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Gestational Diabetes Mellitus Knowledge Assessment among Saudi Women

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Abstract

BACKGROUND: IDF estimates that 16.2% of women giving live births in 2015 had some form of hyperglycemia during pregnancy. In Saudi, a study estimated that the prevalence of gestational diabetes mellitus (GDM) is 39.4%.

AIM: We aimed to assess Saudi women's GDM knowledge and awareness.

METHODS: A cross-sectional study was conducted between August and December 2016 in Saudi Arabia using a validated questionnaire that included 12 questions focused on awareness and knowledge about GDM. Their responses were scored, and participants were divided poor knowledge (≤ 4/12) fair/good knowledge (≥ 5/12).

RESULTS: A total of 9002 adult female participated. Mean age was 27.8 ± 7.9, and they were mainly married urban residents with bachelor's degrees or higher. The mean overall score was 5.5 ± 2.5 with most of them in the fair GDM knowledge category. Participants were mostly aware of the GDM risk factors (54%) while they were least aware of the GDM diagnosis (15.9%). Multigravida and a prior history of GDM were the two risk factors about which participants were most aware (67.7%). Compared to those with poor knowledge, those with fair/good knowledge were more likely to live in urban areas, live in the central region of Saudi Arabia, work in medical fields, and be married, educated, and have personal and/or family histories of chronic diseases (all P values < 0.001).

CONCLUSION: Our study showed a high prevalence of poor awareness and knowledge, mainly in those areas relating to GDM diagnosis.

Introduction

According to the Saudi General Authority of Statistics, the total number of births in the Ministry of Health hospitals in 2014 was 267,455 with about 3335 stillbirths [1]. According to the Central Intelligence Agency, the birth rate in Saudi Arabia was 18.4 births/1,000 people [2].

Gestational diabetes (GDM) is defined by the American Diabetes Association as glucose intolerance that was not present before pregnancy. During pregnancy, the placenta secretes diabetogenic hormones, including placental lactogen and progesterone, which contribute to insulin resistance and subsequent hyperglycemia [3] [4].

There are several factors have shown to have a role in developing of GDM. The most common risk factors include previous personal and family history of GDM, history of the macrocosmic baby, unexplained stillbirths, and family history of type 2 diabetes (T2D). In-between pregnancy weight gain is considered one of the most common modifiable risk factor for GDM [5] [6] [7]. Advanced maternal age and cigarette smoking are also risk factors for GDM [8].

According to the American Diabetes Association (ADA) guideline, the time for GDM screening depends on the presence of risk factors. If the pregnant women had any risk factors, then the screening should be done in the first prenatal visits while if the pregnant women have no risk factors, then the screening should be done between 24–28 weeks of gestations. Oral Glucose Tolerance Test (OGTT) used for diagnosis of GDM [13].

In 2015, the IDF estimated that 16.2% of women giving live births had some form of hyperglycemia in pregnancy with an estimated 85.1% due to GDM, 7.4% due to other forms of newly diagnosed diabetes, and 7.5 % due to the history of diabetes detected before pregnancy [9]. In 2002, a prospective study of 808 pregnant women in Saudi Arabia estimated the prevalence of GDM to be 12.5% [10]. Another prospective study involving pregnant women was conducted from 2011 to 2014 using the oral glucose tolerance test (OGTT), which showed that 39.4% of them had GDM [11]. A cross-sectional study of 13,627 pregnant women, who were subject to fasting plasma glucose, showed that the prevalence of GDM was 36.6% [12]. GDM caused an increase in maternal and fetal complications that include preeclampsia, Caesarean section, neonatal hypoglycemia, respiratory distress, and perinatal mortality [14] [15].

Most women with GDM will not need to continue on insulin after delivery, but it is very important to repeat the OGTT after delivery. Regular screening for diabetes after delivery is very important as these women at risk to have earlier GDM in next pregnancies and about 50% of them will develop type 2 diabetes in the next 5-10 years [16] [17]. Both the ADA and the American College of Obstetricians and Gynecologists recommend that women with GDM should be screened at 6-12 weeks postpartum for persistent high glucose level [18] [19] [20]. Regarding post-delivery management, breastfeeding, doing exercise for 150 minutes per week at a moderate intensity and dietary changes have shown to decrease the incidence of type 2 diabetes and promote postpartum weight loss [21].

Knowledge and awareness about this chronic disease will translate to an increase in self-care as a result of early diagnosis and treatment, which ultimately will contribute to complication reduction. GDM knowledge allows patients and those at risk to undertake early interference and thus prevent many complications by making simple lifestyle changes that include an increase in physical activity and diet control [22].

Despite the high prevalence of GDM in our society, there are lacks of studies that estimate the awareness level. Our primary study goal was to assess the awareness and knowledge of Saudi women about GDM and its possible related maternal and neonatal complications.

Methods

We conducted a cross-sectional study from August to December 2016 in different Saudi regions to assess the awareness and knowledge of women about GDM and its possible complications. Any Saudi females above the age of 18 years were invited to participate in the study through an online invitation. We excluded male and non-Saudi participants and incomplete responses. The study proposal was submitted to Taif University School of Medicine Ethical Committee and was approved. All completed online questioners were collected in an Excel spreadsheet and exported to the Statistical Package for the Social Sciences (SPSS) file.

The questionnaire included 13 questions about the baseline characteristics that included sociodemographic data, educational level, personal experience in or living with someone who works in the medical field, living with someone who has diabetes, history of pregnancy or GDM, and history of any chronic illnesses. Weight and height were self-reported by the participants, and body mass index (BMI) was calculated.

To assess GDM knowledge and awareness, we used a validated questionnaire that included 12 questions focusing on general awareness and knowledge about DM and GDM risk factors, diagnosis, treatment, and consequences/ complications [23]. The answer options provided were yes, no, and don't know. Each correct response was given a score of 1, and each woman was scored out of a total of 12. A score of 0–4 was considered poor knowledge, 5–8 was fair, and 9–12 was good GDM knowledge. Participants were divided into two groups consisting of poor knowledge and fair/good knowledge.

Data were analysed using the SPSS software version 20. Frequencies and percentages were used for each variable. The chi-square test was used to study the relationship between variables, and the T-test was used for comparison between means. A p-value ≤ 0.05 was considered statically significant.

Result

A total of 9002 adult females participated in the study and were included in the final analysis. Participants' mean age was 27.8 ± 7.9, and they were mainly urban residential, married, had bachelor's degrees or higher, and the mean BMI was in the overweight range (Table 1). Eighty per cent of the participants were from the central or western region of Saudi Arabia. Less than one-third of the participants were either working or living with someone who worked in the medical field, but the majority was unemployed. Half of the participants reported living with diabetic patients. Almost 90% of the participants had no personal history of any chronic illness, but in those with chronic illnesses, hyperlipidemia was most observed, and thyroid disorders were the least

common. Around two-thirds knew a female with a history of GDM, but only 8.1% had a personal history of GDM.

Table 1: Baseline characteristics of the whole cohort

Baseline characteristics (N=9002)	
Mean age (yrs)	27.8 ± 7.9
Urban residence (%)	89.7
Single (%)	50.6
Married (%)	45.7
High school or less (%)	17.1
Bachelor degree (%)	76.3
Mean weight (Kg)	63.5 ± 14.2
Mean BMI (Kg/m^2)	25.1 ± 5.4
Central region of Saudi (%)	40.6
Eastern region of Saudi (%)	9.6
The western region of Saudi (%)	39.3
North region of Saudi (%)	4.9
South region of Saudi (%)	5.6
Work in the medical field (%)	21.7
Living with someone who works in the medical field (%)	32.9
Unemployed (%)	67.6
Chronic illness history	
Living with someone who has diabetes (%)	50.7
No previous personal history of any chronic illness (%)	89.6
Personal history of diabetes (%)	3.0
Personal history hypertension (%)	3.0
Personal history hyperlipidemia (%)	3.6
Personal history of thyroid disease (%)	0.9
Pregnancy-related history	
Mean numbers of previous pregnancy	1.4 ± 2.2
Previous history of GDM (%)	8.1
Know someone who had GDM (%)	67.0
Knowledge about GDM risk factors	
Increase the number of pregnancies increases the risk of developing GDM (%)	72.6
Prior personal history of GDM increases the risk of future GDM (%)	62.9
Weight gain preconception increases the risk of developing GDM (%)	24.7
The family history of GDM increases the risk of future GDM (%)	54
Excessive weight gain in pregnancy increase the risk of future GDM (%)	57.1
Knowledge about GDM diagnosis	
OGTT is the gold stander test to screen for GDM (%)	9.7
The optimal time to do OGTT is 24-28 weeks (%)	22.2
Knowledge about GDM treatment	
Lifestyle and diet modifications are part of the GDM management plan (%)	65.4
Insulin is one of the appropriate GDM management plan (%)	23.7
Knowledge about GDM consequences/complications	
GDM usually disappears after delivery (%)	59.7
Untreated GDM increases the risk of neonatal complications (%)	47.6
GDM increases the risk of future type 2 diabetes (%)	47.3
GDM knowledge	
Mean of the total score out of 12 points	5.5 ± 2.5
Poor diabetes knowledge (%)	33.8
Fair diabetes knowledge (%)	54.8
Good diabetes knowledge (%)	11.4

Regarding overall GDM knowledge assessment, the mean overall score was 5.5 ± 2.5 with most of them in the fair GDM knowledge category. Participants were mostly aware of the GDM risk factor component while they were least aware of the GDM diagnosis-related component. Increased numbers of pregnancy and the prior history of GDM were the two risk factors about which those participants were most aware.

When compared to females with poor knowledge, those with fair/good GDM knowledge were more likely to be older (P < 0.001), urban residents (P < 0.001), married (P < 0.001), have a bachelor's degree and be employed (P < 0.001), have higher BMI (P < 0.001), live in the central region of Saudi Arabia (P < 0.001), work or live with someone who works in the medical field (P < 0.001), live with diabetics (P < 0.001), report chronic illnesses (P<0.001), have higher number of pregnancies (P<0.001), report history of personal GDM (P < 0.001), and know a female(s) with GDM history (P < 0.001) (Table 2).

Table 2: Groups based on the overall GDM knowledge score

Variables	Poor knowledge	Fair/Good knowledge	P value
Number of participants (%)	33.8	66.2	n/a
Mean of the total score out of 12 points	2.7 ± 1.3	6.9 ± 1.6	<0.001
Mean age (yrs)	27.0 ± 7.6	28.2 ± 8.1	<0.001
Urban residence (%)	87.5	90.8	<0.001
Single (%)	54.3	48.7	
Married (%)	42.3	47.4	<0.001
High school or less (%)	20.4	15.4	
Bachelor degree (%)	74.2	77.4	<0.001
Mean weight (Kg)	62.1 ± 14.1	64.3 ± 14.2	<0.001
Mean BMI (Kg/m^2)	24.5 ± 5.4	25.4 ± 5.3	<0.001
Central region of Saudi (%)	35.3	43.3	
Eastern region of Saudi (%)	9.2	9.8	
Western region of Saudi (%)	43.9	36.9	<0.001
North region of Saudi (%)	4.4	5.1	
South region of Saudi (%)	7.2	4.9	
Work in the medical field (%)	19.3	22.8	<0.001
Living with someone who works in the medical field (%)	29.2	34.7	<0.001
Unemployed (%)	75.7	63.5	<0.001
Chronic illness history			
Living with someone who has diabetes (%)	47.6	52.3	<0.001
No previous personal history of any chronic illness (%)	91.9	88.4	<0.001
Personal history of diabetes (%)	1.8	3.6	<0.001
Personal history hypertension (%)	2.4	3.3	0.015
Personal history hyperlipidemia (%)	2.5	4.1	<0.001
Personal history thyroid disease (%)	0.6	1.1	0.009
Pregnancy-related history			
Mean numbers of previous pregnancy	1.4 ± 2.1	1.5 ± 2.2	0.018
Previous history of GDM (%)	4.1	10.2	<0.001
Know someone who had GDM (%)	56.5	72.4	<0.001
Knowledge about GDM risk factors			
Increase the number of pregnancies increases the risk of developing GDM (%)	42.1	88.2	<0.001
Prior personal history of GDM increase the risk of future GDM (%)	31.2	79.0	<0.001
Weight gain preconception increases the risk of developing GDM (%)	5.3	34.5	<0.001
The family history of GDM increases the risk of future GDM (%)	23.2	69.7	<0.001
Excessive weight gain in pregnancy increase the risk of future GDM (%)	26.4	72.8	<0.001
Knowledge about GDM diagnosis			
OGTT is the gold stander test to screen for GDM (%)	2.8	13.2	<0.001
Optimal time to do OGTT is 24-28 weeks (%)	9.6	28.7	<0.001
Knowledge about GDM treatment			
Lifestyle and diet modifications is part of the GDM management plan (%)	37.6	79.6	<0.001
Insulin is one of the appropriate GDM management plan (%)	8.0	31.7	<0.001
Knowledge about GDM consequences/complications			
GDM usually disappears after delivery (%)	41.9	68.8	<0.001
Untreated GDM increase the risk of neonatal complications (%)	19.7	61.8	<0.001
GDM increase the risk of future type 2 diabetes (%)	18.0	62.2	<0.001

Regarding the overall GDM knowledge assessment and when compared to females with poor knowledge, those with fair/good GDM knowledge were more likely to be aware about all assessed GDM-related risk factors (P < 0.001), all assessed GDM-related diagnostic strategies (P < 0.001), all assessed GDM-related treatment plans (P < 0.001), and all assessed GDM-related consequences/ complications (P < 0.001).

Partial correlations were made adjusting for region, age, BMI, marital status, education, and knowing someone or working in the medical field between GDM knowledge score and personal history of diabetes (r - 0.046, P < 0.001), between GDM knowledge score and number of pregnancies (r-0.024, P < 0.025), and between GDM knowledge score and previous personal history of GDM (r= -0.139, P < 0.001).

Discussion

One of the major study findings is the lack of GDM-related knowledge and awareness among the participating women despite the high prevalence of pregnancy and GDM in Saudi Arabia. When compared with the prevalence of GDM in India, which is about 39.4% varying between 3.8% and 41%, the mean overall score for GDM knowledge in Saudi Arabia was 5.5 ± 2.5 with most of them in the fair GDM knowledge category; in India, the median knowledge score was 7, and the level of awareness and knowledge about GDM was mostly fair [23] [24]. Even though most of our study participants had bachelor's degrees or higher while most of the Indian study participants had secondary education, our participant's knowledge and awareness was still not optimal, which may be related to the lack of any direct GDM-related educational programs and campaigns . The overall score was low for our participants, but questions about risk factors revealed that most of them have good knowledge and were aware of GDM, especially those with histories of prior pregnancies and those with a personal history of GDM; this finding was different when compared with the study done in India [24]. This finding was likely related to the high number of pregnancies in Saudi Arabia when compared with India.

Most of our participants were unaware of the optimal test to screen for GDM (OGTT) or the recommended time to do the OGTT. They were also unaware about the lifestyle and diet modifications as the first line treatment for GDM despite documented maternal and fetal harm of uncontrolled GDM [25]. This may explain the high observed prevalence of undiagnosed GDM nationally, which was estimated to be around 50% along with the high prevalence of uncontrolled GDM-related complications [26].

Few studies have evaluated the impact of health campaigns on the population's disease-specific awareness. An English study that measured the impact of public awareness campaigns for cancer symptoms concluded that public behaviours were influenced by those campaigns. They also observed an increase in early-stage cancer diagnoses along with a decrease in the late stage cancer diagnoses [27]. Another study done in the United States that measured the influence of health promotion on the diagnosis and management of diabetes concluded that chronic disease detection and management could be improved by health campaigns [28]. For that purpose, we have recommended a national plan for educational programs and health campaigns to promote and improve GDM knowledge and awareness among Saudi women.

Our study strengths include the large sample size, diversity, and national distribution of participants. Our limitations include the electronically distributed questionnaire.

In conclusion among the participating Saudi women, our study showed a high prevalence of poor awareness and knowledge, mainly in those areas relating to GDM diagnosis.

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