

Effectiveness of Artificial Intelligence Follow-up Systems in the Health Management of Patients with Type 2 Diabetes: A Meta-Analysis

INPLASY2025100081
doi: 10.37766/inplasy2025.10.0081
Received: 22 October 2025
Published: 22 October 2025

Zhou, J; Yang, N; Lin, W; Zhao, XL; Huang, Y; Peng, DD; Lu, F.

Corresponding author:
Jie Zhou

463507409@qq.com

Author Affiliation:
The Health Management Center of Guangxi Hospital Division of The First Affiliated Hospital, Sun Yat-Sen University.

ADMINISTRATIVE INFORMATION

Support - The Health Management Center of Guangxi Hospital Division of The First Affiliated Hospital, Sun Yat-Sen University.

Review Stage at time of this submission - Risk of bias assessment.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY20251000081

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

INTRODUCTION

Review question / Objective The objective of this review is to systematically evaluate the effectiveness of artificial intelligence (AI) follow-up systems compared to traditional follow-up management models in improving key health outcomes for patients with type 2 diabetes. Specifically, we will assess the impact on glycemic control, measured by glycated hemoglobin (HbA1c), fasting plasma glucose (FPG), and 2-hour postprandial glucose (2hPG), as well as on Body Mass Index (BMI), by synthesizing evidence from interventional studies.

Condition being studied Type 2 diabetes mellitus (T2DM) is a prevalent, chronic metabolic disorder characterized by persistent hyperglycemia resulting from insulin resistance and progressive beta-cell dysfunction. It represents a major global public health challenge, with its prevalence continuing to rise worldwide. The management of T2DM is complex and requires continuous medical

care and ongoing patient self-management to achieve optimal glycemic control. Effective management is critical, as poorly controlled diabetes is a leading cause of serious complications, including cardiovascular disease, neuropathy, nephropathy, and retinopathy, significantly impairing patients' quality of life and imposing a substantial economic burden on healthcare systems.

METHODS

Search strategy A meta-analysis was conducted by searching randomized controlled trials (RCTs) in PubMed, Embase, Cochrane Library, CNKI, Wanfang Database and VIP Database from inception until April 30, 2025. Key endpoints included changes in glycated haemoglobin A1c(HbA1c),fasting plasma glucose(FPG), postprandial blood glucose(PBG), body mass index(BMI) and blood lipids.

Participant or population Patients with type 2 diabetes.

Intervention Does the use of an artificial intelligence follow-up system for health management.

Comparator Traditional follow-up management models.

Study designs to be included Interventional Study.

Eligibility criteria

Exclusion criteria

1. Repeatedly published literature,
2. Literature without abstracts and whose full texts cannot be obtained,
3. Case reports, literature reviews, meta-analyses, conference papers, dissertations, etc
4. Literature not published in Chinese or English.

Information sources Electronic Databases: PubMed, Embase, Cochrane Library, CNKI, Wanfang Database and VIP Database.

Main outcome(s) Of the 1349 records identified, 9 RCTs from 4 countries were included in the meta-analysis. Among the studies, 2 studies used the intelligent voice follow-up platform to manage the patients with type 2 diabetes, 3 studies employed the intelligent comprehensive follow-up platform, 1 studies combined the intelligent comprehensive follow-up platform with wearable smart devices, and 3 studies adopted the intelligent comprehensive follow-up platform alongside regular outpatient follow-ups. Meta-analysis showed that There were all statically significant differences in improving HbA1c, FPG, PBG, BMI and blood lipids in comparison of using artificial intelligence follow-up systems of type 2 diabetes (experimental group) with conventional management (control group). However, there was no statistically significant difference between the experimental groups that used the intelligent comprehensive follow-up platform combined with wearable smart devices and those that used the intelligent comprehensive follow-up platform along with regular outpatient follow-ups.

Quality assessment / Risk of bias analysis

Methodological quality was assessed using the Cochrane Handbook for Systematic Reviews of Interventions. Data were summarised narratively and valid data were synthesised in a meta-analysis.

Strategy of data synthesis The data synthesis will commence with a descriptive analysis, summarizing the characteristics of all included studies in a table and narratively. For quantitative synthesis, a meta-analysis will be conducted if the included studies are sufficiently homogeneous. Continuous outcomes (HbA1c, FPG, 2hPG, BMI) will be pooled using a random-effects model, expressed as Mean Differences (MD) or Standardized Mean Differences (SMD) with 95% confidence intervals. Statistical heterogeneity will be quantified using the I^2 statistic, with an $I^2 > 50\%$ indicating substantial heterogeneity that will be explored through pre-specified subgroup analyses (e.g., baseline HbA1c, intervention duration, AI type). Sensitivity analyses will test the robustness of the findings, and publication bias will be assessed via funnel plots and Egger's test if sufficient studies are included. If meta-analysis is not feasible, the findings will be synthesized narratively. All analyses will be performed using statistical software such as R or Stata.

Subgroup analysis We plan to conduct subgroup analyses to explore potential sources of heterogeneity based on: Baseline HbA1c level, Duration of the intervention, Type of AI intervention.

Sensitivity analysis Sensitivity analyses will be performed to test the robustness of the results by: Excluding studies with a high risk of bias. Comparing fixed-effect and random-effects models.

Country(ies) involved China.

Keywords Type 2 Diabetes Mellitus/T2DM/ Telemedicine/Telehealth/Mobile Health/mHealth/eHealth/Remote Consultation/Text Messaging/Mobile Applications/Smartphone/Telemonitoring/Follow-Up/Intelligent follow-up.

Contributions of each author

Author 1 - Nan Yang.

Email: yang767321412@outlook.com

Author 2 - Wei Lin.

Email: 310783407@qq.com

Author 3 - Xiaolin Zhao.

Email: 330963608@qq.com

Author 4 - Yan Huang.

Author 5 - Dandan Peng.

Email: 511671504@qq.com

Author 6 - Fang Lu.

Email: 404014217@qq.com