

# Prevalence of Diabetes Mellitus among Benue State University Students

## RESEARCH ARTICLE

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## ABSTRACT

This study was conducted to detect the prevalence of diabetes mellitus among Benue State University students. A total of 300 students were randomly sampled. Blood samples were collected and analyzed using a glucometer to access their blood sugar levels. The results indicated that 21(7.0%) out of the 300 students sampled were diabetic. Infection according to sex showed that male (9.52%) had higher prevalence than female (4.58%). In relation to age, 55years (33.33%) and above had the highest prevalence, this result can be attributed to the relatively small sample size. According to location on campus, students in second campus(8%) showed higher prevalence of the disorder. Diabetes was seen to be more prevalent among students that did not exercise (76.19%). Chi square analysis showed a significant difference ( $P=0.040$ ) ( $P<0.05$ ) in the rate of diabetes in relation to age. There was no significant difference ( $P>0.05$ ) in the rate of the disorder between sex, location, family history and frequency of exercise. This study shows that diabetes is endemic in Benue State University, hence, stake holders in the health sector should intensify efforts towards public awareness to reduce infection rate and to manage the disease. There is need for a comprehensive and integrated approach to diabetes prevention, control and management.

**Keywords:** Diabetes Mellitus, Prevalence, Students.

## INTRODUCTION

Diabetes mellitus is one of the most dangerous non-communicable diseases. It is one of the major causes of mortality, blindness, kidney failure, heart attacks and strokes among other diseases in both developing and developed countries. It is often simply referred to as "diabetes" which stems from a Greek term for "passing through", a reference to increased urination (polyuria), and a common symptom of the disease. "Mellitus" is the Latin word for "honeyed", a reference to the glucose noted in the urine of diabetic patients. Diabetes mellitus is a disease caused by either insufficient insulin production or decreased sensitivity of cells to insulin or a group of metabolic diseases that lead to high blood glucose levels due to defects in either insulin secretion or insulin action. Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. The chronic hyperglycemia of diabetes is associated with long term damage, dysfunction and failure of different organs especially the eyes, kidneys, nerves, heart and blood vessels. Diabetes mellitus

is a life-long disease marked by elevated levels of sugar in the blood. It is the second leading cause of blindness and renal diseases worldwide. Diabetes mellitus is a chronic disease caused by inherited and/or acquired deficiency in the production of insulin by the pancreas or by ineffectiveness of the insulin produced [1-4]. Diabetes is classified into type 1, type 2, gestational diabetes and other specific types. Several pathogenic processes are involved in the development of diabetes. These range from autoimmune destruction of the pancreatic cells with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The basis of the abnormalities in carbohydrate, fat and protein metabolism in diabetes is deficient action of insulin on target tissues. Deficient insulin action results from inadequate insulin secretion and/or diminished tissue responses to insulin at one or more points in the complex pathways of hormone action. Impairment of insulin secretion and defects in insulin action frequently coexist in the same patient and is often unclear which abnormality, if either alone, is the primary cause of the hyperglycemia [1].

The incidence of diabetes has soared worldwide in recent years and is expected to keep growing with the increase seen in metabolic forms of diabetes. This is largely blamed on the rise on obesity and the global spread of Western-style habits; physical inactivity, along with a diet that is high in calories, processed carbohydrates and saturated fats and insufficient in fibre-rich whole foods. The aging of the population is also a factor. However, other factors like environmental factors may also contribute [5]. It has been estimated that the number of people living with diabetes has risen from 108 million in 1980 to 422 million in 2014 [6]. The prevalence of diabetes among adults over 18 years of age had risen from 4.7% in 1980 to 8.5% in 2014. The prevalence has been rising more rapidly in middle- and low-income countries. In 2016, an estimated 1.2 million deaths were directly caused by diabetes. More than half of all deaths attributed to high blood glucose occur before the age of 70 years.

According to [7], an estimated 15.5 million adults aged 20-79 years were living with diabetes in Africa in 2017 with a regional prevalence of 3.3%. More than half (55.3%) of adults living with diabetes in Africa live in urban areas. Currently, Sub-Saharan Africa is estimated to have at least 10 million people with diabetes and about 62% are not diagnosed. In Sub-Saharan Africa, Nigeria has the highest number of people with diabetes with an estimated number of 3.9 million. The prevalence of the varying types of diabetes in adolescents and gestational diabetes mellitus (GDM) is also more recognized now. Type 1 diabetes is often misdiagnosed or undiagnosed and may result in coma and/or death. Deaths related to diabetes in Nigeria in 2013 were estimated to be 105,091 cases. More than half of these deaths occurred in people less than 60 years of age. Hyperglycemia and glycosuria indicates the major metabolic lesions in carbohydrate metabolism accompanied by metabolic disturbance in protein (gluconeogenesis) and lipids (ketosis and hypercholesterolemia). The presence of hyperglycemia and renal glycosuria with an osmotic diuresis (polyuria) which eventually lead to dehydration and its associated polydipsia. Hyperglycemia is sustained by the process of glycogen lysis and gluconeogenesis which enhance the production of more glucose [1]. With the rise in diabetes mellitus cases and deaths observed, it is becoming disturbing with the little or no improvement in its care over the years after past research reported that physicians, equipments, tests and drugs for diabetes were found to be inadequate in major health facilities [8]. A review of the current prevalence of the disease, the availability of health professionals engaged in managing the disease across the country will help promote awareness of the dangers of diabetes, encourage government to provide more resources for diabetes care and educate people to adopt healthy lifestyles to reduce the risk of becoming diabetic. The author in [9] reported that not less than 1.05 million Nigerians are likely to be diabetic and some suffer from diabetic complications such as retinopathy, neuropathy, macroangiopathy, slow healing sores/wounds, kidney failure, amputations, blindness, heart diseases, nerve damage and stroke. Diabetes is

associated with long-term complications that affect almost every organ of the body. Uncontrolled diabetes can complicate pregnancy and birth defects are more common in babies born to diabetic women. Diabetes often goes undetected because symptoms can be attributed to many other cases and some patients fail to heed to warning signs. It is on this premise that this study seeks to determine the prevalence of diabetes mellitus among Benue State University students.

## MATERIAL AND METHOD

### Description of study area

The Study was carried out in Benue State University, Makurdi. The school is located at Km 1, Gboko road, Makurdi, Benue state. It is located near the southern bridgehead of the Benue River on a sandy alluvial formation. It occupies 6 square kilometers piece of land between Gboko road and River Benue, approximately 1.5km wide and 4km wide. The land slopes gently from Gboko road towards River Benue with variable gradients ranging from 0.50 as a consequence much of the area is well drained though some portions experience hydro orphic condition which may serve as breeding sites for mosquitoes. Being part of Makurdi town, the University experienced sticky debilitating conditions both in the wet and dry seasons a characteristic of the Benue trough, the Benue State University is located between the South bank of River Benue and the Makurdi Gboko high way. The University gates are located along a by motor way that leads up to the Makurdi Airport. The Benue State University comprise of eight (8) faculties which are faculty of Arts, education, Environmental sciences, Health sciences, Law, management sciences, sciences and social sciences. Within these faculties are a total of 27 departments in the 2015/2016 session a grand total of 25818 students was recorded in the university [10-11].

### Study design and sample size

The study was carried out in Benue State University, Makurdi. Samples were randomly collected from students in both the eastern and Western wings of the university campus. Sample size determination is the act of choosing the number of observations or replicates to include in a statistical sample. Larger samples are more closely approximate to the population hence they are better than smaller sample sizes. A target population of 300 students were sampled.

### Ethical clearance

Research ethics govern the standards of conduct for scientific researchers. It is important to adhere to ethical principles in order to protect the rights and welfare of research participants. As such, it is advised that all research involving human beings should be reviewed by appropriate ethics committee. Since the samples for this study are human, it was necessary to obtain ethical clearance. A letter was written to the Benue State Primary Health Care Board. After a brief oral interview with the personal assistant of the executive secretary of the organization, the clearance was granted.

### Data sources

#### Primary data sources

The population was randomly selected from the university campus. Questionnaires were administered and an oral interview conducted. Questions included factors that predisposes them to acquiring the disease, what they think could be causes of the disease, their eating habits, the source or kinds of food they eat and how frequently they exercise.

#### Secondary data sources

Specimens (blood samples) of 300 students were collected from both male and female students within the school campus. Records on the number of students diagnosed with diabetes were taken as well as those with normal blood sugar levels. This record covered the period during

which the study was conducted. These records helped in determining the prevalence of diabetes in the region.

### Diagnostic method and procedure

#### Diagnostic method

The diagnostic method used for examining the blood samples or specimens was the direct glucometer method with emphasis on the fasting blood sugar (FBS) also known as fasting blood glucose concentration (FBG) with the use of a glucometer and testing strips which determine the blood sugar levels.

#### Procedure

- i. Hand gloves were worn and all materials to be used were neatly arranged.
- ii. Using alcohol swab, the fingertip to be lanced was disinfected
- iii. Using a lancet, the tip of the disinfected finger was pricked, and the first drop of blood wiped away.
- iv. Applying a little pressure, the second drop of blood was squeezed onto the specimen pad on the specimen pad on the test strip.
- v. The glucometer was allowed to process and display the result on the screen. The result was then recorded.

#### Method of data analysis

Simple percentages were computed to describe the data and were presented in tables. The data were imputed in computer software known as Statistical Package for Social Science (SPSS) and chi-square test was used to determine the prevalence of infection and significance level of diabetic (hyperglycemic) students at 0.05 level of significance.

## RESULTS

A total of the 300 students were sampled, 21 had high blood sugar levels which represents (7%) of the sampled population. Figure 1 illustrates the prevalence of diabetes mellitus among the students of Benue State University as deduced from this study.

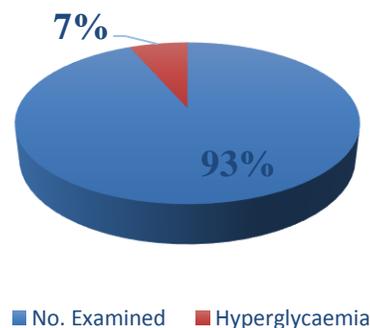


Figure 1:Prevalence rate of diabetes

The occurrence of hyperglycemia in relation to sex indicated that out 300 students examined, 147 were male and 14 of them (9.52%) were hyperglycemic (diabetic) while 153 of the examined students were female out of which 7 (4.58) were hyperglycemic. Chi-square ( $\chi^2$ ) analysis indicated no significant difference ( $P = 0.93$ ) as presented in Table 1.

Table 1: Occurrence of Hyperglycemia in relation to sex

| Sex          | No. Examined | Hyperglycemia | Percentage (%) | $\chi^2$ | p-value |
|--------------|--------------|---------------|----------------|----------|---------|
| Male         | 147          | 14            | 9.52           | 2.61     | 0.93    |
| Female       | 153          | 7             | 4.58           |          |         |
| <b>Total</b> | <b>300</b>   | <b>21</b>     |                |          |         |

Table 2 shows the occurrence of hyperglycemia among students in relation to location. The location in this study has to do with the two campuses of the University, the Western and Eastern wings of the campus. About 150 students were examined from each campus of which 9 were hyperglycemic in the Western wing and 12 in Eastern wing. The percentage prevalence of diabetes among students in the Western wing of the campus is 6.0% and 8.0% in the Eastern wing. The chi-square value is 0.43 and p-value of 0.497 (not statistically significant). From the statistics, it can be deduced that prevalence is higher among students in the Eastern wing than that of the students in the Western wing.

Table 2: Occurrence of Hyperglycemia in relation to location

| Location     | No. Examined | Hyperglycemia | Percentage (%) | $\chi^2$ | p-value |
|--------------|--------------|---------------|----------------|----------|---------|
| Western wing | 150          | 9             | 6.0            | 0.43     | 0.497   |
| Eastern wing | 150          | 12            | 8.0            |          |         |
| <b>Total</b> | <b>300</b>   | <b>21</b>     |                |          |         |

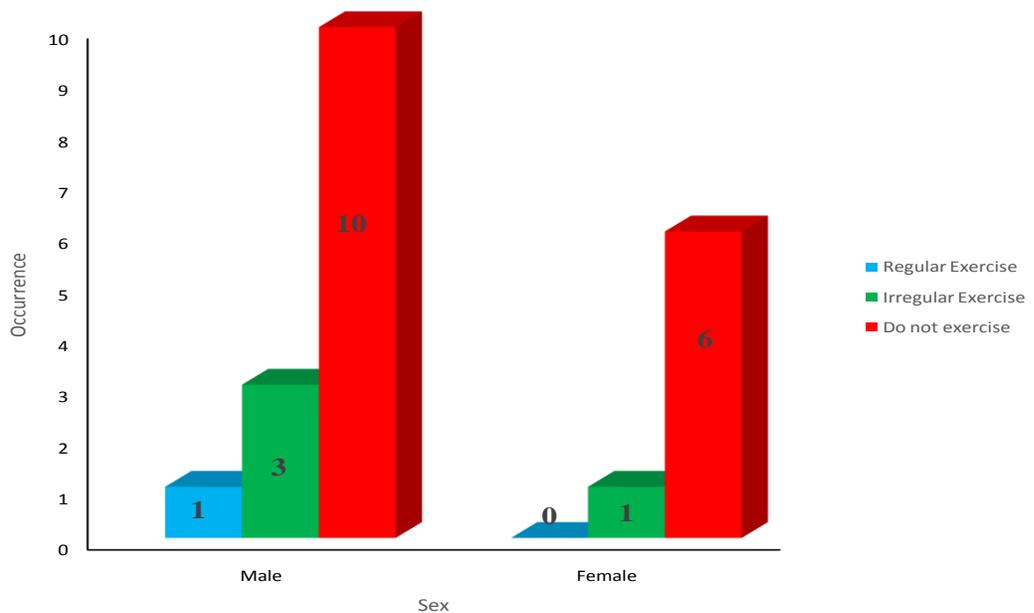
Diabetes mellitus is usually thought of as a disease associated with only the aged. Table 3 shows occurrence of the disease in relation to the age of the students. Out of the 300 students examined, 191 were between the age of 15-25 and 10 of them were hyperglycemic with a prevalence of 5.24%. 66 students were between the ages of 26-35, 9 of which were hyperglycemic which a prevalence of 13.64%. Students between the ages of 36-45 were 26 in numbers, 1 was hyperglycemic with a prevalence of 3.85%. 14 of the examined students were between 46-55 years, none of them had high blood sugar level. 3 students were above 55 years and 1 was hyperglycemic with a prevalence of 33.33%. The chi-square value of the occurrence of diabetes mellitus among students in relation to age is 9.63 and a p-value of 0.040 (statistically significant). Figure 5 shows the prevalence in relation to age in percentage.

Table 3: Occurrence of Hyperglycemia in relation to age

| Age          | No. Examined | Hyperglycemia | Prevalence (%) | $\chi^2$ | p-value |
|--------------|--------------|---------------|----------------|----------|---------|
| 15 - 25      | 191          | 10            | 5.24           |          |         |
| 26 - 35      | 66           | 9             | 13.64          |          |         |
| 36 - 45      | 26           | 1             | 3.85           |          |         |
| 46 - 55      | 14           | 0             | 0.00           |          |         |
| > 55         | 3            | 1             | 33.33          | 9.63     | 0.040*  |
| <b>Total</b> | <b>300</b>   | <b>21</b>     | <b>7.00</b>    |          |         |

\* There is a significance difference at  $p < 0.05$

Relationship between sex and exercise among diabetic students is represented in Figure 2. The result shows that 14 male students were hyperglycemic and 1 exercise regularly, 3 exercise irregularly and 10 hardly exercise. A total of 7 female students were hyperglycemic, 1 exercise irregularly and 6 do not exercise. Physical inactivity is one of the risk factors of diabetes mellitus. This result indicates that those with exercise impairment are more prone to being diabetic. The correlation coefficient is 0.052 and p-value is 0.821(not statistically significant).



R = 0.052; p-value = 0.821

Figure 2: Relationship between sex and exercise among diabetic students

The prevalence of diabetes mellitus in the study among Benue State University students is 7%. The prevalence in this study is higher than that of the study carried out by Uloko *et al*, 2018 in the North-Eastern (5.9%), North-Western (3.0%), North-Central (3.8%), South-Western (5.5%) and South-Eastern (4.6%) regions of Nigeria but lower than the prevalence in the South-

Southern (9.8%) region. The prevalence was seen to be highest among students above 55 years of age(33.33%), because of the relatively small sample size followed by those between 26-35 years of age(13.64). In relation to sex, men (9.52%) showed higher prevalence than the women (4.58%). This study demonstrates that the male gender is more prone to diabetes than the female. This may be attributed to the habit of smoking and consuming alcohol which is more common among the male. Smoking and consumption of alcohol increases the risk of becoming diabetic. This agrees with the study of Adeloye *et al.* 2010 who reported a greater prevalence in men(4.4%) than women (4.1%). This study Regensteiner *et al.* 2008who reported that diabetic women have greater exercise impairment than diabetic men.

The reason for the high prevalence of diabetes among the students could be attributed to the increase in physical inactivity, increased consumption of diet with high calories (processed food) and adoption of Western lifestyles such as smoking and consumption of alcohol. The results also revealed that the disease was higher among those with family history of the disease and those that are physically inactive.

## CONCLUSION

In this study, the findings showed that diabetes mellitus is prevalent among students of Benue State University. The high index in diabetes mellitus usually signifies the deficiencies in healthy diets, lifestyles and hereditary traits. Diabetes is more prevalent among the male students, this could be attributed to habits like smoking and consumption of alcohol which is more common among males. Additionally, diabetes mellitus is a problem in Benue State University and as such, it is expected that this study will reawaken the need to implement programs that will prevent and control the non-communicable epidemic. Health education programs should be encouraged in schools, communities and through the media to create more awareness of the dangers of diabetes and the need to live healthier. Medications used for diabetes treatment should be made more affordable and available to diabetics. Facilities for management of diabetes and its complications should also be provided to improve outcome.

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