

Impact of Self-care Program for Gestational Diabetic Women on Pregnancy Outcomes

Rasha El Sayed Ibrahim*, Nahed Mousa Saber

Maternal and Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt

*Corresponding author: hour_magdy@yahoo.com

Received November 10, 2019; Revised December 21, 2019; Accepted December 30, 2019

Abstract Background: Gestational diabetes is a global health concern because it's high prevalence, and the potential complications for mothers and their offspring; therefore, Patient teaching is one of the most significant aspects in improving women knowledge, and self-care. **Aim:** This study was developed to evaluate the effect of self-care program for gestational diabetic women on pregnancy outcomes. **Methods:** A purposive sample of 80 gestational diabetic women aged (≥ 18 to ≤ 40) years old, and **pregnant** at not less than 24 weeks of gestations who admitted to antenatal clinic, labor unit and postnatal unit of general hospital of Beni-Suef between Jan 2018 to December 2018. A quasi-experimental design was utilized in this study, Control and study group. **The study instruments** included Women interviewing assessment sheet, Diabetic knowledge questionnaire, Self-care behavior, Attitude about diabetes, Maternal observation, and Pregnancy outcome with previously tested content validity and reliability. **Results:** Significant enhance in the level of the women knowledge, attitudes, and self-care behavior was observed after implementation of the self-care program among the women in the study group. **Conclusion:** The findings of the current study concluded education plays an important role in increasing the awareness of pregnant women regarding GDM risks, complications and its proper management to reduce its burden for the mother and the fetus. **Recommendations:** The study recommended that universal screening to all pregnant women for GDM in the antenatal unit to reduce its complications.

Keywords: self-care, gestational diabetes, pregnancy outcomes

Cite This Article: Rasha El Sayed Ibrahim, and Nahed Mousa Saber, "Impact of Self-care Program for Gestational Diabetic Women on Pregnancy Outcomes." *American Journal of Nursing Research*, vol. 8, no. 1 (2019): 122-131. doi: 10.12691/ajnr-8-1-13.

1. Introduction

Gestational diabetes (GDM) is defined as "any level of glucose intolerance with beginning or estimate during pregnancy and most widespread condition in obstetrics. GDM is a heterogeneous disorder, causing an interface between genetic and environmental hazard factors [1].

The risk factors for GDM comprise of age, obesity, previous history of gestational diabetes, positive family history of diabetes, history of disorders in previous pregnancies as miscarriage, stillbirth, macrosomia, preterm delivery, and eclampsia [2].

GDM refers to high blood sugar level that is primarily diagnosed during pregnancy which leads to severe maternal and fetal complications. Maternal complications as preeclampsia, premature membrane rupture, preterm delivery, cesarean section, and polyhydramnios. Fetal complications as fetal macrosomia, damages during delivery including dislocation of the shoulder, bone fractures, nerve paralysis, low birth weight and fetal metabolic disorders [3].

GDM is the most important health-related concern in pregnancy in the 21st century. In latest years, the

occurrence of GDM has expanded around the world, with its incidence varying from 1.4% to 18.5% in different countries [4]. GDM affects approximately 6% of pregnancies in the United States, and it is increasing in prevalence. Pregnant women without known diabetes mellitus should be screened for GDM after 24 weeks of gestation. Management of GDM results in a statistically significantly reducing the occurrence of its complications. Initial management includes glucose monitoring and self-care modifications as diet and physical activity [5].

Self-care is a practice in which every person uses knowledge, skills, and attitude as a source to independently take care of health. Self-care is influenced by personal beliefs, and community culture, and it is a concept that requires further investigation in women with GDM [6]. Self-care is less frequent in women with GDM, which could be analytic of insufficient educational programs that accessible to the health centers and diabetes clinics due to lack of understanding toward self-care strategy [7].

Self-care includes the activities that individuals begin and act upon their own to maintain their wellbeing. GDM women need help with decision-making, behavioral control and acquiring the necessary information for self-care [4].

Self-management of GDM plays essential role in the care of diabetic women including educating for glycemic control and dietary regimen. Self-efficacy is a necessary aspect in management and control of gestational diabetes [8]. Several factors are concerned with the successful effect of self-efficacy in GDM treatment, and health education is the most important factor. Methods of health education and behavioral improvement could be successful in effective in counteracting, and managing diabetes, while also encouraging individuals to modify their attitude toward their lifestyle [9].

2. Significant of the Study

The increased incidence of gestational diabetes and its complications has been developing serious trepidations for maternal and fetal worldwide and in developing countries. Many studies have shown a lack of awareness, and information about gestational diabetes. Appropriate education may be an essential approach to decrease complications from diabetes through improving women's awareness that affect the Pregnancy outcome and reduce complications.

3. Aim of the Study

To evaluate the effect of self-care program for gestational diabetic women on pregnancy outcomes.

4. Research Hypothesis

Hypothetically self-care program for gestational diabetic women will be:-

- 1-Improved pregnancy outcomes.
- 2- Decreased the complications for gestational diabetes on pregnancy outcomes

5. Subject and Methods

5.1. Study Design

A quasi-experimental design

5.2. Setting

The study was conducted at the antenatal clinic, labor unit and the postnatal unit at the general hospital of Beni-Suief /Ministry of health/ Egypt.

5.3. Subject

A Purposive sample of 80 women with gestational diabetes and classified into 2 groups as 40 women in the control group and 40 women in the study group, from the previously mentioned setting. There were selected based on criteria that include: pregnant at not less than 24 weeks of gestations, Age (≥ 18 to ≤ 40) years old and diagnosed with gestational diabetes. The Exclusion Criteria include

Women that take medication that interference with glucose metabolism as oral corticosteroids, pregnant women complain from preeclampsia, pregnancy-induced hypertension, and renal disease.

5.4. Sample Size and Technique of Selection

Sample size is calculated according to the following equation:

$$N = \left[\left(4\sigma^2 \right) \left(Z_{(1-\alpha/2)} + Z_{(1-\beta)} \right)^2 \right] \div E^2.$$

N = total sample size (number of experimental units within both treatments)

σ = assumed a standard deviation of each treatment response (both treatments assumed equal)

$Z_{(1-\alpha/2)}$ = related to the chosen significance criterion α ; can be found in normal distribution tables, or calculated in Microsoft Excel using the formula = NORM.S.INV(1- ($\alpha/2$))

$Z_{(1-\beta)}$ = related to the chosen power, or sensitivity of the experiment; can be found in normal distribution tables, or calculated in Microsoft Excel using the formula = NORM.S.INV(1- β)

E = minimum detectable difference.

The study sample was chosen every three cases from gestational diabetic women who attending to the previous statement according to their inclusion criteria.

5.5. Validity & Reliability

Tool was developed based on the identified needs and demands of the study sample. Also, to assess the degree of the tool confidence. As well as, it was done by four expertise from obstetric and gynecological nursing. The reliability to assess the degree of tool fixation and measured by using Cronbach's alpha test and equal 0.725 and pilot study by using test-retest.

5.6. Instruments

Six tools were used as follow:

1- Socio-demographic data: that developed by researcher and it was divided into three parts as:

The first part: include age, educational status, occupation, and income.

The second part: concerned with the history of the study sample as a medical disease and surgical operation, and Family history of diabetes.

The third part: include the Present pregnancy of the study sample as gestational age, gravid, Para, LMP, ADLS, and time of antenatal visits.

2-Diabetic knowledge questionnaire:

It was developed by the researcher based on the literature review and concerned with the assessment of women's knowledge regarding diabetes. It was consisting of 8 MCQ items covering causes, treatment, and complications of diabetes. Scoring method for the questionnaire as one" for the incorrect answer or unsure answer; and "two" for the correct answer. The general patients' knowledge is classified into good knowledge if the score is $\geq 60\%$ and poor knowledge if it is $< 60\%$ from the maximum score.

3-Self-care behavior about diabetes: it was adopted from [10] and modified by the researcher. It consists of 4 items as physical activity, dietary compliance, monitoring of blood glucose level, and drug compliance. Each question is scored "one" for the unfavorable, and "two" for the favorable. The patients' self-care is classified into satisfied self-care if the score is $\geq 60\%$ and unsatisfied self-care if it is $< 60\%$ from the maximum score.

4- Attitude about diabetes: it was adopted from [11] and modified by the researcher. It consists of 6 items. Researchers used the Likert scale concerned with the assessment of women's attitudes regarding diabetes. It was consisting of five items from 0 to 4. 0= very low, 1=low, 2=medium, 3= high and 4= very high

5- Maternal Observation and follow up sheet: It was developed by the researcher based on literature review; which includes some visits, gestational age urine analysis, blood sugar results, anthropometric measurements as weight and height, presence of edema and present pregnancy complications.

6- Maternal and fetal outcomes: it was adopted from [12]. It includes obstructed labor, mode of delivery and infection. **Fetal outcomes** as fetal macrosomia, jaundice, and prematurity.

Field of study: The study was implemented during the period from Jan 2018 to December 2018, after taking consent from the director and head department as approval for data collection to conduct the study. The letter explained the study's purposes and its main procedure.

5.7. Pilot Study

It was carried out after the development of the tools on 8 (10%) women to test the applicability of the study tools and to estimate any need for addition in the tool. Then necessary modifications were done according to the results of the pilot study and the expert opinions. Otherwise, women included in it were excluded from the study sample.

5.8. Procedures

1- Preparation phase:

The researchers prepare the tools of data collection and learning material after, reviewing literature, different studies, and theoretical knowledge of various aspects of the problems using books, articles, and periodical magazines.

2. Interviewing phase: - The researcher was attended in the antenatal unit to investigate the gestational diabetic woman according to the results of blood sugar. With three days per week to collect data, using the structured interview questionnaire sheet. At the start of the interview, the researcher welcome each woman, utilizing proper channels of communication and explained the aim of the study and taken their informed consent.

3- Implementation Phase:

After preparation of the program, the researcher met pregnant women for the first time at antenatal clinic, which was conducted for the study group included interviewing, assessment and educational program for

control group interviewing and assessment. After that the researcher explained the study purpose and collect baseline data which included gestational age, blood sugar results, blood pressure, and current complication. The tool fill in about 10 to 30 minutes for both (study and control) groups. Carrying out the program has been done based on the needs of the study group through giving 4 sessions each one lasted for 30 minutes included lectures, PowerPoint, and group discussion. The educational program was carried to study group and involved notes on general knowledge of gestational diabetes as definition, etiology, high-risk groups, clinical manifestation, maternal and fetal complications, diagnosis, management, self-care practice as (following a dietary regimen, physical exercise, drug regimen with insulin), postnatal management. Health education for women, and family. Modules for education include power point, lectures, and brochures that contained pictures for self-measuring of random blood glucose level, Dietary recommendations to maintain blood sugar within the normal range, drug regimen. The program derived from [13,14].

4- Evaluation phase

Women in study group were evaluated by assessing the maternal and fetal outcome during antenatal follow-up, labor, and postnatal period.

5.9. Ethical Considerations

The researchers informed the participants about the study and consent were obtained from the participant that was willing to take part in the study prior for data collection, after explanation the aim of the study. Participant informed about their rights to withdraw from the study at any time. Study subject confidentiality was considered during the collection of data. No health danger was present. A participant was certain that all their data are highly confidential.

5.10. Statistical Design

Statistical analysis was analyzed using SPSS version 20 statistical software package for frequency tables and statistical significance. The statistical significance and associations were assessed using, the arithmetic means, the standard deviation (SD), (Z test), Chi-2 or Fisher Exact test was used, and Pearson Correlation (r) to detect the relationship between the variables. Significance level was identified at $P < 0.05$.

6. Results

Table 1 shows that the age of women in both groups ranged from 18-38 years with a mean age (27.7 ± 5). 45% of women in the study group had an academic education, versus 35% in the control group were not educated. Also, 70% of women in the study group were from the urban area, versus 70% in the control group were from rural areas. Moreover, there was a statistically significant difference between the two groups regarding (education level, age, and residence).

Table 1. Distribution of the studied women according to their characteristics: (N= 80)

	Study G. (N=40)	Control G. (N=40)	t/z/ χ^2	P value
Age (years):	27.4 ± 5.4	28 ± 4.5	t= 0.536	*0.594
Education level:			$\chi^2= 12.951$	0.002
1: Not educated	2 (5%)	14 (35%)		
2: Intermediate education	20 (50%)	18 (45%)		
3: University/Academic	18 (45%)	8 (20%)		
Residence:			$\chi^2= 12.800$	<0.0005
1: Rural	12 (30%)	28 (70%)		
2: Urban	28 (70%)	12 (30%)		
Income:			$\chi^2= 0.228$	0.633
1: Sufficient	26 (65%)	28 (70%)		
2: In sufficient	14 (35%)	12 (30%)		
Occupation:			$\chi^2= 3.810$	0.051
1: Not working	24 (60%)	32 (80%)		
2: Working	16(40)	8 (20%)		

MC= Monte Carlo significance. P value by Chi-Square test, *Independent-Samples t-Test and **Mann-Whitney U-Test.

Table 2. Distribution of the study sample according to their previous medical, surgical and family history: (N= 80)

	Study G. (N= 40)	Control G. (N= 40)	z/ χ^2	P-value
Medical history:			$\chi^2= 1.569$	*0.210
Yes	8 (20%)	4 (10%)		
Surgical history:			$\chi^2= 6.270$	0.012
Yes	16 (40%)	6 (15%)		
Family history:			$\chi^2= 4.286$	0.150
Yes	26 (65%)	30 (75%)		

P value by Chi-Square test.

Table 3. Distribution of the study sample according to activity and obstetric history: (N= 80)

	Study group (N= 40)	Control group (N= 40)	z/ χ^2	P value
Gravidity:			$\chi^2= 3.117$	0.077
prim gravida	10 (25%)	4 (10%)		
G2- G4	30 (75%)	36 (90%)		
Parity:			$\chi^2= 2.051$	0.617
Primpara	12 (30%)	10 (25%)		
P2- P4	28 (70%)	30(75%)		
Abortion Number:			$\chi^2= 2.051$	0.617
None	28 (70%)	30 (75%)		
1-2	12 (30%)	10 (25%)		
Living children Number:			$\chi^2= 0.000$	1.000
none	12 (30%)	12 (30%)		
1-3	28 (70%)	28 (70%)		
Gestational age (weeks):	25 (22.5-27.8)	26.5 (24.3-28)	Z= -1.582	0.114
ADLs:			$\chi^2= 8.658$	0.003
1: Dependant	2 (5%)	12 (30%)		
2: Independent	38 (95%)	28 (70%)		
Physical activity:			$\chi^2= 30.629$	<0.0005
1: Regular	34 (85%)	10 (25%)		
2: Irregular	6 (15%)	20 (50%)		
3: Not Done	0 (0%)	10 (25%)		
Time of ANC:			$\chi^2=9.600$	**0.002
1: Regular	36 (90%)	24 (60%)		
2: irregular	4 (10%)	16 (40%)		

P value by Chi-Square test, *Independent-Samples t-Test and **Mann-Whitney U-Test.

Table 2, illustrates that 20% of women in the study group had a medical history of diabetes versus 10% in the control group. 16% of women in the study group had a surgical history as compared to 15%

in the control group. Moreover, two thirds (65%) of women in the study group had a family history of diabetes as compared to three quarters (75%) in the control group.

Table 3 reveals that 75% of women in the study group were multigravida as compared to 90% in the control group. 70% of women in the study group were multipara as compared to 75% in the control group. Also, 70% of women in both groups had children ranged from 1-3. Moreover, there was a statistically significant difference between the two groups regarding ADLs, physical activity and time of antenatal care.

Table 4 illustrates that statistically significantly higher proportions of satisfactory knowledge in the study group as compared to the control group. It also reveals that the total

Level of women satisfaction knowledge about GD after the intervention was significantly higher in the study group than in the control group. Moreover, the source of information differs significantly from all study groups have their source as a health care provider (HCP) versus 60% in the control group.

Table 5 shows statistically significantly higher proportions of favorable practices in the study group as compared to the control group. **It also** clears that the total Level of women's favorable practice about self-care practice after the intervention was significantly higher in the study group than in the control group.

Table 4. Comparison between two groups regarding their knowledge about diabetes after self-care program: (N= 80)

knowledge about diabetes	Study G. (n=40)	Control G. (n=40)	χ^2	P-value
Cause of diabetes:				
correct answer	34 (85%)	10 (25%)	29.091	<0.0005
Symptoms of diabetes:				
correct answer	30 (75%)	14 (35%)	12.929	<0.0005
Treatment of diabetes:				
correct answer	32 (80%)	14 (35%)	16.573	<0.0005
Effect of GDM for mother :				
correct answer	34 (85%)	24 (60%)	6.270	0.012
Effect of GDM for the fetus	35 (87.5%)	23 (57.5%)	7.281	0.012
Care of GDM during pregnancy	37(92.5%)	19(47.5%)	26.000	<0.0005
Care of GDM during labor	39(97.5%)	21(52.5%)	22.000	<0.0005
Care of GDM during the postpartum period	38(95.0%)	20(50.0%)	24.000	<0.0005
1-T.L. of knowledge about diabetes after the intervention				
Good	34 (85%)	17(42.5%)	24.4	<0.001
Poor	6 (15%)	23 (57.5%)		
Sources of information:				
Health care provider	40 (100%)	24 (60%)	20.000	<0.0005
Family and mass media	0 (0%)	16 (40%)		

Data are expressed as frequency (percentage). P value (Chi-Square Test).

Table 5. Comparison between control and study groups according to their self-care practice after self-care program: (N= 80)

Practice variable	Study G. (N=40)	Control G. (N=40)	χ^2	P-value
Physical activity:				
Favorable:	38 (95%)	8 (20%)	46.036	<0.0005
Unfavorable:	2 (5%)	32 (80%)		
Dietary compliance:				
Favorable:	32 (80%)	12 (30%)	20.202	<0.0005
Unfavorable:	8 (20%)	28 (70%)		
Monitoring of blood glucose level:				
Favorable:	36 (90%)	24 (60%)	9.600	0.002
Unfavorable:	4 (10%)	16 (40%)		
Drug regimen compliance:				
Favorable:	34 (85%)	32 (80%)	0.346	0.556
Unfavorable:	6 (15%)	8 (20%)		
2-T.L. of practice about diabetes after the intervention				
Favorable:	25(62.5%)	19(47.5%)	21.6	<0.001
Unfavorable:	15(37.5%)	21(52.5%)		

Data are expressed as frequency (percentage). P value (Chi-Square Test).

Table 6. Comparison between two groups according to their attitude about self-care after self-care program: (N= 80)

Attitude variable	Study G. (N=40)	Control G. (N=40)	χ^2	P-value
It is necessary to take special care of a pregnant mother with GDM	40 (100%)	16 (40%)	34.286	<0.0005
Comprehensive nationwide GDM education program is needed for improving access to information	40 (100%)	20 (50%)	26.667	<0.0005
Special training to provide GDM care is needed for health care providers.	40 (100%)	10 (25%)	48.000	<0.0005
Complications of GDM can be prevented	24 (60%)	14 (35%)	5.013	0.025
GDM is a very serious condition	32 (80%)	24 (60%)	3.810	0.051
Early diagnosis is crucial for preventing complications	26 (65%)	14 (35%)	7.200	0.007
3-T.L. of Attitude regarding GD after the intervention				
Negative	22(55.0%)	32(80.0%)	31.3	<0.001
Positive	18(45.0%)	8(20.0%)		

Data are expressed as frequency (percentage). P value (Chi-Square Test).

Table 6 clears statistically significantly higher proportions of all parameters attitude about self-care in the study group as compared to the control group. It also reveals that the total Level of positive women's attitude about self-care for women with GD after the intervention was significantly higher in the study group than in the

control group.

Table 7 shows statistically significantly higher proportions of complications in the control group than the study group. Moreover the rate of normal delivery was higher in the study group, meanwhile, the CS rate was higher in the control group.

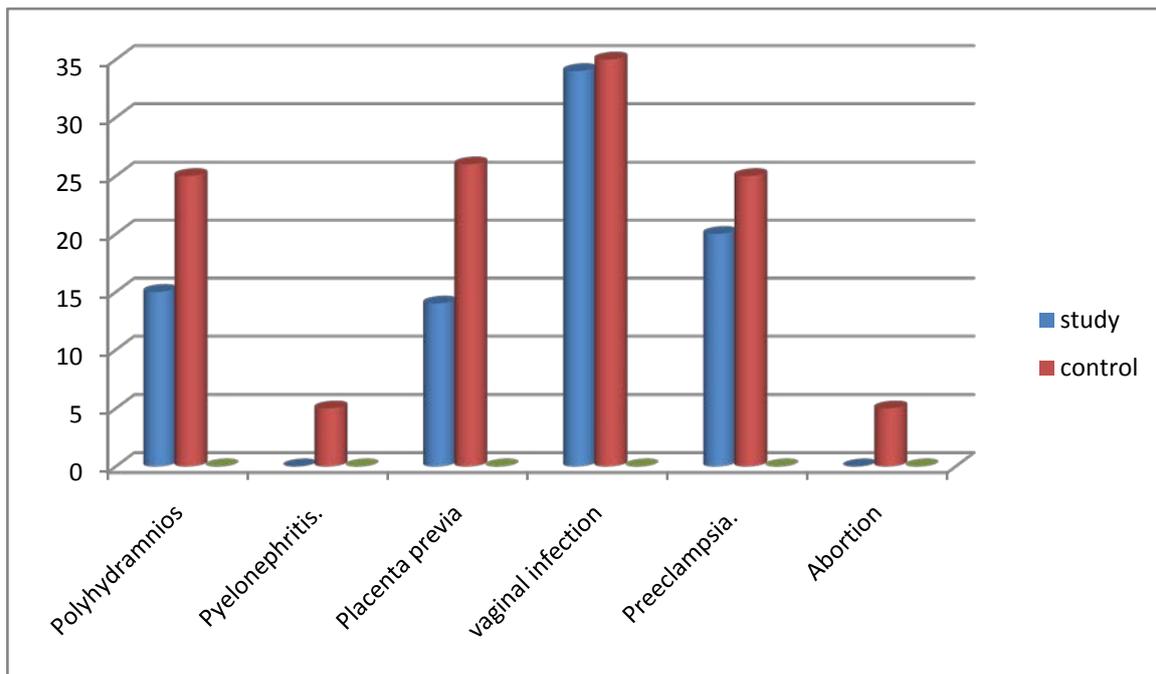


Figure 1. Comparison between two groups regarding maternal condition during pregnancy complications

Table 7. A: Comparison between two groups regarding maternal condition during labor. (N= 80)

Variable	Study G. (N=40)	Control G. (N=40)	χ^2	P value
Mode of delivery:				
Vaginal delivery	16 (40%)	4 (10%)	9.600	0.002
Cesarean section	24 (60%)	36 (90%)		
No maternal complications:				
Preterm	12 (30%)	24 (60%)	16.970	<0.0005
Obstructed labor	14 (35%)	4 (10%)	7.273	0.007
Postpartum hemorrhage	4 (10%)	12 (30%)	7.168	0.007
Infection	8 (20%) a	12 (30%)	5.000	0.025
			1.067	0.302

Data are expressed as frequency (percentage). P-value by Chi-Square test or *Fisher's exact test.

Table 7 B. Comparison between two groups regarding the fetal complications immediately after labor: (N= 80)

	Study G. (N=40)	Control G. (N=40)		
ICU:	16 (40%)	30 (70%)	10.026	0.002
Jaundice:	14 (35%)	20 (50%)	1.841	0.175
Macrosomia:	14 (35%)	24 (60%)	5.013	0.025
Hypo-glycemia:	10 (25%)	26 (65%)	12.929	<0.0005
Prematurity & respiratory distress	6 (15%)	8 (20%)	0.346	0.556
IUFD	0 (0%)	2 (5%)	2.051	0.494*

Data are expressed as frequency (percentage). P-value by Chi-Square test or *Fisher's exact test.

Table 8. Correlation between total women knowledge in both groups and their both "total practice and attitude" about GDM after self-care program

total women practice and Attitude	Total No	total women knowledge				r-test P-Value
		Study G. (N=40)		Control G (N=40)		
1)-Total women practice						
A-Study G.		Satisfy (N=34)	Unsatisfied (N=6)	Satisfy (N=17)	Unsatisfied (N=23)	
Favorable:	25	25	0			0.96**
Unfavorable:	15	9	6			
B- Control G,						
Favorable:	19			12	7	0.84**
Unfavorable:	21			5	16	
2)-Total women Attitude						
1-Study G.						
Negative:	22	22	0			0.95**
Positive	18	12	6			
2- Control Group.						
Negative:	32			11	21	0.82**
Positive	8			6	2	

Data are expressed as frequency (percentage). P value by correlation coefficient test.

Table 7 clears that the rates of fetal health problems were significantly higher in the control group than the study group as (jaundice, macrosomia... etc).

Table 8 clears that there was a significant association between total women knowledge in both study and control groups and their both total practice and attitude about GDM.

7. Discussion

Gestational diabetes mellitus (GDM) is a global health concern, not only because of its high occurrence and on the increase, but also because of the potential implications for the health of mothers and their offspring. Patient education is one of the most important aspects of developing and improving women knowledge about the disease and self-care. So this study aimed at evaluating the effect of self-care program for gestational diabetic women on pregnancy outcomes, with the results will be discussed as follow:

8. Regarding the Sample Characteristics

The present study revealed that the age of women in both groups ranged from 18-38 years with a mean age

(27.7 ± 5), and nearly half of the studied women had an intermediate education, and more than half of studied women were not working. In same line a study that prevalence and risk factors for gestational diabetes according to the diabetes in pregnancy study group in India in a comparison to international association of diabetes and pregnancy study group in El Minya by [15], found that the more than half of women their age ranged from 18 years to 42 years with mean age (26.5 ± 5.5), 64.9% of women had intermediate education, and 91.42% not working. From the researcher's point of view, this age group represents the most prevalent reproductive age groups and reflects the fact that women were likely to be in middle age groups. In addition to education, this explains their cooperation, understanding, and more receptive to information. Moreover occupation this similarity indicated that diabetic affecting women's physical activity.

The present study illustrated that most of the women in the studied group hadn't a medical history of diabetes. In the same line, a study on health-related quality of life and treatment satisfaction by [16], found that half of the patients hadn't co morbidities. In addition to that more, than two-thirds of women in the studied group had a family history of diabetes. This result comes in parallel to the findings [17] in a study on the Prevalence of gestational diabetes mellitus and associated risk factors in

Turkish women, which reported that GDM was significantly associated with the history of diabetes in first degree relatives of the pregnant women. From the researcher's point of view, diabetes is a hereditary disease and there was a significant association between family history of diabetes and the development of GDM.

The present study showed that most women in the studied group were multigravida, and nearly three-quarters of them were multipara. In the same line, a study on screening for gestational diabetes among pregnant women attending a rural family health center-Menoufia governorate by [18], found that most of the studied women were multigravida and multipara.

The present study showed that most women in the study group had participated regularly in physical activity versus half of the women in the control group. This results in same line with [19], recommend a program of fair exercise for 30 minutes most days of the week for women with GDM who have no obstetric contraindications to physical activity, founded that Physical activity improves insulin sensitivity and decreased both fasting and postprandial glucose concentrations in patients with diabetes. Moreover, these results incongruent with [20], in a study on the physical and psychological health domain of quality of life, who assumed that the majority of the study group was practice physical activity. From the researchers' point of view these results are related to effect of self care program for women in study group as that increase awareness about participation physical activity as it was neglected part in our society as recommend women for participate exercise three time per weeks about 30-60 minutes as brisk walking, arm exercise after meal for ten minutes helped to normalize blood glucose level and heart rate . This result was contradicted with [21], in a study effect of quality of life among women with gestational diabetes who reported that three-quarters of women hadn't practice exercise regularly.

8.1. Concerning Women Knowledge Regarding GDM

The present study cleared that the rate of total women knowledge regarding GDM was significantly higher in the study group than the control group. This finding supported by [22], who studied the effect of adaptation program for diabetic sexual dysfunction, found that the level of knowledge for diabetic women increases after the intervention. This finding return to the positive effect of guideline intervention for the study group. Also the sources of information of study group from health care providers. Guideline and health care providers play an important role in improving women's awareness regarding GDM.

8.2. Regarding the Self-care Practice

The present study cleared that there was a statistically significantly higher proportion of favorable practices in the study group as compared to the control. However, both groups had favorable practice regarding drug regimen compliance due to fear of maternal and fetal complications of diabetes. This result was congruent with [23], in study Metformin effects on Treatment satisfaction and quality of

life in gestational diabetes. These results were also consistent with [24], in study Healthy lifestyle behaviors and self-efficacy showed that there was a significant difference between the intervention group and the control group in self-care behaviors as the self-care program had a positive effect on improving women practice in the study group.

These results are supported in some points and contradicted with others by a study by [25], who implement Self-care behaviors and related factors in women with type 2 diabetes and found the majority of the subjects had unfavorable regarding blood glucose monitoring and physical activity, while they had favorable status in terms of drug regimen compliance. This due to insufficient blood glucose monitoring in women with gestational diabetes might be due to the need for improved knowledge and skills for monitoring blood glucose, as well as the provision of services, such as glucometers and blood glucose test strips. From the researcher's point of view Self –care program for the study group improve and enhance knowledge and skills about positive diabetic self-management behavior such as a balanced diet, physical activity, self-monitoring of blood glucose at home, drug compliance, and insulin control. However, women in the control group had a lack of training sessions, inadequate training, and unwilling to perform the physical activity due to false concepts as fear of fetal damage.

8.3. Regarding GDM Attitude

The current study represented that there was a statistically significantly higher proportion of all parameters attitude about self-care in the study group as compared to the control group. This finding supported by [22], found that there was a high statistically significant difference between practice level and altitude of the studied patients regarding diabetes in all items. Also [11], who studied knowledge and attitude regarding gestational diabetes mellitus among obese pregnant women, found that positive attitude regarding GDM control, investigation and expressed positive responses for GDM education program. From the researchers' point of view, this may be related to the positive effect of education on women's knowledge, skills, and attitudes as education improve self-care of diabetic women and its management as the essential role of health care providers for more training for women.

8.4. Regarding the Effect of GDM for the Maternal Condition during Pregnancy and Labor

Results revealed that maternal complications during pregnancy for GDM were the vaginal infection, preeclampsia, and polyhydromans. It was lower in the study group than in the control group. This agrees with Prakash, et al, [26], who revealed that maternal complications during pregnancy were polyhydromans, vaginal infection, hypertension, and wound infection. Dietary intervention and insulin therapy as improving health-related QOL reduce the rate of maternal complications.

The current study illustrated that two-thirds of the study group had C.S delivery versus most of the control group.

35% of women in the study group had maternal complications during labor as obstructed labor, preterm labor, and infection. This result was nearly similar to Prakash, et al. [26], who revealed that Forty-four percent of the women required cesarean section and 34% had complications either during pregnancy or labor. This may be attributed to the preference of some obstetricians to deliver by cesarean section without apparent indication for maternal and fetal safety.

8.5. Regarding the Effect of GDM for Fetal Condition Immediately after Labor

The current study showed that the rates of fetal health problems were significantly higher in the control group than the study group, as well as nearly two-thirds of the fetus, had entered ICU due to fetal complications as fetal macrosomia, jaundice, and hypoglycemia in both groups. These findings are agreed with Poovathi [27], who revealed that there were fetal complications for GDM as of fetal macrosomia, hyperbilirubinemia, and hypoglycemia. This may be due to the effect of the educational program for the study group had an appositive effect in the reduction of fetal complications for the infant with gestational diabetic women.

8.6. Regarding the Correlation between Total Women (KPA) in both Groups about GDM after the Intervention

Results showed a significant increase in the level of patients' knowledge, attitude, and practice in the study group than the control group after the implementation of the program. From the researcher's point of view these results could due to the value of diabetes teaching, which considered an vital part of diabetic patient care, education has a positive effect on increasing awareness and improve self-care behaviors, and decrease complications of GDM for women in the study group. So, the implementation of training programs about self-care in women with GDM was recommended.

These results are consistent with Zandinava, et al. [28], who studied the effect of educational package on self-care Behavior, quality of life, and blood glucose levels in pregnant women with gestational diabetes found that, the positive effect of education on awareness and self-care in the intervention group. Also These results are similar with Barasheh, et al. [29], whom studied the effect of education program on improving self-care management behaviors in diabetic patients, found that, and self-care behaviors, levels of knowledge, skills, and attitude (KPA) at the intervention group have been enhanced after implementation of the program.

Self-management education improves the short-term and long-term outcomes of diabetes, as the quality of life. Teaching women about the disease, its complications and treatment will go far in improving the quality of life. So, self-management education is cost-efficient for diabetes patients and their families [4].

Educational programs for women with GDM could enhance women's health status and perceived the ability to decrease the overall risk of diabetes in the future.

9. Conclusion

Education plays an important role in increasing the awareness of pregnant women regarding GDM risks, complications, and its proper management to reduce its burden for the mother and the fetus, as there was a higher prevalence of GDM in our society. Individualization of education is very essential as it increased the woman's ability to understand each topic. Education help to counsel each woman with GDM about her own risk and the need for preventive measures.

10. Recommendations:

- (1) Universal screening to all pregnant women for GDM in the antenatal unit to reduce its complications for maternal and fetal.
- (2) Stress on implementing a simple and clarified-GDM educational program to all pregnant women to increase their awareness regarding diabetes.
- (3) A future study could conduct on a large sample for women GDM.

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