

Knowledge of Saudi Pregnant Women Regarding Gestational Diabetes Mellitus and its Complications in Riyadh City, Saudi Arabia

Abdulaziz Alkaabba (1)

Salem Eid Alosaimi (2)

Mohammed Dhafer Algarni (2)

Mohammed Hussein Alzahrani (2)

(1) Professor of Family Medicine and Bioethics, Imam Mohammad Ibn Saud Islamic University (IMISU), College of Medicine, Family Medicine, Consultant in Northern Area Armed Forces Hospital (NAAFH) .

(2) Medical students Imam Mohammad Ibn Saud Islamic University (IMISU), College of Medicine

Corresponding author:

Abdulaziz Alkaabba

Professor of Family Medicine and Bioethics,

Imam Mohammad Ibn Saud Islamic University (IMISU),

College of Medicine, Family Medicine,

Consultant in Northern Area Armed Forces Hospital (NAAFH)

Email: afkaabba@gmail.com

Received: May 2022 Accepted: June 2022; Published: July 1, 2022.

Citation: Abdulaziz Alkaabba et al, Knowledge of Saudi Pregnant Women Regarding Gestational Diabetes Mellitus and its Complications in Riyadh City, Saudi Arabia. World Family Medicine. 2022; 20(7): 6-13. DOI: 10.5742/MEWFM.2022.9525090

Abstract

Background: Gestational Diabetes Mellitus (GDM) is recognized as one of the most common preventable diseases related to perinatal and maternal deaths. Despite the high prevalence of the condition worldwide, research cites limited knowledge about the affected population of pregnant women in Saudi Arabia. The main aim of this study was to assess pregnant women's knowledge of GDM and its implications for the mother and fetus. **Methods and Materials:** The study utilized an interview-based questionnaire-based cross-sectional study design that targeted pregnant women coming for antenatal care visits in public health care centers in Riyadh city.

Results: One hundred and forty-three pregnant women participated. 35.5% of the population had adequate knowledge of GDM and its implications, 34.7% did not have enough understanding of the condition, and a further 29.8% were not aware of the complication. Knowledge about GDM was found to be statistically significant only with the number of pregnancies ($p=0.03$).

Conclusion: Saudi pregnant women seem to have an inadequate knowledge scope of GDM and its implications to their health and those of their children. Specialized medical institutions and public health initiatives need to implement interventions to raise the awareness of the condition to help in earlier diagnosis and better management of the condition.

Key words: Saudi pregnant women, knowledge, Gestational diabetes mellitus, Riyadh, Saudi Arabia

Introduction

The rapidly increasing incidence of Diabetes Mellitus and its growing prevalence across all subgroups have implicated an increasing concern over gestational diabetes mellitus (GDM) as one of the most common medical complications of pregnancy (1). The condition, which is characterized by glucose intolerance which begins or is first diagnosed during pregnancy, records as one of the major preventable diseases related to perinatal and maternal deaths (1,2, 14, 15). Although the condition covers a diverse impact scope in reference to the different social and anatomic characteristics of communities, previous studies ascertain a prevalence range of between 3%-14% across all pregnancies. Besides, the prevalence of GDM is heavily dependent on the incidence of type-2 diabetes in a population (9).

Gestational Diabetes Mellitus (GDM) is often linked to several adverse effects in relation to the compromised immune system. These include infant macrosomia, neonatal hypoglycaemia, caesarean delivery and in worst-case death to both the infant and mother (11). Women with GDM are also at a higher risk for developing diabetes mellitus in a later part of their life (2, 9). Children born to mothers with GDM also hold a higher risk of developing impaired glucose tolerance later. The condition's severity and the probability of incidence relate to some risk factors including higher parity, a genetic history of diabetes, advanced maternal age and body mass index (7). Despite the adversity of GDM, an earlier diagnosis has been proven to reduce risks to both expectant mothers and their children.

The GDM epidemic, as part of the diabetic problem, covers a global scope. A study by Zhu and Zhang (15) identified the variation in prevalence by identifying the Middle East and North Africa as the most prone region with an estimated range of 8.4%-24.5%. Southeast Asia and the Western Pacific follow each with a median prevalence of 11.7%. South and Central America, Africa and North America and the Caribbean median prevalence rates are 11.2, 8.9 and 7.0, respectively, whereas Europe recorded the lowest prevalence range rate of 1.8%-22.3%. While Lawrence, Wall and Bloomfield (8) recorded the diverse incidences, their study introduced a new notion where a third of GDM diagnosed women in New Zealand had no prior evidence of their condition.

Due to their transitional relationship, GDM and Type-2 Diabetes share several pathophysiological identities with glucose intolerance being the most dominant (2, 9). While Diabetes Mellitus mainly occurs as a deficiency against the normal insulin range, GDM has been previously linked to the increased requirement for insulin due to increased placental growth hormone, increased production of progesterone, cortisol, prolactin, oestrogen and tumour necrosis factor (2). Previous biological studies also assert an induced insulin resistance due to the increased production of these hormones.

Over the previous decade, the high prevalence of GDM has triggered medical research interest on its screening and diagnosis. Arora D et al. (3) contributed to this literature by identifying the primary risk factors of the condition. Alia et al., (2) identified ethnicity, a previous condition of polycystic ovary syndrome (PCOS), Pre-diabetes or any genetic condition relating to type-2 diabetes, prior perinatal mortalities and advanced maternal age (>25) as the most substantial screening benchmarks. Research cites insulin resistance as a risk factor for obesity that later advances to hyperglycaemia of pregnant mothers, or increased weight of the fetus. Joham et al., on the other hand, asserted a significant correlation between Polycystic Ovary Syndrome (PCOS) and GDM, characterized by an 11.2% prevalence in PCOS women as opposed to the 3.8% prevalence in normal pregnant women (2). Ross n. et al., (10) also asserted a strong relationship between PCOS and obesity in pregnant women. Obesity, by the affirmation mentioned above, positively contributes to increased GDM incidence.

Since GDM follows a similar pathophysiological framework to type-2 diabetes, prevention holds an imperative role in its management (2, 9). Among these preventive interventions, a healthy lifestyle is associated with a reduced risk of GDM. Statistics reveal a 60% reduced risk of GDM on pregnant women practising a healthy lifestyle (6). However, there have been controversies related to this intervention, including the LIMIT study that only highlighted benefits to Body Mass Index but not the incidence of GDM (2). Although other studies still confirm the benefit of healthy diets and lifestyles, some differ as to the relevance of impact (10). For instance, an RCT Finnish study, called RADIAL found a 39% reduced risk of GDM by healthy lifestyle interventions (2).

Despite the high prevalence of GDM, there is still a significant deficiency in the knowledge held by pregnant women regarding the condition and its implications. Literature has failed in availing significant research on the awareness level of GDM among pregnant women. However, some studies, including a Bangladesh case research by Monir et al., (6) and an Indian study by Shriram, asserted poor GDM knowledge in both healthy and GDM-diagnosed pregnant women. Since GDM is officially recognized as a chronic pregnancy condition, increased knowledge should implicate higher self-care practices in reducing prevalence. Increased knowledge should also result in early diagnosis and treatment that will further reduce the adversity of the complications. Several studies also affirm the role of relevant educational information in instilling positive attitudes towards the adoption of a healthy lifestyle, hence increasing the awareness of GDM in pregnant women (1, 12, 13). This study aims to assess pregnant women's knowledge of gestational diabetes mellitus and its complications. The study hypothesizes that there exists a poor knowledge scope of GDM and its implications across pregnant women and their children. An accurate assertion will help medical regulatory boards and pregnant women reduce the incidence of GDM and the severity of the condition.

Material and Methods

The study used a descriptive cross-sectional research design using a validated questionnaire. The online questionnaire was translated to Arabic and distributed to pregnant women regardless their GDM incidence. The only inclusion criteria were pregnancy and personal consent to work within the study, from the chosen women. Convenience sampling, as part of the nonprobability approach, was adopted to ensure the sample characteristics reflected the assertion of the pregnant women population. One hundred and forty-three pregnant women were included.

The online questionnaire was divided into four main sections. The first section focused on the demographics of participants, with a major emphasis on the common risk factors of GDM, followed by questions about other medical factors including the number of pregnancies, parity and gestational age. The second part of the questionnaire assessed the general knowledge of pregnant women about gestational diabetes mellitus. Finally, the third and fourth sections had questions on the effects of GDM on mothers and the effects of GDM on neonatal outcomes. All participants were included solely after being informed that their participation was voluntary and signing an informed consent form.

Variables

The dependent variable in the study was knowledge about GDM and its implication to mother and neonatal outcomes. Demographics, participants' medical conditions and the gestation period encompassed the independent variables.

Data Analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS), version 21.0 software. Descriptive analysis of the data was available by frequencies, percentages, means and standard deviations. Chi-square was used to analyse statistical significance. P-value of .05 or less was considered as statistically significant.

Results

Table 1 summarizes the demographic features of the participants. Most participants were below the age of 25 (56 – 143 ± SD) at about 40.6%, followed by 25-35 age group (56; 39.2%).

As for the history of previous pregnancies, 55 (38.5%) participants had multiple pregnancies, while 88 (61.5%) had a previous single pregnancy.

Sixty participants were of a gestational period of more than 37 weeks, while 27 participants had a gestational period of more than 40 weeks. The remaining participants (39.2%) with a gestational period of between 37-40 weeks accounted for.

In terms of parity, 33 participants (23.15%) were multipara, while 38.5% were nulliparous while the rest (38.5%). Out of the 143 responses, 54 reported that they know about diabetes mellitus, compared to 54 reported not knowing of the disease.

Overall, 35.5% had knowledge on GDM and Diabetes in general. By contrast, 34.7% recorded not having adequate information about GDM. The rest, 29.8% represented were without any prior knowledge of GDM.

About the knowledge about the effect of GDM, 36.5% reported having adequate knowledge about the effect of GDM on mothers. Further, 36.2% reported limited information regarding the effects of GDM on mothers, compared to 27.3% who did not know of the effects of GDM to mothers.

As for the knowledge of the pregnant women about the effects of GDM on neonatal care, 37.3% reported a clear knowledge scope of the effects of the GDM to neonatal care and the implication to children, compared to 35.9% did not have enough information regarding this clause. 26.8% did not know of their knowledge towards the effects of GDM on neonatal care. The analysis also revealed the highest frequency by the general knowledge of GDM. In the table, participants were more knowledgeable of the 137 index on general knowledge of GDM. The same categorical variable also provided the highest frequency of negative responses.

Table 1. Demographic characteristics of the participants (N=141)

	Variable	Frequency	Percent
Age in years)	25-35	56	39.2
	<25	58	40.6
	>35	29	20.3
Number of pregnancies	Multiple	55	38.5
	Single	88	61.5
Gestational age (in weeks)	37-40	56	39.2
	<37	60	42.0
	>40	27	18.9
Parity	Multipara	33	23.1
	Nulliparous	55	38.5
	Para 1	55	38.5

Table 2. Knowledge about gestational diabetes mellitus (GDM)

Questionnaire question	Knowledge	Freq.	%
Have you heard about diabetes mellitus?	Don't Know	34	23.8
	No	47	32.9
	Yes	62	43.4
Can diabetes occur for the first time in pregnancy?	Don't Know	35	24.5
	No	54	37.8
	Yes	54	37.8
Is family history of diabetes a risk factor for diabetes in pregnancy?	Don't Know	30	21.0
	No	50	35.0
	Yes	63	44.1
	Don't Know	26	18.2
Is pre-pregnancy obesity a risk factor for diabetes in pregnancy?	No	59	41.3
	Yes	58	40.6
Is diabetes in previous pregnancy a risk factor for diabetes in pregnancy?	Don't Know	29	20.3
	No	55	38.5
	Yes	59	41.3
Is rapid weight gain in pregnancy a risk factor for diabetes in pregnancy?	Don't Know	44	30.8
	No	56	39.2
	Yes	43	30.1
Effects of GDM on mothers			
Do you think GDM increases the risk of NVD?	Don't Know	29	20.3
	No	51	35.7
	Yes	63	44.1
Do you think GDM increases the risk of instrument delivery?	Don't Know	36	25.2
	No	56	39.2
	Yes	51	35.7
Do you think GDM increases the risk of emergency CS?	Don't Know	29	20.3
	No	59	41.3
	Yes	55	38.5
Do you think GDM increases the risk of preterm delivery?	Don't Know	25	17.5
	No	67	46.9
	Yes	51	35.7
Do you think GDM increases the risk of PPH?	Don't Know	31	21.7
	No	47	32.9
	Yes	65	45.5

(continued next page)

Effects of GDM on neonatal outcomes			
Do you think GDM increases the risk of high birth weight?	Don't Know	30	21.0
	No	54	37.8
	Yes	59	41.3
Do you think GDM increases the risk of hypoglycemia at birth?	Don't Know	20	14.0
	No	61	42.7
	Yes	62	43.4
Do you think GDM increases the risk of shoulder dystocia?	Don't Know	32	22.4
	No	53	37.1
	Yes	58	40.6
Do you think GDM increases the risk of breech delivery?	Don't Know	26	18.2
	No	55	38.5
	Yes	62	43.4
Do you think GDM increases the risk of congenital neonatal anomalies?	Don't Know	32	22.4
	No	54	37.8
	Yes	57	39.9

Discussion

GDM is portrayed as one of the most common preventable diseases related to maternal and perinatal mortalities. The adversity of its complications depends on some risk factors, with the most medical-related, like obesity, posing more risk. The pregnancy-related condition also holds a high prevalence rate with the most relevant incidence being within developing countries and states with an unhealthy and sedentary lifestyle. Despite this high incidence and the evident adversity of the complication, there exists a low knowledge among the most prone population of pregnant women. This study was aimed at assessing the scope to which pregnant women understood or had knowledge regarding GDM and its implications to both mothers and their infants during neonatal care.

One of the major findings of the study was a higher knowledge of diabetes mellitus and its complications to mothers. Pregnant mothers were also identified as having a high knowledge regarding the effects of GDM on their children. However, the statistics were not optimal for such a population of pregnant women. The implication, given the assumption of those without a clear understanding as part of those without knowledge, is that more than 64% of the sample population had inadequate knowledge on GDM and its effects to their health and those of their children. From these statistics, an estimated 35% had fair knowledge about the condition but with a lack of adequacy

to qualify as knowledgeable. The rest, 29%, is an estimate of those with poor knowledge about the condition. In general, the sample did not show significant evidence to assert an adequate prevalence of GDM knowledge across pregnant women.

When participants' awareness of GDM and its effects on both their health and those of their children was assessed, the results suggested that 42 participants, relating to 29% of the population were not aware of the condition. The high prevalence of positive answers (40.643.4%) towards knowledge of GDM was from the final third that assessed the effects of GDM on the infant. Otherwise, most participants did not confirm having enough knowledge of the condition. The study also found that none of the demographics highlighted a relationship with the knowledge of GDM across pregnant women.

The present study was in accordance with most studies of the same research aim. For example, a study by Alharthi et al. (1) found 39% prevalence rate of GDM knowledge in India as opposed to the 41% prevalence rate in Saudi Arabia. The present study results, on the other hand, asserted a slight difference of 2% resulting in 37% as the prevalence rate of GDM knowledge across pregnant women (1). The same study asserted that most participants were aware of GDM and its risk factors but did not possess adequate knowledge of the scope of its impact.

There are also previous studies that assessed the knowledge of GDM across pregnant women. Salhi et al., (13) for instance, assessed the knowledge of pregnant women regarding the effects of GDM by including educational interventions as a controlling factor. Although poor knowledge of GDM was prevalent across pregnant women, educational interventions were asserted as having a positive influence on the prevalent knowledge scope (12). The study also asserted that education level also played an influential role in the knowledge held by pregnant women about GDM. The present study did not assert any of the demographics, except the number of previous pregnancies ($p=0.003$), as having an influential role to the knowledge of pregnant women about GDM. Gestational period and parity each had a p -value of 0.033, which by the 0.05 alpha level does not show enough evidence to assert a relationship. On the contrary, the referenced study by Salhi et al. (13) found a number of risk factors relevant to the knowledge of GDM across pregnant women. These include educational level, nationality, number of pregnancies, GDM and chronic HTN.

Several studies also assessed the impact of educational interventions like health campaigns on the knowledge of GDM and its effects on pregnant women (12, 13). The results based on such studies were also consistent with the present study's results that affirm a poor knowledge of GDM in pregnant women. However, the limited literature base about the assessment of knowledge towards GDM does not provide a case-specific conclusion. Instead, the relevance of public health campaign on the knowledge of cancer across the same population reflected the significance of the intervention to GDM. A similar study in the United States also affirmed public health campaigns as being beneficial in the diagnosis and management of diabetes.

Conclusion

The growing prevalence of type-2 diabetes has implicated a growing concern about Gestational Diabetes Mellitus. However, current literature fails to provide enough research on the knowledge of this condition across its most prone populations. From this study's results, pregnant women have poor knowledge of GDM and its implications to both their health and that of their children. The study, in reference to other research studies, also asserted that GDM knowledge was dependent on several factors, including educational level and public health intervention. However, the presence of risk factors of GDM did not affect the prevalence of knowledge about the condition. The present study also found that a relatively high percentage of pregnant women are not aware of the condition. The majority of the population also did not possess adequate knowledge of the condition. In this regard, medical interventions related to public health announcements and educational forums should be adopted to aid in increasing knowledge about GDM across pregnant women.

Acknowledgement

The authors extend their appreciation to the Deanship of Scientific Research at Imam Mohammad Ibn Saud Islamic University for funding this work through Research Group no. RG-21-11-01 .

References

1. Alharthi AS, Althobaiti KA, Alswat KA. Gestational diabetes mellitus knowledge assessment among Saudi women. *Open access Macedonian journal of medical sciences*. Aug 20;6(8):1522.
2. Alia S, Pugnali S, Borroni F, Mazzanti L, Giannubilo SR, Ciavattini A, Vignini A., Impact of gestational diabetes mellitus in maternal and fetal health: An update. *Diabetes*. 2019;5:1-6.
3. Arora D, Arora R, Sangthong S, Leelaporn W, Sangratanathongchai J. Universal screening of gestational diabetes mellitus: prevalence and diagnostic value of clinical risk factors. *J Med Assoc Thai*. 2013 Mar 1;96(3):266-71. Colorafi KJ, Evans B. Qualitative descriptive methods in health science research. *HERD: Health Environments Research & Design Journal*. 2016 Jul;9(4):16-25.
4. Galanis P. Fundamental principles of qualitative research in the health sciences. *Arch Hell Med*. 2017 Nov 1;34(6):834-40.
5. Goveia P, Cañon-Montañez W, Santos DD, Lopes GW, Ma RC, Duncan BB, Ziegelman PK, Schmidt MI. Lifestyle intervention for the prevention of diabetes in women with previous gestational diabetes mellitus: a systematic review and meta-analysis. *Frontiers in endocrinology*. 2018 Oct 5;9:583.
6. Lakshmi D, Felix AJ, Devi R, Manobharathi M. Study on knowledge about gestational diabetes mellitus and its risk factors among antenatal mothers attending care, urban Chidambaram. *International Journal of Community Medicine and Public Health*. 2018 Oct;5(10):4388.
7. Lawrence RL, Wall CR, Bloomfield FH. Prevalence of gestational diabetes according to commonly used data sources: an observational study. *BMC Pregnancy and Childbirth*. Dec;19(1):1-9.
8. Li Z, Cheng Y, Wang D, Chen H, Chen H, Ming WK, Wang Z. Incidence Rate of Type 2 Diabetes Mellitus after Gestational Diabetes Mellitus: A Systematic Review and MetaAnalysis of 170,139 Women. *Journal of Diabetes Research*. 2020 Apr 27;2020.
9. Mijatovic-Vukas J, Capling L, Cheng S, Stamatakis E, Louie J, Cheung NW, Markovic T, Ross G, Senior A, Brand-Miller JC, Flood VM. Associations of diet and physical activity with risk for gestational diabetes mellitus: a systematic review and meta-analysis. *Nutrients*. 2018 Jun;10(6):698.
10. Monir N, Zeba Z, Rahman A. Comparison of knowledge of women with gestational diabetes mellitus and healthy pregnant women attending at hospital in Bangladesh. *Journal of Science Foundation*. 2018 Sep 13;16(1):20-6.

11. Ogu RN, Maduka O, Agala V, Alamina F, Adebisi O, Edewor U, Porbeni I, Abam C. Gestational Diabetes Mellitus Knowledge Among Women of Reproductive Age in Southern Nigeria: Implications for Diabetes Education. *International Quarterly of Community Health Education*. 2020 Apr;40(3):177-83.
12. Salhi AA, Alshahrani MS, Alyamin MM, Hamdi WA, Alyami SR, Almagbool AS, Almoqati NH, Almoqati SH, Al-Saaed EA, Al Habes HS, Alwdei BM. Assessment of the knowledge of pregnant women regarding the effects of GDM on mothers and neonates at a Maternal and Children hospital in Najran, Saudi Arabia. *Parity*;40(34):6-8.
13. Silva Junior JR, Souza AS, Agra KF, Cabral Filho JE, Alves JG. Gestational Diabetes Mellitus: the importance of the production in knowledge. *Revista Brasileira de Saúde Materno Infantil*. 2016 Jun;16(2):85-7.
14. Zhu Y, Zhang C. Prevalence of gestational diabetes and risk of progression to type 2 diabetes: a global perspective. *Current diabetes reports*. 2016 Jan 1;16(1):7.