

INPLASY

The Impact of Comprehensive Nursing Interventions on Blood Glucose Levels and Pregnancy Outcomes in Patients with Gestational Diabetes Mellitus : A Systematic review and meta-analysis

INPLASY202520068

doi: 10.37766/inplasy2025.2.0068

Received: 13 February 2025

Published: 13 February 2025

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202520068

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 February 2025 and was last updated on 13 February 2025.

INTRODUCTION

Review question / Objective The present study employs meta-analysis to evaluate the effects of comprehensive nursing interventions relative to routine care on blood glucose levels and maternal and neonatal outcomes in patients with gestational diabetes mellitus (GDM). The objective of this meta-analysis was to assess the effects of comprehensive nursing interventions on blood glucose, adverse mood, and pregnancy outcomes in patients with gestational diabetes.

Condition being studied Gestational diabetes mellitus (GDM) is a common complication during pregnancy, which leads to spontaneous hyperglycemia during pregnancy. Due to the changes in lifestyle, diet and metabolism during the preconception period, the incidence of GDM has been increasing year by year. The reported incidence of GDM varies from 1% to 14% in

different countries, and in China, it is approximately 1% to 5%. GDM has significant impacts on both the mother and the fetus. The recent impacts mainly include urinary and reproductive system infections, polyhydramnios, gestational hypertension, etc. It can also cause fetal deformities and miscarriage. Newborns are prone to hypoglycemia, respiratory distress syndrome, etc. Currently, doctors usually recommend GDM patients to undergo dietary and exercise therapy to keep their blood sugar within the normal range. If the effect is not good, insulin therapy is used. However, the use of drugs may have adverse effects on the fetus. Therefore, it is particularly important to take effective interventions for both the mother and the fetus in advance, such as scientific dietary guidance, to reduce maternal and fetal complications and lower the neonatal mortality rate.

Previous studies have shown that nursing intervention can improve the complications of

GDM patients. With the advancement of medical technology, nursing intervention for GDM has received more attention. Compared with conventional nursing (including health education, prenatal monitoring, etc.), comprehensive nursing intervention covering psychology, diet, exercise, etc. seems to be more effective for blood sugar control and pregnancy outcomes. In recent years, many comparative studies have been reported in this regard. In addition, the patient-centered nursing service concept is an important guiding measure for the current reform of nursing work in China. High-quality nursing can effectively lower the blood sugar of patients and reduce pregnancy complications by guiding patients in diet and exercise.

METHODS

Search strategy ("Diabetes, Gestational"[Mesh]) OR (((((Diabetes, Pregnancy-Induced[Title/Abstract]) OR (Diabetes, Pregnancy Induced[Title/Abstract])) OR (Pregnancy-Induced Diabetes[Title/Abstract])) OR (Gestational Diabetes[Title/Abstract])) OR (Gestational Diabetes Mellitus[Title/Abstract])) AND (((comprehensive nursing[Title/Abstract]) OR (High-Quality Nursing[Title/Abstract])) OR (Exercise Intervention[Title/Abstract])) OR (Psychological intervention[Title/Abstract])).

Participant or population Patients with gestational diabetes.

Intervention Patients in the intervention group received comprehensive nursing intervention including psychological intervention, health education, dietary control, exercise intervention, pregnancy monitoring, and prevention of postpartum complications.

Comparator The control group received routine care, including one-time health education, nutritional and exercise guidance, regular pregnancy monitoring and regular postpartum care.

Study designs to be included Randomized controlled trial.

Eligibility criteria Exclusion Criteria: a. Studies that do not directly relate to the comprehensive nursing intervention and GDM, such as basic science research, case reports, or opinion articles, are excluded. b. Incomplete Data: Studies lacking sufficient data for meta-analysis, such as those without effect size estimates or confidence intervals, are excluded. c. Duplicate Publications: Studies where the same data are published

multiple times or included in multiple reports are excluded, with only the most complete or recent report being considered for analysis.

Information sources We will search articles in databases including PubMed, EMBASE, Cochrane library and CNK. All Chinese publications published before September 1, 2024 will be searchable without restrictions on country and article type. The list of references for all selected articles will be screened independently to identify additional studies that were missed in the initial search.

Main outcome(s) Maternal outcomes include caesarean section, pregnancy-induced hypertension, hyperamniotic fluid, and postpartum hemorrhage. Blood glucose index includes: hemoglobin, 2 hours postprandial blood glucose, fasting blood glucose; Neonatal outcomes included macrosomia, fetal malformation, neonatal hypoglycemia, neonatal complications, and neonatal jaundice.

Additional outcome(s) Neonatal low birth weight infants, neonatal jaundice, neonatal Apgar score, neonatal BMI, neonatal body length, nursing satisfaction, etc.

Data management Two authors will independently extract data. Any disagreement will be resolved by discussion until consensus is reached or by consulting a third author. The following data will be extracted: authors, published years, country, sample size, study design, age, intervention group, the content, control, follow up, caesarean section, fetal macrosomia, Gestational hypertension, fetal distress, Neonatal respiratory distress, neonatal complications, postpartum hemorrhage, HbA1c, 2h-PG, FPG and so on.

Quality assessment / Risk of bias analysis Two authors independently evaluated the risk of bias in RCTs using the Cochrane Collaboration's risk of bias assessment tool [17], including the following seven modules: random sequence generation; allocation concealment; blinding (participants, personnel, and outcome assessment); incomplete outcome data; and selective reporting and other bias. These domains were categorized as having a high, low, or unclear risk of bias.

Strategy of data synthesis Stata14.0 and RevMan5.3 software were used for statistical analysis. Meta-analysis was used to calculate OR and 95% CI to evaluate the binary classification data. Continuous variables are expressed as standardized mean difference (SMD) and 95% CI. I² and Q tests were used to assess heterogeneity

across studies. When I^2 exceeds 50% and p value is less than 0.1, heterogeneity is high, suggesting the use of random effects model for meta-analysis. Conversely, when the P -value is greater than 0.1 and the I^2 is 50% or lower, the study is considered uniform and can therefore be analyzed using a fixed-effect model. Groups were analyzed according to different pregnancy and age. Sensitivity analysis methods were used for each subgroup, including the sequential exclusion of individual studies. In addition, we performed a meta-regression analysis to determine the source of heterogeneity. Publication bias was assessed by funnel plot and Egger test.

Subgroup analysis Sensitivity analysis is specified in advance to evaluate the results, robustness analysis, and subgroup analysis to determine whether the pooled effect is associated with clinical features of the included trial. Two subgroup analyses will also be performed, the first subgroup is pregnancy (first trimester, second trimester, third trimester); The second subgroup is age.

Sensitivity analysis When heterogeneity was present, random-effect models were considered more appropriate than fixed-effect models, resulting in wider intervals and more conservative estimates of effects. The potential for publication bias was assessed by visually examining the study size and treatment effect of funnel plots. Begg's and Egger's tests were used to detect publication bias. To further investigate heterogeneity, sensitivity analyses, meta-regression, and subgroup analyses were performed to evaluate outcome data from standardized meta-analyses and associations. STATA software version 15.0 or Revman 5.3 was used for all statistical analyses.

Language restriction English.

Country(ies) involved China/Sichuan Academy of Medical Sciences & Sichuan Provincial People's Hospital.

Keywords Comprehensive care, patients with gestational diabetes, blood sugar levels, and pregnancy outcomes.

Contributions of each author

Author 1 - Zhao Qing - Zhao Qing proposed research questions and made plans, conducted literature search and screening, and was responsible for the construction of the main structure and the writing of the main content of the meta-analysis articles.

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Author 2 - Qin Ruixue - Qin Ruixue assisted in the formulation of the research plan, carried out data extraction and quality assessment, and revised and improved the first draft of the article written by the first author.

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