation in care delivery and improve patient outcomes.

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