



## Assessment of Prevalence of Impaired Blood Glucose among Staff of University of Maiduguri

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**Abstract.** This study aimed to assess the prevalence of impaired blood glucose among staff at the University of Maiduguri, Nigeria, to identify potential public health concerns within an occupational setting. Utilizing an ex-post-facto cross-sectional design, the research involved 200 randomly selected staff members who underwent biomedical measurements—including fasting blood glucose, BMI, waist-to-hip ratio, and blood pressure—alongside demographic and behavioral data collection through questionnaires. The findings revealed a mean age of 42.3 years, with a gender distribution of 74% males and 26% females. The prevalence of impaired blood glucose was found to be significant; however, statistical analysis indicated no significant difference between genders ( $\chi^2=0.316$ ,  $p=0.574$ ), suggesting that both male and female staff are equally susceptible to early glucose metabolism disturbances. Most participants fell within the normal BMI range, but a considerable proportion were overweight or obese, correlating with increased risk factors for impaired glucose regulation. The results underscore the impact of sedentary lifestyles, occupational stress, and dietary habits prevalent in academic environments. Based on these findings, the study recommends routine screening programs, promotion of healthy lifestyle practices, and targeted health education campaigns to facilitate early detection and prevention of diabetes and related non-communicable diseases among university staff. Addressing these risk factors is essential for improving individual health outcomes and maintaining institutional productivity.

**Keywords:** Impaired Blood Glucose, University Staff Health, Non-Communicable Diseases, Occupational Risk Factors and Diabetes Prevention

### 1. Introduction

The global burden of diabetes mellitus has risen dramatically over recent decades, making it a major public health concern worldwide. According to the International Diabetes Federation (IDF, 2021), approximately 537 million adults aged 20-79 years were living with diabetes, and this number is projected to increase further in the coming years. Impaired blood glucose levels, including impaired fasting glucose (IFG) and impaired glucose tolerance (IGT), serve as precursors to type 2 diabetes and are critical indicators for early intervention. University staff, often engaged in sedentary work and facing high stress levels, may be at increased risk for developing glucose metabolism disorders. Despite this, limited data exists on the prevalence of impaired blood glucose specifically among academic and administrative staff in higher education institutions.

The workplace environment plays a significant role in influencing health behaviors and outcomes. Several studies have demonstrated that university employees tend to have lifestyles characterized by physical inactivity, poor dietary habits, and high stress, all of which are risk factors for impaired glucose metabolism (Kivimäki et al., 2018). Moreover, the demanding nature of academic responsibilities can lead to irregular schedules and limited time for exercise, further exacerbating risk factors. Screening for blood glucose abnormalities in this population is essential to identify at-risk individuals early and implement preventive health measures. However, data on the prevalence of impaired blood glucose among university staff remains scarce, especially in developing countries.

Understanding the prevalence of impaired blood glucose among university staff is crucial for designing targeted health interventions and policies. Early detection allows for lifestyle modifications and medical management that can prevent progression to overt diabetes and its associated complications. Several cross-sectional studies have highlighted the importance of workplace health screenings, which can serve as cost-effective strategies to curb the rising tide of non-communicable diseases (NCDs) such as diabetes (WHO, 2020). Furthermore, university employees represent a vital segment of the working population, and their health status can influence overall productivity and institutional well-being. In addition, assessing the prevalence of impaired blood glucose among university staff provides insights into the broader epidemiological patterns within the community. Universities often serve as microcosms of society, reflecting underlying health trends and risk factors prevalent in the general population. Identifying high-risk individuals among staff can facilitate community-wide health initiatives and inform public health policies. Studies from various regions have reported differing prevalence rates, highlighting the importance of localized data to tailor intervention strategies effectively (Akhtar et al., 2019). Thus, conducting such assessments is a vital step toward comprehensive health promotion efforts within academic institutions.

## 2. Research Methodology

The study adopted Ex-Post-facto research design. Ex-post-facto research, also known as causal-comparative research, is a non-experimental research design used to investigate possible cause-and-effect relationships between variables after the events have already occurred. In this type of research, the researcher does not manipulate the independent variable but instead studies it as it naturally exists (Creswell & Creswell, 2018). The term “ex-post-facto” literally means “after the fact,” indicating that the researcher examines existing conditions or events to determine their possible causes or effects. This design is particularly useful in situations where experimental manipulation is either unethical or impractical, such as studying the effects of smoking, gender, or socioeconomic status on academic performance or health outcomes.

Kerlinger and Lee (2000), ex-post-facto research involves identifying groups that differ on a particular variable and then examining how these differences affect other variables. For instance, a researcher might compare the job satisfaction levels of university staff who engage in regular physical activity with those who do not, without manipulating their exercise

habits. The researcher relies on existing data or naturally occurring groups to infer relationships between variables. However, because there is no direct control over the independent variable, establishing definitive causality is difficult. Instead, the researcher can only suggest associations or possible causal links based on observed patterns and statistical analysis.

### 2.1 Instruments for the Research

To achieve the stated objectives of determining behavioural and biomedical health risk factors among staff of the University of Maiduguri, a combination of questionnaire-based tools and biomedical measurement instruments.

### 2.2 Instruments for Measuring Prevalence of Obesity

Weighing Scale – to measure body weight in kilograms.

Stadiometer – to measure height in meters.

Measuring Tape – to measure waist and hip circumference for calculating waist-to-hip ratio.

Body Mass Index (BMI) Formula – to determine obesity status using weight and height measurements.

### 2.3 Instruments for Measuring Prevalence of Impaired Blood Glucose

Glucometer with Test Strips – to measure fasting blood glucose levels.

Lancets and Alcohol Swabs – for safe and hygienic blood sample collection.

Laboratory Glucose Analyzer (optional) – for confirmatory fasting plasma glucose or HbA1c testing.

General Instruments and Materials

Informed Consent Form – to obtain voluntary participation from respondents. Data Collection Form or Questionnaire Booklet – to record all responses and measurements systematically.

### 2.4 Procedure for Data Collection

The data collection procedure for the study on behavioural and biomedical health risk factors among staff of the University of Maiduguri was involve several systematic steps to ensure accuracy, reliability, and ethical compliance. The process includes preparation and biomedical measurements.

### 2.5 Preparation Stage

Before data collection begins, ethical approval was obtained from the University of Maiduguri Research Ethics Committee. Permission was sought from the

university management to access staff members across various departments. Research assistants were trained on the objectives of the study, ethical considerations, and proper use of instruments such as sphygmomanometers, glucometers, and lipid profile kits. All instruments were calibrated and tested for accuracy before use.

### 2.6 Recruitment and Informed Consent

Participants will be selected using a systematic random sampling technique from the staff register. Each selected staff member were approached individually, and the purpose of the study will be explained. Participants were assured of confidentiality and anonymity. Those who agree to participate will sign an informed consent form before data collection begins.

### 2.7 Biomedical Measurements

After completing the questionnaires, participants undergo biomedical assessments conducted by trained health personnel.

**Blood Pressure Measurement:** Each participant rest for at least five minutes before measurement. Blood pressure were taken using a digital sphygmomanometer, with two readings recorded and the average used for analysis.

**Anthropometric Measurements:** Weight were measured using a calibrated weighing scale, and height will be measured using a stadiometer. Body Mass Index (BMI) will be calculated as weight (kg) divided by height (m<sup>2</sup>). Waist and hip circumferences will also be measured to determine waist-to-hip ratio.

**Blood Glucose Test:** Fasting blood glucose was measured using a glucometer after participants have fasted for at least eight hours.

### 2.8 Data Recording and Quality Control

All data were recorded immediately on standardized data collection forms. Each participant will be assigned a unique identification code to maintain confidentiality. The principal investigator review all forms daily to ensure completeness and accuracy. Any missing or inconsistent data will be verified with the participant where possible.

### 2.9 Data Management and Storage

Collected data were entered into a secure database using statistical software such as SPSS for analysis. Hard copies of questionnaires and measurement sheets will be stored in locked cabinets, while electronic data will be password-protected. Only the research team will have access to the data.

This procedure ensures that both behavioural and biomedical data are collected systematically, ethically, and accurately to achieve the study’s objectives on the prevalence of health risk factors among staff of the University of Maiduguri.

Data collected for the study was analysed using descriptive statistics of frequency counts and percentage to describe the demographic characteristics of the respondents while inferential statistics of chi-square was used to test the objectives at 0.05 level of significance.

## 3. Results

Descriptive Statistics of Lecturers at University of Maiduguri, Borno State  
Sample Size: N = 200

**Table 1:** Demographic Characteristics

Variable	Mean ± SD	Range
Age (years)	42.3 ± 8.7	28-65
Height (cm)	169.4 ± 8.2	152-189
Weight (kg)	73.8 ± 12.4	48-110
BMI (kg/m <sup>2</sup> )	25.7 ± 3.9	18.2-36.4

**Table 1:** Demographic Characteristics

This table presents the basic demographic data of 200 lecturers from the University of Maiduguri. The average age of the lecturers is 42.3 years, with a standard deviation of 8.7 years, indicating a middle-aged academic staff with ages ranging from 28 to 65 years. The average height is 169.4 cm, with heights spanning from 152 to 189 cm. The mean weight is 73.8 kg, varying from 48 to 110 kg. The body mass index (BMI), which assesses body fat based on height

and weight, has an average of 25.7 kg/m<sup>2</sup>, with a range from 18.2 to 36.4, indicating a mix of normal weight and overweight individuals among the lecturers.

**Table 2: Gender Distribution**

Gender	n	Percentage (%)
Male	148	74.0
Female	52	26.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

**Table 2: Gender Distribution**

This table summarizes the gender composition of the lecturer population. Out of 200 lecturers, 148 are male, representing 74% of the sample, while 52 are female, making up 26%. The total proportion adds up to 100%, illustrating a gender imbalance skewed towards males within the academic staff.

**Table 3: Characteristics by Gender**

Variable	Male (n=148)	Female (n=52)
Age (years)	43.1 ± 8.9	40.2 ± 7.8
Height (cm)	172.5 ± 7.4	160.8 ± 5.9
Weight (kg)	76.2 ± 12.1	66.9 ± 10.8
BMI (kg/m <sup>2</sup> )	25.6 ± 3.8	25.9 ± 4.2

**Table 3: Characteristics by Gender**

This table compares demographic and anthropometric variables between male and female lecturers. Males tend to be slightly older (average age 43.1 years) compared to females (40.2 years). Males are also taller (172.5 cm vs. 160.8 cm), heavier (76.2 kg vs. 66.9 kg), and have a marginally lower BMI (25.6 vs. 25.9). These differences reflect typical gender-based physical distinctions, with males generally being taller and heavier, but BMI values are similar, indicating comparable body compositions.

**Table 4: Age Distribution by Categories**

Age Category	Male n (%)	Female n (%)	Total n (%)
25-34 years	28 (18.9%)	14 (26.9%)	42 (21.0%)
35-44 years	54 (36.5%)	22 (42.3%)	76 (38.0%)
45-54 years	48 (32.4%)	13 (25.0%)	61 (30.5%)
55-65 years	18 (12.2%)	3 (5.8%)	21 (10.5%)
<b>Total</b>	<b>148 (100%)</b>	<b>52 (100%)</b>	<b>200 (100%)</b>

**Table 4: Age Distribution by Categories**

This table breaks down the age groups and gender distribution within each category. The largest proportion of lecturers falls within the 35-44 years age group, with 36.5% of males and 42.3% of females. The 45-54 years group is also significant, comprising 32.4% of males and 25% of females. Fewer lecturers are in the 55-65 years bracket, especially among females (5.8%), indicating a relatively younger academic staff overall. The data show that most lecturers are in the mid-career age range.

**Table 5: Anthropometric Characteristics by Age Group**

Age Group	n	Height (cm)	Weight (kg)	BMI (kg/m <sup>2</sup> )
25-34 years	42	170.2 ± 8.5	69.4 ± 11.2	23.9 ± 3.2
35-44 years	76	169.8 ± 8.1	73.6 ± 12.1	25.5 ± 3.7
45-54 years	61	168.9 ± 8.3	76.8 ± 12.5	26.9 ± 4.1
55-65 years	21	167.4 ± 7.9	75.3 ± 13.2	26.8 ± 4.3
<b>Overall</b>	<b>200</b>	<b>169.4 ± 8.2</b>	<b>73.8 ± 12.4</b>	<b>25.7 ± 3.9</b>

Table 5: Anthropometric Characteristics by Age Group. This table examines how height, weight, and BMI vary across different age groups. Younger lecturers (25-34 years) have a mean height of 170.2 cm, weight of 69.4 kg, and BMI of 23.9, indicating a generally healthier and leaner profile. As age increases, height slightly decreases (from 170.2 to 167.4 cm), while weight and BMI increase, reaching 76.8 kg and 26.9 BMI in the 45-54 years group. Overall, there is a trend toward increased body weight and BMI with age, which is common due to metabolic and lifestyle changes.

**Table 6: BMI Classification**

BMI Category	Male n (%)	Female n (%)	Total n (%)
Underweight (<18.5)	3 (2.0%)	2 (3.8%)	5 (2.5%)
Normal (18.5-24.9)	62 (41.9%)	20 (38.5%)	82 (41.0%)
Overweight (25.0-29.9)	58 (39.2%)	20 (38.5%)	78 (39.0%)
Obese (≥30.0)	25 (16.9%)	10 (19.2%)	35 (17.5%)
<b>Total</b>	<b>148 (100%)</b>	<b>52 (100%)</b>	<b>200 (100%)</b>

Table 6: BMI Classification. This table categorizes lecturers based on their BMI. Most are within the normal weight range (18.5-24.9), accounting for 41% of the total. Nearly 39% are overweight, and 17.5% are obese, with a small percentage (2.5%) being underweight. The distribution is roughly similar across genders, though a slightly higher percentage of females are in the obese category compared to males, highlighting potential health considerations related to body weight.

**Table 7: Academic Rank Distribution**

Academic Rank	N	Age (Mean ± SD)	Male/Female
Assistant Lecturer	38	32.4 ± 3.2	26/12
Lecturer II	52	37.8 ± 4.1	38/14
Lecturer I	48	42.5 ± 3.8	36/12
Senior Lecturer	36	48.9 ± 4.2	28/8
Associate Professor	18	53.2 ± 3.9	14/4
Professor	8	58.6 ± 3.1	6/2
<b>Total</b>	<b>200</b>	<b>42.3 ± 8.7</b>	<b>148/52</b>

Table 7: Academic Rank Distribution. The table details the academic ranks of the lecturers, with the majority being Assistant Lecturers (38) and Lecturers II (52). The average age increases with rank, from 32.4 years for Assistant Lecturers to 58.6 years for Professors, reflecting career progression. Gender distribution within ranks shows a mix, with more males occupying higher ranks. The data depict typical academic career development and demographic patterns within the university.

There is no significant difference between male and female lecturers in the prevalence of impaired blood glucose among academic staff of University of Maiduguri.

**Table 8: Summary of chi-square analysis on impaired blood glucose Classification by Gender**

Blood Glucose Status	Male	Female	Total
Impaired	45(46.62)	18(16.38)	63(63)
Normal	103(101.38)	34(35.62)	137(137)
<b>Total</b>	<b>148(148)</b>	<b>52(52)</b>	<b>200(200)</b>

Chi-Square ( $\chi^2$ )=0.316; df=1;prob=0.574

The chi-square analysis examining the prevalence of impaired blood glucose among male and female lecturers at the University of Maiduguri reveals that there is no statistically significant difference between the two genders. The calculated chi-square value ( $\chi^2 = 0.316$ ) with 1 degree of freedom results in a p-value of 0.574, which exceeds the conventional threshold of 0.05 for statistical significance. Although a higher percentage of males (46.62%) are reported to have impaired blood glucose compared to females (16.38%), this difference could be attributed to chance rather than a true underlying disparity. The similar overall prevalence rates indicate that both male and female academic staff are equally susceptible to early metabolic disturbances.

#### 4. Discussions

The study's finding that there is no significant difference in the prevalence of impaired blood glucose between male and female lecturers at the University of Maiduguri aligns with some existing research suggesting that gender may not be a primary determinant in early glucose metabolism disturbances within certain populations (Al-Lami et al., 2020). The chi-square analysis yielded a p-value of 0.574, indicating that the observed differences in impaired blood glucose levels between genders are likely due to chance rather than a true underlying disparity. This suggests that both male and female academic staff are equally susceptible to impaired glucose regulation, possibly influenced more by shared occupational and lifestyle factors than by gender-specific biological differences (Khan et al., 2019).

Biologically, men and women can exhibit differences in glucose metabolism, often attributed to hormonal variations such as insulin sensitivity influenced by sex hormones like estrogen and testosterone (Matsuzaki et al., 2014). However, these differences tend to diminish with age or in the presence of similar environmental factors, such as diet, physical activity, and stress levels, which are common in occupational settings like universities (Miller et al., 2018). In the context of academic staff, prolonged sedentary work and stress-related factors could equally impact both genders, leading to comparable rates of impaired glucose regulation. Hence, the current findings reinforce the idea that environmental and behavioral factors may play a more significant role than biological sex in the development of impaired glucose metabolism in this population.

This lack of gender disparity in impaired blood glucose prevalence emphasizes the importance of inclusive screening and health promotion strategies among university staff. Since both male and female lecturers are equally affected, health interventions should focus on lifestyle modifications such as promoting physical activity, healthy eating, and regular blood glucose monitoring across the entire workforce (WHO, 2016). Such comprehensive approaches are essential for early detection and management of pre-diabetic conditions, which can prevent progression to full-blown diabetes and reduce associated health complications (American Diabetes Association, 2021). Tailoring health programs to address shared risk factors, regardless of gender, can therefore be more effective in this setting.

The absence of a significant difference between male and female lecturers in impaired blood glucose

prevalence underscores the importance of addressing common lifestyle and occupational risk factors in the entire academic staff. These findings suggest that gender-specific interventions may not be necessary at this stage, and instead, universal preventive measures should be prioritized. Future research could explore additional variables such as age, duration of employment, and lifestyle behaviors to better understand the determinants of impaired glucose regulation and to develop targeted strategies for health promotion in academic populations (Khan et al., 2019; WHO, 2016).

#### 5. Conclusion

This study indicates that the prevalence of impaired blood glucose among staff at the University of Maiduguri is significant, with no statistically significant difference between males and females, suggesting that both genders are equally susceptible due to shared occupational and lifestyle factors such as sedentary routines and stress. These findings highlight the importance of implementing inclusive health promotion and screening programs that focus on lifestyle modifications like increased physical activity, healthy eating, and regular monitoring for all staff members, regardless of gender, to facilitate early detection and prevent progression to diabetes.

#### 6. Recommendations

Based on the study the findings recommended:

- The university should establish routine blood glucose and BMI screening for all staff to facilitate early detection of impaired glucose regulation and other non-communicable disease risk factors.
- The university should develop and promote programs that encourage physical activity, healthy eating, stress management, and weight control among staff members to reduce risk factors associated with impaired blood glucose.
- Conduct health education campaigns to raise awareness about the importance of maintaining healthy blood glucose levels and adopting lifestyle modifications to prevent diabetes.
- Create policies that facilitate physical activity, such as incorporating exercise breaks, providing fitness facilities, or encouraging active commuting to work.

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