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Prevalence Of Elevated Blood Pressure and Abnormal Blood Glucose Level Among Lecturers in The School of Applied Sciences and Technology, Auchi Polytechnic, Auchi, Edo State, Nigeria

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Abstract: ***This study investigated the prevalence of elevated blood pressure and abnormal blood glucose levels among lecturers in the School of Applied Sciences and Technology, Auchi Polytechnic, Auchi, Edo State, Nigeria. The study population comprised lecturers within the school, and a sample size of 63 respondents was obtained from an estimated population of 75 using the Taro-Yamane formula. Blood pressure and blood glucose levels were measured using a sphygmomanometer and glucometer respectively. Data obtained were analyzed using descriptive and inferential statistics. The findings showed that 77.78% and 84.13% of respondents had normal systolic and diastolic blood pressure respectively, while 22.22% and 15.87% exhibited elevated systolic and diastolic blood pressure. Results also revealed that 80.95% of respondents had normal blood glucose levels, 14.29% were pre-diabetic, and 4.76% were diabetic. Statistical analysis indicated significant relationships between sex and blood pressure as well as blood glucose levels ($p < 0.05$). In addition, blood pressure showed a positive significant relationship with blood glucose level. The study concluded that sex significantly influences blood pressure and blood glucose levels among lecturers. It therefore recommends regular health screening, healthy dietary habits, physical exercise, and stress management to reduce the risk of hypertension and diabetes among academic staff.***

Keywords: Blood Pressure, Blood Glucose, Hypertension, Blood Glucose Level, Lecturers, Auchi Polytechnic.

I. INTRODUCTION

Diabetes mellitus (DM) and hypertension are global health conditions affecting millions of people with many victims unaware that they have the sickness. Diabetes Mellitus occurs because the body cannot produce any or sufficient of the hormone insulin or use insulin efficiently (Herrywati and Dewi, 2024). According to the International Diabetes Federation (IDF), about 3.9 million Nigerians aged 20–79 years are living with diabetes. Studies in Nigeria have also reported increasing prevalence rates of diabetes among adolescents and young adults (Abubakar *et al.,* 2025). Long-term diabetes may lead to complications such as kidney disease, retinopathy, and peripheral neuropathy, while associated conditions like hypertension further increase the risk of cardiovascular and other diabetes-related complications. (Abubakar *et al*., 2025).

Academic staff are often exposed to occupational stress, sedentary lifestyles, irregular feeding patterns, and workload pressure, which may predispose them to hypertension and glucose abnormalities. (Olatunji et al., 2022; Adebimpe & Eze, 2021). Hypertension is defined as a persistent elevation of systolic blood pressure of ≥140 mmHg and diastolic blood pressure of ≥90 mmHg (WHO, 2023). Abnormal blood glucose levels may occur as hypoglycemia or hyperglycemia and are indicators of impaired glucose metabolism (ADA, 2024). Despite the increasing global burden of hypertension and diabetes mellitus, there is limited information on the prevalence of these conditions among lecturers in tertiary institutions in Nigeria (Olatunji *et al*., 2022). particularly among lecturers in Auchi Polytechnic.

Therefore, this study aims to evaluate the prevalence of elevated blood pressure and abnormal blood glucose levels among lecturers in the School of Applied Sciences and Technology, Auchi Polytechnic, Auchi.

Lecturers are exposed to stress-related activities including prolonged teaching hours, research workload, inadequate physical activity, and unhealthy dietary habits. These factors may contribute to increased blood pressure and abnormal glucose metabolism. However, there is limited documented data on the health status of lecturers in Auchi Polytechnic regarding hypertension and blood glucose abnormalities. The aim of this study is to carry out a survey on the blood glucose level and blood pressure and to determine the prevalence of elevated blood pressure and abnormal blood glucose levels among lecturers in the School of Applied Sciences and Technology, Auchi Polytechnic, Auchi.

II. LITERATURE REVIEW

Concept of Blood Pressure

Hypertension, also known as high blood pressure, is a major global public health challenge influenced by genetic and environmental factors. Its increasing prevalence in developing countries has been linked to urbanization, aging, sedentary lifestyle, obesity, excessive alcohol intake, and high salt consumption (Egwim *et al*., 2024; WHO, 2023). Hypertension (high blood pressure) is when the pressure in your blood vessels is too high (140/90 mmHg or higher), it is a long-term medical condition in which the blood pressure in the arteries is persistently elevated. It is common but can be serious if not treated. (WHO, 2023; Naish & Court, 2014). People with high blood pressure may not feel symptoms. The only way to know is to get your blood pressure checked.

Hypertension is classified into primary (essential) and secondary hypertension. Primary hypertension accounts for most cases and is mainly associated with genetic and lifestyle factors such as excessive salt intake, obesity, smoking, physical inactivity, and alcohol consumption. Secondary hypertension results from identifiable medical conditions including kidney disease, endocrine disorders, or certain medications (CDC, 2024; WHO, 2023; *Poulter et al.,* 2015). Hypertension develops through a complex interaction between genetic and environmental factors. Several genetic variations have been associated with elevated blood pressure, including common variants with minor effects and rare variants with stronger effects. In addition, studies suggest that DNA methylation at specific CpG sites may influence blood pressure regulation through effects on vascular and renal functions (Keaton *et al.,* 2024; Kato *et al*., 2015; Lifton *et al*., 2001). It is also caused by a combination of environmental, and lifestyle factors. Major risk factors include excessive salt intake, obesity, physical inactivity, smoking, alcohol consumption, stress, aging, and family history of hypertension (CDC, 2024; WHO, 2023; Poulter *et al*., 2015). Medical conditions such as diabetes mellitus, kidney disease (O'Brien *et al*., 2007) and endocrine disorders may also contribute to the development of hypertension (Whelton *et al*., 2018). In addition, occupational stress and sedentary lifestyle among working-class populations have been associated with increased prevalence of hypertension (Egwim *et al*., 2024). Hypertension has serious adverse effects on human health and is a leading risk factor for cardiovascular diseases worldwide. Persistent elevation of blood pressure can damage blood vessels and vital organs, resulting in complications such as stroke, heart failure, kidney disease, visual impairment, and heart attack (Poulter *et al*., WHO, 2023). Uncontrolled hypertension may also contribute to cognitive decline, peripheral vascular disease, and premature death (Whelton *et al*., 2018; CDC, 2024). Long-term hypertension places excessive strain on the cardiovascular system, thereby reducing life expectancy and overall quality of life (Mills *et al*., 2020).

Concept of Blood Glucose

Blood glucose (blood sugar) is the main form of sugar in the blood and the body's primary energy source. It is produced from the digestion of carbohydrates and regulated by insulin, which facilitates glucose uptake into cells for energy use. Blood glucose can be measured easily using glucometers or laboratory methods and is an important indicator of metabolic health and chronic disease risk (American Diabetes Association, 2024; World Health Organization, 2023; Guyton & Hall, 2021; Diabetes UK, 2013)Blood glucose refers to the

concentration of glucose present in the bloodstream, which serves as the body's primary source of energy. It is tightly regulated by hormones such as insulin and glucagon to maintain metabolic balance (American Diabetes Association [ADA], 2024). Normal fasting blood glucose levels typically range from 70–99 mg/dL, while levels between 100–125 mg/dL indicate prediabetes and values ≥126 mg/dL are suggestive of diabetes mellitus. Abnormally low blood glucose (hypoglycemia) occurs when levels fall below 70 mg/dL, whereas hyperglycemia refers to elevated blood glucose levels above the normal range (ADA, 2024; World Health Organization [WHO], 2023).

Occupational Stress and Health

Siegrist and Li (2020) demonstrate that structural workplace imbalances, specifically where high worker effort meets low occupational rewards, induce chronic psychological and physical strain. Occupational stress among lecturers is commonly associated with heavy workload, academic pressure, inadequate rest, and long working hours. These stressors may contribute to unhealthy lifestyle behaviours such as poor diet and physical inactivity. Sedentary lifestyle and chronic stress are important risk factors for metabolic disorders, including obesity, hypertension, and type 2 diabetes mellitus (Olatunji *et al*., 2022; Egwim *et al.,* 2024). Prolonged stress may also disrupt hormonal balance, thereby increasing susceptibility to both cardiovascular and metabolic diseases.

III. MATERIALS AND METHODS

Study Area

The study was conducted at Auchi Polytechnic, located in Auchi, Edo State, Nigeria. The institution is one of the foremost polytechnics in Nigeria, offering a wide range of academic and professional programmes. The study focused solely on the School of Applied Sciences and Technology, which comprises several departments dedicated to science and technology education. Lecturers within the School of Applied Sciences and Technology served as the target population for this study.

Study Design

This study employed a cross-sectional descriptive survey design to assess the blood glucose and blood pressure levels of lecturers in the School of Applied Sciences and Technology, Auchi Polytechnic, at a single point in time.

Study Population

The study population comprised all lecturers in the School of Applied Sciences and Technology, Auchi Polytechnic, Auchi.

Sample Size Determination

The sample size was determined using an appropriate sample size determination formula for descriptive studies. Based on the calculation, a total of 63 lecturers were selected and participated in the study.

Sampling Technique

A simple random sampling technique was employed to select participants from the study population, ensuring that each eligible lecturer had an equal chance of being included in the study.

Inclusion Criteria

A total of 63 lecturers from the School of Applied Sciences and Technology, Auchi Polytechnic, voluntarily participated in the study. Eligible participants were apparently healthy lecturers who had no severe or critical medical conditions at the time of data collection, were available during the study period, and consented to undergo blood glucose and blood pressure assessments.

Ethical considerations and Exclusion Criteria

Ethical approval for the study was obtained from the Ethics Committee of Auchi Polytechnic, Auchi, while permission to conduct the research was granted by the Polytechnic management and the Heads of Departments within the School of Applied Sciences and Technology. Written informed consent was obtained from all participants and the Primary Health Care personnel of the Auchi Polytechnic Cottage Clinic. Participation was voluntary, and confidentiality and anonymity were strictly maintained throughout the study. Pregnant women, individuals with severe or critical illnesses, and persons whose religious or socio-cultural beliefs precluded participation were excluded from the study

to minimize potential health risks and avoid factors that could influence blood glucose and blood pressure measurements. All procedures were conducted in accordance with established ethical guidelines for human research.

Materials/Apparatus

The materials and instruments used for this study included a digital sphygmomanometer for measuring blood pressure and a glucometer with compatible test strips for determining blood glucose levels. Cotton wool and methylated spirit were used for cleaning and disinfecting the skin prior to blood sample collection, thereby ensuring proper hygiene and minimizing the risk of contamination.

Procedure for Blood Pressure Measurement

Blood pressure of each respondent was measured using a digital sphygmomanometer. The Participants were seated comfortably and were allowed to rest for at least five minutes before measurement. The cuff was placed on the upper arm according to the manufacturer's instructions, and systolic and diastolic blood pressure readings were recorded.

Procedure for Blood Glucose Determination

The Blood glucose levels of each respondent were determined using a glucometer and compatible test strips. The fingertip was cleaned with methylated spirit and allowed to dry before a sterile lancet was used to obtain a capillary blood sample. The blood sample was applied to the test strip inserted into the glucometer, and the glucose reading was recorded.

Sample Size Determination

Since it was not feasible to include all lecturers in the School of Applied Sciences and Technology, Auchi Polytechnic, a representative sample was selected. The sample size of 63 lecturers was determined from the target population using the Taro Yamane formula (Yamane, 1967).

Statistical Analysis

Data obtained from the study were entered into and analyzed using appropriate statistical software. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Results were presented in tables and charts where appropriate. Data analyzed using Statistical Package for Social Sciences (SPSS). Results presented as mean ± SD and percentages. Chi-square and t-test used where necessary. Significance accepted at $p < 0.05$.

IV. RESULTS

Table 1: Systolic and Diastolic Blood Pressure status of respondents

Systolic	Male	Female	Total	p-value
Normal	29 (46.03)	20 (31.75)	49 (77.78)	0.029
Elevated	9 (14.29)	5 (7.94)	14 (22.22)	
Total	38	25	63 (100)	
Diastolic	Male	Female	Total	
Normal	32 (50.79)	21 (33.33)	53 (84.13)	0.012
Elevated	6 (9.52)	4 (6.35)	10 (15.87)	
Total	38	25	63 (100)	

Table 2: Glucose level status of respondents

Diabetic Status	Male	Female	Total	p-value
Normal (99 mg/dL and below)	30 (47.62)	21 (33.33)	51 (80.95)	0.000
Pre-Diabetics (100 – 125 mg/dL)	6 (9.52)	3 (4.76)	9 (14.29)	
Diabetics 126 mg/dL and above	2 (3.18)	1 (1.59)	3 (4.76)	
Total	38	25	63 (100)	

Table 3: Relationship between blood pressure and blood glucose

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.492	.276		5.400	.000

GLUCOSE	.330	.114	.270	2.905	.004

V. DISCUSSION

A total of 63 lecturers from the School of Applied Sciences and Technology, Auchi Polytechnic, were assessed to determine the prevalence of blood glucose abnormalities and hypertension. The findings revealed that most of the respondents had normal blood pressure and blood glucose levels; however, a proportion exhibited elevated blood pressure and abnormal glucose levels, indicating the presence of metabolic and cardiovascular risk factors within the study population.

Table 1 shows the systolic and diastolic blood pressure status of the respondents. The results revealed that 77.78% of the respondents had normal systolic blood pressure, while 22.22% had elevated systolic blood pressure. Similarly, 84.13% had normal diastolic blood pressure, whereas 15.87% had elevated diastolic blood pressure. The significant p-values obtained for systolic ($p = 0.029$) and diastolic ($p = 0.012$) blood pressure indicate that sex significantly influenced blood pressure status among the respondents. This finding agrees with the report of Gassara et al. (2021), who observed that males are more likely to develop hypertension at an earlier age than females. The elevated blood pressure observed among some lecturers may be associated with occupational stress, sedentary work patterns, inadequate physical activity, and poor dietary habits, which are common among academic staff. The prevalence of hypertension observed in this study is also comparable to the findings of Okorie *et al.* (2018), who reported a moderately high prevalence of hypertension among Nigerian adults.

Table 2 presents the blood glucose status of the respondents. The results showed that 80.95% had normal blood glucose levels, 14.29% were pre-diabetic, and 4.76% were diabetic. The significant relationship observed between sex and blood glucose status ($p < 0.001$) suggests that sex may influence glucose regulation among the lecturers. The presence of pre-diabetic and diabetic individuals among apparently healthy respondents is of public health concern because pre-diabetes is a major risk factor for the development of type 2 diabetes mellitus. This finding supports previous reports that early identification of individuals with pre-diabetes is essential for preventing the progression to diabetes through lifestyle modifications such as healthy eating, regular physical activity, and weight management. The occurrence of abnormal glucose levels may be attributed to factors such as poor dietary habits, physical inactivity, obesity, and advancing age.

Table 3 examined the relationship between blood pressure and blood glucose levels. The regression analysis revealed a significant positive relationship between blood glucose and blood pressure ($\beta = 0.270$, $p = 0.004$), indicating that increases in blood glucose levels were associated with increases in blood pressure. This finding is consistent with the study of Onyeji et al. (2023), who reported elevated mean blood sugar and blood pressure levels among adults. The association may be explained by common risk factors shared by both conditions, including obesity, insulin resistance, unhealthy diet, and sedentary lifestyle. However, the present finding differs from that of Oladoyinbo *et al.* (2017), who reported no significant relationship between sex and the prevalence of hypertension and diabetes.

Overall, the findings highlight the need for regular health screening, health education, and lifestyle modification programmes among lecturers. Adoption of healthy dietary practices, increased physical activity, stress management, and routine monitoring of blood pressure and blood glucose levels may help reduce the burden of hypertension, diabetes, and other cardiovascular diseases within the academic community.

VI. CONCLUSION

This study concludes that there is a significant relationship between blood pressure and blood glucose levels among the respondents. It was also observed that sex has a significant influence on both blood pressure and blood glucose levels. The findings indicate a growing concern regarding hypertension and diabetes among young adults, with a considerable proportion likely remaining undiagnosed. Therefore, early diagnosis and timely

detection are essential in reducing the burden of hypertension and diabetes in Nigeria.

VII. RECOMMENDATIONS

This study recommends the adoption of healthy lifestyle practices such as regular physical exercise, balanced diet, and effective stress management in order to prevent and control hypertension and diabetes. It further recommends that blood pressure and blood glucose levels should be routinely monitored to ensure early detection and promote effective management of these conditions. In addition, there should be intensified public health education and awareness campaigns on the importance of weight management and healthy lifestyle practices in the prevention and control of hypertension and diabetes.

Furthermore, the Nigerian government should create more job opportunities in order to reduce the workload and occupational stress on lecturers, as excessive workload may contribute to increased risk of hypertension and other related metabolic disorders.

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