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Prevalence and Risk Factors of Cardiovascular Disease in Selected Communities of Ekiti State, Southwestern Nigeria.

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KEYWORDS

Cardiovascular disease, cardiovascular disease risk factors, low and middle income countries, Anthropometrics, Blood Pressure, Dysglycaemia.

ABSTRACT:

Background: Cardiovascular diseases (CVDs) have been on the increase in the low and middle income countries (LMICs) with increase in the attendant morbidity and mortality. In spite of this, adequate attention has not been paid to cardiovascular disease risk factors (CVDRF). People living in LMICs often do not have the benefit of Primary Health Care programmes for early detection and treatment of the risk factors for CVDs.

Objectives: The study assessed the cardiovascular risk factors among the people in selected communities in Ekiti State, Southwestern Nigeria with view of reducing cardiovascular disease.

Methods: This was a cross sectional study in which six hundred and twenty six (626) consecutive and consenting participants of age ≥ 18years were interviewed from 6 randomly selected communities in the three senatorial zone of the state. The parameters obtained were respondents' socio-demographics and cardiovascular risk factors. P-value <0.05 was considered to be statistically significant.

Results: The mean age of the respondents was 48.4±17.1 years. The prevalence of cardiovascular risk was 64.9%. Being married (AOR, 3.537; 95% C1: 1.244-10.055), widowed (AOR, 4.707; 95% CI: 1.005-22.043), overweight (AOR, 7.636; 95% CI: 2.584-22.564), obese (AOR, 9.764; 95% CI: 2.984-31.947), stage 1 SBP (AOR, 2.834; 95% CI:

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1.183-6.789), stage 2 SBP (AOR, 7.614; 95% CI:1.655-35.026) were the determinants of cardiovascular risk factors in this study .

Conclusion: The results showed that there is high prevalence risk factors for cardiovascular disease in Ekiti state. The findings call for primary prevention and early detection of the risk factors through awareness and regular screening, to reduce morbidity and mortality in the area.

Introduction:

Cardiovascular diseases (CVDs) refer to a group of heart and blood vessel-related disorder.[1] Globally, it is a disease of public health importance associated with attendant morbidity and mortality.[2] In 2002, an estimated 17.9 million people died from CVDs globally,[2] and CVDs are projected to become the worldwide leading cause of morbidity and mortality by 2030.[3] This projection applies especially to low and middle-income countries, including Nigeria.[4,5] The recent rise in CVDs in developing countries has been attributed to rapid urbanization and adoption of westernized lifestyles which have led to unhealthy lifestyle behaviors, decreased physical activity, and poor dietary habits causing a rise in chronic diseases especially CVDs.[6] Other studies have suggested that 80% of the risk factors for future CVDs can be predicted from known CVDs risk factors such as hypertension, diabetes, obesity and dyslipidemia while the remaining factors are still not clear.[7,8] A study in Saudi Arabia amongst population of diverse people in 2014 reported 92.6% prevalence of CV risk factors.[9] In Nigeria, study in Lagos, Southwestern Nigeria reported 12.9% prevalence of CV risk factor in 2010 and was attributed to hypertension (20.8%), diabetes (2.5%), and abdominal obesity (14.7%).[6] Another study in Oyo State, Nigeria reported 76.9% prevalence of CV risk factors in 2020 and was attributed to systolic hypertension (29.6%), visceral obesity (35.8%), diabetes mellitus (18.8%), and physical inactivity (84.6%).[4]

In Nigeria, the prevalence and associated CVDs risk factors are not clearly understood. The absence of well-developed programs for identification and CVD risk assessment and the management of those at risk may be responsible for this observation.[6] In order to reduce the burdens of CVDs, there is need to identify the risk factors so that appropriate intervention can be instituted. Previous studies on risk factors for CVDs in Southwestern Nigeria were hospital-based.[4,6,8] This study is therefore aimed to ascertain the prevalence of CVD risk factors and its determinant among the people in selected communities of Ekiti State Southwestern Nigeria.

Materials and Methods:

Study setting

This study was conducted among adults in selected communities of Ekiti State, Southwestern Nigeria. Ekiti State has 16 local government areas and three senatorial zone, with a projected 2019 population of 3,365,736 using a growth rate of 3.1% and 2006 population figure as the baseline. [10] Ekiti State is mainly inhabited by the Yoruba ethnic group that is primarily an agrarian group. However, they live in rural, semi-urban and urban centers where some are traders, artisans and civil servants. The majority, who are civil servants and traders are involved in sedentary lifestyle by the nature of their work. There are three tertiary health facilities in the State.

Study design and population

This was a descriptive cross sectional study conducted among adults aged ≥18 years with no ongoing acute or chronic incapacitating illness. The inclusion criteria comprised all consenting respondents aged 18 years and above, while exclusion criteria were pregnant women, medically unfit persons with oedema, ascites or other chronic illnesses, and those who could not stand straight for height and weight measurement. Also exempted from the study were respondents with a history of CVDs.

Sample size and Sampling procedure: A minimum sample size (n) of 626 was calculated using the formula $n= z^2pd/d^2$,[11] where, z is equal to 1.96, cardiovascular risk prevalence rate (p) equal 76.9% from previous study, the margin of error (d) taken to be 3.5%.[4]

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Approximately six hundred and twenty six (626) were selected, to make allowance for possible non- responses. A multi stage sampling technique was used.

Research instruments and data collection methods:

A standardized interviewer-administered questionnaire adopted from WHO STEPS instrument,[12] and adapted to a local setting was employed to collect information from the respondents using ungraduates of tertiary institutions who were trained research assistants and who were familiar with the community based quantitative data collection. All the interviewers were bilingual in English and Yoruba. Anthropometric measurements were carried out for physical assessments using stadiometer (SECA 213 Height Measure, Leicester, UK) to measure height to the nearest 0.1m, digital bathroom weighing scale (SECA Clara 803 Weight Scale, GmbH and Co, Germany) for weight measurement. All measurements were carried out in line with recommended standard protocol.[13] The Systolic and diastolic blood pressures were assessed in accordance to the guidelines of the international Society of Hypertension (ISH)/ and the seventh Joint National Committee on hypertension (JNC-7).[14] using an automated digital blood pressure (BP) monitor (OMRON M3). BP measurements were taken after each participant had rested for at least 5 minutes, were well seated with their back resting on a comfortable chair and feet on the ground. BP was measured twice with the left arm at two minutes interval. Appropriate cuff size for the participant's arm was ensured and they were asked not to talk while the BP was being taken. Laboratory assistants from the community comprehensive health centers were employed to measure the Random/fasting blood sugar (RBS) level using Accu-Chek Active glucometer.

Ethical consideration and consent:

The study was approved by the Ethics and Research Committee of Federal Teaching Hospital Ido-ekiti. (ERC FETHI). When seeking consent from the respondents, the methods and objectives of the study were explained clearly to the respondents individually. For those respondents that could not read or write, the questionnaire was translated from English language to their local language by an independent interpreter who served as their legal guardian while back translation to English language was done to maintain response consistency. The respondents were told they were free to refuse or disengage participation at any time without losing any benefit of care or favour to those that participated. Thus, informed written consent either by appending signature or thumbprint was obtained from all adult respondents before starting the study. Confidentiality and privacy were ensured throughout the study. The study was at no cost to the respondents. The reporting of this study conforms to the strengthening the Reporting of observational studies in Epidemiology (STROBE) statement.[15]

Measurement of outcome variables:

Normal blood pressure was defined in respondent with a systolic blood pressure (SBP) $\leq$120 mmHg and/ or a diastolic blood pressure (DBP) $\leq$ 80mmHg, Pre-hypertension (SBP 121-139 and DBP 81-89), Stage 1 hypertension as (SBP 141-159mmHg and DBP 90-99mmHg), and Stage 2 hypertension (SBP $\geq$160mmHg and DBP$\geq$100mmHg).[15] A respondent was considered to have diabetes if his fasting blood sugar was greater than 126mg/dl or random blood sugar was greater than 200mg/dl.[16] Body mass index (BMI) of the respondents was classified into underweight ($\leq$18.5kg/m^2), normal (18.5-24.9kg/m^2), overweight .0-29.9kg/m^2), and obese ($\geq$30kg/m^2).[17]

Analysis:

The data were checked daily on the field and Statistical Package for Social Science (SPSS) version 25 (SPSS Inc., Chicago, IL, IBM Version) was used for entry and analysis. Univariate analysis of all the variables was first determined. Data were presented using frequency tables. Association between CV risk factors and other categorical variables was assessed using chi-square. For every cell with an expected value less than 5, Fishers Exact Test was used to determine the statistical significance. In the multivariate analysis, stepwise model of binary logistic regression analysis was done to determine the determinants of CVD risk. Variables imputed into the logistic model were selected based on their level of significance during the bivariate analysis. Adjusted odds ratio and 95% confidence interval were obtained to identify determinants of CVDs. Level of significance was set at $p < 0.05$ for this study.

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Results:

Table 1: Socio-demographic Characteristics of Respondents

Variable	Frequency N = 626	Percentage (%)
Age (in years)		
< 20	15	2.4
20 – 29	84	13.4
30 – 39	95	15.2
40 – 49	157	25.1
50 – 59	116	18.5
≥ 60	159	25.4
Mean age ± SD	48.4 ± 17.7	
Range (min. – max.)	16 – 100	
Sex		
Male	170	27.2
Female	456	72.8
Tribe		
Yoruba	603	96.3
Igbo	12	1.9
Hausa	1	0.2
Others	10	1.6
Education		
None	60	9.6
Primary	95	15.2
Secondary	144	23.0
Tertiary	327	52.2
Occupation		
Civil Servant/ Professional	191	30.5
Business/ Trader	145	23.2
Artisan/ Driver	632	10.1
Unskilled labourer/ Farmer	32	5.1
Unemployed	6	1.0

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Retiree	45	7.2
Health workers	82	13.1
Student	62	9.9
Religion		
Christianity	596	95.2
Islam	30	4.8
Marital Status		
Single	111	17.7
Married	417	66.6
Divorced/ Separated	58	9.3
Widowed	40	6.4

In Table 1 above, the result showed that 626 respondents were studied. The mean age of the respondents was 48.4 ±17.7 years (range 18-100). Majority of the respondents were females (72.8%), Yoruba (96.3%), and educated up to tertiary level (52.2%). Almost one-third were civil servants/ professionals (30.5%), and Christianity was the dominant religion (95.2%). The majority of the respondents were married (66.6%).

Table 2: Profile of Anthropometric Parameters, Blood Pressure and Glycaemia

Variable	**Frequency N = 626**	**Percentage (%)**
Family History of Diabetes		
Yes	68	10.9
No	558	89.1
Family History of Hypertension		
Yes	124	19.8
No	502	80.2
Body Mass Index		
Underweight	29	4.6
Normal	278	44.4
Overweight	203	32.4
Obese Class 1	85	13.6
Obese Class 2	25	4.0
Obese Class 3	6	1.0
Waist Hip Ratio		

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High	406	64.9
Normal	220	35.1
Systolic Blood Pressure		
Normal	427	68.2
Pre-hypertension	88	14.1
Stage 1 Hypertension	70	11.2
Stage 2 Hypertension	41	6.5
Diastolic Blood Pressure		
Normal	497	79.4
Pre-hypertension	17	2.7
Stage 1 Hypertension	78	12.5
Stage 2 Hypertension	34	5.4
Random Blood Sugar		
Normal	596	95.2
Dysglycaemia	30	4.8

In this study, a few of the respondents had family history of diabetes (10.9%), hypertension (19.8%), overweight (32.4%), and class 3 obesity (1.0%). The majority had high waist-hip ratio (64.9%), and only few had isolated stage 2 SBP (6.5%), isolated stage 2 DBP (5.4%), and dysglycaemia (4.8%). (Table 2).

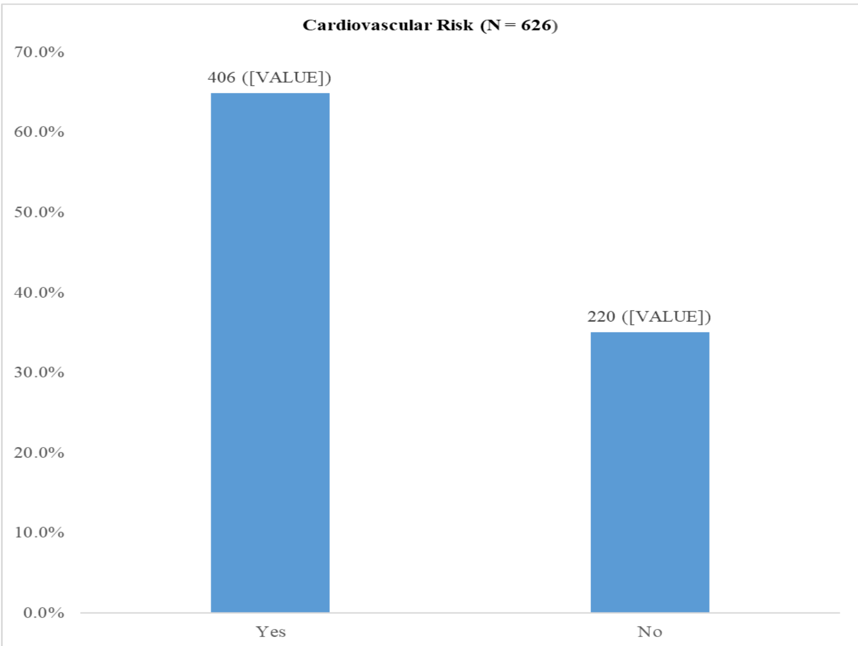

Figure 1: Presence of Cardiovascular Risk among Respondents

In this study, the proportion of respondents with cardiovascular risk was 64.9%, figure 1.

Table 3: Socio-demographic Associates of Cardiovascular Risks among Respondents

Variable	Cardiovascular Risk			
	Yes n (%)	No n (%)	χ^2	p-value
Age (in years)			140.948	**<0.001**
< 20	5 (33.3)	10 (66.7)		
20 – 29	15 (17.9)	69 (82.1)		
30 – 39	46 (48.4)	49 (51.6)		
40 – 49	113 (72.0)	44 (28.0)		
50 – 59	93 (80.2)	23 (19.8)		
≥ 60	134 (84.3)	25 (15.7)		
Sex			14.536	**<0.001**
Male	90 (52.9)	80 (47.1)		
Female	316 (69.3)	140 (30.7)		
Tribe			15.746	**<0.001**
Yoruba	400 (66.3)	203 (33.7)		
Others	6 (26.1)	17 (73.9)		
Education			18.090	**<0.001**
None	51 (85.0)	9 (15.0)		
Primary	69 (72.6)	26 (27.4)		
Secondary	93 (64.6)	51 (35.4)		
Tertiary	193 (59.0)	134 (41.0)		
Occupation			72.521	**<0.001**
Civil Servant/ Professional	134 (70.2)	57 (29.8)		
Business/ Trader	114 (78.6)	31 (21.4)		
Artisan/ Driver	37 (58.7)	26 (41.3)		
Unskilled labourer/ Farmer	24 (75.0)	8 (25.0)		
Unemployed	3 (50.0)	3 (50.0)		
Retiree	36 (80.0)	9 (20.0)		
Health worker	43 (52.4)	39 (47.6)		
Student	15 (24.2)	47 (75.8)		

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Religion			0.927	**0.336**
Christianity	389 (65.3)	207 (34.7)		
Islam	17 (56.7)	13 (43.3)		
Marital Status			123.704	**<0.001**
Single	22 (19.8)	89 (80.2)		
Married	303 (72.7)	114 (27.3)		
Divorced/ Separated	47 (81.0)	11 (19.0)		
Widowed	34 (85.0)	6 (15.0)		

In the table 3 above, There was a statistically significant association between CV risk and the respondents' age, gender, tribe, education, occupation, and marital status (p<0.001).

Table 4: Associations between Profile of Anthropometric Parameters, Blood Pressure, Glycaemia and Cardiovascular Risk among Respondents

Variable	**Cardiovascular Risk**			
	Yes n (%)	**No n (%)**	χ^2	**p-value**
Family History of Diabetes			0.697	0.404
Yes	41 (60.3)	27 (39.7)		
No	365 (65.4)	193 (34.6)		
Family History of Hypertension			5.915	**0.015**
Yes	92 (74.2)	32 (25.8)		
No	314 (62.5)	188 (37.5)		
Body Mass Index			61.371	**<0.001**
Underweight	12 (41.4)	17 (58.6)		
Normal	142 (51.1)	136 (48.9)		
Overweight	153 (75.4)	50 (24.6)		
Obese	99 (85.3)	17 (14.7)		
Systolic Blood Pressure			42.255	**<0.001**
Normal	243 (56.9)	184 (43.1)		
Pre-hypertension	65 (73.9)	23 (26.1)		
Stage 1 Hypertension	60 (85.7)	10 (14.3)		
Stage 2 Hypertension	38 (92.7)	3 (7.3)		
Diastolic Blood Pressure			7.807	**0.050**

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Normal	309 (62.2)	188 (37.8)		
Pre-hypertension	12 (70.6)	5 (29.4)		
Stage 1 Hypertension	59 (75.6)	19 (24.4)		
Stage 2 Hypertension	26 (76.5)	8 (23.5)		
Random Blood Sugar			8.740	**0.003**
Normal	379 (63.6)	217 (36.4)		
Dysglycaemia	27 (90.0)	3 (10.0)		

There was a statistically significant association between CV risk fand respondents family history of hypertension (p=0.015), BMI (p<0.001), SBP (p<0.001), RBS (0.003) as seen in Table 4.

Table 5: Binary Logistic Regression for the Predictors of Cardiovascular Risks among Respondents

Variable	**AOR**	**95% CI**		
		Upper Boundary	**Lower Boundary**	**p-value**
Age (in years)				
< 20	1.000			
20 – 29	0.477	0.122	1.864	0.287
30 – 39	0.733	0.116	4.613	0.740
40 – 49	1.644	0.254	10.650	0.602
50 – 59	2.268	0.342	15.066	0.397
≥ 60	3.895	0.530	28.622	0.181
Sex				
Male	1.000			
Female	1.347	0.826	2.197	0.232
Tribe				
Yoruba	2.116	0.683	6.558	0.194
Others	1.000			
Education				
None	1.427	0.480	4.241	0.523
Primary	0.754	0.345	1.647	0.479
Secondary	1.081	0.596	1.960	0.798
Tertiary	1.000			
Occupation				
Civil Servant/ Professional	0.641	0.181	2.273	0.491

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Business/ Trader	0.499	0.133	1.881	0.305
Artisan/ Driver	1.462	0.120	1.774	0.261
Unskilled labourer/ Farmer	1.914	0.185	4.509	0.912
Unemployed	1.388	0.133	14.510	0.784
Retiree	1.503	0.105	2.411	0.390
Health worker	1.607	0.174	2.122	0.435
Student	1.000			
Marital Status				
Single	1.000			
Married	3.537	1.244	10.055	**0.018**
Divorced/ Separated	2.880	0.716	11.592	0.137
Widowed	4.707	1.005	22.043	**0.049**
Family History of Hypertension				
Yes	0.701	0.389	1.263	0.237
No	1.000			
Body Mass Index				
Underweight	1.000			
Normal	2.308	0.834	6.383	0.107
Overweight	7.636	2.584	22.564	**<0.001**
Obese	9.764	2.984	31.947	**<0.001**
Systolic Blood Pressure				
Normal	1.000			
Pre-hypertension	1.526	0.782	2.976	0.215
Stage 1 Hypertension	2.834	1.183	6.789	**0.019**
Stage 2 Hypertension	7.614	1.655	35.026	**0.009**
Diastolic Blood Pressure				
Normal	1.000			
Pre-hypertension	0.539	0.145	1.997	0.355
Stage 1 Hypertension	0.635	0.305	1.324	0.226
Stage 2 Hypertension	0.412	0.121	1.404	0.156
Random Blood Sugar				
Normal	1.000			

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Dysglycaemia	3.288	0.781	13.843	0.105

In this study, being married (AOR, 3.537; 95% C1: 1.244-10.055), widowed (AOR, 4.707; 95% CI: 1.005-22.043), overweight (AOR, 7.636; 95% CI: 2.584-22.564), obese (AOR, 9.764; 95% CI: 2.984-31.947), stage 1 SBP (AOR, 2.834; 95% CI: 1.183-6.789), stage 2 SBP (AOR, 7.614; 95% CI: 1.655-35.026) were the determinants of cardiovascular risk factors. (Table 5).

Discussion:

In this study, the prevalence of cardiovascular risk factors was 64.9%. This high prevalence is a cause for concern since the respondents were apparently healthy individuals that are unaware of their CV risk status. This finding was close to 72.6% prevalence of CV risk reported in a study conducted in USA.[18] This could result from high prevalence of systolic hypertension, overweight, and obesity recorded among this study respondents. It may also result from the age distribution of the respondents which, many of them are above 40 years, and are viewed as susceptible to CV risk factors. The impact of age distribution to CV risk factors has been corroborated by other studies. [9, 19] Nevertheless, the prevalence of CV risk factors in this study is lower than the finding in a study in Oyo State, Nigeria which reported 76.9% prevalence of CV risk factors in 2020 and was attributed to systolic hypertension (29.6%), visceral obesity (35.8%), diabetes mellitus (18.8%), and physical inactivity (84.6%).[4] Likewise studies in Saudi Arabia by Soofi et al.[9] and in Nepal by Khanal et al.[19] have recorded higher CV risk factors prevalence of 92.6% and 86.4% respectively. This may be due to the older age population and a higher life expectancy in their studies. The mean age of respondents in this study was 48.4 (±17.7) years compared to 54.2 (± 11.1) and 53.5 (± 10.1) years reported respectively in their studies. The finding in this study calls for primary prevention of CV risk factors which has been identified as a cost-effective means of reducing CVDs morbidity and mortality in developing countries. However, the prevalence of CV risk factors found in our study was higher than 12.9% reported in a population -based study conducted in Lagos, Southwestern Nigeria.[6] Despite that the study was done in the same geopolitical zone but different states, there is a wide gab in the prevalence of CVD risk factors. The disparity may be due to the lower age distribution in their study (mean age was 42.1 ±21.6 years compared to 48.4 ±17.7 years our study).

This study has established a significant association between CV risk and marital status of the respondents. The mechanisms underlying the role of marital status on CVD are not entirely understood. Several studies have linked marital status as a risk factor for CVDs to neuro-endocrine pathways, healthy lifestyle behaviors (such as physical activity and diet), psycho pathological factors, and biological mediators pathway. [4,5,20] In this study, being married was 3.737 times as likely to increase the risk of CVDs when compared to single respondents. This was consistent with the reports of Ramezankhani et al.[21] who found that married individuals were associated with the risk of developing CVDs. This may be related to the age and associated BMI of the respondents. In our study, at baseline, single respondents were younger and had a lower BMI when compared with married respondents. This highlights the role of age and BMI as an important con-founder in this relationship. In contrast, several other studies have reported a negative association between married individuals and the risk for CVDs.[20,22,23] These studies relied on social causation theory that suggests that individuals benefit from spousal support and living together would allow earlier recognition and response to warning symptoms.[22-24] However, other studies have found no significant association between risk of CVDs and married individuals.[25,26]

Similarly, this study has found that being a widow was 4.707 times as likely to develop the risk for CVDs compared to being single. Our finding was consistent with the reports of other studies. [20,22] The interpretation of marital status on CVDs becomes more complex with the inclusion of divorced or widowed. [26,27] Several mechanisms have been suggested to account for the negative effect of widowed on CVDs.[20,22] Stress-related theory suggests that partner loss may have a negative effect on the economic, behavioral and emotional well being of an individual which may reduce the one's ability to prevent, detect or treat illness.[27,28] This stress has tendency to trigger the development of other CV risk factors such as hypertension, diabetes, dyslipidaemia, and

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obesity.[20.22] Other study has found loss of social support to play a role in determining poor outcomes in widowed individuals.[24] The relationship between widowed identified as risk factor for CVDs is complex and requires further study to fully identify the mechanisms underlying these differences in outcomes.

This study identified respondents with overweight 7.636 times more likely to develop CV risk factors than those with normal values. This was consistent with other studies.[4,5] One could recommend from here that clinicians and other stakeholders who take care these patients should consider body mass index measurement as routine screening in clinical practice to predict those at risk early enough, and of equal importance, to recommend an appropriate intervention to reduce the incidence of obesity and other co-morbid conditions associated with overweight.

In this study, obesity was identified as determinants of CV risk factor as it confers 9.764 times as likelihood of developing CVDs compared with non-obese individuals. The pathogenesis of obesity as a risk factor for CVDs is multi-factorial with genetic, environmental, and lifestyle causes.[29-31] The high prevalence of respondents with obesity in this study is worrisome and calls for concerted efforts to create awareness on its consequences, and the need for lifestyle modification to enhance its control. The high prevalence may be due to strong association between obesity and major CV risk factors such as stage 1 and 2 isolated systolic hypertension, overweight, type 2 diabetes, and dyslipidaemia.[29,32,33] This finding was consistent with the results of other studies.[4,5] It may also generally reflect the adoption of westernized lifestyles being reported in developing countries, where unhealthy lifestyle behaviors in the direction of high energy intake and sedentary habits are on the increased.[6,7] This may account for the reason why the prevalence of obesity in this study was almost double and three times the findings by Babatunde et al.[4] and Amole et al.[34] in the same Southwestern Nigeria two years and eight years ago respectively. The difference may just be related to the socio-economic status of the different study areas.[5] However, some studies have reported obesity "paradox" and found that individuals with overweight and obesity have a clinically better outcomes in the context of prevalent CVDs following an acute coronary event.[35]

Stage 1 isolated systolic hypertension was observed to be 2.834 times as likely to cause CV risk factors in this study. This was consistent with study by Qi et al. who found that 13.4% of respondents with isolated stage 1 hypertension was associated with CVDs risk.[33] The significant attributable risk of CVD associated with stage 1 hypertension in this study may be of immense importance for CVDs prevention in Nigeria. It is therefore suggested than early detection of stage 1 isolated systolic hypertension, and subsequent intervention are key to retarding blood pressure progression, maintain vascular health, and protect target organ damage in order to reduce the burden of CVDs.[33,36]

In this study, stage 2 isolated systolic hypertension was observed to be 7.614 times the odds of risk of CVDs. This finding was consistent with a study by Giles et al. who reported a higher risk factor for CVDs in respondents with stage two isolated systolic hypertension.[37] In this study as high as 76.5% of respondents have stage 2 isolated systolic hypertension, indicating a higher long term risk of CVDs.[38,39] This finding is importance given the existing evidence that stage 2 isolated systolic hypertension is more important in predicting CVDs and renal diseases in an ageing population.[38] The implication of this finding is that many of the respondents will require pharmacological, in addition to lifestyle interventions to halt this progression.[3,4] And this may result in additional burden, both in terms of medication adherence and high cost of the drug especially in low resource setting.[39] This finding reinforces the need for effective and sustained health education as well as routing blood pressure check in order to reduce the incidence of CVD in the study area.

Limitations: This was a cross sectional study and thus, had limited opportunities to measure any causal association between CV risk factors and other variables. Multivariate analysis cannot exclude unmeasured confounders, and association does not mean causality. Information collected from the respondents was self-reported and might be subjective by recall bias when highlighting the association between cardiovascular risk and socio-demographics. Despite these limitations, the study generates distinctive information regarding the burden of and the risk factors for CVDs, which could be

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helpful for formulating further steps to implement interventions in Southwestern Nigeria.

Conclusion: CV risk factors are highly prevalent in adults attending general out-patient clinics in selected communities of Ekiti State, many of whom were undiagnosed and therefore unaware of their CV risk status before the screening. The findings call for primary prevention and early detection of risk factors through awareness and regular screening to reduce morbidity and mortality that are associated with CV risks.

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Authors' contribution:

All the authors contributed equally in conceptualization, data curation, formal analysis methodology, writing original draft, and editing.

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