KNOWLEDGE AND PERCEIVED RISK FACTORS OF GESTATIONAL DIABETES AMONG ANTENATAL ATTENDEES AT CIVIL SERVICE HOSPITAL, ILORIN KWARA STATE

Barakah A. Masuud, Samad T. Nasirudeen, Habeebat D. Owoiya, & Ganiyah Ejalonibu,
Dept. of Health Promotion and Environmental Health Education, University of Ilorin, Ilorin Nigeria

Abstract
Gestational diabetes mellitus (GDM) is any degree of glucose intolerance with onset or first recognition during pregnancy. This acknowledges the possibility that a woman may have developed diabetes coincidentally with pregnancy. In Nigeria, the prevalence of gestational diabetes is 13.4% with unidentified risk factors. This study examined knowledge and perceived risk factors of gestational diabetes among antenatal attendees at Civil Service Hospital, Ilorin. A descriptive research design comprising 213 antenatal attendees at Civil Service Hospital Ilorin, was adopted. The collection of data was performed with a researcher-designed questionnaire. Concerning the knowledge and perceived risk factors of gestational diabetes mellitus, the respondents have adequate knowledge of gestational diabetes mellitus, with a decision mean of 3.36, the respondents agreed that gestational diabetes mellitus were due to nutrition with a decision mean of 3.27, followed by lack of exercise with a decision mean of 3.30, and a decision mean of 2.92 were due to heredity. The study concluded that nutrition, lack of exercise and heredity are risk factors of gestational diabetes mellitus and pregnant women considered as leading risk factors. There should be a registered dietitian or certified diabetes educator who will provide pregnant women with the right proportion and amount of food.

Key Words*: Knowledge, Perceived risk factors, Gestational diabetes, Antenatal attendees, Civil service hospital*

Introduction

Antenatal clinic is a specialized clinic which pregnant women attend during the period of gestation. These pregnant women attending the clinic sometimes are diagnosed with many ailments and conditions which include gestational diabetes mellitus. Gestational diabetes mellitus (GDM) is any degree of glucose intolerance with onset or first recognition during pregnancy. This acknowledges the possibility that a woman may have developed diabetes coincidentally with pregnancy. GDM can be classified as A1GDM and A2GDM. A1GDM is managed without medication and responsive to nutritional therapy diet-controlled, A2GDM is managed with medication to achieve adequate glycemic control (Coustan, 2013). A woman is diagnosed with gestational diabetes when glucose intolerance constitutes beyond 24-28weeks of gestation. Gestational diabetes is caused by not enough insulin in the setting of insulin resistance. Risk factors include being overweight, a family history of type 2

diabetes mellitus, and having polycystic ovarian syndrome. Diagnosis is by blood tests (American Diabetes Association, 2014).

Globally, the prevalence of GDM varies widely, largely because of different diagnostic criteria. The most recent meta-analysis by Saeedi et al. (2021) reported the global prevalence of GDM was 14.7% based on the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria; the most used screening method worldwide. In 2019, a meta-analysis using the same criteria reported that the highest pooled prevalence (11.4%) of GDM was in South Asia (Bangladesh, India, and Sri Lanka) compared to the rest of the world (3.6 – 6.0) (Samira-Behboudi-Gandevani et al., 2019). The prevalence rate of gestational diabetes varies between 3 to 15%, a variation that reflects variable risks related to ethnicity, lifestyle, nutrition, exercise and environment. The prevalence of GDM is reported as 14% of all pregnancies in the United States (Kim, Newton &Knopp, 2012). In Nigeria, the prevalence of GDM was 0.5 - 38% and the pooled prevalence was 11.0% (95% CI 8-13) (Taoreed et al., 2021).The risk factor of gestational diabetes mellitus is associated with important prenatal and long–term health risks and many of the risks increase in relation to the severity of maternal hyperglycemia. Effective measures to prevent women with GDM from progressing to type 2 diabetes mellitus could therefore have a significant positive health impact (Wah-Cheung &Byth, 2013). Different ethnic groups in the same environmental setting experience widely variable risk factors (American Diabetes Association, 2014; Ferrara & Kahn, 2014 ; Beisher, Oats, Sheedy, &Waslstab, 2019).

It has been estimated that 90 percent of all pregnancies complicated by diabetes are due to gestational diabetes mellitus and approximately 40% of these women with GDM during their pregnancy will go on to develop type 2 diabetes mellitus (Schaefer-Graf, Buchanan, Xiang, Peters &Kjos, 2012), the incidence and prevalence of gestational diabetes mellitus in pregnant women has led to adverse health outcomes such as pre-eclampsia, cesarean delivery, macrosomia, birth trauma and increased risk of type 2 diabetes mellitus later in life (World Health Organization, 2014).Once the pregnant women are diagnosed to have GDM, they are put into high-risk category and referred to a higher level of health-care facilities for follow-up care. Knowledge about GDM among pregnant women will translate into adoption of a healthy lifestyle; better healthcare-seeking pattern, better self-care, and thus prevention and early diagnosis of the disease (WHO, 2014).

Gestational Diabetes Mellitus is especially common during the last third stage of pregnancy (American Diabetes Association, 2014); it affects 1% of those under the age of 20 years and 13% of those over the age of 44 years and above. A number of ethnic groups including Asians, American Indians, Indigenous Australians and Pacific Islanders are at higher risk. In 90% of people, gestational diabetes mellitus will resolve after the baby is born (American Diabetes Association, 2014). The World Health Organization (WHO, 2014) studies has also predicted the undoubtedly increase in the incidence of GDM especially in the developing countries due to the worldwide epidemic of glucose intolerance. In the light of the above, the objective of this study is to identify and examine the knowledge and perceived risk factors of gestational diabetes among antenatal attendees at Clinic at Civil Service Hospital, Ilorin, Kwara State.

Methodology

Descriptive research design of the survey type was used for the study. The population of the study was 1065 registered pregnant women attending Antenatal Clinic at Civil Service Hospital, Ilorin, Kwara State. A multistage sampling procedure was used select 213 antenatal attendees respondents. At the first stage, stratified sampling technique was used to group pregnant women into three strata according to their months of gestation. Therefore, first trimester, second trimester and third trimester and above and were categorized as group 1, 2 and 3 respectively.

At second stage, proportionate sampling technique was used to select 20% in each group. Hence, in group 1, 110 respondents were selected. In group 2, 82 respondents were selected and in group 3, 21 respondents were selected. At the final, 213 respondents were used for the study.

For data collection, a researcher-designed questionnaire was used. The questionnaire included both the demographic characteristics of the population and statements regarding the knowledge and perceived risk factors of gestational diabetes mellitus. The instrument was validated by experts in the Department of Health Promotion and Environmental Health Education, University of Ilorin. The corrections and suggestions were incorporated to ensure the instrument is valid in face and content. The reliability of the instrument was carried out using split-half method. The instrument was administered to twenty (20) pregnant women attending antenatal clinic at Kwara State General Hospital, Ilorin, Kwara State. The data obtained from the administration was subjected to Spearman-Brown Prophecy statistical analysis. A correlation coefficient of r = 0.68 was obtained and this was considered reliable for the study. The data was analyzed using descriptive statistics. Statistical Package for Social Science (SPSS) version 23.0

Results

The studied population consisted of 213 antenatal attendees. Regarding age 20-24 years old were 127 (59.6%), 25-29 years old 4 (1.9%), 30-34 years old 46 (21.6%), 35-39 years old 1 (0.5%) and 40 years and above 35 (16.4%). As to marital status, majority of the respondents were married 153 (71.8%) were married, divorced 25 (11.7%), widow 14 (6.6%) and separated 21 (9.9%). Regarding occupational status, 70 (32.9%) of the respondents were civil servants, 97 (45.5%) were self-employed and 46 (21.6%) were others. Regarding religion, 103 (48.4%), were Muslims, 95 (44.6%) were Christians and 15 (7.0%) fell within others.

Research Question 1 :Do antenatal attendees at Civil Service Hospital, Ilorin, Kwara State have knowledge of gestational diabetes mellitus?

Table 1: Knowledge of gestational diabetes mellitus

S/N	Items	Mean	Standard Deviation	Decision
1	I am aware that diabetes during pregnancy is caused by production of inadequate insulin by the pancreas.	3.46	.89	
2	I am aware that diabetes occurs during pregnancy.	3.41	.70	Agreed
3	I am aware that diabetes during pregnancy will progress to diabetes if not well managed.	3.42	.73	
4	I am aware that diabetes during pregnancy will disappear in 90% of pregnant women after child delivery.	3.16	.84	
	Average mean	**3.36**		

The findings from table 1 above showed that the respondents agreed with the first objectives on knowledge of gestational diabetes mellitus which says do antenatal attendees at Civil Service Hospital, Ilorin, Kwara State have knowledge of gestational diabetes mellitus with an average mean of 3.36 which is greater than the decision mean of 2.5. It means that antenatal attendees at Civil Service Hospital, Ilorin, Kwara State have adequate knowledge of gestational diabetes mellitus.

Research Question 2: Are pregnant women aware that nutrition is a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Service Hospital, Ilorin, Kwara State?

Table 2: Nutrition and gestational diabetes mellitus

S/N	Items	Mean	Standard Deviation	Decision
5	Diabetes during pregnancy is caused by high consumption of food such as rice, yam, millets and semovita etc.	3.38	.83	
6	Diabetes during pregnancy is caused by high consumption of saturated fats which is the major cause of adding extra weight to the body.	3.27	.80	**Agreed**
7	Adding extra salt and sugar to food is a risk factor of diabetes during pregnancy.	3.33	.79	

8	Consumption of soda drinks and junks food is a risk factor of diabetes during pregnancy.	3.16	.90
	Average mean	**3.29**	

The findings from table 2 above showed that the respondents agreed with research objectives two which says that are pregnant women aware that nutrition is a risk factor of gestational diabetes mellitus with an average mean of 3.29 which is greater than the decision mean of 2.5. It means that nutrition is a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Service Hospital, Ilorin, Kwara State.

Research Question 3: Will lack of adequate exercise be a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Service Hospital, Ilorin, Kwara State?

Table 3: Lack of adequate exercise and gestational diabetes mellitus

S/N	Items	Mean	Standard tion	Decision
9	Physical activity will be a means to ve healthy status before, during and pregnancy	3.31	.90	
10	Women with vigorous physical activity pregnancy will not be at high risk of oping diabetes during pregnancy.	3.30	.89	**Agreed**
11	Active promotion of physical activities egnant women will reduce the risk of oping diabetes during pregnancy.	3.32	.91	
12	Pregnant women who engaged in ir exercise for at least 3-4 times per will have minimal risk in developing es during pregnancy.	3.14	.92	
	Average Mean	**3.30**		

The findings from table 3 above showed that the respondents agreed with third objectives which says that will lack of adequate exercise is a risk factor of gestational diabetes mellitus with an average mean of 3.30 which is greater than the decision mean of 2.5. It means that lack of adequate exercise is a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Service Clinic, Ilorin, Kwara State.

Research Question 4: Are pregnant women aware that heredity is a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Hospital, Ilorin, Kwara State

Table 4: Heredity and gestational diabetes mellitus

S/N	Items	Mean	Standard Deviation	Decision
13	A family history of diabetes mellitus will be a risk factor for pregnant women to develop diabetes during pregnancy.	3.28	.83	
14	The presence of diabetes mellitus before pregnancy in a woman will be a risk factor of diabetes during pregnancy.	3.10	.88	**Agreed**
15	A baby born to a mother with diabetes during pregnancy will be at risk of developing diabetes during pregnancy.	2.92	1.10	
16	Inherited diabetes will be a risk factor for diabetes during pregnancy.	2.38	1.15	
	Average mean	2.92		

The findings from table 4 above showed that the respondents agreed with the fourth objectives which says are pregnant women aware that heredity is a risk factor of gestational diabetes mellitus with an average mean of 2.92 which is greater than the decision mean of 2.5. It means that heredity is a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Service Hospital, Ilorin, Kwara State.

Discussion of Findings

The result shows that antenatal attendees at Civil Service Hospital, Ilorin, Kwara State, have adequate knowledge of gestational diabetes. The findings revealed that the respondents agreed that gestational diabetes is caused by production of inadequate insulin by the pancreas, with an average mean of 3.36. The result is in line with Metzger & Coustan (2011) who reported that gestational diabetes mellitus is caused by not enough insulin in the setting of insulin resistance, a woman is diagnosed with gestational diabetes mellitus when glucose intolerance constitutes beyond 24-28weeks of gestation. Also it is in agreement with Schaefer-Graf, Buchanan, Xiang, Peters &Kjos (2012) who concluded that It has been estimated that 90 percent of all pregnancies complicated by diabetes are due to gestational diabetes mellitus and approximately 40% of these women with GDM during their pregnancy will go on to develop type 2 diabetes mellitus, and also Ben Haroush et. al (2015) reported that Women with a history of GDM have a high risk of progression to type 2 diabetes mellitus (Type2 Diabetes Mellitus) after child delivery.

The result shows that nutrition is a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Service Hospital, Ilorin, Kwara State. The findings revealed that the respondents agreed that nutrition is a risk factor of gestational diabetes mellitus among

pregnant women with an average mean of 3.27. The findings is in agreement with Seshiah, Sahay, Das, Siddharth, Banerjee, Rao, Ammini, Balaji, Gupta, Divakar, Misra and Thanawala (2009) the expected weight gain during pregnancy is 300 to 400 gm/ week and total weight is 10- 12 kg/ month. Hence the meal plan aims to provide sufficient calories to sustain adequate nutrition for the mother and fetus and to avoid excess weight gain and postprandial hyperglycemia. Also, California Diabetes and Pregnancy Programs (2012), the primary goal is to control blood glucose levels by controlling intake of carbohydrates and saturated fats while ensuring adequate nutrition without excessive weight gain. American Dietetic Association (2014) reported that pregnant women with GDM should maintain a minimum of 175 grams of carbohydrate or 12 carbohydrate choices per day (approximately 700 kcals from carbohydrates), use diet history to create a meal plan that will ensure blood glucose control at each meal. Smaller meals should contain no more than one or two carbohydrate choices (15-30 grams of carbohydrate) and larger meals no more than three to four carbohydrate choices (45-60 grams of carbohydrate).

The result shows Lack of adequate exercise is a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Service Hospital, Ilorin, Kwara State. On the lack of adequate exercise the respondents agreed that physical activity will be a means to achieve healthy status before, during and after pregnancy, women with vigorous physical activity before pregnancy will not be at high risk of developing diabetes during pregnancy with an average mean of 3.30. This is in accordance with Mottola (2018) a minimal amount of physical activity must be maintained to achieve health benefits during pregnancy. Physical inactivity and a sedentary lifestyle may put the mother and fetus at risk for disease through altered maternal pregnancy adaptations, also Goodyear and Kahn, 2018; Hayashi, Wojtaszewski, and Goodyear 2017; Ryder, Chibalin and Zierath (2011) reported that Investigators have demonstrated that exercise increases the rate of glucose uptake into the skeletal muscle, a process that is regulated by the translocation of the glucose transport protein GLUT-4 Zhang, Solomon, Manson, and Hu (2018) reported that women in the highest quintile of physical activity before pregnancy, specifically vigorous activity, had a 20% risk reduction for the development of GDM compared with inactive women.

The result shows that heredity is a risk factor of gestational diabetes mellitus among antenatal attendees at Civil Service Hospital, Ilorin, Kwara State. The findings revealed the respondents agreed that a family history of diabetes mellitus will be a risk factor for pregnant women to develop diabetes during pregnancy with an average mean of 2.92. The findings is in support of Stride and Hattersley (2012) an uncommon form of Type2 Diabetes (accounting for <5% of all Type2 Diabetes cases) that generally occurs before age 25 years is Maturity Onset Diabetes of the Young. Maturity Onset Diabetes of the Young is characterized by a slow onset of symptoms, the absence of obesity, no ketosis, and no evidence of beta cell autoimmunity. It is most often managed without the need for exogenous insulin. MODY displays an autosomal dominant pattern inheritance, generally spanning three generations and also Kim, Ma &Weremowicz (2014) reported that potentially suggesting that there is a subgroup of women who may be genetically have the incidence to develop GDM. Defects in both insulin secretion and insulin action are crucial in the pathogenesis of GDM. Buchanan & Xiang (2015) reported that a study among Danish twins

showed major genetic components in both traits, more than 75% of the variation of the insulin secretion trait and at least 53% of peripheral insulin sensitivity can be explained by genetic components.

Conclusion

This paper concluded that antenatal attendees at Civil Service Hospital, Ilorin, Kwara State have adequate knowledge of gestational diabetes. Also, nutrition, lack of exercise and heredity are risk factors, that pregnant women are considered as the main course of gestational diabetes mellitus. Based on the findings the below recommendations were suggested:

1. Knowledge of gestational diabetes should be part of health education programme given to pregnant women so as to enlighten those that have little or no knowledge of gestational diabetes and to increase the knowledge of those that are aware of it before.
2. There should be a registered dietitian or certified diabetes educator that will provide pregnant women on right proportion and amount of Medical Nutrition Therapy. Medical Nutrition Therapy is a nutritional treatment for a specific condition, in this case, gestational diabetes mellitus, based on a detailed assessment of individual factors such as pre-pregnancy weight, physical activity level, pregnancy weight gain to date and diet history.
3. An Exercise Physiologists (a person who studies or specialize in guiding individual for specific exercise) that will guide and provide the guidelines correspond to moderate-intensity exercise (i.e. 60-80% of maximal aerobic capacity, VO2 max). Aerobic exercise in which large muscle groups are used, including walking, stationary cycling, aqua exercise, or low-impact aerobics.
4. And lastly there should be a scientist who will explain the genetic susceptibility of GDM and Maturity Onset Diabetes of the Young to pregnant women so as to reduce the incidence of GDM.

References

American Diabetes Association. (2014). Clinical practice recommendations. Gestational diabetes mellitus. *Diabetes Care*, 25(1): S94-S96.

American Dietetic Association. (2014). Nutrition Practice Guidelines for Gestational Diabetes Mellitus.

Beisher, N. A., J. N., Oats, M. T., Sheedy, & J. E., Waslstab. (2019). Incidence and severity of gestational diabetes according to country of birth in women living in Australia. *Diabetes care* 40(2): 35-38.

Ben-Haroush, A., Yogev, Y., Chen, R., Rosenn, B., Hod, M., & Langer, O. (2014). The postprandial glucose profile in the diabetic pregnancy. *America Journal of Obstetricians and Gynecologists*191: 576-81.

Buchanan, T. A., & Xiang, A .H. (2015). Gestational diabetes mellitus. *Journal of Clinical Investigation.* 115:485-491.

California Diabetes and Pregnancy Programs Guidelines for Care. (2012). State Program Guide. Maternal and Child Health Branch, Department of Health Services, State of California.

Coustan DR. Gestational diabetes mellitus. Clin Chem. 2013 Sep;59(9):1310-21.

Ferrara, A., & Kahn, (2014). An increase in the incidence of gestational diabetes mellitus: *NorthernCaliforniaObstetric Gynecology*, 103 (3): 526-533.

Goodyear, L. J., & Kahn, B. B. (2018). Exercise, glucose transport, and insulin sensitivity in pregnancy.

Harlass, F. E., Brady, K., & Read, J. A. (2011). Reproducibility of the oral glucose tolerance test in pregnancy. *America Journal of Obstetric Gynecology* 164(2):564-568.

Hayashi, T., Wojtaszewski, J. F., & Goodyear, L. J. (2017). Exercise regulation of glucose transport in skeletal muscle. *America Journal of Physiology*. 273:E1039-1051.

Kim, S. H., Ma, X. &Weremowicz, S. (2014). Identification of a locus for maturity-onset diabetes of the young on chromosome. *Diabetes care*, 53: 1375-1384.

Kim, C., Newton, K. M&Knopp, R. H. (2012). Gestational diabetes and the incidence of type 2 diabetes: a systematic review. *Diabetes Care* 25 (10): 1862-1868.

Langer, O. (2014). Intensified versus conventional management of gestational diabetes. *America Journal of Obstetric Gynecology* 170(4):1036-1047.

Makgoba, M., Savvidou, M. D. & Steer, P. J. (2012). An analysis of the interrelationship between maternal age, body mass index and racial origin in the development of gestational diabetes mellitus. 119:276–282.

Metzger, B. E. & Coustan, D. R. (2011). Summary and recommendations of the Fourth International Workshop-Conference on Gestational Diabetes Mellitus. The Organizing Committee. Diabetes Care(Supplement 2):B161-167.

Sustainable Development Goals (2012).

Mottola, M. F. (2018). The role of exercise in the prevention and treatment of gestational diabetes mellitus. Current Diabetes Reports. 8:299-304.

Ryder, J. W., Chibalin, A. V. &Zierath, J. R. (2011). Intracellular mechanisms underlying increases in glucose uptake in response to insulin or exercise in skeletal muscle. Physiology Scand. 171:249-257.

Saeedi M., Cao Y., Fadl H., Gustafson H., Simmons D. Increasing prevalence of gestational diabetes mellitus when implementing the IADPSG criteria: A systematic review and meta-analysis. Diabetes Res. Clin. Pract. 2021;172:108642. doi: 10.1016/j.diabres.2020.108642.

Samira-Behdoudi–Gandevani, Mina Amiri, Razieh Bidhendi, Yarandi & Fahimeh RamezaniTehrani. Diabetology and metallic syndrome 11, Article Number 11, (2019)

Seshiah V, Balaji V, Balaji MS, Sanjeevi CB, Green A. J Assoc Physicians India. 2014 Sep;52:707-11. PMID: 15839447

Schaefer-Graf, U. M., Buchanan, A. H., Xiang, R. K., Peters, S. L., Kjos, (2012). Clinical predicators for a high risk for the development of diabetes mellitus in the early puerperium in women with recent gestational diabetes mellitus. *America Journal of Obstetric Gynecologist,* 186: 751-756.

Stride, A. & Hattersley, A. T. (2012). Different genes, different diabetes: lessons from maturity-onset diabetes of the young. *Annual Medicine*. 34: 207-216.

Sustainable Development Goals (SDGS, 2012

Taoreed Adegoke Azeez , Tamunosaki Abo-Briggs , Ayodeji Sylvester Adeyanju (2021). A systematic review and meta-analysis of the prevalence and determinants of gestational diabetes mellitus in Nigeria. *Indian J Endocrinol Metab*. 25(3):182-190doi: 10.4103/ijem.ijem_301_21

Wah-Cheung, N. & Byth, K. (2013). Population health significances of gestational diabetes. Diabetes Care. 2-6.

World Health Organization. Prevention of diabetes mellitus (2014). Report of World Health Organization Study Group. Genev; No. 844.

Zhang, C., Solomon, C.G., Manson, J. E. & Hu, F.B. (2018). A prospective study of pregravid physical activity and sedentary behaviors in relation to the risk for gestational diabetes mellitus. Arch International Medicare. 166:543-548.