INPLASY

The effect of smartphone-based-interventions on health-related quality of life of adults with type 2 diabetes mellitus- A systematic review

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ADMINISTRATIVE INFORMATION

Support - University of Thessaly.

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Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 22 March 2025 and was last updated on 22 March 2025.

INTRODUCTION

Review question / Objective Previous systematic reviews have primarily focused on examining the influence of smartphone-based interventions mainly on the metabolic or clinical parameters among adults with type 2 diabetes. However, there is still not enough evidence in the literature regarding the assessment of these interventions on health-related quality of life (HRQoL). Considering the significant negative influence of type 2 diabetes on HRQoL in adults, understanding the benefits of smartphone-based interventions in improving the HRQoL of individuals with type 2 diabetes is crucial. Therefore, this systematic review aims to analyze existing literature to fill this gap by examining the effect of smartphone-based interventions on the HRQoL of adults diagnosed with type 2 diabetes.
The objective is to review the effect of smartphone-based self-management interventions on health-related quality of life of adults with type 2 diabetes mellitus.

Rationale The positive effect of the digital interventions on the health-related quality of life of people with type 2 diabetes underlies the importance on focusing on patient-centered outcomes and the importance of following a holistic approach when treating type 2 diabetes.
The findings of systematic reviews can guide healthcare providers in selecting and recommending these interventions, thereby enhancing patient care. In addition, recognizing which characteristics of the interventions are more effective for patients could help clinicians tailor treatment plans to individual needs, improving adherence and outcomes.
In addition to these, policymakers could use the evidence to develop and implement policies that prioritize these interventions.
Another point is that informing patients how these interventions could help them improve their overall quality of life empowers them to make informed decisions about their care and increase their motivation and adherence to treatment plans.

The existing results of this systematic review can pave the way for further research, including more in-depth studies on specific interventions or patient populations.
Improving the HRQOL of patients with type 2 diabetes leads to a reduction of complications, hospitalizations, and overall healthcare costs, benefiting public health systems and leading, therefore, to healthier, more productive communities.

Condition being studied The condition being studied is type 2 diabetes. In the 21st century, diabetes has emerged as a prominent global health concern. The increasing prevalence of diabetes is leading to significant economic consequences for healthcare systems worldwide. This condition is associated with various chronic complications, including macrovascular, microvascular and additional conditions. In addition, episodes of hypoglycaemia , fear of hyperglycaemia and sedentary lifestyle are common. These lead to a lower health related quality of life (HRQoL) comparing to the general population. HRQoL examines the impact of an individual's physical and mental well-being on their daily functioning and overall contentment with life . QoL has become highly emphasized in recent years as an important healthcare outcome. With an increasing prevalence of chronic diseases and the focus of health care expanding from “adding years to life” to “adding life to years”, there is a growing interest in assessments of the quality of life in healthcare. There are different reasons why people with type 2 diabetes may experience a lower HRQoL compared to the general population. Diabetes-related complications may have a negative physical impact, such as pain, discomfort, immobility, and fatigue, as well as psychological impact, including frustration and distress for individuals. Treating type 2 diabetes should involve a comprehensive approach that incorporates both lifestyle modifications and medication. In recent years there is an increased utilization of smartphone applications that have a notable impact on self-management for type 2 diabetes. Most of these apps have several similar features including self-monitoring, education, reminders and communication. Thus, existing reviews were not yet able to evaluate the effectiveness of smartphone-based technologies on psychosocial outcomes, like health-related quality of life. Therefore this systematic review aims to show the effectiveness of these interventions on the health-related quality of life with patients with type 2 diabetes.

METHODS

Search strategy Two databases PubMed and Library Information Science & Technology Abstracts (LISTA), were systematically searched for studies published from the 1st January 2014 until October 2024. The terms used during the search procedure were: ("diabetes mellitus type 2"[Title/Abstract] OR "type 2 diabetes mellitus"[Title/Abstract] OR "type 2 diabetes"[Title/Abstract] OR "T2D"[Title/Abstract] OR "dm type 2"[Title/Abstract]) AND ("smartphone*"[Title/Abstract] OR "mobile application*"[Title/Abstract] OR "mobile*"[Title/Abstract] OR "mhealth"[Title/Abstract] OR "application*"[Title/Abstract]) AND ("health related quality of life"[Title/Abstract] OR "quality of life"[Title/Abstract] OR "hrqol"[Title/Abstract] OR "HRQL"[Title/Abstract] OR "hrqol"[Title/Abstract] OR "qol"[Title/Abstract] OR "qol"[Title/Abstract]).
An additional search for relevant studies was conducted from the reference list of the eligible publications.

Participant or population The participants included in the systematic review were human adults with type 2 diabetes. Publications were excluded if : 1) focused on patients with prediabetes, type 1 diabetes, gestational diabetes.

Intervention Intervention focused on smartphone applications as a major component for self-management of the T2D disease. Publications were excluded if smartphone were not the major component of the intervention.

Comparator A control group that did not follow the intervention, or a control situation in case of a cross over design randomized controlled trials.

Study designs to be included Randomized controlled trials. Publications were excluded if they were study protocols, letters to the editors, reviews, conference proceeding and magazines.

Eligibility criteria Population: Human adults T2D patients
Intervention: Intervention focused on smartphone applications as a major component for self-management of the T2D disease.
Comparator: A control group that did not follow the intervention, or a control situation in case of a cross over design randomized controlled trials.
Outcome: Primary or secondary outcome of HRQoL, measured with any widely-used questionnaire.

Study design: Randomized controlled trials that published before 2014, due to technological advancements.

Information sources Two databases PubMed and Library Information Science & Technology Abstracts (LISTA), were systematically searched for studies published from the 1st January 2014 until October 2024.

Main outcome(s) Health-related quality of life, measured with any widely-used questionnaire. Publications that measured the outcome as disease-specific quality of life were excluded.

Quality assessment / Risk of bias analysis Risk of bias in the eligible studies was assessed with the risk of bias 2 (RoB2) Cochrane library tool.

Strategy of data synthesis Data were extracted from the eligible studies as follows: (1) first author surname and year of publication, (2) T2D patients characteristics, (3) description of the intervention, and (4) main outcomes. For all of the eligible studies a summarized narrative data synthesis was adopted and a relevant table was created.

Subgroup analysis In the moment no subgroup analysis is conducted.

Sensitivity analysis In the moment no sensitivity analysis is conducted.

Language restriction The systematic review will be conducted in english.

Country(ies) involved Greece.

Keywords type 2 diabetes, T2D, health-related quality of life, HrQoL, smartphone, digital interventions.

Contributions of each author

Author 1 - Marietta Yioukka - Author 1 is the main and first author. Author 1 did the research procedure, selected the publications included in the systematic review, performed the risk of bias, analyzed the data, and wrote the manuscript.
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