Barriers Affecting Utilization of Postpartum Glucose Tolerance Screening Test among Gestational Diabetic Women

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Abstract

Background: Severalprofessional societies and organizations around the world recommend postpartum glucose tolerance testing in women with a history of GDMto reduce the risk of gestational diabetes.**Aim & design:** A descriptivestudy design was conducted aiming to assess the barriers affecting utilization of postpartumglucose tolerance screening test among gestational diabetic women.**Sample:** a purposive sample of 486 pregnant women was chosen for this study.**Setting:**at the postpartum ward of Ain Shams Maternity Hospital. **Tools:** the study utilized a structured interviewing questionnaire named "mother's knowledge regarding postpartum glucose tolerance screening test and barriers affecting their utilization with post-partum glucose test".**Results:** It was discovered that 59.6% of the samples tested had an incorrect knowledge of postpartum glucose tolerance screening test. Furthermore, 75.1% of the women in the study did not utilize postpartum glucose tolerance screening test. Thus, health team barriers accounted 78.6% of women, followed by women's barriers which accounted for 65.0% of them as barriers affecting utilization of postpartum glucose tolerance test.**Conclusion:** more than half of studied sample have incorrect overall knowledge of PPGS. Most of studied sample did not utilize PPGS andmore than three-quarters of the studied sample reported "health team factor" as the most main barrier preventing them to utilize the screening test and a statistically significant relationship was observed between the utilization of the studied sample and the total factors of PPGS affecting their utilization. **Recommendations:** Design and implement an educational program for women with gestational diabetes to encourage them to participate in postpartum glucose tolerance screening test.

Keywords: Gestational diabetes, glucose tolerance screening test

Introduction

Gestational diabetes mellitus (GDM) is one of the most common pregnancy problemsin the second and third trimesters. Hyperglycemia is a symptom of GDM, which is identified during pregnancy and is caused or exacerbated by underlying factors like genetic predisposition, insulin resistance, and chronic inflammation. Although this condition is usually only transient, it is a risk factor for type 2 diabetes (T2D) later in life and can have long-term negative effects on both mothers, including preeclampsia and hypertension during pregnancy, as well as postpartum development and effects on offspring, including neonatal complications such as asphyxia, hypoglycemia, kernicterus, jaundice, bacterial infections, neonatal respiratory distress syndrome (NRDS), and birth trauma, such as shoulder dystocia and brachial plexus injury **(ACOG, 2018).**

Evidence suggests that identifying women with glucose intolerance in the postpartum period is critical, as appropriate treatment can prevent or delay the onset of T2D and reduce the disease's burden. Control and reduction through the implementation of evidence-based prevention strategies, early detection, and management to adequately address the

growing prevalence of GDM globally **(Quaresima, 2018).**

A growing body of studies on the importance of postnatal glucose screening. Women should thereafter be screened to monitor blood sugar levels and identify those most at risk of developing diabetes, as well as for early identification of type 2 diabetes and successful treatment of "pre-diabetes," but most of them overlook the effects on women's postpartum blood sugar compliance. The GDM can currently be tested in two current approaches. In the one-step approach, is recommend that women with GDM have a single a 2-h 75 g oral glucose tolerance test (OGTT) 6 to 12 weeks postpartum (PPOGTT), followed by a glycemic status assessment every three years, according to the one-step strategy **(Raman, et al., 2017)**

The percentage of GDM women who had timely postpartum blood glucose testing was quite low. Women's non-participation in the PPOGTT has been explained in several ways. Subjective barriers include neonatal care, travel and economical challenges, a lack of interest in healthcare, a lack of family support, a lack of understanding of T2D risk, and testing complaints. It also includes concerns with the health-care system, such as inadequate communication between gynecologists/dialectologists and general practitioners, a feeling among gynecologists and GPs that postpartum follow-up in GDM is unnecessary, and a lack of general guidelines**(Pennington, 2017).**

Nurses have a variety of responsibilities, including promoting health and preventing gestational diabetes and its consequences, as well as improving the health of postpartum women by preserving physical and social normalcy and preventing or treating risk factors. Self-monitoring of blood sugar, follow-up treatment, motivation to make healthier lifestyle choices, and reminders of women for follow-up appointments of postpartum glucose tolerance test via email and phone calls for comprehensive health education are all encouraged **(Mourady et al., 2017).**

Nurses also play an essential role in case management and support by defining, diagnosing, and treating women responses to existing or potential health problems, as well as providing supportive and restorative care in disease prevention models that promote health. They also collaborate with healthcare organizations to develop gestational diabetes management guidelines and evidence-based practice-based decision-making to ensure that a large number of women are screened for GDM to control the disease at an early stage, as well as to participate in medical testing decision-making and scheduling of postpartum glucose tolerance screening test. Also be more included in postpartum care programs to identify barriers to postpartum glucose tolerance test, and should follow the expected recommendations, which should begin during pregnancy, and be prepared to handle the transition to a parent's postpartum care plan**(Mensah, Rooyen, and Ham-Baloyi, 2019).**

Significance of the study

Women with gestational diabetes mellitus (GDM) are 7 to 12 times more likely than women with normal blood sugar levels to develop type 2 diabetes. Various types of hyperglycemia can arise during pregnancy; gestational diabetes mellitus (GDM) affects about 7% of pregnancies globally. According to a recent study of the incidence of GDM in 250 participants in Egypt, one out of every eight women had GDM **(Nachum et al., 2017).**

Gestational diabetes is a serious metabolic condition that can harm both the mother and the baby. The risk of having type 2

diabetes later in life was elevated by 50% in women with a history of GDM, and the chance of developing diabetes in the postpartum period was dramatically enhanced. This is crucial for women who have been diagnosed with GDM. Glycemic status should be determined at least 6 to 12 weeks after delivery, as this is preventative and controlled for the development of type 2 diabetes **(Liu et al, 2019).**

Postpartum screening is critical, and there is a broad request for women with gestational diabetes to be educated about the importance of screening. However, in the actual world, opportunities for postnatal screening and intervention are frequently overlooked due to a variety of circumstances. Women with GDM pregnancies should have postpartum screening to detect glucose abnormalities and receive appropriate counseling and referral **(Cho et al., 2015).**

Aim of the study:

This study aimed to assess the barriers affecting utilization of postpartumglucose tolerance screening test among gestational diabetic womenthrough:
1. Assessing women's knowledge regarding post-partum glucose tolerance screening test
2. Assessing barriers affecting women's utilization of post-partum glucose tolerance screening tests.

Research questions:
1. What is women's level of knowledge regarding postpartum glucose tolerance screening test?
2. What are the barriers that affect women's utilization of post-partum glucosetolerance screening test?

Subjects& methods
Research design:
A descriptive research design was used.

Setting:
The study was conducted at the Postpartum Department of Ain Sam University Maternity Hospital.

Subjects:
Sample type:
A purposive sample type with the following:

Inclusion criteria:
- Postpartum women at the age of 18 - 45 years.
- Postpartum women who had a history of GDM

Exclusion Criteria:
- Women with chronic health problems such as chronic diabetes mellitus and hypertension

Sample size:
486 postpartum women to compute the sample size, the researchers used the following formula: Equation of Steven-Thompson **(Khuanbai,2019)**

$$\frac{Z2\ P(1-P)}{d2}$$

N =Sample size

Z: Statistics for a level of confidence. (For the level of confidence of 95%, which is conventional, the Z value is 1.96).

- P = the expected proportion in population based on previous studies.

d=error percentage = (0.05))

Tool of data collection:

I: A Structured Interviewing Questionnaire:

It was designed after the researchers reviewed the existing literature to gather the essential data for the study's aim. The interview form was written in Arabic. It is divided into 4 parts:

Part I: was concernedwiththe assessment of general characteristics of women under study, which consisted of 7 open-ended and closed-ended questions, including the following items: age, marital status, place of residence, educational level, mother's occupational status, and health insurance.

Part II: was concerned with the assessment a history of Gestational Diabetes of women under study, which consisted of 10 open-ended and closed-ended questions, including the following items:the timing of diagnosis, blood glucose levels, method of controlling, gestational GDM complications and complications during labor .

Part III: concerned with women's knowledge of gestational diabetes mellitus (GDM) and postpartum glucose tolerance screening testwere assessed. This includes 12 open-ended and closed-ended questions about what they know about GDM, risk factors for developing GDM during pregnancy, signs of elevated blood sugar levels, signs of low blood sugar levels, effects of GDM on the mother, effects of GDM on the fetus, glucose level screening during pregnancy, maternal and infant GDM complications during pregnancy, delivery and postpartum, knowledge of postpartum blood glucose screening in women, the timing of postpartum screening, the importance of postpartum screening, and more.

Part IV: focus on to assess utilization of postpartum glucose tolerance screening test as reported by the women this includes only one closed-ended question .

❖ **Scoring system:**
Scoring system for women's knowledge regarding GDM and postpartum glucose tolerance screening test:

Correct answers receive (2) score, while incorrect responses receive (1) score. Then divide the overall knowledge value by 60 percent to get correct knowledge equal to or more than 60 percent and incorrect knowledge less than 60 percent.

Part V: was concerned with "barriers that affect women'sutilization of postpartum glucose tolerance screening test". Four main barriers are included: such as female barriers, health system barriers, testing barriers, and social barriers. All questions are closed-ended, which may be one of the reasons they are holding back their utilizationof the postpartum glucose screening test.

❖ **Scoring system for** barriers that affect women's utilization of postpartum glucose tolerance screening test

No barrier to utilize was given (2) score while had barriers to utilize was given a (1) score.

Total scores were calculated and then converted into two categories; no barrier to utilizeif equal to 60 % or more, while had barriers to utilize if less than 60%.

Content Validity and Reliability:
Content Validity: A panel of three specialists in maternity and gynecological health nursing from Ain Shams University Faculty of Nursing evaluated the data collection tool for comprehensiveness, correctness, and clarity in language.

Modifications in the language and sequencing of statements were examined, according to their opinions.

Content reliability of the tool was tested to ascertain that assessment tools produce consistent and predictable outcomes throughout time. The Alpha Cronbach test was used to verify the research tool's reliability for knowledge and influencing factors (0.842).

Ethical Consideration:

The ethical research considerations in this study were included the following:

• The Director of Ain Shams University Maternity Hospital, where the study was conducted, gave his official permission.

• Explain the study's aims and goals to all mothers who are participating.

• Researcher seek women's verbal consent to participate in the study and inform them that they have the right to withdraw from it at any moment.

• Researcher are assured that subject data, including phone numbers, is kept private and secret during PPGS, and that data gathering tool are destroyed following statistical analysis.

Administrative design:
An official permission letter containing the title and purpose of the study was sent to the director of the Ain Shams University Maternity Hospitals.

Operational design:
The study was conducted through two phases:
I. Preparatory phase.
II. Implementation phase.

I. Preparatory phase:
To construct research tools, the researcher read advanced local and worldwide books, journals, journals, scholarly journals, and internet references; after that, a pilot test was conducted.

Pilot Study:
A. A one-month pilot study (49 women, 10% of the overall study sample) was conducted among women enrolled in the abovementioned study setting from June 1 to30, 2020. Because the data collection procedures were not changed, all samples from the pilot study were included in the study sample.

B. Implementation phase (fieldwork):

• During this phase, researchers collected data for the 12 months from July 1, 2020, to June 30, 2021, by visiting the above .mentioned settingthree days a week from 9:00 a.m. to 2:00 pm.

• At the start of the interview, the researcher gave a brief introduction to the women being interviewed, emphasized that the study aimed to acquire their trust and confidence, and then received their verbal agreement.

• In the postpartum ward of Ain Shams Maternity Hospital, the researcher questioned women who met the sampling requirements separately. The average number of women questioned every day (5-9) completed structured interview questionnaires that were used to evaluate women's general characteristics , and knowledge of GDM&postpartum glucose tolerance screening test, and to complete part V of the data collection, the researcher requested that each mother supply a phone number for post-discharge follow-up.

• Each interview lasted 25 minutes in total.

Researcher called via phone each woman to identify variables that would make it difficult for them to adhere to postpartum glucose tolerance screening test, as well as to track their performance.

• The researcher repeated the previous stages until the sample size specified previously is reached.

• In addition, 20 women were dropped from the study because they could not be reached after being discharged from the hospital to track their postpartum glucose screening results.

Statistical Analysis:

The study's data input was done in two stages, quality control, coding, and data entry. As needed, the data is statistically evaluated, processed, and displayed as numbers, percentages, tables, figures, and graphs. The Statistical Package for Social Sciences, version 20.0, was used to analyze the data (SPSS Inc., Chicago, Illinois, USA). The mean and standard deviation are used to present quantitative data (SD). Frequencies and percentages are used to express qualitative data.

The following tests were done:

▪ A Chi-square (x^2) test of significance was used to compare proportions between qualitative parameters.

▪ Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables

▪ The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:
▪ Probability (P-value)
– P-value ≤0.05 was considered significant.
– P-value ≤0.001 was considered highly significant.
– P-value >0.05 was considered insignificant.

Result:

Table (1): represents (44.6%), of women in the age group >30-45 years with a mean age of 30.35±6.98 and married (60.1%), the table also clarifies that (40.1%)were diploma certificates. As for the residents, (64.8%)were urban, while the occupation, (58.1%) were housewivesand (26.4%) were a teacher, and (19.7%) them were care services. The table also shows (that 70%) were not medically insured.

Table (2): reveals that (74.9%) of the studied women had a history of Gestational Diabetes Mellitus (GDM). Regarding the timing of diagnosis, (62.7%) out of them had a diagnosis between the seventh to the ninth month. Concerning blood glucose levels, more than one-third had controlled blood sugar levels during pregnancy (41.6%) and 64.9% of them were controlling their blood sugar level upon "a pharmacological regimen".

Moreover, the table shows that (34.8%)had gestational GDM complications. Concerning mother complications, 52.9% had preeclampsia, while, 49.8% of them had macrosomia as fetal complications.

Furthermore, 25.1%had complications during labor as a result of GDM. As regardsthe type of mother and new borne complications, 39.4% of them had perineal tears as mother complications.While RDS complications represent 42.6% among delivered babies.

Figure (1): represents the women's knowledge regarding gestational diabetes during pregnancy. It reveals that (68.9%)had correct knowledge; while, others had incorrect knowledge.

Table (3): reveals that (30.0%) were aware of post-partum glucose screening; while, (75.3%) of them "had no idea about exact timing" of post-partum glucose screening.

Concerning the importance of performing a screening test, (44.5%) of women performed it to make sure normal glucose levels after delivery. Regarding the type of screening test, (56.8%)had no idea about the test type of post-partum screening.

Figure (2): Indicates that (40.4%) of the studied women had correct knowledge; while, (59.6%) of them had incorrect knowledge.

Figure (3): represents that (75.1%) of the studied women did not -utilize postpartum glucose tolerance screening test; while, (24.9%) of them utilizedthe postpartum glucose tolerance screening test.

Figure (4): indicates that (78.6%) of women had health team's factors as barriers to adherence to postpartum glucose tolerance screening test; Followed by the second factor which represents (65.0%) of them had women's factors and the third factor represent (57.6%) of women who had social factors.

Table (4): represents that, there wasa highly statistically significant relation between the level of total knowledge of the studied women and their age, educational level, place of residence, occupation, and medical insurance.

Table (5): shows that there wasa highly statistically significant relation between women's utilization of post-partum glucosetolerance screening and their age, educational level, and medical insurance (p-value <0.001). While there was no statistically significant relation between women's utilization of post-partum glucosetolerance screening and their marital status and occupation.

Table (6): indicates that there wasa highly statistically significant relation between women's utilization ofpost-partum glucose screening and total barriers to adheringto post-partum glucose tolerance screening test (p-value <0.001).

Table (7): reveals that there wasa highly statistically significant relation between the total level of knowledge of the studied women and their utilization ofpost-partum glucose tolerance screening (p-value <0.001).

Table (8): shows that there wasa highly statistically significant moderate positive correlation between the total score of knowledge regarding gestational diabetes during pregnancy, postpartum glucose screening of the studied women, and their total score of barriers affecting women's adherence to post-partum glucose screening (p -value<0.001).

Table (1): Number and percentage distribution of the studied women according to their general characteristics (N=486).

General characteristics	No.	%
Age (years):		
16-20 years	98	20.2
>20-30 years	171	35.2
>30-45 years	217	44.6
Mean±SD	30.35±6.98	
Marital status:		
Married	292	60.1
Divorced	122	25.1
Widow	72	14.8
Educational level:		
Uneducated	98	20.2
Primary certificate	49	10.1
Diploma certificate	195	40.1
University certificate	144	29.6
Place of residence:		
Rural area	171	35.2
Urban	315	64.8
Occupation:		
House wife	282	58.1
Working	204	41.9
If, working (n=204)		
Teacher	54	26.4
Saleswomen	38	18.6
Care services	40	19.7
Waitress	38	18.6
Craftworks	34	16.7
Medical insurance		
Insured	146	30.0
Not insured	340	70.0

Table (2): Number and percentage distribution of studied women according to their history of gestational diabetes (N=486).

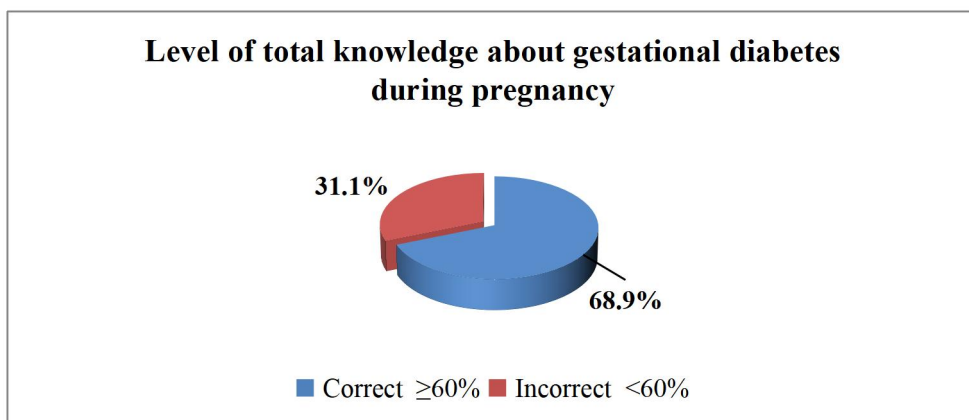| History of gestational diabetes:	No.	%
History of Gestational Diabetes Mellitus (GDM)		
Yes	364	74.9
No	122	25.1
Timing of diagnosis as GDM (n=364)		
Beginning of pregnancy until the third month	26	7.1
From the fourth month to the sixth month	110	30.2
From the seventh month to the ninth month	228	62.7
Blood sugar levelsare controlled during pregnancy		
Yes	202	41.6
No	284	58.4
Methodof blood glucose control (n=202)		
Exercise regimen	20	9.9
Diet	51	25.2
A pharmacological regimen	131	64.9
Gestational diabetes complications		
Yes	170	34.8
No	316	65.2
Gestational diabetes complications on mother (n=170)		
High blood pressure (preeclampsia)	90	52.9
Preterm labor	80	47.1
Gestational diabetes complications on fetus (n=223)		
Fetal loss	45	20.2
Congenital abnormality	67	30.0
Macrosomia	111	49.8
Complications during labor as a result of uncontrolled diabetes:		
Yes	122	25.1
No	364	74.9
Complications during labor on mother (n=122)		
Excessive bleeding	37	30.3
Perineal tear	48	39.4
Prolonged labor	37	30.3
Complications during labor on baby (n=122)		
Respiratory distress syndrome	52	42.6
Hypoglycemia	41	33.6
Shoulder dystocia	29	23.8

Figure (1): Percentage distribution of the studied women according to their total knowledge about gestational diabetes during pregnancy.

Table (3): Number and percentage distribution of the studied women according to their knowledge about postpartum glucose tolerance screening test (N=486).

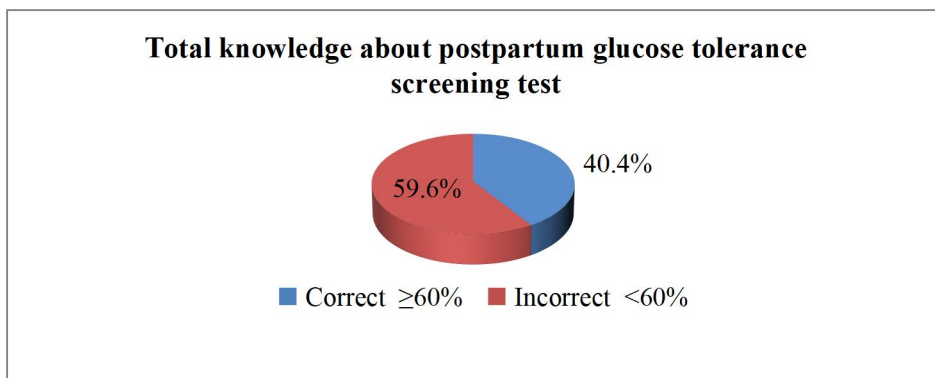| Women's knowledge about postpartum glucose tolerance screening test	No.	%
Awareness to post-partum glucose tolerance screening test:		
Yes	146	30.0
No	252	70.0
Timing of postpartum glucose tolerance screening test(n=146)		
Second weeks post-partum	19	13.0
Fourth weeks post-partum	8	5.5
Eighth weeks post-partum	9	6.2
I don't know	110	75.3
Importance of performing glucose tolerance screening test (n= 146)		
Make sure normal glucose level after delivery	65	44.5
Make sure not to develop DM	21	14.4
I don't know	60	41.1
Post- partum screening types (n= 146)		
Have no idea about test type	83	56.8
Fasting glucose blood test	63	43.2

Figure (2): Percentage distribution of the studied women according to their total knowledge about postpartum glucose tolerance screening test.
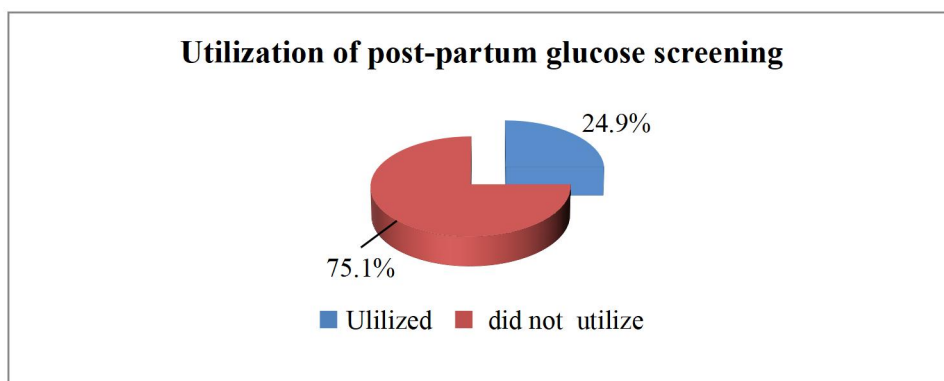

Figure (3): Percentage distribution of studied women according to their utilization of thepost-partum glucose tolerance screening test.
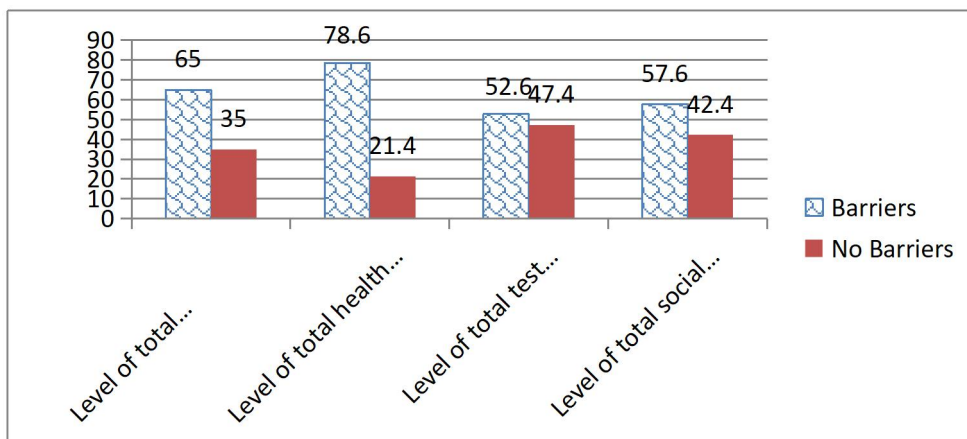

Figure (4): Percentage distribution of studied women's barriers affecting utilization of thepost-partum glucose tolerance screening test.

Table (4): Relation between total level of knowledge of the studied women and their general characteristics (N=486).

| General characteristics | Level of total knowledge | | | | x2 | p-value |
| | Correct (n=196) | | Incorrect (n=290) | | | |
	No.	%	No.	%		
Age (years)						
16-20 years	36	18.4	54	18.6		
20-30 years	45	22.9	120	41.3	39.076	<0.001**
30-45 years	117	59.7	116	40.1		
Marital status						
Married	129	65.9	124	42.8		
Divorced	43	21.9	69	23.8	7.122	0.029*
Widow	24	12.2	97	33.4		
Educational level						
Uneducated	16	8.1	82	28.3		
Primary	12	6.1	35	12.1		
Diploma	74	37.8	102	35.2	88.956	<0.001**
University	94	48.0	71	24.4		
Place of residence						
Rural	36	18.4	161	55.5		
Urban	160	81.6	129	44.5	53.075	<0.001**
Occupation						
House wife	79	40.3	232	80.0		
Working	117	59.7	58	20.0	57.921	<0.001**
Medical insurance						
Insured	90	45.9	32	11.1		
Not insured	106	54.1	258	88.9	48.421	<0.001**

P-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table (5): Relation between women's general characteristics and their utilization of post-partum glucose tolerance screening test(N=486).

General characteristics	Utilization of post-partum glucose tolerance screening test				x^2	p-value
	Utilized (n=121)		Did not utilize (n=365)			
	No.	%	No.	%		
Age (years)						
16-20 years	19	15.7	78	21.4		
20-30 years	20	16.5	150	41.1	26.921	<0.001**
30-45 years	82	67.8	137	37.5		
Marital status						
Married	84	69.4	206	56.5		
Divorced	25	20.6	98	26.8	5.200	0.074
Widow	12	10.0	61	16.7		
Educational level						
Uneducated	9	7.4	88	24.1		
Primary	7	5.8	42	11.5		
Diploma	39	32.2	153	41.9	34.444	<0.001**
University	66	54.6	82	22.5		
Place of residence						
Rural	29	23.9	140	38.3	5.275	0.022*
Urban	92	76.1	225	61.7		
Occupation						
House wife	59	48.8	225	61.7	3.654	0.056
Working	62	51.2	140	38.3		
Medical insurance						
Insured	66	54.5	80	21.9	32.61	<0.001**
Not insured	55	45.5	285	78.1		

Using: Chi-square test; p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table (6): Relation between women's utilization of post-partum glucose tolerance screening test and total barriers affecting utilization of post-partum glucose screening (N=486).

The total domain of barriers		Utilization of post-partum glucose tolerance screening test				x2	p-value
		Utilized (n=121)		Did not utilize (n=365)			
		No.	%	No.	%		
Total women's barriers	Barriers	39	32.2	277	75.9	54.766	<0.001**
	No Barriers	82	67.8	88	24.1		
Total health team's barriers	Barriers	62	51.2	320	87.7	51.814	<0.001**
	No Barriers	59	48.8	45	12.3		
Total test barriers	Barriers	48	39.6	208	57.0	7.193	0.007*
	No Barriers	73	60.4	157	43.0		
Total social barriers	Barriers	100	82.6	181	49.6	28.072	<0.001**
	No Barriers	21	17.4	186	50.4		

P-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table (8): Relation between total level of knowledge of the studied women and their utilization of post-partum glucose tolerance screening test(N=486).

Utilization of post-partum glucose tolerance screening test	Level of total knowledge				x2	p-value
	Correct		Incorrect			
	No.	%	No.	%		
Utilize	78	39.8	43	14.8	50.340	<0.001**
Not utilize	118	60.2	247	85.2		

Using: Chi-square test; *p-value <0.05 S; **p-value <0.001 HS

Table (9): Correlation between total knowledge of the studied women and total barriers affecting women's utilization of post-partum glucose tolerance screening test (N=486).

The total score of knowledge		**Total barriers domains**
The total score of knowledge about gestational diabetes during pregnancy	r-value	0.753
	p-value	<0.001**
The total score of knowledge about postpartum glucose screening	r-value	0.614
	p-value	<0.001**
The total score of knowledge regarding gestational diabetes during pregnancy and postpartum glucose\[tolerance screening test	r-value	0.684
	p-value	<0.001**

Using: Pearson's correlation coefficient (r); **p-value <0.001 HS

Discussion

gestational diabetes mellitus (GDM) is a significant risk factor for type 2 diabetes mellitus (T2D), and early treatment in women at risk is vital. Despite these recommendations, only a small fraction of women get screened for glucose intolerance after giving birth (PPOGTT) **(Cho et al., 2019)**.The goal of this study was to determine the barriers affecting utilization of postpartum glucose tolerance screening test a among gestational diabetic women**.**

As regard of general characteristics of the studied women, the current study illustrated that slightly less than half of the women were > 30-45 years oldwith mean age of 30.35±6.98, two-thirds were married, more than one-third were diploma, over two-thirds live in urban, and over three-quarters lack health insurance. The current findings are partially compatible with those of **Kumsar et al. (2021),** who investigated postpartum women with gestational diabetes' willingness to engage in a diabetes screening program at a

Turkish university hospital. They discovered that women's average age was 33.126.58, which was higher than the second and third middle schools, and that their income was sufficient.

The current study findings showed, three-quarters of the women in the study had a history of gestational diabetes (GDM), with two-thirds being diagnosed between the seventh and ninth months and more than one-third of themhad controlled blood sugar levels during pregnancy.Moreover, two-thirds of those who had their blood sugar levels examined during pregnancy had controlled by "medication". Furthermore, more than a third of the women had GDM complications during

pregnancy, approximately half of them had preeclampsia as a mothers' complications, and less than half had macrocosmic baby as a fatal consequence. Furthermore, one quarter were having complications during labor as a result of GDM, more than one third out of them have perineal tear as mother complications, in addition to respiratory distress syndrome (RDS)complications of newborns account for about half of all cases.

These findings are partially supported by **Inoue et al. (2018)**who conducted a study among East Asian women with gestational diabetes to assess postpartum risk of diabetes and predictive factors for glucose intolerance , he found that more than half of the studied women, the time to diagnosis (weeks) was 22.99 ± 7.88 and treated with insulin. almost one third had perinatal complications with birth weight (g) (full-term only) $3086.27 \pm 433.76 \pm 2.13$

Partially contradicting these findings, **Liu et al. (2019)**who conducted a prospective cohort study research among 237 Chinese mothers with a history of gestational diabetes mellitus to assess glucose screening within six months postpartum, and reported that the majority of gestational weeks (weeks) diagnosed with gestational diabetes were between 24 and 28 weeks, Blood glucose control during pregnancy more than half of them were acceptable or good , Management of gestational diabetes mellitus the majority were dependent on diet or physical activity. This is because, the Chinese people take care of their health by employing complementary and traditional remedies instead of utilizing the drug regimen.

The current study results revealed that more than two-thirds of studied womenhad correct knowledge about gestational diabetes. This is because diabetes is frequent pregnancy co-morbidity that affects a significant portion

of pregnant women, making information about it readily available. **Alnaim (2020)** offers differing views on these findings, who carried out a study aimed to assess the current level of knowledge regarding GDM among prenatal women attending primary healthcare centers (PHCs) in the city of Al-Khobar, claiming that more than a third of women have a strong general understanding of GDM and that, as a result, PHC is ineffective in community outreach and education.

Concerning toknowledge about postpartum glucose tolerance screening test, current findings illustrated that one third were aware to post-partum glucose screening; while, about three quarter out of them were "have no idea about exact timing" of post-partum glucose screening.Concerningawareness about importance of performing screening test, slightly less than half of women performed it to make sure that glucose level returned to normal of after delivery. More than half of themwere unaware of the various types of screening tests available after birth. These findings confirm the findings of **Alharthi et al. (2018)**, whoassess Saudi women's GDM knowledge and awareness through a cross-sectional study and found that just a third of subjects knew about the OGTT as Goldstander's test for GDM screening and that only a minority knew when the OGTT should be done.

Furthermore, the findings of the current study contradict those of **Islam et al. (2017),** who conducted a study of obese pregnant women undergoing antenatal evaluation in a tertiary hospital to assess knowledge and attitudes toward gestational diabetes mellitus (GDM). They reported that more than two-thirds of the women had complete information, which includes all aspects of knowledge - relevant investigations needed to control GDM, such as (meaning, timing, and importance), and they point out that due to the majority of subject were highly educated

Regarding total knowledge of postpartum glucose tolerance screening test. according to the current study, almost one-third of the studied women had a correct total knowledge score. This due to postpartum follow up is neglected among women in Egypt due to deficiency of health education from health care team during this period. This finding contrasts with **Kumsaret al., (2021)** finding that most people are unaware of the OGTT.

As regard of utilization of postpartum glucose tolerance screening test, it was discovered that three-quarters of the women didn't utilizepostpartum glucose tolerance screening test, while one-quarter utilized it. In accordance, **Herrick et al. (2019)** who study Postpartum diabetes screening among low income women with gestational diabetes in Missouri 2010–2015 he pointed out that the minority of women committed with diabetes screening test (OGTT) within 12 weeks of postpartum

Concerning women's barriers affecting utilization of post-partum glucose tolerance screening test, indicatedthat health team's barrier were identified by just over three-quarters of women, followed by women's barrier as a second barrier, which were cited by more than two-thirds of women and just under two-thirds of women who identified social barriers. This is because healthcare practitioners do not provide prenatal counseling regarding PPGTT, which is limited the information about GDM problems during pregnancy, and women believe that stabilizing blood sugar levels after delivery eliminates the need for PPOGTT.

Similar results were reported by **Capula et al. (2013)** whoinvestigated predictors of postpartum glucose tolerance testing in Italian women with gestational diabetes mellitusand showed that more than two-thirds of women did not receive verbal or

written counseling, clinical and biochemical parameters that might influence screening rates were included in logistic regression analyses. As expected, early GDM diagnosis and higher education status were strongly associated with better PPOGTT adherence and insulin therapy during pregnancy as a predictor of adherence at follow-up.

Besides disagreeing with these findings, **Quaresima et al. (2018)**who verify the barriers to postpartum glucose intolerance screening in an Italian population and suggest that the primary barrier to preventing postnatal screening is continuing neonatal care, which affects more than one-third of mothers. The second barrier, which accounted for less than a third of the total, was their lack of awareness of the significance of the test. Then more than one out of every ten women admitted to missing it; about one out of every ten women couldn't get a PPOGTT appointment at the nearest center (from their perspective, the Italian public health system requires an appointment to receive medical care, although waiting lists are typically long).

Regarding the relation between the total knowledge score of the studied women and their general characteristics, presented that, the overall knowledge of the studied women was statistically highly significant concerning their age, education level, place of residence, occupation, and health insurance. This is due to women's rising age and susceptibility, which has resulted in a rise in information seeking. **Capula et al. (2013)** observed that educational level is linked to increased awareness of gestational diabetes, which is linked to good self-care and management.

Concerning the relation between women's general characteristics and their utilization ofpost-partum glucose tolerance screening test,the current study,showed that women's utilization of post-partum glucose

tolerance screening test was highly statistically significant with their age, education level, and health insurance (p-value 0.001). However, there were no statistically significant links between women's utilization of post-partum glucose tolerance screening test and their marital status or occupation. This may be because of her advanced age, a woman is at a higher risk of acquiring type 2 diabetes, increasing pressure on her to have a PPPGTT, and the availability of financing for testing motivates women to continue testing. These findings are in line with those of **Quaresima et al. (2018)**, who reported that women with health insurance, a first-degree relative with T2D, and a history of GDM had higher adherence to postpartum glucose test.

As regards relation between women's utilization of post-partum glucose tolerance screening testand total barriers affecting utilization of post-partum glucose tolerance screening test, the current results indicated a highly statistically significant relation (p-value 0.001). These findings are in accordance with **Nielsen et al. (2014)**, who conducted a systemic review to investigatedeterminants and barriers for gestational diabetes mellitus postpartum follow-up and found a link between women's adherence to postpartum blood glucose screening and health-care provider concerns such as a lack of communication/collaboration among providers, inconsistent recommendations, or a lack of familiarity with guidelines. Lack of understanding of the necessity for testing and newborn care is a highly statistically significant link between GDM and women's issues such as lack of understanding of the need for tests and newborn care.

Regarding relation between the total of knowledge score of the studied women and their utilization of post-partum glucose tolerance screening test, revealeda highly

statistically significant relation (p-value 0.001). As a result of their increased awareness of PPGTT and its importance, they will become more engaged and increase utilization of the test. These findings are backed up by **Hoedjes et al. (2020)** who studied women at increased metabolic risk to assess motivators and barriers to a healthy postpartum lifestyle discovered a robust link between maternal knowledge and postpartum glucose screening commitment.

Concerning the correlation between total knowledge of studied sample and total score of barriers affecting their utilization of PPGS, showed that, there were highly statistically significant moderate positive correlation between total score of knowledge regarding gestational diabetes during pregnancy, postpartum glucose screening of the studied women's and their total score of barriers affecting women's utilization of post-partum glucose screening (p -value<0.001). This prove that knowledge impacting and binding to barriers affecting utilization ofPPGS

These results correspond to, **Van et al. 2015** who examinedwomen's views and knowledge regarding healthcare seeking for gestational diabetes in the postpartum period, andfound that inadequate knowledge of type 2 diabetes (T2DM) risk, differences between postpartum screening knowledge and practice, and differing opinions of the utility of postpartum screening all have a positive link with postpartum blood glucose screening adherence. As a result, the number of women who undergo postpartum blood glucose testing has decreased.

According to the findings, around two-thirds of the studied women exhibited an incorrect knowledge of postpartum glucose screening test and the health team barrier is the primary barrier affecting their utilization of PPGTT. The lack of dedication to PPGTT screening reflects this. This emphasizes the necessity of teaching pregnant women with gestational diabetes in prenatal and postnatal clinics to raise their understanding and utilization to PPGTT.

Limitation of the study

As a result of the Covid-19 pandemic, women are less likely to seek follow-up care and health restriction precautions of health care service setting which lead to decrease flow rate of cases.

In addition, 20 women were dropped from the study because they could not be reached after being discharged from the hospital to track their postpartum glucose screening results.

Conclusion:

Moreover half of the studied womenhad incorrect overall knowledge of PPGTT. The majority of the studied women did not utilize the PPGTT. The "health team factor" was recognized by more than three-quarters of the study participants as the most significant barrier affecting utilization of the screening test. The study question is supported by the current findings.

Recommendations

In the light of the findings of the study, the following recommendations were suggested:

- Nurses need a postpartum glucose tolerance screening continuing education program to upgrade, update, and improve their skills.

- Encourage all maternal health services to inform high-risk pregnant women with GDM about the necessity of postpartum glucose tolerance testingthrough counseling session

- For generalizable results, replication with bigger statistical samples from diverse Egyptian regions and long-term follow-up are recommended.

- More research is needed to see how educational technology affects postpartum glucose tolerance screening tests in women with GDM.

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