



RISK FACTORS ASSOCIATED WITH GESTATIONAL DIABETES AMONG PREGNANT WOMEN IN OWERRI MUNICIPAL COUNCIL, SOUTHEASTERN NIGERIA.

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¹Nwaokoro J.C., ² Emerole C.O., ³ Ibe S.N.O., ⁴ Amadi A.N., ⁵Dozie I. N. S. ¹⁻⁵Department of Public Health, School of Health Technology, Federal university of Technology, P.M.B.1526, Owerri, Imo State, Nigeria.

ABSTRACT

CORRESPONDENCE :

Nwaokoro J.C
Department of Public Health
School of Health Technology
Federal university of
Technology,
P.M.B.1526, Owerri, Imo
State, Nigeria.
Email:
nwaokorojc@hotmail.com
Phone No: +234 7036880688

“Despite new advances in the treatment of gestational diabetes among pregnant women, the condition continues to menace the lives of pregnant women. Understanding the risk factors would help reduce the incidence.”

Background

Gestational diabetes is emerging as a serious public health problem in Nigeria where the largest number of people with diabetes in Africa occurs. Current studies in Nigeria give an overall prevalence of gestational diabetes as 13.4% among pregnant women with unidentified risk factors.

Aims and Objectives

This study aimed at investigating the risk factors associated with gestational diabetes.

Materials and Methods

A cross-section analytical study design was adopted for this research and comprising a total of 100 pregnant women receiving ante-natal health care service at the Federal Medical Center, Owerri. A structured questionnaire including a set of detailed pre-determined questions was administered on the subjects. Data collected were analyzed statistically, using chi-square and T test.

Results

The results obtained suggest that there is a significant relationship ($p < 0.05$) between previous macrosomic baby, parity, previous history of caesarean section, family history of diabetes and occurrence of gestational diabetes, respectively. However, there is no significant relationship ($p > 0.05$) between history of miscarriages and stillbirth, socioeconomic status and occurrence of gestational diabetes. A family history of diabetes is independently and significantly associated with the development of gestational diabetes itself even after adjusting for other risk factors.

Conclusion

This study will be a working tool to guide obstetricians and midwives in counseling and advising women of their risk of developing GDM.

Key Words: Gestational diabetes mellitus, pregnancy, prevalence, public health, Socio-economic status, Tropics.

INTRODUCTION

Gestational diabetes mellitus (GDM), which is strictly associated with pregnant women, is emerging as a serious public health problem. Worldwide, the incidence of GDM is approximately 4% of mothers.¹ According to International Diabetes Federation²; the prevalence rate of gestational diabetes varies between 3 to 15%, a variation that reflects variable risks related to ethnicity, lifestyle and environment. The prevalence of GDM is reported as 14% of all pregnancies in the United States.³ In Korea, 2% to 5% of all pregnant women reportedly develop GDM. Current studies in Nigeria give an overall prevalence of gestational diabetes as 13.4% among pregnant women with unidentified risk factors.⁴

Gestational diabetes 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 could therefore have a significant positive health impact.⁵ Offspring of women with GDM are at an increased risk for obesity and have unexpectedly high prevalence of elevated glucose levels during childhood and adolescence.^{6,7} Both pedigrees, intrauterine, environmental and hormonal influences are likely to contribute to these abnormalities.⁶

The available data suggest that the frequency of diabetes during pregnancy is highly variable and generally reflecting the underlying pattern of Non Insulin Dependent Diabetes Mellitus (NIDDM) in the particular population. Different ethnic groups in the same environmental setting experience widely variable risk.^{8,1,9}

It has been estimated that 90 percent of all pregnancies complicated by diabetes are due to gestational diabetes and approximately 40% of these women with GDM during their pregnancy will go on to develop type 2 diabetes.¹⁰ The incidence and prevalence of gestational diabetes 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 later in life. The following research hypotheses guided the study: a family history of diabetes does not have any relationship with gestational diabetes; there exists no relationship between parity and gestational diabetes and there is no association between previous

history of caesarean section and gestational diabetes.

The latest WHO 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.¹¹ In the light of the above, the objective of this study was to identify and examine the risk factors associated with gestational diabetes among Pregnant Women attending Federal Medical Center in Owerri Municipal Council, Southeastern Nigeria.

MATERIALS AND METHODS

Area of study

This study covers Owerri municipal council which is the capital of Imo State, Southeastern, Nigeria. Owerri municipal council is located in the lower part of Imo state and it lies between latitude 5.485°N and longitude 7.035° E. There are about eight active government hospitals under Ministry of Health and several private hospitals diversely located in the municipality. National census conducted in 2005 has it that the population is 127, 213 covering a total area of 50.885 sq meters approximately.¹²

Research design

A cross-section analytical study design was adapted for this research, with the use of survey method to establish systematic relationship or association between risk factors and gestation diabetes mellitus.

Study population

The target population of this study is ante-natal women attending Federal Medical Centre (FMC) in Owerri municipal council. This study comprised a total of 100 pregnant women receiving ante-natal health care service at the Federal Medical Center, Owerri.

Sampling Technique

The sampling technique adopted in the selection of the population is simple random sampling of the subjects to obtain data about past, present and pre-dispositions towards gestational diabetes.

Instrument for Data collection

A structured questionnaire including a set of detailed pre-determined questions was developed for the collection of relevant data for this study. Questionnaire items had forced choice questions by which subjects were directed to select a response option that most nearly describe their position.

Validity of the instrument

The validity of the study instrument is said to be authentic considering the fact that it was first given a peer thorough examination by authors, necessary suggestions, inputs and corrections were also made, after which it was presented to professionals in the area of study for more vetting and subsequent approval.

Method of data collection

The copies of the questionnaire were administered randomly to ante-natal women in the health facility. For effective administration of the questionnaires, some staff of the hospital was used in distribution and supervision. Completed questionnaires were checked and collected the same day while some the next day due to some unforeseen lapses.

Method of data analysis

The data collected were statistically analyzed using simple ratio analysis and chi-square (χ^2) test presented in tabular form. In addition, charts were used to graphically represent relevant information obtained from the study.

RESULTS

Socio-Demographic Characteristics of Respondents

Presented in Table 1. are the socio-demographic characteristics of the respondents. The survey sample included 100 pregnant women. Majority of the pregnant women, 92.0% was married compared to 8.0% that was single.

Table 1 also presents the distribution of respondents according to the level of education attained. There were differences in the educational attainment between respondents. The occupation of the spouses is equally represented in Table 1. Documented in Table 2 is information on present pregnancy among the survey sample. Information on history of miscarriage and stillbirth in previous pregnancies, history of a caesarean section and having a baby weighing more than 4.5kg or more in previous pregnancies is presented in Table 2.

Information sought from respondents as reported in Table 4 included if they had been diagnosed with diabetes before the start of the survey. Eleven (11.0%)

of the women had history of gestational diabetes in previous pregnancy. The prevalence of gestational diabetes among the 100 pregnant women surveyed in this study is 19.0%.

Further risk factors that might predispose pregnant women to having gestational diabetes is documented in Table 5. None of the women surveyed smoked, however, 15 (15.0%) stayed close to relatives that smoked. Such relations include husbands 11(73.3%) and fiancés 4 (26.7%).

Ninety-eight (98.0%) of the pregnant women reported that they engage themselves in physical activities compared to 2 (2.0%) that do not. Frequency of exercise includes once in a week (22.0%), three times in a week (57.0%) and everyday (21.0%). Types of exercises common among respondents include trekking (66.0%), pelvic tilting or rocking (16.0%), pelvic floor exercise (12.0%) and breathing awareness (6.0%).

From Table 6, it can be deduced that there is a significant relationship ($p < 0.05$) between maternal age, previous macrosomic baby, parity, previous history of caesarean section, family history of diabetes, physical activity and occurrence of gestational diabetes. However, there is no significant relationship ($p > 0.05$) between history of miscarriage and stillbirth, socioeconomic status and occurrence of gestational diabetes.

DISCUSSION

The study showed that (Table 5) there is no significant association between socio-economic status and gestational diabetes. This corroborates the findings of Innes et al.¹³ and Keshavarz et al.¹⁴ which found no association between gestational diabetes and socio-economic status.

To ascertain the relationship between parity and gestational diabetes, Table 2 gave information on pregnancy status. A higher percentage of pregnant women reported that their present pregnancy was not the first one as compared to 20% that reported otherwise. Majority, (56.0%) had 1 or 2 children, (30.0%) had 3 or 4 children, (10.0%) had 5 or 6 children while (4.0%) had none. It was deduced from the study

Table 1. Socio-Demographic Characteristics of Respondents

Variable	Frequency (n = 100)	Percentage (%)
Marital status		
Single	8	8.0
Married	92	92.0
Separated	0	0
Divorced	0	0
Educational status		
No formal	0	0
Primary	10	10.0
Secondary	27	27.0
Tertiary	63	63.0
Occupation		
Civil servant	14	14.0
Self employed	51	51.0
Housewife	4	4.0
None	31	31.0
Husband's Occupation		
Civil servant		
Self employed	24	24.0
Private sector employee	38	38.0
No formal occupation	29	29.0
	9	9.0

Table 2. Information on present pregnancy

Variable	Frequency (n = 100)	Percentage%
First pregnancy		
Yes	20	20.0
No	80	80.0
Age of pregnancy		
First trimester	18	18.0
Second trimester	42	42.0
Third trimester	40	40.0
Cannot remember	0	0

that parity of the respondents has an association of significance with gestational diabetes. This deduction is supported by Berkowitz et al.¹⁵ in the crude analysis he carried out regarding the prevalence of gestational diabetes mellitus which increased with parity, relative risks for two, three and more than four children, in relation to the first pregnancy. In addition, Keshavarz et al.¹⁶ in a descriptive analysis also found that women with more children were more likely to present with

gestational diabetes mellitus. To examine the nature of association between pregnancy outcomes and gestational diabetes, information on previous history of miscarriage and stillbirth, caesarian section and previous macrosomic baby in previous pregnancy were presented in Table 3. The outcome of this result indicated a statistical significance ($P < 0.05$). Macrosomic baby and gestational diabetes mellitus. Although, the findings also go contrary to the same study as regards previous

Table 3. Information on pregnancy outcomes

Variable	Frequency (n = 100)	Percentage%
History of miscarriage		
Yes	25	25.0
No	75	75.0
History of stillbirth		
Yes	27	27.0
No	73	73.0
History of caesarean section		
Yes	34	34.0
No	66	66.0
Had a baby weighing 4.5kg or more		
Yes	14	14.0
No	86	86.0

Table 4: information on family history of diabetes and type of diabetes

Variable	Frequency	Percentage (%)
Diagnosed of diabetes before		
Yes	39	39.0
No	61	61.0
Type of diabetes diagnosed		
Type 1	11	28.2
Type 2	28	71.8
Any relation with diabetes		
Yes	56	56.0
No	44	44.0
Which relation?		
Father	22	39.3
Mother	32	57.1
Sister	2	3.6
Brother	0	0
Gestational diabetes in previous pregnancy		
Yes	11	11.0
No	89	89.0

history of miscarriage and stillbirth. To determine the relationship between a family history of diabetes and occurrence of gestational diabetes, Table 3, 4 and 6 were used to cover these variables. Information sought from respondents included if they had been diagnosed of diabetes before the start of the survey, of which most of them (61.0%) reported they had not been diagnosed of diabetes compared to (39.0%) that had history of diabetes. The prevalence of GDM among these 100 pregnant women surveyed in this study was 19.0%. After

analyzing the data collected statistically, it was observed that there was a significant association between the variables. A family history of diabetes is independently and significantly associated with the development of gestational diabetes itself even after adjusting for other risk factors.¹⁴

Table 5. Other risk factors associated with gestational diabetes

Variable	Frequency	Percentage (%)
Smoking status		
Yes	0	0
No	100	100
Stays close to a smoker		
Yes	15	15.0
No	85	85.0
Relationship with the person		
Father	0	0
Husband	11	73.3
Fiancé	4	26.7
Engage in physical activities		
Yes	98	98.0
No	2	2.0
Frequency of exercise		
Once a week	20	20.4
Three times a week	57	58.2
Everyday	21	21.4
Type of exercise		
Trekking	66	67.3
Pelvic tilting or rocking	16	16.3
Pelvic floor exercise	12	12.2
Breathing awareness	4	4.08

CONCLUSION

Parity, previous history of caesarean section, and family history of diabetes were found as key risk factors which predispose pregnant women to GDM. This study also guides obstetricians and midwives in counselling and advising women of their risk of developing GDM during a given pregnancy based on individual risk factors.

Limitations of the study

In the process of carrying out this research work, limitation encountered includes; difficulty in assessing needed data of the pregnant women due to some bureaucratic bottlenecks in the management system of the Federal Medical Center, Owerri. Also during administration of the research instrument (questionnaire), compliance on the part of the pregnant women was not encouraging. Among reasons given was tiredness to fill

out the questionnaire, some even reported “not in the mood”.

Recommendation

Based on the conclusion of the study, it is therefore recommended that: there should be heightened surveillance by way of screening during pregnancy for purposes of early detection of gestational diabetes; medical history of pregnant women should be properly taken and documented to aid further research work; follow-up counselling should be carried out for those who had been previously diagnosed of gestational diabetes to avoid the occurrence of type 2 diabetes in future; and finally, governmental and non-governmental agencies should provide resources for carrying out mass screening on pregnant women.

Table 6. Relationship between risk factors and occurrence of gestational diabetes.

Variable	Gestational diabetes		P value
	Present	Absent	
Maternal Age			
15 - 24	2 (10.5%)	14 (17.3%)	0.003
25 - 34	4 (21.1%)	30 (37.0%)	0.000
35 - 44	9 (47.4%)	37 (45.7%)	0.000
45 - 54	4 (21.1%)	0	nil
Parity			
None	0	4 (4.94%)	nil
1 to 2	2 (10.5%)	54 (66.7%)	0.000
3 to 4	9 (47.4%)	21 (25.9%)	0.028
5 to 6	8 (42.1%)	2 (2.47%)	0.048
Family history of diabetes			
Yes	10 (52.6%)	29 (35.8%)	0.001
No	9 (47.4%)	52 (64.1%)	0.000
Socioeconomic status			
Civil servant	2 (10.5%)	12 (14.8%)	0.220
Self employed	6(31.6%)	45 (55.6%)	0.593
Housewife	2 (10.5%)	2 (2.5%)	1.000
None	9 (47.4%)	22 (27.1%)	0.120
Preg. outcomes			
History of miscarriage			
Yes	10(52.6%)	15(18.5%)	0.317
No	9(47.4%)	66(81.5%)	0.000
History of stillbirth			
Yes	12(63.2%)	15(18.5%)	0.564
No	7(36.8%)	66(81.5%)	0.000
History of caesarean section			
Yes	8(42.1%)	26(32.1%)	0.002
No	11(57.9%)	55(67.9%)	0.000
Have a baby weighing 4.5kg or more			
Yes	8(42.1%)	6(7.4%)	0.043
No	11(52.9%)	75(92.6%)	0.000
Engage in physical activities			
Yes	17(89.5%)	81 (100.0%)	0.000
No	2(10.5%)	0	nil

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