

Effectiveness of A Lifestyle Modification Module On Knowledge Regarding Prevention of Gestational Diabetes Mellitus Among Antenatal Mothers: A Quasi-Experimental Study

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ABSTRACT

Background:

Gestational Diabetes Mellitus (GDM) is a common metabolic disorder during pregnancy and may contribute to adverse maternal and fetal outcomes when not adequately prevented or managed. The study examined whether a structured lifestyle modification module could improve mothers' knowledge regarding prevention of GDM. Objectives: To assess pre-intervention knowledge, evaluate the effectiveness of the lifestyle modification module, compare pre- and post-test knowledge within the groups, compare post-test knowledge between groups, and determine the association between pre-test knowledge and selected demographic variables. Methods: A quantitative quasi-experimental, non-randomized control-group pre-test post-test design was used among 70 antenatal mothers attending selected maternity units in the Sangli–Miraj–Kupwad Corporation area. Thirty-five mothers were included in each of the experimental and control groups using non-probability convenient sampling. Data were collected with a structured knowledge questionnaire. Content validity was established through 24 experts and reliability was established by the split-half method ($r = 0.88$). The experimental group received a lifestyle modification module covering diet, physical activity, weight management, antenatal check-ups and blood glucose monitoring. Post-test assessment was conducted after seven days. Data were analyzed using frequency, percentage, mean, standard deviation, paired t-test, independent/unpaired t-test and chi-square test. Results: In the experimental group, the mean knowledge score increased from 15.54 ± 3.64 in the pre-test to 19.26 ± 0.70 in the post-test, with a significant paired t-value of 12.41 ($p < 0.05$). In the control group, the mean score increased from 13.71 ± 3.20 to 14.83 ± 1.65 , with a t-value of 0.81 ($p > 0.05$). The post-test mean score was significantly higher in the experimental group than in the control group (19.26 ± 0.70 vs. 14.83 ± 1.65 ; $t = 14.59$, $p < 0.05$). Conclusion: The lifestyle modification module was effective in improving mothers' knowledge regarding prevention of GDM. Structured nursing education on healthy diet, physical activity, weight management, antenatal care and blood glucose monitoring can be incorporated into routine antenatal health education.

Keywords: Gestational Diabetes Mellitus; lifestyle modification; knowledge; antenatal mothers; health education; quasi-experimental study.

Introduction

Gestational Diabetes Mellitus (GDM) is characterized by hyperglycemia first recognized during pregnancy. It is an important maternal health concern because inadequate prevention and management may increase the risk of complications for both mother and baby. The burden of GDM has increased alongside changes in diet, physical activity, body weight and other lifestyle factors. The thesis on which this manuscript is based identifies GDM as an important public health concern in India and emphasizes the role of awareness and preventive lifestyle practices. Prevention and risk reduction depend on appropriate dietary practices, regular physical activity, healthy weight management, timely antenatal care and appropriate blood glucose monitoring. Knowledge is an important prerequisite for mothers to understand risk factors and adopt recommended preventive practices. The study therefore focused on evaluating a structured lifestyle modification module as a nursing education intervention. The conceptual framework for the study was based on the Health Belief Model, which emphasizes perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy. These constructs provide a useful basis for understanding why mothers may adopt preventive behaviours after receiving health education.

Aim and Objectives

The aim was to assess the effectiveness of a lifestyle modification module on the knowledge of mothers regarding prevention of GDM in selected maternity units in the Sangli, Miraj and Kupwad Corporation area.

- To assess the pre-intervention level of knowledge regarding prevention of GDM among mothers in the experimental and control groups.
- To evaluate the effectiveness of the lifestyle modification module on knowledge regarding prevention of GDM among mothers in the experimental group.
- To compare pre- and post-test knowledge scores within the experimental and control groups.
- To compare post-intervention knowledge between the experimental and control groups.
- To find the association between pre-test knowledge scores and selected demographic variables in the experimental group.

Materials and Methods

Research design and setting

A quantitative approach with a quasi-experimental non-randomized control-group pre-test post-test design was adopted. The study was conducted in selected maternity units of hospitals in the Sangli, Miraj and Kupwad Corporation area, Maharashtra.

Participants and sampling

The study included 70 antenatal mothers, with 35 mothers in the experimental group and 35 in the control group. Non-probability convenient sampling was used. The study included mothers in the first and second trimester who were willing to participate and could understand Marathi or English. Mothers with pre-existing diabetes and critically ill mothers were excluded, as stated in the study delimitations.

Data collection tool

A structured knowledge questionnaire was used. It included demographic variables and multiple-choice questions related to prevention of GDM. The tool was validated by 24 experts. Reliability was established using the split-half method, yielding a reliability coefficient of $r = 0.88$. A pilot study was conducted among 10 mothers to assess feasibility.

Intervention

Following the pre-test, the experimental group received a structured lifestyle modification module addressing healthy diet, physical activity/exercise, weight management, routine antenatal check-ups and blood glucose monitoring. The control group did not receive the module during the study period. The post-test was administered after seven days using the same knowledge questionnaire.

Ethical considerations and analysis

Ethical clearance and institutional permissions were obtained before data collection, and written informed consent was obtained from participants. Confidentiality was maintained. Data were analyzed using frequency, percentage, mean, standard deviation, paired t-test, unpaired/independent t-test and chi-square test. Statistical significance was considered at $p < 0.05$.

Results

The study included 70 mothers, equally distributed between the experimental and control groups. Baseline comparisons showed significant differences between the groups in age, educational status and previous knowledge regarding GDM ($p < 0.05$), whereas obstetric history, occupation, diet pattern and family history of diabetes mellitus did not show statistically significant differences ($p > 0.05$).

INTERPRETATION AND ORGANIZATION OF DATA: TABLES, FIGURES AND GRAPHS

The data collected of the study was classified under following sections:-

SECTION I

Frequency and percentage distribution of demographical.

SECTION II

frequency and percentage of pretest, posttest knowledge score in experience and control group.

SECTION III

Comparison of pre and posttest knowledge score within Experimental and Control group

SECTION IV

Comparison of mother with post-interventions finding between experimental and control group

SECTION V

Association of pre-test Knowledge scores with demographic variables.

SECTION – I

Table no. 1: Frequency and percentage distribution of demographical variables.
(n=35+35)

Sr. No	Variables	Control Group Frequency(f)	Percentage (%)	Experimental Group Frequency (f)	Percentage (%)
1	Age in years				
	20–24years	14	40.00	12	34.29
	25–30years	10	28.57	09	25.71
	30-35years	11	31.43	14	40.00
2	Obstetrics history				
	Primi	25	71.43	19	54.29
	Multi	10	28.57	16	45.71
3	Occupation				
	Self Employed and Private Job	08	22.86	11	31.43
	Housewife	27	77.14	24	68.57
4	Diet Pattern				
	Vegetarian	11	31.43	14	40.00
	Mixed	24	68.57	21	60.00
5	Family History of DM				
	Yes	21	60.00	25	71.42
	No	14	40.00	10	28.58
6	Previous Knowledge regarding GDM				
	Yes	09	25.71	16	45.71
	No	26	74.29	19	54.29
7	Education				
	10 th to 12 th	25	71.43	23	65.71
	Graduation	08	22.86	09	25.71
	PG	02	05.71	03	8.57

Interpretation

The above table shows the frequency and percentage distribution of demographic variables among antenatal mothers in the control and experimental groups. Majority of the antenatal mothers in the control group belonged to the age group of 20–22 years (40.00%), whereas in the experimental group majority were aged 24 years and above

(40.00%). Regarding parity, most of the mothers in both groups were primi mothers. Majority of the participants in both groups were housewives. With regard to diet pattern, most participants followed a mixed diet. Majority of antenatal mothers in both groups had a family history of diabetes mellitus. Regarding previous knowledge on Gestational Diabetes Mellitus, majority of participants in both groups had no previous knowledge regarding GDM

SECTION – II

TABLE NO. 2 Pre Assessment level of knowledge in Experimental and control Group
(n=35)

Variable	Level of knowledge	Score	Experimental Group		Control Group	
			Frequency	Frequency	Percentage (%)	Percentage (%)
Level of knowledge among mothers	Good	15 – 20	27	16	45.71	77.14
	Average	8 – 14	05	15	42.86	14.29
	Poor	0 – 7	03	04	11.43	8.57

Interpretation

The study findings conclude that the majority of mothers in the control group had good and average levels of knowledge in the pre-test, while only a few mothers had poor knowledge. This suggests that although some mothers were aware of the topic, there is still a need for educational interventions to improve knowledge among all mothers

TABLE NO. 3 Post Assessment level of knowledge in Experimental and control Group
(n=35)

Variable	Level of knowledge	Score	Experimental Group		control Group	
			Frequency	Frequency	Percentage (%)	Percentage (%)
Level of knowledge among mothers	Good	15 – 20	35	16	45.71	100
	Average	8 – 14	00	19	54.29	0.00
	Poor	0 – 7	00	00	0.00	0.00

Interpretation

The study findings conclude that the educational intervention was highly effective in improving the knowledge of mothers regarding the subject. After the post-test, all mothers in the experimental group attained a good level of knowledge, indicating the success of the lifestyle modification module in enhancing awareness and understanding among mothers

Table shows the assessment of the level of knowledge among mothers in the control group during the post-test. Out of 35 mothers, 19 (54.29%) had average knowledge scores between 8–14, while 16 mothers (45.71%) had good knowledge scores between 15–20. None of the mothers were found in the poor knowledge category. The findings indicate that the majority of mothers in the control group had an average level of knowledge, whereas nearly half of them had good knowledge after the post-test.

SECTION: - III

TABLE NO. 4 Comparison of knowledge score within Experimental and Control group (n=70)

Groups	Frequency	Mean	S.D.	t value	P value
Experimental	35	19.26	0.70	14.59	< 0.05
Control	35	14.83	1.65		

Interpretation

The study findings conclude that the lifestyle modification module was effective in improving the knowledge of mothers regarding prevention of Gestational Diabetes Mellitus (GDM). The statistically significant difference in mean knowledge scores between the experimental and control groups confirms that the intervention had a positive impact on enhancing mothers' knowledge.

TABLE NO. 5 Comparison of Pre-test and post-test knowledge scores within the experimental and control groups.

Group	n	Post-test Mean	SD	t-value	p-value
Experimental	35	19.26	0.70	14.59	<0.05
Control	35	14.83	1.65		

The experimental group (n=35) had a post-test mean score of 19.26 ± 0.70 , whereas the control group (n=35) had a lower post-test mean score of 14.83 ± 1.65 . The obtained t-value was 14.59, which was statistically significant at $p < 0.05$.

This indicates that there was a statistically significant difference in post-test scores between the experimental and control groups.

Discussion

The present study demonstrated that the lifestyle modification module significantly improved knowledge regarding prevention of GDM among antenatal mothers. The experimental group showed a marked increase in mean knowledge from 15.54 to 19.26, while the control group showed only a small increase from 13.71 to 14.83. The significant paired t-value in the experimental group supports the effectiveness of the intervention.

The post-test comparison further demonstrated a statistically significant difference between the experimental and control groups. The experimental group achieved a higher mean knowledge score (19.26 ± 0.70) than the control

group (14.83 ± 1.65), with $t = 14.59$ and $p < 0.05$. These findings support the use of structured nursing education to strengthen knowledge related to diet, exercise, weight management, antenatal care and blood glucose monitoring. The study also found significant associations between pre-test knowledge and selected demographic variables, including age, parity, education, occupation, diet pattern and family history of diabetes, as reported in the thesis. Because some baseline characteristics differed significantly between groups, this should be considered when interpreting the quasi-experimental findings.

Conclusion

The lifestyle modification module was effective in improving knowledge regarding prevention of Gestational Diabetes Mellitus among antenatal mothers. All mothers in the experimental group achieved good knowledge in the post-test, and the post-test knowledge score was significantly higher than that of the control group. The findings support the role of nurses in providing structured, evidence-informed health education as part of antenatal care.

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