Natural Resources for Human Health
eISSN: 2583-1194

Original Research

Received 24 July 2026
Revised 20 Aug 2026
Accepted 05 Sep 2026

Natural Resources for Human Health 2026, Vol.6(22s): 888–907

KEYWORDS:
GDM, Educational package , Antenatal care, Pregnant female Self-care behaviors.

Effect of Educational Package on Self-care Behaviors among Women with Gestational Diabetes

Eman Kamal El sebaay[1], Eman A. Fadel[2], Reda Abd El-Hady Hemeda[3], Hanan El-Sayed Mohamed El-Sayed[4]

[1] Director of Nursing Department, General Administration of Medical Affairs, Mansoura University, Egypt
[2] Prof. of Woman's Health and Midwifery Nursing, Faculty of Nursing, Mansoura University, Prof. of Woman's Health and Midwifery Nursing, Faculty of Nursing, Mansoura National University.
[3] Professor of Obstetrics and Gynecology Medicine, Mansoura University, Egypt
[4] Professor of Women's Health and Midwifery Nursing, Faculty of Nursing, Mansoura University, Egypt

ABSTRACT:

Background: Effective management of (GDM) depends heavily on female commitment to daily self-care behaviors; many female require structured education , practical help to incorporate these activities into pregnancy.

Aim: To assess impact of an instructional program on self-management practices in female diagnosed with GDM.

Methods: A quasi-experimental investigation was performed at Antenatal Outpatient Clinics of New Obstetrics & Gynecology Hospital, Mansoura University, Egypt. A targeted sample of 132 pregnant female diagnosed with GDM was evenly distributed among an intervention group (n = sixty six) , a control group (n = sixty six). Data were gathered by a standardized interview questionnaire & Summary of Diabetes Self-Care Activities.

Results: Before intervention, both groups were comparable in their demographic features, obstetric history, baseline self-care behaviors ($p > 0.05$). only 16.7% of intervention cohort & 18.2% of control cohort exhibited strong adherence. At post-intervention assessment, high adherence increased to 97.0% in intervention group compared with 18.2% in control group. female who had package exhibited markedly superior compliance with healthy eating habits, suggested blood glucose monitoring, physical exercise, foot-care routines compared to those receiving standard care ($p < 0.001$).

Conclusion: educational package was effective in improving adherence to key GDM self-care behaviors among studied pregnant female.

Recommendation: Structured, practical GDM education must be incorporated into routine antenatal care, with continued nursing assessment & reinforcement of female self-care behaviors.

Natural Resources for Human Health
eISSN: 2583-1194

1. INTRODUCTION

GDM develops when maternal metabolic adaptation to pregnancy fails to maintain glucose homeostasis. As pregnancy advances, placental hormones heighten insulin resistance to guaranty sufficient food delivery to fetus; insufficient pancreatic β-cell compensation leads to maternal hyperglycemia (Sweeting et al., 2022). GDM impacts around one in six births globally, particularly in low- and middle-income nations, where access to organized education, blood glucose monitoring, & specialist healthcare may be restricted (World Health Organization [WHO], 2025).

clinical importance of GDM spans maternal-fetal continuum. Maternal hyperglycemia enhances transport of glucose across placenta, prompting increased insulin release in fetus & resulting in excessive fetal development. As a result, impacted pregnancies correlate with heightened risks of hypertensive conditions, preeclampsia, neonatal hypoglycemia, birth injuries, surgical delivery, premature birth, excessive fetal growth, respiratory issues, neonatal intensive care unit admission (Sweeting et al., 2022; Ye et al., 2022).

These hazards were not confined to gestation & parturition. Females with a background of GDM have a significantly heightened risk of recurring GDM , development of T2DM & cardiovascular ailments, while their offspring were more prone to obesity & disrupted glucose metabolism in future. GDM thus represents an initial stage in an intergenerational trajectory by which cardiometabolic risk might be conveyed from mother to offspring (Wicklow et al., 2023). Management of GDM encompasses nutritious dietary practices, monitoring of blood glucose levels, consistent physical exercise, administration of medication as necessary, prenatal follow-up to ensure glycemic regulation , avert complications for both mother , fetus (American Diabetes Association Professional Practice Committee, 2025). Consistent use of these principles in daily life was essential for effective self-care among female. brief interval among diagnosis, frequently occurring in second or third trimester, delivery can complicate matters, especially when female face pregnancy-related unease, apprehension for fetal well-being, worries about therapy (Karavasileiadou et al., 2022).
In Egypt, prevalence of diabetes has markedly risen, surpassing global averages. International Diabetes Federation (IDF) identified Egypt as one of top ten nations globally for diabetes prevalence & placed it twenty one st for GDM. In 2021, prevalence of (GDM) among expectant mothers in Egypt was 15.9% (Eltoony, Ibrahem, Hafez, Ali, Elsewify, 2021). incidence of (GDM) was found to be eight percent among 250 expectant mothers attending a rural family health clinic in Egypt in 2022 (Abouzid, Ali, Elkhawas & Elshafei, 2022).

In Egypt, increasing burden of GDM shows need for maternity nurses to support female in developing effective self-care practices through structured education. This approach was aligned with Egypt Vision 2030, which emphasizes improving healthcare quality, strengthening preventive services, promoting maternal & child health (Abouzid, Ali, Elkhawas & Elshafei, 2022).

Aim of the study

present research sought to assess impact of an instructional program on self-care practices in female diagnosed with GDM.

1.2. Research Hypothesis

Female with GDM who receive educational package had improved self-care behaviors compared with those who receive routine antenatal care.

2. METHODS

2.1 Study Design

A quasi-experimental research design involving one intervention and one control groups was used to evaluate the effect of an educational package on self-care behaviors among women with gestational diabetes. This design assesses the effect of an intervention on a target population without random allocation (Andrade, 2021).

2.2. Study Setting

study was conducted at Antenatal Outpatient Clinics of New Obstetrics , Gynecology Hospital, Mansoura University, Dakahlia Governorate, Egypt. outpatient clinics were located on one floor comprising a reception area, one gynecology clinic, two antenatal clinics, two ultrasound clinics, an early detection clinic for reproductive system tumors, an electronic fetal monitoring clinic, a trophoblastic disease clinic, a hysteroscopy clinic, two laboratory rooms, an outpatient pharmacy, two

teaching halls, a nursing staff room, and two waiting areas for pregnant women. The antenatal clinics provide services to approximately 80 pregnant women daily , operate five days per week, from Saturday to Wednesday, among 9:00 a.m. & 2:00 p.m.

2.3. Study Sample

study included 132 pregnant female with GDM who attended previously mentioned setting for antenatal care & met following eligibility criteria. **Inclusion criteria:** Pregnant female who may read & write, were aged ≥eighteen years, had a gestational age of twenty eight–thirty weeks, had a singleton pregnancy, had a confirmed medical diagnosis of GDM, adhered to their scheduled antenatal follow-up visits.

Exclusion criteria: female were excluded if they had coexisting medical disorders or had previously received structured education on diabetes self-management.

Sample Size Calculation

sample size was determined via Clin Calc .com/calculating sample size based on mean difference (software). average self-care score prior to intervention was 76.9 ±13.4, while post-intervention it rose to 97.4 ±9.3 (Zandinava et al, 2017). With an alpha error of one percent (ninty nine percent significance) & a beta error of five percent (ninty five percent study power), determined sample size was sixty pregnant female with GDM; accounting for a ten percent attrition rate, final sample size was sixty six female. According to aforementioned formula, a sample size of sixty six was necessary for each group.

2.4. Data Collection Tools

Two tools were utilized for data collection.

Tool I: A structured Interview Questionnaire:

This tool consisted of two parts:

Part I: General characteristics of pregnant women: It included age, residence, occupation, educational level, monthly family income & BMI.

Part II: Obstetric history of the studied women: It consist gravidity, abortion, parity, previous mode of delivery, number of living children, complications in previous pregnancy & its type.

Tool II: Summary of Diabetes Self- Care Activities (SDSCA)

Investigator utilized Arabic adaptation from Al Hashmi, Al-Noumani, Alaloul, Murthi, & Khalaf, (2022). Summary of Diabetes Self-Care Activities aims to assess compliance of diabetic pregnant female with self-care practices. previous week overview of diabetes self-management tasks was categorized into five areas: nutrition (three components; scoring range, zero-twenty one), exercise (two components; scoring range, zero-forteen), glucose monitoring (one component; scoring range, zero-seven), foot hygiene (four components; scoring range, zero-twenty eight), compliance with medication (one component; scoring range, zero-seven). Scoring methodology: Each item received a score ranging from zero to seven based on frequency of days woman engaged in designated self-care activity over past week. overall score varied among zero & seventy seven, with increased values signifying enhanced compliance with suggested self-care practices. Domain scores were derived by aggregating relevant item scores.

2.4.1 Pilot Study

preliminary study comprised ten percent of sample size (forteen expectant mothers) to evaluate lucidity of inquiries, uniformity, practicality, impartiality, identify any vagueness in instruments. pilot results indicated that no modifications were necessary. individuals involved in pilot study were incorporated into final sample.

2.5 Validity and Reliability

content validity of self-care instrument was evaluated by a trio of specialists in female Health & Midwifery Nursing. Their input was taken into account, leading to essential modifications consist rewording certain terms to enhance clarity, pertinence, structure of items. Tool (II) exhibited strong internal consistency, evidenced by a Cronbach's alpha coefficient of 0.903.

2.6. Ethical Considerations

Ethical authorization was obtained from Research Ethics Committee of Faculty of Nursing at Mansoura University (IRB, No.755). Formal authorization to conduct research was obtained from designated location. Participants' rights, confidentiality, voluntary participation were ensured throughout study, signed informed consent was collected prior to data collection.

2.7. Data Collection Process: -Data were collected through 3 phases

I. Preparatory phase

Ethical consent was secured from Research Ethics Committee of Faculty of Nursing & director of Antenatal Outpatient Clinics at Mansoura University. investigator devised data gathering instruments & created educational materials following an examination of pertinent national & international literature.

II. Implementation phase

Investigator participated in antenatal clinics 3 times a week starting in January 2025 , persisted until necessary sample was finalized. female meeting specified inclusion , exclusion criteria were selected. investigator presented her identity, elucidated objectives , methods of study, secured documented informed consent. 132 female included were divided into two categories: an intervention group consisting of sixty six female , a control group including sixty six female. Initially, general & obstetric attributes were gathered by a structured interview form. Baseline self-care practices were then evaluated in both cohorts with Summary of Diabetes Self-Care Activities.

control group was provided with standard antenatal care, while intervention group received educational package alongside standard treatment. To enhance engagement & hands-on instruction, intervention cohort was divided into six smaller groups comprising nine-thirteen female each. Every group participated in a weekly session for four successive weeks, with each session enduring roughly forty to fifty minutes. sessions were conducted via lectures, group discussions, demos, further demonstrations. initial session covered definition, complications, etiology, risk determinants, diagnosis, symptoms, preventative strategies, treatment of GDM. second segment addressed nutritious eating habits & self-assessment of blood glucose levels, included a hands-on demonstration of glucose measurement. third focused on secure physical activities & workouts throughout pregnancy. fourth component encompassed hands-on instruction regarding foot care , self-administration of insulin. Every female was provided with illustrated booklet following initial session to reinforce instructional material.

III. Evaluation phase

To evaluate effect of instructional package on self-care behaviors in females with GDM, a post-test was administered one month following final session of intervention using same pretest tools.

2.8. Statistical Analysis

Statistical evaluation was conducted utilizing SPSS version 20.0 for Windows (SPSS Inc., Chicago, IL, USA). Continuous data that follow a normal distribution were represented as mean ± (SD), whilst categorical variables were conveyed as frequency & percentage. chi-square test or Fisher's exact test, as applicable, was employed to analyze categorical variables. dependability of study questionnaires was evaluated by an internal consistency analysis. Statistical significance was deemed to be at $p < 0.05$.

3. RESULTS

Table 1. Comparison of general characteristics of intervention & control groups (n = 132)

Intervention group			**Control group**		**Significance test**	
Variables	**n = 66**		**n = 66**			
	n	**%**	**n**	**%**	**χ^2**	**P**
Age (years)						
< twenty	6	9.1	6	9.1		

21–25	11	16.7	14	21.2		
26–30	20	30.3	22	33.3		
> 30	29	43.9	24	36.4	0.927	0.819
Residence						
Rural	34	51.5	36	54.5		
Urban	32	48.5	30	45.5	0.122	0.727
Education level						
Basic education	13	19.7	12	18.2		
Secondary education	30	45.5	29	43.9		
University and higher	23	34.8	25	37.9	0.140	0.932
Occupation						
Worker	35	53.0	37	56.1		
Housewife	31	47.0	29	43.9	0.122	0.727
Family monthly income						
Not enough	29	43.9	25	37.9		
Enough	32	48.5	33	50.0		
Enough and save	5	7.6	8	12.1	1.004	0.605
Body mass index						
Normal weight	15	22.7	25	37.9		
Overweight	45	68.2	38	57.6		
Obese	6	9.1	3	4.5	4.090	0.129

Table 1: Indicates no statistical significance differences among intervention & control groups regarding general characteristics (P > 0.05). In which 43.9% and 36.4% respectively of intervention and the control groups were over 30 years of age. Additionally, 51.5% and 54.5% respectively, in the intervention & control groups resided in rural areas. Regarding occupation, 53% & 56.1% respectively, were employed.

Table 2. Obstetric history of the intervention & control groups (n = 132)

Variables	**Intervention group (n = 66)**		**Control group (n = 66)**		**Significance test**	
	n	**%**	**n**	**%**	**χ^2**	**P**
Number of pregnancies						
Once	8	12.1	6	9.1		
2–3 times	33	50.0	33	50.0		
> 3 times	25	37.9	27	40.9	0.363	0.834
Number of deliveries						

None	9	13.6	7	10.6		
Once	11	16.7	11	16.7		
2–3 times	45	68.2	46	69.7		
> 3 times	1	1.5	2	3.0	0.594	0.898
Living children						
None	9	13.6	7	10.6		
One	12	18.2	12	18.2		
2–3	44	66.7	45	68.2		
> 3	1	1.5	2	3.0	0.595	0.898
Occurrence of abortions						
None	57	86.4	56	84.8		
Once	7	10.6	8	12.1		
2 or more	2	3.0	2	3.0	0.076	0.963
Previous mode of delivery						
None	8	12.1	6	9.1		
Normal vaginal delivery with episiotomy	16	24.2	12	18.2		
Cesarean section	42	63.6	48	72.7	1.257	0.533
Occurrence of complications						
No	55	83.3	56	84.8		
Yes	11	16.7	10	15.2	0.057	0.812
Eclampsia	2	18.2	2	20.0	0.095	0.992

Table 2: No statistical significance differences in both groups regarding obstetric history (P > 0.05). In which 50% in both groups had 2-3 pregnancies and 68.2% and 69.7% respectively, of the intervention and the control groups had 2-3-time deliveries. Also, 66.7% and 68.2% respectively, had 2-3 living children. In addition, 86.4% and 84.8% respectively had no abortion, 63.6% and 72.7% respectively had previous cesarean section and only 16.7% and 15.2% respectively had previous complications.

Natural Resources for Human Health
eISSN: 2583-1194

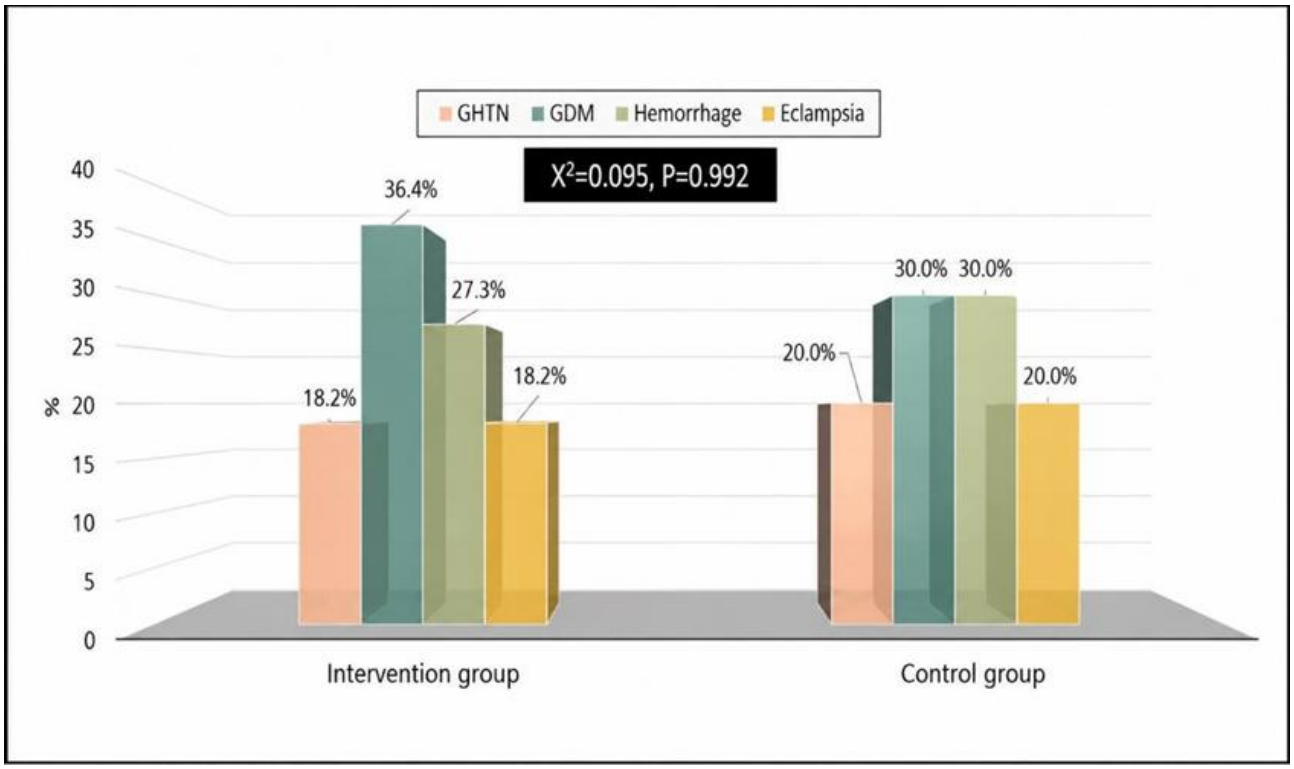

Figure 1. Type of complications occurred in the intervention and control groups (n=22)

Figure 1: Illustrate that 36.4 %, 27.3% and 18.2% of the intervention group had previous gestational diabetes, antepartum hemorrhage, eclampsia and gestational hypertension compared to 30%,30% and 20% of control group.

Table 3: Comparison of self-care behaviors related to healthy diet & physical activity among te intervention & control groups pre-intervention (n = 132)

Items	Intervention group n = 66		Control group n = 66		Significance test	
During the last sever days:	**No.**	**%**	**No.**	**%**	**χ^2**	**P**
for how many days did you follow a healthy diet?						
1	9	13.6	8	12.1		
2	24	36.4	22	33.3		
3	21	31.8	22	33.3		
4	9	13.6	10	15.2		
5	2	3.0	3	4.5		
6	0	0.0	0	0.0		
7	1	1.5	1	1.5	0.422	0.995
How well did you follow your diet during last month (rate of days in week)						

1	5	7.6	5	7.6		
2	19	28.8	20	30.3		
3	28	42.4	27	40.9		
4	8	12.1	8	12.1		
5	5	7.6	5	7.6		
6	1	1.5	1	1.5		
7	0	0.0	0	0.0	0.044	0.999
For how many days did you practice physical activities in general for at least thirty minutes? (Total minutes of activities including walking)						
1	27	40.9	27	40.9		
2	20	30.3	20	30.3		
3	15	22.7	15	22.7		
4	1	1.5	1	1.5		
5	1	1.5	1	1.5		
6	1	1.5	1	1.5		
7	1	1.5	1	1.5	0.000	1.000
For how many days did you participate in a specific exercise session (such as walking, swimming, biking) other than what you do around house or as part of your work?						
1	29	43.9	28	42.4		
2	22	33.3	22	33.3		
3	11	16.7	12	18.2		
4	1	1.5	1	1.5		
5	2	3.0	2	3.0		
6	0	0.0	0	0.0		
7	1	1.5	1	1.5	0.061	0.998

Table 3: Shows that there were no statistical significance differences of self-care behaviors regarding healthy diet & practice of physical activities among pregnant female in intervention & control groups pre - intervention (P > 0. 05). In which 36.4% , 42.4% ,40.9% & 43.9% respectively of intervention group compared to 33.3% ,40.9% ,40.9% & 42.4% respectively of control group reported adherence to healthy diet for two days during last 7 days, following diet for three days in week, practicing physical activity for at least thirty minutes during last 7 days, practicing specific exercise session for general physical activity for one day per week.

Natural Resources for Human Health
eISSN: 2583-1194

Table 4. Comparison of self-care behaviors related to blood glucose monitoring & foot care among intervention , control groups (pre-intervention) (n = 132)

Items	Intervention group n = 66		Control group n = 66		Significance test	
During the last seven days:	No.	%	No.	%	χ^2	P
How many days did you test your blood sugar level?						
1	7	10.6	7	10.6		
2	20	30.3	19	28.8		
3	20	30.3	19	28.8		
4	7	10.6	8	12.1		
5	8	12.1	9	13.6		
6	1	1.5	1	1.5		
7	3	4.5	3	4.5	0.177	0.999
For how many days did you test your blood sugar level according to your physician's instructions?						
1	8	12.1	8	12.1		
2	27	40.9	26	39.4		
3	15	22.7	14	21.2		
4	10	15.2	12	18.2		
5	2	3.0	2	3.0		
6	2	3.0	2	3.0		
7	2	3.0	2	3.0	0.235	0.999
For how many days did you check your feet?						
1	33	50.0	32	48.5		
2	20	30.3	19	28.8		
3	8	12.1	10	15.2		
4	1	1.5	1	1.5		
5	2	3.0	2	3.0		
6	1	1.5	1	1.5		
7	1	1.5	1	1.5	0.263	0.999

For how many days did you check interior of your shoes (to ensure that there were no materials that could cause any injury to your feet?						
1	48	72.7	49	74.2		
2	8	12.1	10	15.2		
3	4	6.1	2	3.0		
4	3	4.5	2	3.0		
5	2	3.0	2	3.0		
6	0	0.0	0	0.0		
7	1	1.5	1	1.5	1.099	0.954

Table 4: Demonstrates that there were no statistically significant changes in self-care practices related to blood glucose monitoring & foot care among pregnant female in intervention & control groups prior to intervention (P > 0.05).In which 30.3%,40.9%, 50% & 72.7% respectively of intervention group compared to 28.8%, 39.4%, 48.5% & 74.2% respectively of control group reported monitoring blood sugar level two- three days, testing blood sugar level for two days according to physician instructions, checking their feet one day & checking interior of shoes for one day during last 7 days.

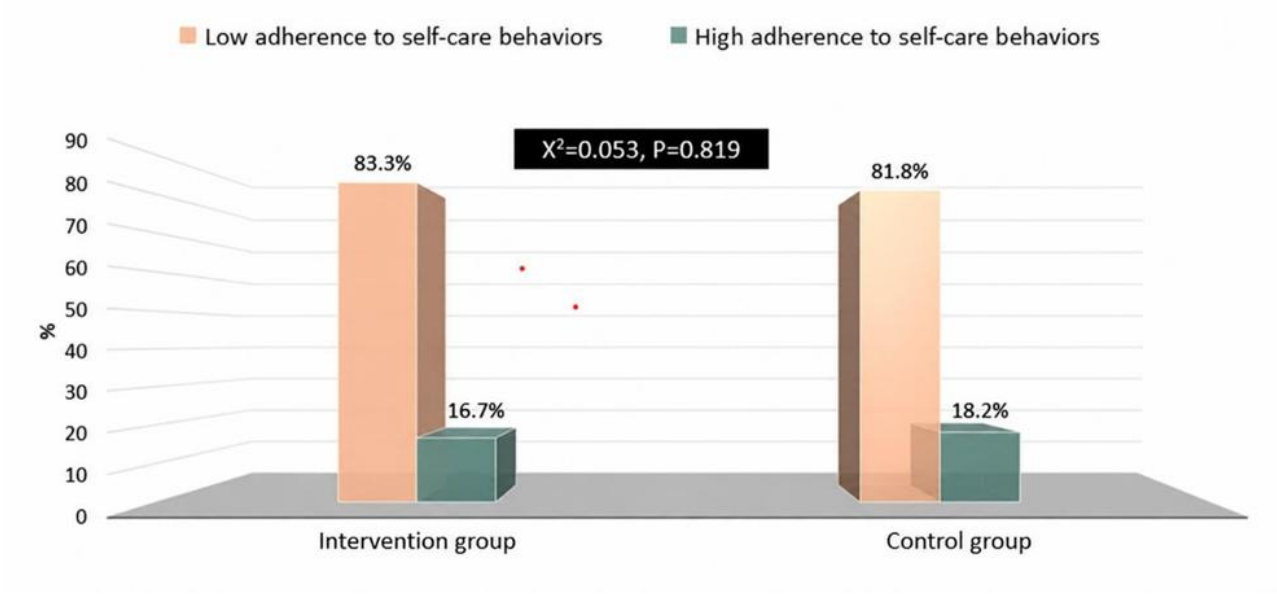

Figure (2): Comparison of level of adherence to self-care behaviors among intervention & control groups among studied female pre- intervention

Figure (2): Show that there was no statistical significance difference in adherence to self-care behaviors among pregnant female in intervention & control groups pre-intervention (P

> 0. 05). In which only 16.7% , 18.2% respectively of intervention ,control groups have high adherence level to self- care behaviors.

Table 5. Comparison of self-care behaviors related to healthy diet & physical activity among intervention & control groups (post-intervention) (n = 132)

Items	Intervention group		Control group		Significance test	
	n = 66		n = 66			
During the last seven days:	**No.**	**%**	**No.**	**%**	**χ^2**	**P**
For how many days did you follow a healthy diet?						
1	0	0.0	8	12.1		
2	0	0.0	22	33.3		
3	0	0.0	22	33.3		
4	0	0.0	10	15.2		
5	11	16.7	3	4.5		
6	35	**53.0**	0	0.0		
7	20	30.3	1	1.5	118.762	<0.001**
How well did you follow your diet during the last month (rate of days in the week)						
1	0	0.0	5	7.6		
2	0	0.0	20	30.3		
3	0	0.0	27	40.9		
4	0	0.0	8	12.1		
5	11	16.7	5	7.6		
6	**36**	**54.5**	1	1.5		

7	19	28.8	0	0.0	114.358	<0.001**
For how many days did you practice physical activities in general for at least 30 minutes? (Total minutes of activities including walking)						
1	0	0.0	27	40.9		
2	0	0.0	20	30.3		
3	0	0.0	15	22.7		
4	11	16.7	1	1.5		
5	**32**	**48.5**	1	1.5		
6	23	34.8	1	1.5		
7	0	0.0	1	1.5	120.621	<0.001**
For how many days did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?						
1	0	0.0	28	42.4		
2	0	0.0	22	33.3		
3	0	0.0	12	18.2		
4	11	16.7	1	1.5		
5	**31**	**47.0**	2	3.0		
6	24	36.4	0	0.0		
7	0	0.0	1	1.5	120.818	<0.001**

Natural Resources for Human Health
eISSN: 2583-1194

Table 5 Shows that there were highly statistical significance differences of self-care behaviors regarding healthy food , practice of physical activities among pregnant female in intervention & control groups post-intervention (P < 0.001). In intervention group, 53%, 54.5%, 48.5%, 47% adhered to a healthy diet for six days over past week, maintained a healthy diet for six days per week in previous month, engaged in physical activities for a minimum of thirty minutes on five days during last week, attended specific exercise sessions five days per week in last week, compared to 0.00%, 1.5%, 1.5%, 3% in control group.

Table 6. Comparison of self-care behaviors related to blood glucose monitoring & foot care among intervention & control groups (post-intervention) (n = 132)

Items	**Intervention group**		**Control group**		**Significance test**	
	n = 66		**n = 66**			
During the last seven days:	**No.**	**%**	**No.**	**%**	**χ^2**	**P**
For how many days did you test your blood sugar level?						
1	0	0.0	7	10.6		
2	0	0.0	19	28.8		
3	0	0.0	19	28.8		
4	0	0.0	8	12.1		
5	10	15.2	9	13.6		
Items	**Intervention group**		**Control group**		**Significance test**	
	n = 66		**n = 66**			
During the last seven days:	**No.**	**%**	**No.**	**%**	**χ^2**	**P**
6	35	**53.0**	1	1.5		
7	21	31.8	3	4.5	98.664	<0.001**
During the last seven days, for how many days did you test your blood sugar level according to your physician's instructions?						
1	0	0.0	8	12.1		
2	0	0.0	26	39.4		
3	0	0.0	14	21.2		
4	0	0.0	12	18.2		
5	10	15.2	2	3.0		
6	35	**53.0**	2	3.0		
7	21	31.8	2	3.0	110.461	<0.001**

During the last seven days, for how many days did you check your feet?						
1	0	0.0	32	48.5		
2	0	0.0	19	28.8		
3	10	15.2	10	15.2		
4	**35**	**53.0**	1	1.5		
5	21	31.8	2	3.0		
6	0	0.0	1	1.5		
7	0	0.0	1	1.5	100.807	<0.001**
During the last seven days, for how many days did you check the interior of your shoes (to ensure that there are no materials that could cause any injury to your feet)?						
1	0	0.0	49	74.2		
2	0	0.0	10	15.2		
3	11	16.7	2	3.0		
4	30	45.5	2	3.0		
5	19	28.8	2	3.0		
Items	**Intervention group**		**Control group**		**Significance test**	
	n = 66		**n = 66**			
During the last seven days:	**No.**	**%**	**No.**	**%**	**χ^2**	**P**
6	4	6.1	0	0.0		
7	2	3.0	1	1.5	107.826	<0.001**

Table 6. Shows that there were a highly statistical significance differences of self-care behaviors regarding blood glucose testing & foot care among pregnant female in intervention & control groups post-intervention ($P < 0.001$). In which 53 %, 53 %, 53 % & 45.5% respectively of intervention group versus 1.5%, 3%, 1.5% & 3% respectively of control group tested blood sugar level for six days in last seven days , tested blood sugar level for six days in last 7 days according to physician instructions , checked their feet during last 7 days for four days in last 7 days & checked interior of shoes for four days .

Natural Resources for Human Health
eISSN: 2583-1194

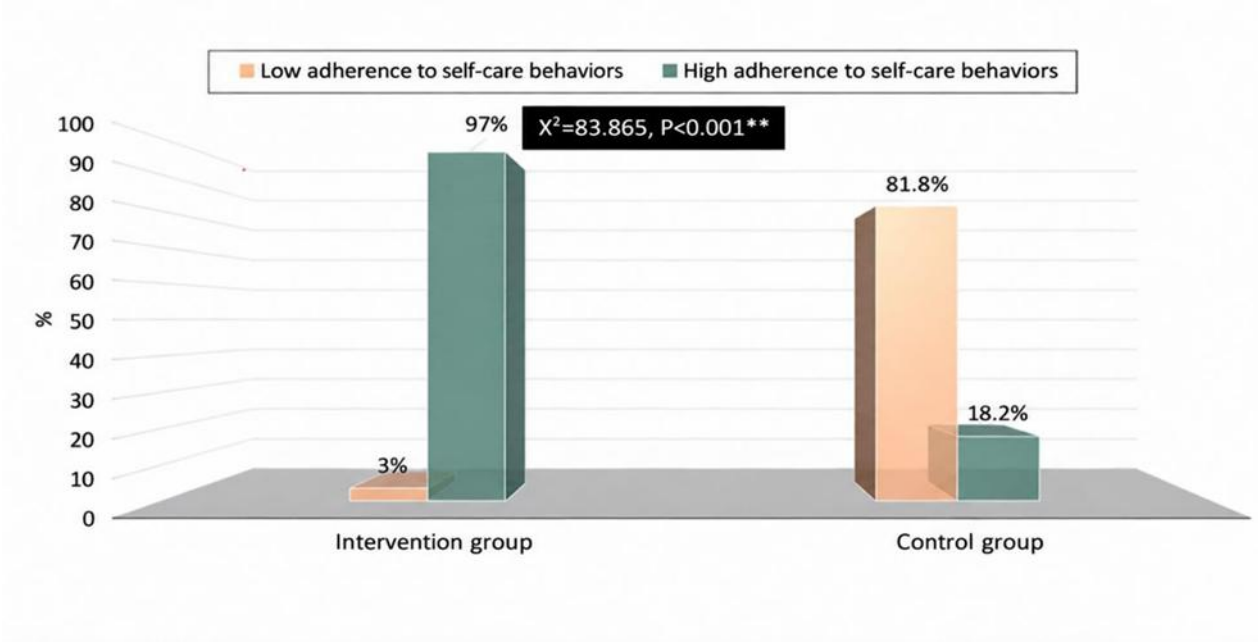

Figure. 3. Comparison level of adherence to self-care behaviors of intervention & control groups post intervention. **Figure 3.** Show that there were a highly statistical significance differences among pregnant female in intervention & control groups regarding adherence to self- care behaviors post-intervention ($P < 0.001$). In which 3 % Vs. 81.8% respectively of intervention group & control group had Low adherence to self- care behaviors while, 97% % Vs. 18.2% respectively of intervention group & control group had high adherence to self- care behaviors.

4. DISCUSSION

present research sought to assess impact of an instructional program on self-care practices in female diagnosed with GDM. present research indicated that prior to introduction of teaching package, most female in both cohorts exhibited minimal adherence to self-care practices, with no statistically significant disparity among groups. Following execution of educational package, a markedly significant statistical disparity was observed among two cohorts, favoring intervention group. overwhelming majority of female in intervention cohort exhibited strong compliance with self-care practices, in contrast to fewer than one-fifth of female in control cohort, signifying a notable enhancement among those who received teaching package.

From researcher's point of view, this result reflects effectiveness of educational package in improving female overall self-care behaviors related to GDM. low adherence before intervention may be explained by insufficient knowledge, lack of practical guidance, fear of disease, limited awareness about importance of daily self-care practices. remarkable post-intervention improvement among the intervention group may be attributed to the structured, clear, and practical content of the educational package, which helped women understand the importance of diet control, blood glucose monitoring, physical activity, foot care. repeated education , follow-up may have enhanced female motivation, self-confidence, ability to apply self-care behaviors in daily life.

These results were corroborated by Lamadah et al. (2022), who examined self-care practices for GDM using an educational intervention employing BASNEF paradigm. intervention group exhibited a notable enhancement in total GDM self-care behavior scores in comparison to control group following educational intervention.

Mohammadkhah et al. (2025) investigated impact of a training intervention grounded in health belief model on self-care practices of female with GDM, revealing a notable enhancement in self-care behaviors post-intervention.

Conversely, Yew et al. (2021) assessed impact of a smartphone application-driven lifestyle coaching initiative on gestational weight gain, glycemic regulation, maternal & neonatal results in female with GDM, finding that smartphone intervention did not markedly diminish excessive gestational weight gain or enhance certain maternal outcomes, despite its positive effect on

glycemic control. This discord might stem from variations in intervention methods, level of female involvement with the application, notion that digital interventions could be less efficacious without backing of direct interpersonal instruction.

Also, Saxon et al. (2026), who studied "Self-efficacy and readiness to change among women with recent gestational diabetes engaging in a web-based lifestyle intervention," and found no significant improvement in self-efficacy & readiness to change compared with control group. This disagreement may be explained by differences in the study population, as their study focused on postpartum women with recent GDM rather than pregnant women currently managing GDM, in addition to differences in outcome measures and intervention timing.

present study revealed no statistically significant disparities in self-care behaviors pertaining to a healthy diet among intervention & control groups prior to execution of educational package. Following execution of instructional package, markedly significant disparities were observed among two cohorts.

This discovery aligns with research conducted by El-Ansary & Fouad (2020), which assessed impact of educational sessions on knowledge, attitudes, self-care practices of pregnant female with GDM at Mansoura University Hospitals. research revealed a statistically significant enhancement in dietary self-management behaviors among pregnant female with GDM following educational sessions, especially in adhering to prescribed dietary guidelines & embracing healthier eating practices.

findings of current study were corroborated by Maleki et al. (2023), who assessed impact of mobile-assisted education on health-promoting lifestyles & blood glucose levels in female with GDM in Iran, revealing a statistically significant enhancement in nutrition-related health-promoting behaviors post-educational intervention.

Concerning self-care practices related with physical activity, present study revealed no statistically significant disparity among intervention & control groups prior to intervention. Following execution of educational package, markedly significant disparities were observed among them.

This discovery aligns with research conducted by Ali et al. (2022), which examined impact of self-care guidelines on knowledge & practices of pregnant female with GDM in Egypt, revealing a statistically significant enhancement in exercise-related self-care behaviors following application of these guidelines. Primarily, majority of female had not engaged in physical activity or adhered to exercise precautions prior to guidelines, whereas adoption of exercise markedly increased following their introduction.

this aligns with findings of Lamadah et al. (2022) in Alexandria, Egypt, which indicated that educational intervention markedly enhanced physical activity practices related to GDM in intervention group relative to control group. Salarkarimi et al. (2025) executed a randomized controlled trial in Iran involving overweight & obese pregnant female with diabetes, revealing that exercise self-care markedly enhanced in intervention group following WhatsApp-based self-care education in contrast to control group.

In contrast, Menek and Kaya (2024), who compared home exercise under supervision & self-home exercise in pregnant female with GDM, found no statistically significant improvement in physical activity practice before & after self-directed home exercise intervention compared with standard care. This discord might have been ascribed to variances in character & severity of intervention.

present study revealed no statistically significant disparity in self-care behaviors concerning blood sugar testing among intervention & control groups.

preliminary intervention phase. Following execution of educational package, markedly significant disparities were observed among two cohorts.

In similar line, Özkan et al. (2025), who studied impact of nursing education on pregnancy risk perception & diabetes self-management in pregnant female diagnosed with GDM. They discovered that diabetes self-management education significantly improved glucose management subdimension among female in individual education group. He et al. (2022), who evaluated effect of health education combined with customized psychological nursing intervention on pregnancy outcome of pregnant female with GDM. They found that female who received health education had significantly better blood glucose indicators after intervention compared with female who received routine care. Ghasemi et al. (2021), who compared effect of individual counseling with counseling on social application on self-care & quality of life of female with GDM & found a significant improvement in self-care regarding blood glucose monitoring

among female who received counseling compared with those who received routine care. supported by Tian et al. (2021), who compared efficacies of telemedicine & standard prenatal care on blood glucose control in female with GDM & found that telemedicine-based care improved blood glucose control among female with GDM through regular blood glucose reporting, feedback, follow-up.

In contrast, Mallicka & Shukla (2024), who evaluated practice of self-monitoring of blood glucose among pregnant female with GDM in tertiary care hospital in India & found that overall adherence to self-monitoring of blood glucose was very low among pregnant female with GDM, and no statistically significant difference was observed among studied groups. Regarding self-care behaviors related to foot care, current study indicated that before implementation of instructional package, there was no statistically significant difference among intervention & control groups. While, after execution of teaching package, highly statistically significant differences were identified among two groups in intervention group. This revealed a considerable improvement in foot care practices among female who got educational package.

This finding matched with Ali et al. (2022), who observed a highly significant improvement in pregnant female reported self-care habits after implementation of self-care recommendations. corroborated by Salarkarimi et al. (2025), who conducted a study in Iran & reported a statistically significant improvement in self-care behaviors related to foot care among female in intervention group following educational intervention compared with control group.

In contrast, Hijazi et al. (2025), who assessed effectiveness of targeted educational interventions on enhancing self-efficacy & foot care practices among diabetic female in Jordan & found that intervention based on weekly text reminders & follow-up calls did not produce a statistically significant improvement in foot care practices compared with control group.

This discrepancy may be due to differences in nature & intensity of educational intervention, as previous study relied on weekly text-message reminders & follow-up calls alone, which may have been less effective in promoting behavioral change than a comprehensive, structured, interactive educational approach that provides direct instruction & practical guidance on foot-care practices.

5. CONCLUSION AND RECOMMENDATIONS

findings demonstrated that structured educational package was effective in improving self-care behaviors among female with GDM. Although intervention & control groups had comparable self-care adherence before intervention, female who received package showed substantially greater post-intervention adherence than those who received routine antenatal care alone. improvement was evident across healthy dietary practices, physical activity, blood glucose monitoring according to medical instructions, foot-care behaviors. These findings support research hypothesis & highlight value of structured, skill-based education in enabling pregnant female to translate GDM recommendations into consistent daily self-care practices.

Recommendations:

Based on study findings, following were recommended:

1. Integrate the structured educational package into routine antenatal services for women diagnosed with GDM.
2. Provide practical, individualized nursing education with demonstration and redemonstration of blood glucose monitoring, insulin self-injection when prescribed, foot care,together with clear guidance on diet , safe physical activity.
3. Assess self-care adherence regularly during antenatal follow-up and provide reinforcement and problem-solving support according to each woman's needs.
4. Make culturally appropriate illustrated educational materials available to women and involve family members when appropriate to support sustained self-care at home.

REFERENCES

[1] Abouzid, M. R., Ali, K., Elkhawas, I., & Elshafei, S. M. (2022). An overview of diabetes mellitus in Egypt and the significance of integrating preventive cardiology in diabetes management. Cureus, 14(7), e27066. doi:10.7759/cureus.27066

[2] Ahmed Osman Mohamed, H., Yehia Moustafa Sweelam, M., Kamal Helmy, H., Arafat Goda, A., & Hassan AbdElfattah Mohamed, N. (2022). Effect of intervention PRECEDE model on knowledge and practice of preventive

behaviors among high-risk pregnant women regarding gestational diabetes. Egyptian Journal of Health Care, 13(1), 1720–1734.

[3] Al Hashmi, I., Al-Noumani, H., Alaloul, F., Murthi, S., & Khalaf, A. (2022). Translation and psychometric validation of the Arabic version of Summary of the Diabetes Self-Care Activities (SDSCA) among pregnant women with gestational diabetes. BMC Pregnancy and Childbirth, 22, Article 563. doi:10.1186/s12884-022-04897-4

[4] Ali, R. A. Z., Nour, S. A., & Abdelaati, I. H. (2022). Effect of self-care guidelines on knowledge and practice of pregnant women with gestational diabetes mellitus. Evidence-Based Nursing Research, 4(3), 9–21. doi:10.47104/ebnrojs3.v4i3.244

[5] American Diabetes Association Professional Practice Committee. (2025). 15. Management of diabetes in pregnancy: Standards of care in diabetes—2025. Diabetes Care, 48(Supplement 1), S254–S269. doi:10.2337/dc25-S015

[6] Andrade, C. (2021). The limitations of quasi-experimental studies, and methods for data analysis when a quasi-experimental research design is unavoidable. Indian Journal of Psychological Medicine, 43(5), 451–452. doi:10.1177/02537176211034707

[7] Assaf, E. A., Al Sabbah, H., Momani, A., Al-Amer, R., Al-Sa'ad, G. A., & Ababneh, A. (2024). Factors influencing gestational diabetes self-care among pregnant women in a Syrian refugee camp in Jordan. PLOS ONE, 19(2), e0297051. doi:10.1371/journal.pone.0297051

[8] Dang, N. A. T., Le, H. M., Nguyen, A., Glöde, P. C., Vinter, C. A., Nielsen, J., ... Linde, D. S. (2025). Self-care interventions among women with gestational diabetes mellitus in low- and middle-income countries: A scoping review. Systematic Reviews, 14, Article 50. doi:10.1186/s13643-025-02790-7

[9] Dincer, B., Kocali, C., Elveren, T., Demir, S., Demir, K., Dolu, F. N., ... Feyizoğlu, G. (2025). The effectiveness of diabetic foot wound prevention training given with Pecha Kucha (20 × 20) presentation technique: A randomized controlled experimental study. The International Journal of Lower Extremity Wounds. Advance online publication. doi:10.1177/15347346251318778

[10] Druye, A. A., Owusu, G., Yeboa, N. K., Boso, C. M., Berchie, G. O., Nabe, B., ... Azu, T. D. (2024). Self-management interventions for gestational diabetes in Africa: A scoping review. BMC Pregnancy and Childbirth, 24, Article 549. doi:10.1186/s12884-024-06764-w

[11] El-Ansary, E. S., & Fouad, S. (2020). Effect of educational sessions on knowledge, attitude and self-care practices among pregnant women with gestational diabetes. Egyptian Journal of Health Care, 11(3), 275–291. doi:10.21608/ejhc.2020.110408

[12] Eltoony, L. F., Ibrahem, S. A., Hafez, M. Z. E. D., Ali, O. M., & Elsewify, W. A. E. (2021). Prevalence and risk factors for gestational diabetes in Aswan, Egypt according to International Association of the Diabetes and Pregnancy Study Groups (IADPSG). The Egyptian Journal of Hospital Medicine, 82(4), 701–707.

[13] Ghasemi, F., Vakilian, K., & Khalajinia, Z. (2021). Comparing the effect of individual counseling with counseling on social application on self-care and quality of life of women with gestational diabetes. Primary Care Diabetes, 15(5), 842–847. doi:10.1016/j.pcd.2021.05.009

[14] He, R., Lei, Q., Hu, H., Li, H., Tian, D., & Lai, Z. (2022). The effect of health education combined with personalized psychological nursing intervention on pregnancy outcome of pregnant women with gestational diabetes mellitus. BioMed Research International, 2022, Article 3157986. doi:10.1155/2022/3157986

[15] Hijazi, H., Alshraifeen, A., Alshahrani, M. S., Alqudah, M., Alomari, M. A., Bani Hamad, D., ... Al-Khawaldeh, O. A. (2024). Assessing the effectiveness of targeted educational interventions on enhancing self-efficacy and foot care practices among diabetic women in Jordan. Frontiers in Public Health, 12, Article 1502781. doi:10.3389/fpubh.2024.1502781

[16] Karavasileiadou, S., Almegewly, W., Alanazi, A., Alyami, H., & Chatzimichailidou, S. (2022). Self-management and self-efficacy of women with gestational diabetes mellitus: A systematic review. Global Health Action, 15(1), Article

2087298. doi:10.1080/16549716.2022.2087298

[17] Khani Jeihooni, A., Razmjouie, F., Jormand, H., Sedghi Jahromi, F., Afzali Harsini, P., Kamyab, A., ... Ghaleh Golab, F. (2024). Effectiveness of educational intervention in improving physical activity and nutritional performance among pregnant women: A pre-post quasi-experimental study using the health belief model. Frontiers in Global Women's Health, 5, Article 1471957. doi:10.3389/fgwh.2024.1471957

[18] Khunti, K., Sukumar, N., Waheed, G., Gray, L. J., Dallosso, H., Henson, J., ... Seidu, S. (2023). Structured group education programme and accompanying mHealth intervention to promote physical activity in women with a history of gestational diabetes: A randomised controlled trial. Diabetic Medicine, 40(7), e15118. doi:10.1111/dme.15118

[19] Lamadah, S. M., Ibrahim, H. A. F., Elgzar, W. T., El-Sayed, H. A., Sayed, S. H., & El-Houfey, A. A. (2022). Gestational diabetes self-care behavior: An empowerment educational intervention based on BASNEF model. Iranian Journal of Nursing and Midwifery Research, 27(6), 538–546. doi:10.4103/ijnmr.ijnmr_46_21

[20] Maleki, M., Mousavi, P., Abedi, P., Rokhafrooz, D., & Maraghi, E. (2023). Effect of mobile-assisted education on health-promoting lifestyle and blood sugar of women with gestational diabetes: A randomised controlled trial. BMJ Nutrition, Prevention & Health, 6(2), 310–317. doi:10.1136/bmjnph-2023-000802

[21] Mallicka, & Shukla, N. (2024). Practise of self-monitoring of blood glucose among pregnant women with gestational diabetes mellitus attending a tertiary care hospital in Lucknow, Uttar Pradesh. Indian Journal of Public Health Research & Development, 15(2), 354–360. doi:10.37506/ddfygr07

[22] Menek, M. Y., & Kaya, A. K. (2024). Comparison of home exercise under supervision and self-home exercise in pregnant women with gestational diabetes: Randomized controlled trial. Archives of Gynecology and Obstetrics, 309(3), 1075–1082. doi:10.1007/s00404-023-07339-4

[23] Mohammadkhah, F., Kamyab, A., Pezeshki, B., Norouzrajabi, S., & Khani Jeihooni, A. (2025). The effect of training intervention based on health belief model on self-care behaviors of women with gestational diabetes mellitus. Frontiers in Global Women's Health, 5, Article 1490754. doi:10.3389/fgwh.2024.1490754

[24] Özkan, A., Afşar, F., & Aygördü Hamitoğlu, B. (2025). The impact of nursing education on pregnancy risk perception and diabetes self-management in pregnant women diagnosed with gestational diabetes mellitus. Journal of Academic Research in Nursing, 11(3), 152–162. doi:10.55646/jaren.galenos.2025.40360

[25] Salarkarimi, F., Karandish, M., Zakerkish, M., & Abbaspoor, Z. (2025). Impact of WhatsApp-based self-care education on self-care behaviors and lifestyle in overweight and obese pregnant women with diabetes: A randomized controlled trial. Jundishapur Journal of Chronic Disease Care, 14(1), e153793. doi:10.5812/jjcdc-153793

[26] Saxon, C. E., Seely, E. W., Bertin, K. B., Suresh, K., Skurnik, G., Roche, A. T., ... Nicklas, J. M. (2026). Self-efficacy and readiness to change among women with recent gestational diabetes engaging in a web-based lifestyle intervention: The Balance After Baby Intervention Trial. American Journal of Lifestyle Medicine, 20(3). doi:10.1177/15598276231155147

[27] Sweeting, A., Wong, J., Murphy, H. R., & Ross, G. P. (2022). A clinical update on gestational diabetes mellitus. Endocrine Reviews, 43(5), 763–793. doi:10.1210/endrev/bnac003

[28] Tian, Y., Zhang, S., Huang, F., & Ma, L. (2021). Comparing the efficacies of telemedicine and standard prenatal care on blood glucose control in women with gestational diabetes mellitus: Randomized controlled trial. JMIR mHealth and uHealth, 9(5), e22881. doi:10.2196/22881

[29] Wicklow, B., & Retnakaran, R. (2023). Gestational diabetes mellitus and its implications across the life span. Diabetes & Metabolism Journal, 47(3), 333–344. doi:10.4093/dmj.2022.0348

[30] World Health Organization. (2025). WHO recommendations on care for women with diabetes during pregnancy. Retrieved from https://www.who.int/publications/i/item/9789240117044

[31] Ye, W., Luo, C., Huang, J., Li, C., Liu, Z., & Liu, F. (2022). Gestational diabetes mellitus and adverse pregnancy outcomes: Systematic review and meta-analysis. BMJ, 377, e067946. doi:10.1136/bmj-2021-067946

[32] Yew, T. W., Chi, C., Chan, S. Y., van Dam, R. M., Whitton, C., Lim, C. S., ... Yong, E. L. (2021). A randomized controlled trial to evaluate the effects of a smartphone application-based lifestyle coaching program on gestational weight gain, glycemic control, maternal, and neonatal outcomes in women with gestational diabetes mellitus: The SMART-GDM study. Diabetes Care, 44(2), 456–463. doi:10.2337/dc20-1216

[33] Zandinava, H., Sehhatti Shafaei, F., Mohammad-Alizadeh Charandabi, S., Ghanbari Homayi, S., & Mirghafourvand, M. (2017). Effect of educational package on self-care behavior, quality of life, and blood glucose levels in pregnant women with gestational diabetes: A randomized controlled trial. Iranian Red Crescent Medical Journal, 19(4), e44317. doi:10.5812/ircmj.44317