Original Article

Beyond pregnancy, awareness of future risk of developing diabetes in women with gestational diabetes mellitus

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ABSTRACT

Objective: Gestational Diabetes Mellitus (GDM) is a worldwide phenomenon and a public health problem. Women with a previous history of GDM are at increased risk for future episodes of GDM, pre-diabetes, and type 2 diabetes. GDM is a potential threat to maternal and child health in Pakistan.
The objective of this study was to assess Knowledge related to GDM and the risk perception for type 2 diabetes in women with gestational diabetes presenting at a tertiary care hospital in Karachi.
Methodology: A cross-sectional study was conducted at the National Institute of Diabetes & Endocrinology, Dow University of Health & Sciences using a self-administered validated questionnaire. The responses were scored, and participants were divided into poor & fair/good knowledge.
Results: A total 101 adult females with a current diagnosis or a previous history of GDM participated in the study. The mean age of the population fell in the range of 35-39. The mean number of children the participants had was 2 (30.69%). Five (4.9%) women were well versed with the knowledge of diabetes before this/last pregnancy. Thirty (29.7%) women had GDM in their previous pregnancy. Regarding the overall GDM knowledge assessment, 56 women had poor knowledge and 44 women had fair/good knowledge.
Conclusion: Our study concludes that there is a low knowledge and awareness among the participants regarding GDM. Further research should be done on this topic.

KEYWORDS: Gestational Diabetes Mellitus, Type 2 diabetes (T2D), Pregnancy, Women, Awareness.

INTRODUCTION

Diabetes is the most common endocrine pathology.[1] Diabetes mellitus is a diverse assemblage of chronic metabolic illnesses which are characterized by hyperglycemia. Its basic cause is a relative or absolute deficiency of insulin or there may be a defect in insulin action, which results in profound changes in the intermediary metabolism of carbohydrates, lipids, and proteins.[2] Diabetes of all types is associated with significant acute, chronic complications and co-morbidities which increase morbidity and mortality. The global prevalence of diabetes and impaired glucose tolerance in adults has been increasing over recent decades.[3] According to World Health Organization[4] globally an estimated 422 million adults were living with diabetes in 2014, compared to 108 million in

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1980. The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population.[5] The percentage of deaths attributable to high blood glucose or diabetes that occurs before age 70 is higher in low- and middle-income countries than in high-income countries.[6]

Gestational Diabetes Mellitus (GDM) is a worldwide phenomenon that can be defined as glucose intolerance that develops or is first recognized during pregnancy.[7] About 95% of patients return to normal glucose status with delivery,[8] but women with a previous history of GDM are at increased risk for future episodes of GDM, pre-diabetes (impaired glucose tolerance and impaired fasting glucose), and type 2 diabetes.[9] Progression to T2D later in life occurs in 5% to 50% of women within the following 10 years. Females with GDM have increased adverse maternal and neonatal outcomes such as preeclampsia, cesarean section, macrosomia, and neonatal hypoglycemia.[10] In addition, for women who become pregnant again, their future offspring also may be adversely affected if women enter a subsequent pregnancy with undiagnosed T2DM or experience recurrent GDM. The prevalence of GDM in a population is a reflection of the prevalence of T2D in that population. GDM is a potential threat to maternal and child health in Pakistan. Studies show a high frequency of GDM (11.8%) in Pakistan.[11]

In the past decade, the prevalence of gestational diabetes mellitus (GDM) has been increasing worldwide.[12] In 2015 alone, it was estimated that 20.9 million women had hyperglycemia in pregnancy, 85.1% of which were due to GDM.[13] The complications arising due to GDM affect both the mother and the baby. Women with a history of GDM have a significantly increased risk of developing T2D in later life.[14] Health literacy is becoming a growing and relevant factor that has been shown to decrease the risk of adverse outcomes in non-pregnant diabetic patients. Improving health literacy helps the individual to comprehend and adopt a healthy lifestyle.[15] However, it is an issue to manage GDM that requires women to acknowledge their diagnosis. Consequently, the construction of a health literacy system is required to comprehend the value of antenatal (and postpartum) screening and supervision of the condition during and after the pregnancy.[16]

The objective of the study was to assess Knowledge of GDM and the risk perception for type 2 diabetes in women with gestational diabetes in women presenting at a tertiary care hospital of Karachi.

METHODS

This Cross-sectional study was conducted at the National Institute of Diabetes & Endocrinology (NIDE), Dow University of Health (DUHS). Inclusion criteria were diabetic women who had a history of GDM pregnancy and women currently having GDM. Whereaswomen without a history of GDM and women who were unable to give informed consent were excluded. Non-randomized, Purposive Sampling was used to collect data from the participants. We calculated a sample size of 101 using OpenEpi sample size calculator with 90% hypothesized frequency of knowledge of GDM in the selected population with 5% margin of error and 95% confidence interval and 1% design effect. Initial questions of the data collection sheet elicit demographic information from the participants. Questions 9 to 12 elicit knowledge regarding what diabetes is and the implications of GDM. The 05 questions (Questions 9 to 13) of the questionnaire are marked as correct or incorrect. A correct answer receives a score of one. An incorrect answer or an "I don't know" answer receives a score of zero. Questions 13 to 15 ask about specific behaviors that are associated with living a healthy lifestyle and are associated with lowering the risk of developing diabetes mellitus. Questions 16 and 17 ask about signs symptoms and complications of diabetes mellitus. These questions (Questions 14 to 17) have more than one correct answer; however, the highest possible score for each question is one mark. Therefore, a guide for marking is developed which provides the criteria for gaining each mark. The highest possible score on the knowledge questionnaire is 09. Participants who scored 0-3 were considered to have poor knowledge, 4–6 were fair, and 7-9 were with good GDM knowledge. Participants were divided into two groups consisting of poor knowledge and fair/good knowledge. The data was entered into SPSS statistical version 19 and analyzed. Mean values and frequencies were calculated for all quantitative variables. The chi-square test was used to study the relationship between variables. A p-value ≤0.05 was considered statically significant.

RESULTS

A total of 110 women were approached, out of which 101participated in the survey. The mean age of the population fell in the range of 35-39 (26.73%). while the mean weight in range without pregnancy was 60-64 kg (22.77%). Many of the approached participants were new mothers (37.62%) while observing the pregnancy week majority of women were in their third trimester (14.8%).

Regarding the overall GDM knowledge assessment, 56 women had poor knowledge and 44 women had fair/good knowledge. It can also be seen that 5 women who had abortions were in the poor knowledge category. Twenty-two women from poor knowledge and fourteen women from fair/good knowledge had no children. No significant difference was found among the variables. Details are mentioned in Table-I.

Table-II explains the knowledge of participants regarding GDM which was administered by the researcher A significant association was found between groups and knowledge variables. The majority of the participants reported that diabetes is a disease that can be cured. Many participants were aware that you have an increased likelihood of developing diabetes in later life. Further details are mentioned in Table-II.

Table-I: Demographic Variables.

Variable Name	*Poor Knowledge*	*Fair/Good Knowledge*	*P-Value*
	N	*N*	
NUMBER OF PARTICIPANTS	56	44	
AGE			
15-19	0	0	
20-24	3	0	
25-29	15	8	
30-34	14	9	0.11
35-39	12	15	
40-44	6	4	
45-49	0	5	
50-54	2	1	
55-60	4	2	
NUMBER OF CHILDREN			
0	3	3	
1	13	7	
2	16	15	
3	13	12	
4	3	3	0.62
5	1	3	
6	1	0	
8	1	0	
Abortion	5	1	
Baby's Age			
0	22	14	
1-5	6	7	
6-10	0	6	
11-15	2	2	0.066
16-20	2	3	
26-30	0	2	
31-35	1	0	
Baby not born yet	16	8	

DISCUSSION

Our study assesses Knowledge of GDM and the risk perception for type 2 diabetes in women with gestational diabetes in Karachi and we observed that majority of women had poor knowledge about future implications of GDM.

A study conducted in Peshawar showed that the women in their study who were diagnosed with GDM had a mean age of 33 which is similar to our study where the majority (27,26.73%) of the women having GDM were in the age range of 35 to 39 while 23 (22.7%) had age between 30 to 34 (17). However, another study conducted in Pakistan reported that the mean age of the participants diagnosed with GDM was between 20-25.[11]

In our study 30 (29.7%) of the women had GDM in their previous pregnancy. Another study conducted in Pakistan reported that 6.8% of their participants had a previous history of GDM[11] Qualitative research conducted in the United Kingdom reported that 31% of their participants had a previous diagnosis of GDM.[18]

In Pakistan, the prevalence of GDM is reported to be 4.2% to 26%.[11] In our study, 110 women participated while 56 of them had poor knowledge and 49 had fair/good knowledge regarding GDM. However, a study conducted in Saudi Arabia reveals that out of 99 participants, 33 had poor knowledge while 66 had fair/

Table-II: Knowledge Variables.

Variable	*Poor*	*Fair/Good*	*P-Value*
Diabetes is a disease			
for which there is no treatment	10	3	
that can be cured	18	11	
that cannot be cured but can be controlled	10	30	<0.001
I don't know	18	0	
If you have had gestational diabetes			
you will always develop diabetes in later life	3	7	
you have an increased likelihood of developing diabetes in later life	2	30	
there is little likelihood of developing diabetes in later life	16	5	<0.001
I don't know	35	2	
If you have had gestational diabetes in one pregnancy, will it occur again in future pregnancies?			
it is unlikely to occur again in future pregnancies	19	2	
it is likely to occur again in future pregnancies	2	38	<0.001
I don't know	35	4	
Do you know, being overweight:			
increases the risk of developing diabetes in the future	28	41	
does not affect the risk of getting diabetes	8	1	<0.001
I don't know	20	2	
As part of a healthy lifestyle, it is recommended that you exercise			
occasionally	14	3	
5 times a week for 30 minutes/day or 150min/week	7	34	
vigorously at the gymnasium once a fortnight for 10 to 20 minutes only	1	3	<0.001
I don't know	34	4	
Which of the following types of exercise are recommended as part of a healthy lifestyle?			
Walking briskly	35	40	
Cycling	4	27	
swimming regularly	2	9	<0.001
bungee jumping	1	1	
I don't know	19	2	
A healthy diet includes foods that contain dietary fiber. Which of the following foods contain fiber?			
meat, fish, and chicken	4	4	
dairy products	2	3	
bread and cereal	3	19	<0.001
fruits and vegetables	20	24	
I don't know	27	7	
Which of the following are the signs and symptoms of diabetes?			
Weight Gain	12	29	
Excessive Thirst	5	32	
High Cholesterol	2	9	
High-Blood Pressure	6	11	
Tiredness	17	18	<0.001
Frequent vaginal infection	3	17	
Passing excessive amounts of urine	18	33	
I don't know	22	4	
Diabetes may cause health problems such as			
stroke	8	33	
blindness	2	22	
heart attack	12	35	<0.001
kidney disease	7	28	
I don't know	37	2	

good knowledge and the prevalence of GDM in the country is between 3.8% to 41%.[19] A study conducted in South India reported 56.7% fair knowledge among the participants regarding GDM while 17.5% had well and 25.8% had poor knowledge.[20] A multi-ethnic cohort study conducted in Australia reported that 54.8% of Caucasian women had an advanced level of knowledge regarding GDM. 50% of Indian, 33.3% of Vietnamese, and 23.1% of Filipino women had excellent knowledge.[21]

In our study, only 32 of the women out of 110 knew that GDM in one pregnancy can lead to diabetes in the future. This figure is quite low and similar findings were seen in the study conducted in South India where 63 women out of 120 were aware of GDM increasing risk for future diabetes.[17] A study conducted in Tamil Nadu reported that 50.8% of urban women who participated in the study and 24.4% of women from rural areas knew that GDM could lead to diabetes.[22] In our study, 41 women were aware of the fact that weight gain is a symptom of diabetes while in the South Indian study, 39 women were aware.[17,20]

Pregnancy is identified as an opportunity for the identification of the risk of disease and the prospect of implementing behavior change.[23] Nutritional knowledge plays a significant effect on one's dietary behaviors.[24] When the participants of our study were asked if they knew what food contains dietary fiber, 44 participants selected fruits and vegetables. A study conducted in Australia used web-based education as an intervention for the participants. Out of 116 women, 98%of them had good understanding regarding the intake of fruits and vegetables.[25] In the multi-ethnicity Australian study, the Indian women had a better understanding of what food constitutes while Vietnamese women had poor knowledge.[21] Forty one women in our study reported that doing exercise 5 times a week for 30 minutes/day or 150 minutes/ week is part of a healthy lifestyle. The interventional study reported that 92% of the women in their study selected exercise daily for 30 minutes as the correct answer. Ninty six percent of the women in their study answered correctly when they were asked about exercise recommended during pregnancy which is walking, swimming, and yoga.[25] While in our study 75 women chose walking and 11 women chose swimming. In a study conducted in Dhaka out of 368 participants, 162 reported that if a woman with diagnosed GDM is eating well and regularly exercising medication can be avoided to control the disease. Seventeen of the women in our study reported that hypertension is a sign of diabetes while in another study 139 women selected this option.[26]

Strengths and Limitations:

Our study provides insight into the knowledge and awareness of GDM and nutrition in women of Karachi. The limitation of this study is that the sample size was small and it was conducted in one center, so the results cannot be generalized to the whole population. There could be recall bias from the participants while filling out the questionnaire.

CONCLUSION

Our study concludes that there is a low knowledge and awareness among the participants regarding GDM and its future implications.

We recommend that Public health experts should emphasize the healthcare awareness programs for pregnant women especially those who are in their antenatal period. It is the responsibility of doctors; antenatal care providers or nurses to have a guaranteed discussion with the patient about GDM and its future risks.[16] Mass media campaigns regarding the importance of GDM diagnosis and its associated effects on the mother and the child can bring a positive change in the health behaviors of the women of Pakistan.[27]

Conflict of interest: The authors confirm that regarding this research, no conflict of interest exists.

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Author's Contribution:

HA selected the topic and did the initial research. The manuscript was written by HA. The data was collected by HA and FFA. The data was then provided to FK who transcribed and input the data and also provided the statistics. After the analysis, HA and FK wrote the discussion. AAB supervised the research study and also provided guidance where needed. HA and FK completed the manuscript and also prepared it for submission.