



Prevalence of Hypertension and Associated Cardiovascular Risk Factors: A Crosssectional Study in an Urban Community in North Western Nigeria

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Abstract

Review Article

Background: The prevalence of hypertension and associated cardiovascular risk factors in Gusau north western Nigeria is on the increasing trend. Hypertension is a major public health problem in Gusau the Zamfara State capital. This study aimed to estimate the prevalence of hypertension and associated cardiovascular risk factors in Shaiskawa area of Gusau in the North western Nigeria.

Methods: A consenting adult populations of Shaiskawa community in Gusau North western Nigeria participated for the screening exercise. Two hundred and one respondents aged 18 years and above completed a standardized, structured, pretested, questionnaire which was part of the activities celebrating World Hypertension Day in 2025. Anthropometric parameters, blood pressure and blood glucose of the respondents were recorded, and the data were analyzed using the Statistical Package for Social Sciences version 25.

Results: Most of the respondents were female 113(56.2%) and majority of them were within the age of 51-60 years 48(28.8%). Out of 201 participants 63(31.3%) of them were found to be pre hypertensive, 111(51.3%) of them were hypertensive, 60(33.8%) of them were overweight, 46(22.9%) were obese, 28(13.9%) were prediabetics, and 11(5.5%) of them were diabetics.

Conclusions: The prevalence of hypertension is found to be high with an increasing prevalence of prehypertension, overweight and obesity among the respondents.

Community-based screening programme and regular health education activities should be given priority for the early detection and prevention of hypertension and it associated cardiovascular risk factors.

Keywords: Cardiovascular, Prevalence, Risk factors, Hypertension, Urban community.

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Background

Hypertension is a significant public health problem and a major contributor of cardiovascular morbidity and mortality globally.¹

The worldwide prevalence of hypertension is around one billion, hypertension affect one in every three adult with an estimated annual mortality of 7.1million.² Sub-saharan Africa has the highest (46%) prevalence of hypertension and the lowest prevalence is more in America (35%).^{2,3} The increasing prevalence of hypertension in Sub-saharan Africa is attributed to sedentary lifestyle, urbanization, overweight / obesity, unhealthy dietary practices, and advance age.^{3,4}

According to the World Health Organization, cardiovascular diseases are the leading cause of morbidity and mortality both in developed and developing countries.⁵

Hypertension, overweight, obesity and diabetes mellitus contribute significantly to the increase burden of cardiovascular diseases globally.^{5,6} Hypertension is also associated with the following complications such as coronary artery diseases, cerebrovascular accident, renal failure and heart failure.⁴ Hence, adequately controlled blood pressure is associated with a lower risk of coronary heart disease, stroke, chronic kidney disease, heart failure and death.⁴ Achievement of controlled blood pressure help for the effective function of vital organs, general health and wellbeing of individual. This menace, imposes a serious financial burden on individuals, families and it contribute significantly to around 10% of total healthcare expenditure worldwide.⁷

Early identification of individuals with hypertension and associated cardiovascular risk factors help to reduce the burden of cardiovascular morbidity and mortality. Hence, identification of these individuals with hypertension and associated cardiovascular risk factors, increasing their awareness about the condition and referring them for treatment help in improving the clinical outcome of the disease of such individuals.

This awareness of hypertension, early identification

and referrals are best achieved by effective community outreach activities.

This community outreach activities help to reach and detect individual who are at risk of developing the disease or even those individuals with asymptomatic nature of the disease. The community screening activities also help to reach a large group of people and inform them about the benefit of prevention, early detection, and treatment of cardiovascular diseases.

Therefore, designing strategies for the prevention and control of hypertension and other associated cardiovascular diseases in Sub-saharan Africa is a cost-effective approach in reducing the impact and rising the economic burden of cardiovascular disease in this resource limited setting.

Several studies have been conducted on the screening for hypertension in the community, but limited studies exist on the screening of hypertension and associated cardiovascular risk factors in an urban community. Hence, this study has demonstrated the impact of screening of hypertension and selected cardiovascular risk factors in an urban community in North western Nigeria.

MATERIALS AND METHODS

Study Design and setting:

The study was a community based crosssectional screening conducted in Shaikawa area of Gusau local Government Area of Zamfara State in North West Nigeria.

Study Population

The study took place in Gusau which is one of the 14 local government area of Zamfara State. The estimated population of Zamfara state is around 6.5million, while Gusau being the state capital has an estimated population of 788,41people. The major economic activities of people of Gusau are business activities, civil service, farming and cattle rearing. The majority of them are Hausa with few populations of Igbo, Yoruba and other tribes. The only tertiary centre attended by people in this community is

Federal Medical Centre Gusau.

About 201 study participants aged 18 - 60 years and above were recruited for this study from Shaiskawa community and participated in the screening exercise. The participants were recruited through a community-based screening exercise using a voluntary participation approach, which was commonly employed in the community outreach programme. The questionnaire and consent form written in English was translated to Hausa and back translated to English and informed consent was obtained. All adult respondents aged 18 to 60-years who attended the community-based health screening exercise and also provided an informed consents were included in the screening program. Similarly, all pregnant women, and severely ill individuals and those who decline consent to participate for the screening were excluded from the study.

STUDY PROCEDURE

This study was carried out as a part of a community-based screening program to raise awareness about hypertension and associated cardiovascular risk factors during the 2025 World Hypertension Day celebrations in the Shaiskawa community. The researchers were members of the Zamfara state Hypertension Society and other staffs of Federal Medical Centre Gusau from various departments. This research assistants were jointly trained on the study protocol and data collection procedures for the program. The written and informed verbal consent was obtained from each study participants. All the study participants who consented for the programs were recruited.

Both demographic and clinical characteristics of the respondents were obtained from an interviewer administered questionnaire. The blood pressure of the respondents was measured using digital sphygmomanometer after a five minute rest in sitting position. The two blood pressure measurements were taken, and an average value of blood pressure was recorded. The systolic blood pressure of 120mmHg and diastolic blood pressure of 80mmHg was regarded as normal blood pressure while systolic blood pressure of ≥ 140 mmHg and diastolic blood

pressure of ≥ 90 mm Hg was regarded as hypertension. The weight of the respondents was measured by placing the weighing scale on a flat, hard surface with the participants wearing light clothing. The height of respondents was also measured using a stadiometer scale while the participants stand erect on the stadiometer with head gear removed. The parameters of both height and weight were used to calculate the BMI of each respondent. The random blood glucose levels of the respondents were measured using calibrated digital Accu-Chek Active® glucometers. The glucometers were quality-checked before and during the outreach programme.

Definition of Risk Factors

Hypertension was defined as systolic blood pressure of ≥ 140 mmHg and diastolic blood pressure of ≥ 90 mmHg. The hypertension was classified based on JNC 7 criteria as follows;

Stage 1 hypertension is SBP = 140–159 and/or DBP = 90–99 mmHg, and Stage 11 SBP of > 160 and DBP of 100 mmHg and above.

Prediabetic was defined as random blood glucose of 7.8–11.0mmol/l and diabetes mellitus is diagnosed when random blood glucose is > 11 mmol/l

Overweight was defined as body mass index (BMI) > 25 kg/m² and obesity was also defined and 30 kg/m² respectively.

Data collection.

The IBM SPSS version 25 software was used for the statistical analysis of data of the respondents. The demographic characteristics, such as height, weight, BMI, blood pressure and point-of-care testing for the random blood glucose of the respondents were all recorded in the semi structured questionnaire.

The descriptive statistics were used to summarize the participants' demographic and clinical characteristics. Continuous variables were represented as means, standard deviation (SD), while categorical variables were presented in frequencies and percentages.

The association between age, sex, blood glucose, and body mass index of each respondent with the blood pressure was determined using a chi square statistical analysis. The binary logistic regression analysis was used to determine the independent predictors of blood pressure among the respondents.

Ethical Consideration

The ethical approval was obtained from the research and ethical committee of Federal Medical Centre Gusau. The participation in the programme was voluntary and there was a free will given to the participants to withdraw from further evaluation after the onset of the program. An identification

number was assigned to each of the study participants for their easy identification and their confidentiality was maintained.

RESULTS

Table 1 below displayed the age and sex distribution of respondents. The mean age of the respondents was 51.2 ± 14.0 years, with the most common age group being the 51-60 years, making up 28.8% (n = 58) of the respondents. The next largest age group was 41-50 years at 23.8% (n = 48), the smallest age group was those aged 21-30 years, comprising only 7.5% (n = 15) and more than half of the respondents 113 (56.2%), were female.

Table: Demographic and clinical parameters of the respondents

Age	Frequency	Percentage
21-30	15	7.5
31-40	40	19.9
41-50	48	23.8
51-60	58	28.8
>60	40	19.9
Sex		
Male	88	43.8
Female	113	56.2
Blood pressure		
Normal Blood pressure	27	13.4
Pre hypertension	63	31.3
Hypertension	111	51.3
Body Mass Index		
Underweight	7	3.5
Normal	80	39.8
overweight	60	33.8

Obesity	46	22.9
Blood Glucose		
Normal Blood Glucose	162	80.6
Pre diabetic	28	13.9
Diabetic	11	5.5

The table 2 shows factors associated with blood pressure of the study participants. The respondents who were above 60 years of age has the best proportion of having high blood pressure (80%, n = 32) followed by those 51-60 age category (67.2%, n = 39). The female sex has the highest proportion of

having elevated blood pressure than their male counterparts. The respondents who were obese had highest proportion of having high blood pressure than those who were overweight and the differences was statistically significant ($\chi^2 = 4.718$, $p = 0.030$).

Table 2: Factors associated with blood pressure control among respondents

Variables	HYPERTENSION		Test statistic p-value
	NO (n=90) n (%)	YES (n=111) n (%)	
Age groups (in years)			
21 – 30	13 (86.7)	2 (13.3)	
31 – 40	24 (60.0)	16 (40.0)	$\chi^2 = 29.424$
41 – 50	26 (54.2)	22 (45.8)	p < 0.001
51 – 60	19 (32.8)	39 (67.2)	
> 60	8 (20.0)	32 (80.0)	
Gender			
Male	47 (53.4)	41 (46.6)	$\chi^2 = 4.718$
Female	43 (38.1)	70 (61.9)	p = 0.030
Blood glucose level			
Normal	74 (45.7)	88 (54.3)	$\chi^2 = 0.410$
Impaired	12 (42.9)	16 (57.1)	p = 0.815
Diabetic	4 (36.4)	7 (63.6)	

Body Mass Index category			
Underweight	5 (71.4)	2 (28.6)	
Normal	43 (53.8)	37 (46.2)	$\chi^2 = 8.077$
Overweight	27 (39.7)	41 (60.3)	p = 0.044
Obesity	15 (32.6)	31 (67.4)	

χ^2 = Pearson's Chi square test, **t** = Independent sample t-test, SD = Standard Deviation

The table 3 below showed the results for the independent predictors of hypertension among the respondents. After subjecting all the variables into binary logistic regression, age, sex and body mass index became independent predictors of hypertension among the respondents. The respondents aged 21-30 years were 10 times more likely to have normal blood pressure than those aged 51-60 years (Odds ratio = 10.11, p = 0.006, 95% CI = 1.959-2.143) and 23 times more likely than those

aged 60 years (Odds ratio = 23.01, p < 0.001, 95% CI = 4.100-129.102). The male respondents were 1.35 times more likely to have good blood pressure than female respondents (Odd ratio = 1.35, p = 0.0366, 95% CI = 0.704-2.591)

Similarly, respondents who were underweight were 6.7 times more likely to have normal blood pressure compare to those who were obese (Odd ratio = 6.74, p= 0.049, 95% CI = 1002 – 45.305)

Table 3: Binary Logistic Regression Analysis of Factors Associated with Hypertension Among The Study Participants.

Variable	aOR	p-value	95% CI	
			Lower	Upper
Age groups (in years)				
21 – 30 (RC)				
31 – 40	3.43	0.144	0.656	17.889
41 – 50	4.25	0.085	0.820	22.046
51 – 60	10.11	0.006	1.959	52.143
> 60	23.01	< 0.001	4.100	129.102
Gender				
Male (RC)				
Female	1.35	0.0366	0.704	2.591
Blood glucose level				

Variable	aOR	p-value	95% CI	
			Lower	Upper
Normal (RC)				
Prediabetic	0.90	0.814	0.371	2.181
Diabetic	0.99	0.993	0.244	4.055
Body Mass Index category				
Underweight (RC)				
Normal	3.16	0.224	0.494	20.208
Overweight	5.57	0.072	0.860	36.087
Obesity	6.74	0.049	1.002	45.305
aOR = Adjusted Odds Ratio, CI = Confidence interval, RC = Reference category				

DISCUSSION

This is a community-based study for screening of hypertension and associated cardiovascular risk factors in Shaiskawa area of Gusau, the state capital of Zamfara State in the North western Nigeria.

The female respondents 113(56.2%) were the predominant population than their male 88(43.8%) counterparts. This is similar to the findings of Timothy et al in North central Nigeria where 55% of their study participants were female⁽¹⁾ Similarly, this also corroborate with the findings of Sabeta et al where 58.1% of their predominant respondents were female.⁽²⁾ The reason for female predominance in this study is because female have more health care seeking behavior and tend to have access to screening activities than their male counter parts. The increase in prevalence of hypertension with age has been widely documented in both developed and developing countries.

Furthermore, in this study, the predominant respondents 58(28.8%) were within the age of 51 to 60 years. This is similar to the findings of Sebat et al where their predominant respondents 564(20.8%) were within 35-44yrs age group.² This findings is also similar to the findings of Cheryl et where

majority of their respondents were 60-years and above.³ The increase in age, is associated with increasing stiffness of the aorta and arterial walls which contribute to the increase in prevalence of hypertension among respondents.

About 63(31.3%) of the study participants were pre-hypertensive, this is similar to the findings of Sabe et al and Egbi et al in Ethiopia and South southern Nigeria where (47.3%) and 41.2% of their respondents were found to be prehypertensives.^{2,4} The increase in prevalence of prehypertension is strongly associated with the risk of cardiovascular diseases. Hence, this calls for an urgent intervention and attention among the respondents with prehypertension in order to halt their progression to overt hypertension.

The prevalence of hypertension 111(51.3%) in this study is lower than the findings of loyd et al in South Africa where 77.9% of their respondents have hypertension.⁵ Similarly, this prevalence of hypertension in this study is similar to the findings of Egbi et al (50.4%), pramila et al, (52.1%) and Ulasi et al 46% in India, South South and South eastern Nigeria respectively.^{4,6,7}

Furthermore, the prevalence of hypertension 111(51.3%) in this study is higher than the findings of Seba et al, Balsari et al, Oladipo, et al, Ikpechi, et al and Kamilu et al as 20.8%, 25%, 20.8%, 31.4% and 28.5% respectively.^{2, 8, 9, 10, 11} The probable reasons for the increasing in the prevalence of prehypertension and hypertension are genetics, environmental factors, rapid urbanization, demographic transition and sedentary lifestyle. This high prevalence of prehypertension and hypertension among the respondents suggests the need for regular health education programmes, lifestyle modification, and community based screening activities for early detection, treatment and prevention of hypertension in the community.

About 80(39.8%) of the respondents have normal body mass index, 7(3.5%) of them were under weight, 68(33.8%) of the respondents were overweight and 46(22.9%) of them were obese. This findings is contrary to the result obtained by Ifeoma et al in South western Nigeria where 83.5% of their respondents had normal BMI, 8.9% were overweight, 5.9% were underweight and 1.7% of them were obese.¹² The reason for the variations in the aforementioned studies is due to differences in geographical locations.

Furthermore, the prevalence of overweight 68(33.8%) in the index study is similar to the findings of Abisola et al (29%) in North western Nigeria, this findings of the author is also similar to the findings of Vuvor et al 20% in Ghana.^{13, 14}

Similarly, the prevalence of obesity 46(22.9%) among the respondents was higher than the result obtained by Vuvor et al in Ghana 7.5%.¹⁴ Also, the prevalence of obesity 46(22.9%) in the index study corroborated with the findings of Abisola, Eze, Isac and Ijeoma et al as 35%, 11.3%, 12.6% and 19.5% respectively.^{13, 15, 16, 17} Furthermore, the prevalence of obesity in this study is also similar to the findings of Amole and Ijeoma et al in South west and South eastern Nigeria as 20.5%, and 29.4% respectively.^{16, 17} The rapid industrialization, urbanization in developing countries contributed to sedentary life style and poor dietary habits among

such individuals. This epidemiological transition is probably the reason for the increase in the prevalence of overweight and obesity among the respondents.

About 162 (80.6%) of the respondents had normal glycaemic control, 28(13.9%) of them were pre diabetic and 11(5.5%) were diabetic. The pre diabetic prevalence of the respondents (13.9%) was higher than the level of pre-diabetic prevalence obtained by the Abisola et al (7.3%) in North central Nigeria.¹³ The differences in the demographic characteristics might be the reason for the differences among the respondents.

Also the level of diabetes mellitus among the respondents 11(5.5%) is higher than the African regional prevalence (4.2%) and lower than the IDF global prevalence of (11%).¹³ The findings of Eze and Abubakar et al in South eastern and North central Nigeria were also similar to the finding of the author in index study as 9% and 5.7% respectively.^{15, 18} Hence, there is need for regular screening of hypertensive patients for glucose abnormalities in order to reduce the risk of cardio metabolic risk factors in the community.

The vast majority 32(80%) of the study participants with elevated blood pressure were 60 years and above. This is similar to a crosssectional study in North central Nigeria where the predominant (59%) respondents with elevated blood pressure were found to be 70-years and above.¹³ The reason for the increase prevalence of hypertension with age was because of biological aging process associated with vascular stiffening of aorta and arterial walls.

From the outcome of this study, more than two third of the respondents 7(63.6%) that were hypertensive were also found to be diabetic. This is contrary to the findings of Bisola et al in North central Nigeria where less than one third 21.2% of their respondents that were hypertensive were also found to have diabetes mellitus.¹³ The differences in the study setting and demographic characteristics of the respondents might be the reason for the dissimilarities.

Furthermore, 31 (67.4%) of the respondents that

were hypertensive were also found to have comorbid obesity. This is similar to the findings of Adegoke et al in South western Nigeria where 78.6% of the respondents with hypertension had comorbid obesity.¹⁹ The changes in dietary habits and lifestyle due to urbanization and industrialization contributes to the excess prevalence of obesity among respondents which will probably result in the increased prevalence of hypertension.

The binary logistic regression analysis of the respondents' data shows that age, sex and body mass index were independent predictor of hypertension among the respondents. This findings is similar to the findings of Atoh et al in South western Nigeria where age, sex and BMI were the independent predictor of hypertension among their respondents.²⁰

Conclusion: There is high prevalence of pre hypertension, hypertension, overweight and obesity among the respondents.

Hence, age, body mass index, and sex were independent predictors of hypertension among the respondents. This necessitated for aggressive public health intervention with aim to reduce or prevent the burden of this cardiovascular risk factors.

LIMITATION

This study was done as a screening programme during the World Hypertension Day, with voluntary participation of the individuals. This voluntary participation can introduce bias in the final outcome of the study.

The cross-sectional design of the study limit causality of the relationship among the respondents.

RECOMMENDATION: There is need for regular community-based screening and health education programs with aim to raise the awareness on hypertension and associated cardiovascular risk factors.

This awareness programs should be given a priority which will assist in early detection, prevention and treatment of hypertension and its associated

cardiovascular risk factors.

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Conflict of interest

There was no conflict of interest declared by all the authors

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