

INPLASY PROTOCOL

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Review Stage at time of this submission: Data extraction.

Conflicts of interest:
None declared.

INTRODUCTION

Review question / Objective: The purpose of this study was to examine the role of global non-pharmacologic interventions in glycemic control in patients with type 2

Global non-pharmacological interventions for glycemic control in patients with type 2 diabetes: A Systematic Review and Network Meta-Analysis

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Review question / Objective: The purpose of this study was to examine the role of global non-pharmacologic interventions in glycemic control in patients with type 2 diabetes mellitus compared with usual care and to determine which non-pharmacologic intervention is most effective.

Condition being studied: Globally, the number of people with type 2 diabetes mellitus (T2DM) has tripled in the last three decades. It is estimated that 415 million adults currently have T2DM, and most adults with T2DM have at least one co-morbidity, with cardiovascular complications being the leading cause of morbidity and mortality in these patients. HbA1c, as a golden indicator to determine the effectiveness of glycemic control in diabetic patients, the UK Prospective Diabetes Study (UKPDS) concluded that there is a significant relationship between HbA1c and diabetic vascular complications, with each 1% reduction in HbA1c associated with a 14% reduction in the risk of cardiac events, a 21% reduction in diabetes-related deaths, a 37% reduction in microvascular endpoint events, and a 43% reduction in peripheral vascular disease in patients with diabetes. Therefore, the control of glycemic indicators is important for patients with T2DM.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 May 2022 and was last updated on 16 May 2022 (registration number INPLASY202250108).

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METHODS

Search strategy: Studies on PubMed, Embase, the Cochrane Library Central Register of Controlled Trials, CINAHL and Web of Science from January 1980 to May 2022 were searched. In order to expand the search scope as much as possible, we also searched some of the included literatures related to meta-analysis. Data that has not

yet been published and made public is no longer within the scope of retrieval.

Disease: type 2 diabetes

#1 MeSH descriptor: [Diabetes Mellitus, Type 2] explode all trees

#2 ("Diabetes Mellitus, Noninsulin-Dependent" OR "Diabetes Mellitus, Ketosis-Resistant" OR "Diabetes Mellitus, Non-Insulin-Dependent" OR "Diabetes Mellitus, Stable" OR "Stable Diabetes Mellitus"):ti,ab,kw OR ("Diabetes Mellitus, Type II" OR "NIDDM" OR "Diabetes Mellitus, Noninsulin Dependent" OR "Diabetes Mellitus, Maturity-Onset" OR "Diabetes Mellitus, Slow-Onset"):ti,ab,kw OR ("Diabetes Mellitus, Slow Onset" OR "Slow-Onset Diabetes Mellitus" OR "Type 2 Diabetes Mellitus" OR "Noninsulin-Dependent Diabetes Mellitus" OR "Maturity-Onset Diabetes"):ti,ab,kw OR ("Diabetes Mellitus, Adult-Onset"):ti,ab,kw
#3 #1 OR #2

Intervention: treatment

#4 MeSH descriptor: [Nutrition Therapy] explode all trees

#5 MeSH descriptor: [Exercise] explode all trees

#6 MeSH descriptor: [Psychosocial Intervention] explode all trees

#7 MeSH descriptor: [Health Education] explode all trees

#8 MeSH descriptor: [Telemedicine] explode all trees

#9 MeSH descriptor: [Acupuncture] explode all trees

#10 MeSH descriptor: [Meditation] explode all trees

#11 MeSH descriptor: [Support care] explode all trees

#12 ("Therapy, Nutrition" OR "Medical Nutrition Therapy" OR "Nutrition Therapy, Medical" OR "Therapy, Medical Nutrition"):ti,ab,kw OR ("Exercises" OR "Physical Activity" OR "Acute Exercise" OR "Isometric Exercise" OR "Aerobic Exercise" OR "Exercise Training"):ti,ab,kw OR ("Intervention, Psychosocial" OR "Psychosocial Interventions" OR "Psychological Intervention"):ti,ab,kw OR ("Community Health Education" OR "Education, Community Health" OR "Health Education, Community" OR "DSMES"):ti,ab,kw

#13 (eHealth OR Telehealth OR Mobile

Health OR mHealth OR Health, Mobile):ti,ab,kw OR (Internet based intervention OR Web-based Intervention OR Online Intervention):ti,ab,kw OR (Acupuncture):ti,ab,kw OR (Meditation):ti,ab,kw OR (Yoga):ti,ab,kw OR (Support care):ti,ab,kw #14 # 4 OR # 5 # 6 # 7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 #15 #3 AND #14.

Participant or population: Studies in patients 18 years of age or older diagnosed with T2D according to the American Diabetes Association criteria.

Intervention: Studies interventions must include non-pharmacological interventions such as: nutritional diet therapy, exercise, psychosocial interventions, health education, telemedicine, acupuncture, support care and meditation.

Comparator: Control interventions could be usual care, waiting lists or any other non-pharmacological intervention.

Study designs to be included: RCT.

Eligibility criteria: Studies meeting the following criteria would be considered for inclusion in this NMA: 1. Studies in patients 18 years of age or older diagnosed with T2D according to the American Diabetes Association criteria; 2. Studies interventions must include non-pharmacological interventions such as: nutritional diet therapy, exercise, psychosocial interventions, health education, telemedicine, acupuncture, support care and meditation. 3. Control interventions could be usual care, waiting lists or any other non-pharmacological intervention; 4. The primary outcome was HbA1c (%). Secondary outcomes were quality of life, frequency of cardiovascular events, and incidence of adverse events associated with non-pharmacological interventions. 5. Randomized controlled trials. Studies would be exclusion if they: 1. Enrolled patients with type 1 diabetes or gestational diabetes; 2. Non-pharmacological interventions were only

part of the study intervention and did not reflect the efficacy data of the non-pharmacological intervention; 3. Outcome indicators were incomplete, unavailable, or could not be combined; 4. Non-randomized controlled trials.

Information sources: Electronic databases.

Main outcome(s): HbA1c.

Additional outcome(s): Quality of life, frequency of cardiovascular events, and incidence of adverse events associated with non-pharmacological interventions.

Quality assessment / Risk of bias analysis: The Cochrane collaboration recommended "Risk of Bias" tool was used to assess the quality of included studies. The tool consists of seven components: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting and other sources of bias. Each component is evaluated on a scale of "high risk", "unknown", or "low risk".

Strategy of data synthesis: A network meta-analysis was performed using Stata 14.1 (Stata Corp LP, College Station, Texas) and the mvmeta package, guided by a frequency model, to compare the effects of any two non-pharmacological interventions by combining direct and indirect comparison data. Results were reported as mean differences (MD), odd ratios (OR), and 95% confidence intervals (CI). We generated rankings of non-pharmacologic interventions in terms of glycemic control in patients with type 2 diabetes by calculating the surface under the cumulative ranking curves (SUCRA). Larger SUCRAs indicated better glycemic control for that intervention. To identify any potential inconsistencies between direct and indirect comparison data, we used a node-splitting method and a loop-inconsistency test. We divided the evidence for a given comparison into direct and indirect comparisons, excluded one direct comparison at a time, and estimated

indirect treatment effects for the excluded comparisons, and also calculated inconsistency factors (IF) and 95% confidence intervals to evaluate the inconsistency of each closed-loop system.

Subgroup analysis: No.

Sensitivity analysis: For the included studies we will conduct sensitivity analyses to assess the robustness of the results. This analysis will be performed by comparing studies with high risk of selection and attrition bias in these areas with studies with low risk of bias.

Language: English.

Country(ies) involved: China.

Keywords: Non-pharmacologic interventions; Type 2 diabetes mellitus; Glycemic control; HbA1c; Network meta-analysis.

Contributions of each author:

Author 1 - Luo Jingsong - The first author designed the study, drafted the manuscript, and provided statistical expertise.

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