

## INPLASY

## Effects of mHealth Application Interventions on Type 2 Diabetes Mellitus: A Systematic Review

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**ADMINISTRATIVE INFORMATION****Support** - None.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202590001**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 1 September 2025 and was last updated on 1 September 2025.**INTRODUCTION**

**Review question / Objective** To systematically review randomized controlled trials (RCTs) that implemented mHealth application interventions for self-management of T2DM and to evaluate their effects on glycemic control and psychological outcomes.

**Condition being studied** Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance and relative insulin deficiency. It leads to persistent hyperglycemia, which increases the risk of complications such as cardiovascular disease, nephropathy, neuropathy, and retinopathy. Effective self-management is crucial for controlling blood glucose levels and preventing complications.

**METHODS**

**Search strategy** In PubMed, MeSH keywords such as “diabetes mellitus” [MeSH Terms] AND

“mobile applications” [MeSH Terms] AND “self-care” [MeSH Terms] were searched, and the exclusion criteria were simultaneously applied. In Emtree, the following free text keywords were searched:

“non-insulin dependent diabetes mellitus”/exp AND (“mobile phone”/exp OR “smart phone or mobile health or application or app” AND “self-care”/exp OR “self-care” OR “self-management” OR “self-treatment” OR “self-management” OR “self-nurturance” OR “selfcare” OR “self-management” OR “self-treatment” OR “glucose blood level”/exp OR “hemoglobin A1C”/exp OR “quality of life”/exp).

We systematically searched PubMed, Embase, CINAHL, RISS, and KISS databases for eligible articles published between June 2016 and May 2021. Keywords included: “type 2 diabetes,” “mHealth,” “mobile application,” “self-management,” and “randomized controlled trial.”

**Participant or population** Adults with type 2 diabetes mellitus.

**Intervention** mHealth application interventions for self-management (including modules such as education, self-recording, communication).

**Comparator** Standard care or other non-mHealth interventions.

**Study designs to be included** Randomized controlled trials (RCTs).

#### **Eligibility criteria**

##### **Inclusion Criteria**

RCTs involving adult patients with T2DM  
Interventions using mHealth applications for diabetes self-management  
Reported HbA1c and/or psychological outcomes  
Published between June 2016 and May 2021

##### **Exclusion Criteria**

Non-RCTs, observational studies, reviews, protocols  
Interventions not based on mobile applications  
Studies involving type 1 diabetes or gestational diabetes.

**Information sources** We systematically searched the following electronic databases: PubMed, Embase, CINAHL, RISS, and KISS. The search was conducted for studies published between June 2016 and May 2021. Additional manual searching of reference lists of relevant articles was also performed to identify potential studies.

**Main outcome(s)** Primary – Hemoglobin A1c; Secondary – depression, self-management behaviors.

**Quality assessment / Risk of bias analysis** The literature quality was evaluated using the Joanna Briggs Institute (JBI) critical appraisal tool checklist for RCTs.<sup>31</sup> The JBI critical appraisal checklist for RCTs comprises 13 items for evaluating the risk of bias. The checklist was also assessed for certainty in the selected studies of evidence for an outcome. Based on these criteria, the presence of a positive criterion item was assigned a score of 1, while its absence or ambiguity was scored 0. Based on the quality score and consensus between researchers, individual studies were selected for the systematic review if they had a score of  $\geq 7$  per the JBI criteria. When a consensus regarding quality could not be achieved, a consensus was reached through discussion.

**Strategy of data synthesis** A narrative synthesis was first conducted to describe study characteristics and intervention components. For quantitative outcomes, meta-analysis was

performed using a random-effects model. Effect sizes were reported as mean differences with 95% confidence intervals. Heterogeneity was assessed using the  $I^2$  statistic, and sensitivity analyses were conducted where appropriate.

**Subgroup analysis** No subgroup analysis was planned.

**Sensitivity analysis** No sensitivity analysis was performed.

**Country(ies) involved** Republic of Korea.

**Keywords** diabetes mellitus, meta-analysis, mHealth, mobile application, self-care, systematicreview.

#### **Contributions of each author**

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