

**AWARENESS OF GESTATIONAL DIABETES MELLITUS, IT'S RISK FACTORS AND CONSEQUENCES AMONG ANTENATAL MOTHERS IN FEDERAL MEDICAL CENTRE, OWERRI****Ibebuikwe J. E.<sup>1\*</sup>, Nwokike G. I.<sup>1</sup>, Osuala J. C.<sup>1</sup>, Nwosu D. C.<sup>2</sup> and Nwanjo H. U.<sup>2</sup>**<sup>1</sup>Department of Nursing Science, Faculty of Health Science, Imo State University, Owerri, Nigeria.<sup>2</sup>Department of Medical Laboratory Science, Faculty of Health Science, Imo State University, Owerri, Nigeria.**\*Corresponding Author: Ibebuikwe J. E.**

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**ABSTRACT**

Gestational diabetes mellitus (GDM) is a subtype of diabetes mellitus defined as the development, or first recognition, of glucose intolerance during pregnancy. The purpose of this study was to investigate the awareness of GDM and its risk factors among antenatal women in Federal Medical Centre, exploring where participants obtained information, and understanding of the risk factors, consequences and preventive measures of GDM. A quantitative cross-sectional study of 141 women attending antenatal clinic in Federal Medical Centre Owerri, in June 2017 was performed. 56% women were aware of GDM, 58% women were aware diabetes can occur for the first time during pregnancy. The greatest information source was from doctors/health workers (45%, n=63) followed by family members (22%, n=31), based on 141 respondents. Only one woman correctly identified all four risk factors for GDM. Most women recognized eating a healthy diet (79%) and regular physical activity (75%) to be appropriate lifestyle changes to help prevent GDM. These findings suggest awareness of GDM among pregnant women in Federal Medical Centre Owerri is poor, with a very small proportion having good knowledge (based on the number of risk factors identified). We conclude that increased education about GDM is necessary, both in hospital clinics and within the community. By increasing awareness of GDM, it may be possible to decrease the prevalence of Type2Diabetes Mellitusand long-term morbidity in children of affected mothers.

**KEYWORDS:** Awareness, gestational diabetes mellitus, risk factors, consequences, antenatal mothers.**INTRODUCTION**

Diabetes mellitus (DM), an endocrine disorder of carbohydrate metabolism, results from inadequate production or use of insulin. Insulin produced by the beta cells of the islet of Langerhans in the pancreas, lowers blood glucose level by enabling glucose to move from the blood into the muscles and adipose tissue cells (ADA, 2014). Gestational Diabetes Mellitus (GDM) is one of the subtypes of Diabetes Mellitus, the prevalence of which is constantly increasing.

Gestational Diabetes Mellitus is defined as any degree of glucose intolerance with its onset or is first diagnosed during pregnancy. It complicates about 7% of all pregnancies. Women who are markedly obese, have a prior history of GDM, have glycosuria, or have a strong family history of diabetes are at high risk (American Diabetic Association (ADA), 2014). Hyperglycaemia develops during pregnancy because of the secretion of placental hormones, which causes insulin resistance. Gestational Diabetes occurs in as many as 14% of pregnant women and increases their risk for hypertensive disorders during pregnancy (ADA, 2014).The clinical

manifestations depend on the patient's level of hyperglycaemia. Classic clinical manifestations are polyuria (increased urination), polydipsia (increased thirst), and polyphagia (increased appetite). Other symptoms include fatigue and weakness, sudden vision changes, dry skin, numbness in hands of feet (Smeltzer *et al.*, 2008).

Gestational Diabetes needs special attention by the multidisciplinary team because of the risk that may affect the health of both mother and child. GDM is associated with an increased risk of preeclampsia for mothers in the antepartum period, elevated risk of adverse pregnancy outcomes, including maternal- and peri-natal mortality, obstructed labour, spontaneous abortion, and increased risk of cardiovascular disease and caesarean delivery. a higher risk for macrosomia, hypoglycaemia, jaundice, perinatal mortality, congenital malformations, respiratory distress syndrome, polycythaemia and hypocalcaemia in *infants*(Fraser and Cooper, 2008).Initial management includes dietary modification and blood glucose monitoring. If hyperglycaemia persists, insulin is prescribed. Goals for blood glucose levels during

pregnancy are 105mg/dL (5.8mmol/L) or less before meals and 130mg/dL (7.2mmol/L) or less 2 hours after meal (ADA, 2014). After delivery, blood glucose levels in women with GDM usually return to normal. However, many women who have had GDM develop type 2 diabetes later in life. Therefore, a woman who has had GDM should be counselled to maintain her ideal weight and to exercise regularly to reduce her risk for type 2 diabetes (ADA, 2014). Reduction in GDM prevalence can be achieved by proper formulation of preventive strategies, rational planning and allocation of resources. Nevertheless, the success of any preventive strategy will depend on adequate participation of affected population. Hence, this study was planned to evaluate the awareness about GDM among antenatal mothers.

### Aim

The aim of the study was to determine the awareness of the pregnant women attending antenatal clinic at Federal Medical Centres, Owerri about gestational diabetes.

**Specific objectives:** to find out if the women can:

1. Identify the women's knowledge on the risk factors of gestational diabetes
2. Describe their knowledge on the effects/consequences of gestational diabetes
3. Identify the preventive measures of gestational diabetes.
4. Determine factors influencing their knowledge about gestational diabetes
5. Identify their major source(s) of information about gestational diabetes

## RESEARCH METHODOLOGY

### Research design

A quantitative, cross-sectional descriptive study of pregnant women attending antenatal clinic in Federal Medical Centre Owerri, was performed to analyse their awareness about gestational diabetes, its risk factors and effects.

### Setting

Federal Medical Centre Owerri is located along Orlu road between Alvanlkoju College of Education and Old secretariat in Owerri-North LGA, Imo State. It is the largest federal hospital in Imo State made up of 32clinics/wards/units, of which antenatal clinic is one. The antenatal clinics run every Monday through Thursday (4 days in a week) according to firms.

Firm A	Monday
Firm B	Tuesday
Firm C	Wednesday
Firm D	Thursday

### Target population

The study population comprised of all pregnant mothers who attended antenatal clinic at federal Medical Centre, Owerri during the period of the study. The average

number of women that registered for antenatal care was 220 for the month of June 2017(According to statistics gotten from FMC antenatal clinic).

Antenatal days	Firm	Number of Women
Monday	A	53
Tuesday	B	54
Wednesday	C	52
Thursday	D	61
Total		202

### Sample and sampling technique

Due to cost and time constraints, a sample size of 142 women were selected from the total population, using Yamane Taro's formula

$$N = \frac{N_1}{1 + N_1 \times (e)^2}$$

n - Sample size

N - Total population size

e - Level of precision or sampling error (0.05)

$$n = \frac{202}{1 + 202 \times 0.0025} = 141.9$$

approximately 142.

Convenience sampling technique with no inclusion or exclusion criterion was used to collect data. All participants were enrolled on voluntary basis with emphasis on their anonymity and confidentiality of responses.

Antenatal Firm	Number of women (n= 142)	Percentage (%)
Firm A	32	23
Firm B	36	25
Firm C	29	20
Firm D	45	32
Total	142	100

### Instrument for Data Collection

A detailed questionnaire was used to obtain basic data regarding general awareness about gestational diabetes mellitus. The questionnaire was self-administered and pretested. It comprised of two sections; A and B. section A was made up of Demographic data while section B comprised of questions on awareness Gestational Diabetes Mellitus, its risk factors and the consequences.

### Reliability of Instrument

The reliability of the instrument used for the study was determined through test-retest method. This was done by administering ten copies of the questionnaire to the respondents who were part of the study. After two (2) weeks, new copies of the same questionnaire were administered to the same group. The results were tallied after collection and analysed using Pearson's Product Moment Correlation Co-efficient which yielded 0.93 showing a high correlation.

### Method of Data Collection

A self-administered, pretested, close- and open-ended questionnaire was used to collect information on patient's knowledge and awareness of GDM. The questionnaire

was collected from the respondents by the researcher with 100% return rate.

#### Method of data analysis

All data were analysed using descriptive statistics. To compare data, tables and percentages were used.

#### Ethical consideration

This study was conducted after obtaining an informed consent from the ethical committee of Federal Medical Centre Owerri and written permission letter from the Health Centre. Participants were informed about the aim of the study and participated voluntarily and actively in the study and were allowed to withdraw at any point during the study. Clear instructions were given to participants and they were assured about their anonymity and confidentiality of the research findings. Results were

communicated to the responsible health workers at the Health Centers under study.

#### Data Analysis

This chapter deals with presentation of findings from responses to questionnaire based research questions. The results of the findings were analysed using tables and percentages. A total of 142 women initially participated in the study. One participant was excluded, as she did not complete many questions regarding awareness of gestational diabetes. The final analysis includes responses from 141 women. Many participants did not answer all questions in the questionnaire but were still included also, many of them chose more than one answer option, hence there are some variations in response numbers for each aspect analysed.

**Table 1: Background Demographics of Gestational Diabetes Mellitus (GDM).**

Determinants	No of women (N= 141)	Percentage (100%)
Age		
18 - 25 years	21	15
26 - 33 years	68	48
34-41 years	49	35
42- 49 years	3	2
Gestation		
First trimester (weeks 1-12)	2	1
Second trimester (weeks 13-28)	38	27
Third trimester (weeks 29-40)	101	72
Unknown	0	0
Parity		
Primiparous	37	26
Multiparous	101	72
Unknown	3	2
Educational Background		
Primary	13	10
Secondary	71	50
University	40	28
Other	17	12
Marital Status		
Married	130	92
Single	3	2
Divorced /Separated	0	0
Engaged	8	6

The median age of women in the study was 26 years (18-49 years). Sixty-eight women (48%) were 26-33years old, Thirty- Five per cent (n=49) were 34-41years old only 2 % (3) were above 41years old. Seventy-two percent (n=101) were 29-40 weeks pregnant, 27% were 13-28 weeks pregnant and only 1% of the women was in

their first trimester. Twenty-six per cent of the women (n=37) were primiparous while 72% (n=101) were multiparous. Seventy-one women attended up to secondary education while 10% and 28% attended up to primary and university education respectively. Majority of the women were married (n =130).

**Table 2: Baseline Characteristics of Gestational Diabetes Mellitus (GDM).**

Determinants	NO of Women (N=141)	Percentage (100%)
Past Medical History of T2DM		
Yes	4	3
No	131	93
Don't know	6	4

Past medical history of GDM		
Yes	17	12
No	115	82
Don't know	9	6
Previous Birth Complications		
Yes	31	22
No	96	68
Don't know	14	10
Birth complications	Number of women (n=31)	Percentage (100%)
Macrosomia	12	39
Small for gestational age	4	13
Preterm labour	11	35
Stillbirth	4	13

Four women stated they had a past medical history of Type2Diabetes Mellitus and 12% (n=17) of gravid mothers stated they had a past medical history of GDM. Thirty-one women reported previous birth complications; preterm labour (35%) and macrosomia (39%) were the

most common complications, followed by Sow birth weight and stillbirth (13% each). Of those who described a past-history of GDM, two had birth complications; both had preterm labour.

**Table 3: Awareness of Gestational Diabetes Mellitus (GDM).**

Knowledge of Gestational Diabetes	Number of Women (141)	Percentage (100%)
Have you heard about gestational diabetes mellitus?		
Yes	79	56
No	32	23
Don't know	30	21
Can diabetes occur for the first time during pregnancy?		
Yes	82	58
No	32	23
Don't know	27	19

Knowledge of GDM among women in Federal Medical Centre Owerri was mixed. Seventy-nine (56%) women were aware of GDM, 32 (23%) were not aware while 30 (21%) did not know. Fifty-eight percent of women

(n=82) were aware that diabetes can occur for the first time during pregnancy, 23% (n=32) were unsure, and 19% (n=27) did not think that it could.

**Table 4: Risk factors of Gestational Diabetes Mellitus (GDM) identified by the participants.**

Risk factors identified	No of Women (N= 141)	Percentage (100%)
Pre-pregnancy obesity	32	23
Rapid weight gain in pregnancy	20	14
Family history of diabetes mellitus	40	27
Past history of gestational diabetes	33	24
Multiple Pregnancy	16	11
Increased maternal age	1	1

Twenty-seven per cent (n =40) of the women identified a family history of diabetes mellitus as a risk factor. The second most commonly recognized GDM risk factor was Past history of gestational diabetes (24%) followed by

pre-pregnancy obesity (23%),14% (n=20) of women identified rapid weight gain in pregnancy while 11% and 1% identified multiple pregnancy and increased maternal age respectively.

**Table 5: Number of Risk factors of Gestational Diabetes Mellitus (GDM) identified by the participants.**

Number of Risk Factors Identified	Number of women (N=141)	Percentage (100%)
1	1	1
2	0	0
3	121	85
4	15	11
5	3	2
6	1	1

Only one woman identified all six risk factors for GDM. Eighty-five per cent (n=121) identified three (3) risk factors, 11% identified four, 2% identified five risk

factors and another 1% identified one while none of them identified two risk factors.

**Table 6: Birth Complications of Gestational Diabetes Mellitus (GDM).**

Effects identified	No of Women (N= 141)	Percentage (100%)
Macrosomia	81	57
Stillbirth	56	40
Premature Birth	73	52
Congenital malformation	23	16
Don't know	15	11

Eighty-one women (57%) selected macrosomia as a birth complication of GDM, 40 selected stillbirth, 52%

identified premature birth, 16% identified congenital malformation and 11% did not know.

**Table 7: Maternal Consequences of Gestational Diabetes Mellitus (GDM).**

Effects identified	No of Women (N= 141)	Percentage (100%)
Pregnancy induced hypertension	43	30
Preterm Labour	56	40
Abortion	31	22
Caesarean Section	29	21
Polyhydramnios	19	13
Type2 diabetes mellitus	112	79

According to the participants, the most common complication of gestational diabetes was Type2 diabetes mellitus 112 women identified this, the second most common complication was preterm labour (n=56)

followed by pregnancy induced hypertension identified by 43 women then abortion (n=31), caesarean section (n=29) and polyhydramnios as the least with 13%.

**Table 8: Awareness of the preventive lifestyle measures of Gestational Diabetes Mellitus (GDM).**

Determinant	No of Women(N= 141)	Percentage (100%)
Healthy diet as a preventive measure	106	75
Regular physical activity as a preventive measure	133	92
Preconception use of metformin (Glucophage)	9	6

Awareness towards Lifestyle Measures such as diet, preconception use of metformin and exercise as strategies to help prevent GDM, one hundred and six women (75%) identified eating a healthy diet and 133 women (92%) identified regular exercise as appropriate

lifestyle changes, only 6% (n=9) of the women selected preconception use of metformin as a preventive measure for GDM. In other words majority of the respondents identified healthy diet and regular physical exercise as the major preventive measure of GDM.

**Table 9: Number of Women Aware of Gestational Diabetes Mellitus (GDM) according to Age Group, Parity and Level of education.**

Age Group	No of Women(N=79)	Percentage (100%) 1	Parity	N=79(100%)
18-22	7	9	Primiparous	16(20%)
23-27	22	28	Multiparous	63(80%)
28-32	21	27	Educational Level	
33-37	19	24	Primary	1 (1%)
38-42	9	11	Secondary	22 (28%)
43+	1	1	University	56 (71%)

Those aged 23-27 appeared to have the greatest awareness of gestational diabetes 40%; n=56), while those aged 43 and above had the lowest level of awareness (1%; n=2) others include those aged 18-22years (16%), 28-32years (15%), 33-37years (22%) and 38-42years (6%). The majority of the respondents who

were aware of GDM were multiparous women (80%) while the minority was primiparous women (20%). Also, 71% (n=79) of the women who were aware of GDM attended up to university level of education, 22 (28%) secondary while 1 (1%) only attended primary level of education.

**Table 10: Sources of Information about Gestational Diabetes Mellitus (GDM) Identified by participants.**

Source of information	Number of Women(N=141)	Percentage (%)
Family/friends	31	22
TV/Radio	26	18
Newspaper/Magazines	9	6
Internet	23	16
Health workers/Doctor	63	45
Hospital Posters	14	10

Participants attributed a variety of sources for their awareness of GDM. Doctors/Health workers were the largest source of information (45%; n=63), followed by family/friends (22%; n=31) and the television/radio (18%; n=26). Less commonly reported sources were other types like hospital posters (10%), newspapers/magazines (6%), and the internet (16%).

## DISCUSSION

One of the major findings of this study is that there is lack of awareness about GDM amongst pregnant women, only 79 women (56%) were aware of GDM and only 58% were aware it occurs for the first during pregnancy. The three most common risk factors identified by these women were pre-pregnancy obesity (23%), positive family history of diabetes mellitus (27%) and past-history of gestational diabetes mellitus. Only one woman was able to identify all six risk factors for GDM. This is not in line with the findings of Niyibizi *et al.* (2016) where the most common risk factors for GDM were: high age 64% (95% CI: 53-76), excess weight and obesity 47% (95% CI: 40-54), family history of diabetes 31% (95% CI: 26-36). Educational strategies then need to be put into place for women to make them understand that GDM is a serious condition. Physicians, nurses and diabetes educators should ensure to discuss with patients about GDM, as a future risk for Type 2 Diabetes Mellitus, and not just as a transient condition.

In this study, it is evident that the respondents had some knowledge about the complications of gestational diabetes. Regarding the complications in the mother; 79% knew that development of Type2 diabetes mellitus later in life is one of the long-term complication of GDM, 40% identified preterm labour, 30% identified pregnancy induced hypertension, 22% chose abortion while 21% knew that increased caesarean section rate was one of the complications of pregnancy. The study equally showed that macrosomia was the most common birth complication of GDM with the percentage of 57% followed by premature birth (52%) and stillbirth (40%). Foetal macrosomia is a common adverse infant outcome related to GDM, especially if GDM is unrecognized and untreated.

Ninety-two per cent and 75% of women recognized that regular exercise and a healthy diet respectively were measures to help prevent GDM. While the study indicates that women believed their diet to be healthy, fast food and imported Western food with little

nutritional value are largely consumed by these women.

Poor literacy has been identified as a factor affecting knowledge of gestational diabetes mellitus, which in turn, has been linked to poor self-care and management. Similar results have been reported in Malaysia, where patients with the primary education had least knowledge about GDM. The findings from this study confirmed the previous research outcome that showed that education has a strong impact on health literacy.

Age and parity also show significant influence on knowledge of GDM. Similarly, mothers with history of GDM in previous or present pregnancy were significantly more knowledgeable. This can be attributed to the fact that these mothers have more interaction at their work place and have also gained awareness because of their own experience.

A number of sources of knowledge were identified. Doctors/Health workers (37%), family/friends (24%), and television/radio (22%) were the three most commonly reported. Although doctors/health workers were the largest source of knowledge regarding GDM, this was only observed in around one third (37%) of questionnaires. Surprisingly, an even smaller proportion (16%) stated that healthcare workers (nurses and midwives) were a source of information, which is concerning as all pregnant women are strongly encouraged to visit the antenatal clinics. It is a recognised issue that many women present to antenatal clinics late in their pregnancy. Evidence suggests this is because they feel well and do not perceive a need to present earlier. The study reflects this, as over 80% of women were in their third trimester. Doctors are attempting to tackle this issue by visiting women in the communities to encourage them to attend their 12-week scan, with the incentive that they can learn the sex of their baby (personal observations). Other reported sources of knowledge were television and radio (22%) and healthcare posters (12%), suggesting messages supported by the Ministry of Health are having a limited impact. Further development and distribution of these resources could be implemented to educate women and encourage earlier antenatal clinic attendance in order to improve awareness.

## CONCLUSION

The high prevalence of obesity and diabetes means Gestational Diabetes Mellitus (GDM) is likely to

continue to be a relatively common problem facing healthcare professionals. Women are still not visiting antenatal clinics until late in pregnancy, providing little opportunity for education about GDM and appropriate lifestyle changes that can be made to help prevent it; as well as to managing other health issues. While doctors are proactively attempting to change this, the results of this study indicate that continuing targeted education is necessary to improve awareness of GDM.

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