

# Pregnancy Complications and Mental Health Related Problems Associated With Type 2 Diabetic Patients Attending General Hospital Katsina, Nigeria

Kankia H. I.<sup>1\*</sup>, Safiyya Y. S.<sup>2</sup>

<sup>1</sup>Department of Biochemistry, Umaru Musa Yar'adua University, Katsina, Nigeria

<sup>2</sup>Department of Biology, Umaru Musa Yar'adua University, Katsina, Nigeria

**Abstract:** *The aim of this study was to investigate the association between pregnancy complications, mental health-related problems, and type 2 diabetes mellitus (T2DM) in women attending General Hospital Katsina, Nigeria. The method involves a case-control study of women with T2DM (n = 100) matched by age range to controls without T2DM (n = 100). Data were collected in outpatient, medical records section and laboratory sections of the hospital. Validated interviews were used to obtain the data. The data were analysed using descriptive statistics to calculate percentage frequencies means, ranges and medium. The results were presented using different table groups such as the socio demographic characteristic of women showing their ages, occupation and level of education completed, the pregnancy related factors table showing those pregnancy complications and finally, the mental health table showing those that are anxious and depress the table also contained two parts that is those with T2DM and those without T2DM which serves as control.*

**Keywords:** Pregnancy, Type 2 diabetes, Women, Depression, Anxiety, Pre-eclampsia, Gestational diabetes

## 1. Introduction

Diabetes mellitus (DM) is a heterogeneous group of disorders characterized by elevated blood glucose and other metabolic abnormalities(1).It chronic, inherited or acquired disease that causes the pancreas to produce insufficient insulin resulting in an increased blood glucose concentration (2).It is often describes a group of metabolic diseases in which the person has high blood glucose, either because insulin production is in adequate or because the body cells do not respond properly to insulin, or both. Patients with high blood sugar typically experience polyuria (frequent urination), they will become increasingly thirsty (polydipsia) and hungry (polyphagia)(3)

Women living with T2DM can be tough, and diabetes bring many other health risk for instance, women with T2DM are more likely to have high blood pressure which may also cause stroke, kidney disease and vision problem, to have heart attack, pre-eclampsia and GDM than those without diabetes and to die for it, and tend to have a poorer quality of health compared to those without diabetes (4, 5).

Preeclampsia; is a medical condition characterised by high blood pressure and significant amount of protein in the urine of pregnant women, if left untreated it can developed into eclampsia during birth. Blood pressure elevation is the most visible sign of the disease, The only known definitive treatment for eclampsia or advancing pre-eclampsia is delivery; either by labour induction or Caesarean section of both foetus and placenta(6).

Gestational hypertension also occur in women during pregnancy in which the woman will have high blood pressure because oestrogen hormone was secreted in large

amount and lead to the pressure increase, these shows that pressure increase due to the secretion of many substance that will make the blood tick. Normal blood pressure is 140-160 mmHg systolic and 90-105 mm Hg diastolic and it is usually diagnosed after 20 week of gestation (7-10)

Gestational diabetes mellitus is a type of diabetes that affects females during pregnancy during which they possess very high levels of glucose in their blood. Their bodies are unable to produce enough insulin; resulting in progressively rising levels of glucose majority of patients can control their GDM with exercise and diet. Uncontrolled gestational diabetes can raise the risk of complications during child birth. The baby may be bigger than it should be (7, 9, 10) Mental health-related problems such as depression and anxiety are two common, co-morbid, modifiable conditions associated with DM and recent studies have found that they are implicated in later-onset DM(8). Anxiety and depression are more common among females and those suffering from diabetes, the target population in our study. Several longitudinal studies from developed countries suggest that the association between depression and DM is reciprocal or bidirectional. However, the relationship between depression and diabetes seems stronger, with depression appearing to lead to diabetes more commonly than diabetes leading to depression. Although there has been less focus on anxiety, a meta-analysis reported an increased prevalence of anxiety symptoms and generalized anxiety disorders (GAD) among diabetics (8, 11, 12).

## 2. Methodology

### Study Design and Population

This case-control study involved women with T2DM

(cases) matched to women without T2DM (control group) in the same age range. Both groups comprised women aged 25–65 years, the diagnosis of diabetes or absence of diabetes was confirmed by medical records, medical doctor and laboratory tests. Face-to-face interviews with women with T2DM were carried out in outpatient section at General Hospital Katsina. The control subjects were healthy friends or unrelated family members of people with DM. The information about the presence of depression and anxiety symptoms were collected from medical records also, anxiety and depression were assessed at the time patients were diagnosed by the medical doctor.

### 3. Statistical Analysis

The data were analysed using descriptive statistics to calculate percentage frequencies means, range and medium.

### 4. Result

#### Socio-Demographic Characteristics of Women

A total of 200 participant (100 diabetes and 100 non diabetes) were interviewed the median age of those with T2DM was 37, the range was 74 based on these research it was observed that T2DM affect most urban people than rural, T2DM was as a result of high blood glucose (sugar) and most of the urban people are having lower level of education they are mostly self-employee and non-governmental employee, as seen in table 1 below;

**Table 1:** Socio-demographic characteristics of women

Variables	N=200 N(%) Overall (x+y)	N=100 (x) Women with T2DM	N=100(y) Women without T2DM
<b>Age groups (years)</b>			
25-34	37(18.5)	18(9)	19(9.5)
35-44	75(37.5)	26(13)	49(24.5)
45-54	74(37)	44(22)	30(15)
55-64	12(6)	11(5.5)	1(0.5)
≥65	2(1)	1(0.5)	1(0.5)
<b>Geographical location</b>			
Urban	132(66)	61(30.5)	71(35.5)
Rural	68(34)	39(19.5)	29(14.5)
<b>Highest level of education complete</b>			
No formal education	45(22.5)	28(14)	17(8.5)
Primary school	40(20)	19(9.5)	21(10.5)
Secondary school	55(27.5)	21(10.5)	34(17)
Diploma	40(20)	19(9.5)	21(10.5)
Bachelor degree	17(8.5)	11(5.5)	6(3)
Postgraduate degree	3(1.5)	2(1)	1(0.5)
<b>Occupation</b>			
Government employee	60(30)	11(5.5)	49(24.5)
Non-government employee	38(19)	27(13.3)	11(5.5)
Self employed	49(24.5)	31(15.5)	18(9)
Retired/pensioner	2(1)	-	2(1)
Unemployed	51(25.5)	31(15.5)	20(10)

### 5. Pregnancy Related Factors

It was observed that most people that had gestational diabetes mellitus had either preeclampsia or hypertension at the same time which was having high blood pressure in the body because oestrogen hormone was secreted in large amount and lead to the pressure increase, these shows that pressure increase due to the secretion of many substance that will make the blood tick. Normal blood pressure is 140-160 mmHg systolic and 90-105 mmHg diastolic, when the pressure is low (hypotension), it causes shocked which will lead to death and rise in blood pressure (hypertension) will causes those pregnancy factors such as pre-eclampsia that can lead to eclampsia if not cured, and gestational hypertension all these factors occur because of the pregnancy. The only cure for those pregnancy factors are induction of labour or delivery.

It was observed that those with T2DM have higher prevalence of gestational diabetes when compared with control. Although, there is a slight or negligible difference when both the two were compared in the case of gestational hypertension but in the case of pre-eclampsia, those with T2DM has a higher prevalence, as shown in table 2 below.

**Table 2:** Pregnancy related factors

Factors	N=200 N(%) Overall (x+y)	N=100(x) N(%) Women with T2DM	N=100 (y) N(%) Women without T2DM
No gestational diabetes mellitus	94(47)	57(28.5)	37(18.5)
Gestational diabetes mellitus	106(53)	63(31.5)	43(21.5)
No gestational hypertension	115(57.5)	58(29)	57(28.5)
No gestational hypertension	115(57.5)	58(29)	57(28.5)
Hypertension	85(42.5)	43(21.5)	42(21)
No preeclampsia	127(63.5)	61(30.5)	66(33)
Preeclampsia	73(36.5)	39(19.5)	34(17)

#### Mental Health-Related Factors

Most people that have all those pregnancy complications (gestational diabetes mellitus, gestational hypertension and pre-eclampsia) are mentally depressed and anxious It was also observed that some controls without T2DM may be mentally depressed and anxious due to too much worrying about the pregnancy (see table 3) below:

**Table 3:** Mental health-related factors

Factors	N=200 N(%) Overall (x+y)	N=100 (x) N(%) Women with T2DM	N=100 (y) N(%) Women without T2DM
Not depressed	85(42.5)	42(21)	43(21.5)
Depressed	115(57.5)	58(29)	57(28.5)
Not anxious	73(36.5)	39(19.5)	34(17)
Anxious	127(63.5)	61(30.5)	66(33)

### 6. Discussion

To the best of our knowledge these current study is the first to explore the association between pregnancy and mental health condition in Katsina State Nigeria. The findings of this study were similar to those of Hasan et al (2013) which reported that in similar study conducted in 1989 there were a 6.3% prevalence of DM among adults aged ≥35 years

whereas between 1996 and 2006, among adults aged  $\geq 30$  years, the prevalence rose to 8.3% and 14.9% respectively(8). Those people with T2DM were slightly older than people without T2DM suggesting that the age structures differs between the two groups the body's ability to produce and use insulin deteriorate as one ages, placing older adult at an elevated rate of developing T2DM the sharpest increase in the prevalence of T2DM occur after the age of 40 in this study women in the 34-54 year age group has the highest proportion of T2DM more than 50% of the affected woman in this study were of working age that is between 25 and 64 years which is common future in developing countries(8, 13). Previous studies came to some conclusions about the role of depression as a cause of diabetes(3). So many studies found no evidence to support etiological relationship between depression and diabetes as well overall relationship between diabetes and depression (8, 14).

Moreover, among pregnancy-related factors, GDM, preeclampsia and number of pregnancies were found to increase the odds of T2DM in this study (7, 8, 10). For any population and ethnic group, the risk of GDM indicates the underlying frequency of T2DM. Similarly Hassan et al. found that women with GDM had an increased risk of developing T2DM compared with those without GDM(8). Although meta-analysis reported significant association between T2DM and gestational hypertension, the participating women with a history of gestational hypertension in this study were not associated with increased risk of T2DM(7). Our study could also suggest that the risk of developing T2DM is lower among those women who were pregnant at age above 45 years.

## 7. Conclusion

This study supports the hypothesis that T2DM is not a significant risk factor for depression and anxiety symptoms. Anxiety symptoms were more commonly found among diabetics than depression symptoms. However, both depression and anxiety was not significantly associated with increased odds of T2DM. This study also confirms previous findings that GDM and preeclampsia are the important risk factors for T2DM. Although prevalence of depression and anxiety is not alarming, the findings may alert clinicians to screen and treat anxiety and depression in people with diabetes. Additional properly designed studies are needed to establish the strength and direction of this relationship.

## 8. Acknowledgement

The authors thank the staff of Departments of Biology and Biochemistry, Umaru Musa Yar'adua University, Katsina, Nigeria for showing their interest in the study. The same goes to the Ministry of Health and General Hospital, Katsina State, Nigeria for granting the ethical approval and providing full support throughout the study period.

## References

- [1] Yanoff M, Sassani JW. 15 - Diabetes Mellitus. In: Sassani MYW, editor. *Ocular Pathology* (Seventh Edition). London: W.B. Saunders; 2015. p. 527-53.e7.
- [2] Dunne F. Type 2 diabetes and pregnancy. *Seminars in Fetal and Neonatal Medicine*. 2005;10(4):333-9.
- [3] Allweiss MD. 4 - PREGNANCY AND DIABETES. In: Soskin S, editor. *Progress in Clinical Endocrinology*: Butterworth-Heinemann; 2013. p. 263-9.
- [4] Cundy T. Pregnancy loss and neonatal death in women with type 1 or type 2 diabetes mellitus. *Insulin*. 2008;3(3):167-75.
- [5] Feghali MN, Driggers RW, Miodovnik M, Umans JG. 16 - Diabetes in Pregnancy. In: Mattison DR, editor. *Clinical Pharmacology during Pregnancy*: Academic Press; 2013. p. 257-73.
- [6] Irminger-Finger I, Jastrow N, Irion O. Preeclampsia: A danger growing in disguise. *The International Journal of Biochemistry & Cell Biology*. 2008;40(10):1979-83.
- [7] Amu J, Keith R, Sharan V, Misra P. O48 Audit of antenatal screening for gestational diabetes. *International Journal of Gynecology & Obstetrics*. 2009;107, Supplement 2(0):S107.
- [8] Hasan SS, Thiruchelvam K, Ahmed SI, Clavarino AM, Mamun AA, Kairuz T. Pregnancy complications, mental health-related problems and type 2 diabetes mellitus in Malaysian women. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*. 2013;7(4):191-7.
- [9] Hunt KF, Whitelaw BC, Gayle C. Gestational diabetes. *Obstetrics, Gynaecology & Reproductive Medicine*. 2014;24(8):238-44.
- [10] Stewart ZA, Murphy HR. Gestational diabetes. *Medicine*. 2015;43(1):44-7.
- [11] Wu S-FV, Huang Y-C, Liang S-Y, Wang T-J, Lee M-C, Tung H-H. Relationships among depression, anxiety, self-care behaviour and diabetes education difficulties in patients with type-2 diabetes: A cross-sectional questionnaire survey. *International Journal of Nursing Studies*. 2011;48(11):1376-83.
- [12] Zhang C-X, Chen Y-M, Chen W-Q. Association of psychosocial factors with anxiety and depressive symptoms in Chinese patients with type 2 diabetes. *Diabetes Research and Clinical Practice*. 2008;79(3):523-30.
- [13] Hirsch IB. *Diabetes Management*. Medical Clinics of North America. 2015;99(1):xvii-xviii.
- [14] Hui AL, Sevenhuysen G, Harvey D, Salamon E. Stress and Anxiety in Women with Gestational Diabetes during Dietary Management. *Canadian Journal of Diabetes*. 2014; 38(5, Supplement):S36.