

Gender Differences in Prevalence and Risk Factors for Hypertension among Oyo State Civil Servants at Agodi Secretariat, Ibadan, Nigeria

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Abstract

Hypertension is a major public health challenge worldwide. It is the most important risk factor for cardiovascular disease. Hypertension is noted pathological conditions that predispose individuals to cardiovascular diseases and burdens in Nigeria and Africa. Hence this study aimed to assess the gender difference in the prevalence and risk factors of hypertension among Oyo State civil servants at the Secretariat Clinic. Proper surveillance of morbidity of hypertension in the Oyo state labour workforce helped in assessing the health strength of the Oyo state labour force and also helped in the formulation of health policy targeted at management and enhancing the performance of civil servants in Oyo state. A descriptive cross-sectional study was employed for this study among civil servants in Oyo state Ministries using both quantitative and qualitative. The quantitative study involved the use of an improvised register during the routine service at the clinic and free health mission. Qualitative data was obtained from 20 selected key informants for exit interviews. Any civil servant who comes for any complaint shall be tested for hypertension reading. The trained record officer was used to collect and collate the data from the register. Statistical Package for Social Sciences (SPSS) version 22 was used to enter data and analyze using descriptive and inferential statistics. Ethical approval was received from the Oyo State Ministry of Health Ethical Review Committee. The outcome showed that the most prevalent form of hypertension was concluded to be the Stage 1 hypertensive form, making up 48.8% of females and 46.4% of males among the cases examined.

Keywords: Civil Servant, Gender, Hypertension, Morbidity, Obesity, Prevalence, Risk.

Introduction

Non-communicable diseases have posed significant adverse health effects worldwide, leading to elevated rates of illness and death [1]. Over the years an increased burden of hypertension has been noted to be significant globally, from about 4.5% (approximately 1 billion adults) in 2000 [2] to 7% in 2010 [3]. As at 2021, WHO revealed that the number of people living with hypertension has doubled with an estimate of 1.28 billion [4]. Epidemiological tools also showed dangerous speculation of it increasing to 1.56 billion by 2025 [5].

Africa has been reported to have the highest burden of hypertension with an overall

prevalence of 46% in ages 25 and above for both sexes pooled together [6]. Morbidity and mortality in Africa had previously been traced to malnutrition, communicable infections and poor management of maternal as well as perinatal healthcare [6], however, there is an ongoing transition towards underlying non-communicable diseases such as hypertension resulting in further health complications such as cardiovascular disease (CVDs) (double burden diseases) [8]. A review analysis of the prevalence of hypertension among Nigerian adults showed an estimated prevalence of 28.9% [9] with a range of 6.2 – 48.9% for men and 10- 47.3% for women [10] as well as 30.6%

and 26.4% among urban and rural dwellers respectively [11].

A high prevalence of HT was also noted in a study among residents of Yemetu Ibadan, Southwest Nigeria [12]. Associated clinical manifestations include hyperglycemia diabetic foot, and stroke [13, 14, 15]. Others include chronic kidney [16], all these complications result in morbidity and mortality. Hypertension is a noted pathological conditions that predispose individuals to cardiovascular diseases and their burden in Nigeria and Africa as a whole is of utmost concern, however, studies have affirmed morbidity of both conditions has a deleterious effect that is associated with high mortality. Presently the isolated burdens of these pathological conditions have been well-researched both in Nigeria and globally, however, there is a paucity of information on the morbidity of hypertension in this part of the globe. Hence this study aims at assessing the prevalence and risk factors of morbidity of hypertension among civil servants in Oyo state.

Gender disparities in NCD risk factors have been identified from previous studies in low- or middle-income and high-income countries [17], Findings from an Indonesian national survey in 2015 showed that more women were diagnosed with hypertension than men (50.1% vs. 33.7%) [18]. Among those who were diagnosed, only around 11.5% (men 8.4% vs. women 14.0%) were being treated, and only 14.3% (men 12.4% vs. women 15.7%) had their blood pressure controlled to less than 140/90 mmHg.

Several studies showed that factors associated with hypertension among the Indonesian adult population were age [19], low education, overweight or obesity and health care utilization in the last month [17]. Smoking cessation and depression were the factors most strongly associated with hypertension among men, while, among women, low socioeconomic status (SES) was the most important factor [17]. Based on our knowledge, there is a scarcity of

research on gender differences in the determinants of hypertension in Indonesia. Moreover, to develop early prevention and effective blood pressure management programs in Oyo State, a gender-specific approach is needed. Using the secondary data from a surveillance site, the Sleman Health Demographic and Surveillance System (Sleman HDSS), which was initiated in 2014 to represent the district population data [20], this current study aimed to examine gender differences in the prevalence of and risk factors associated with hypertension among Civil Servants at Secretariat Ibadan.

Gender

The key predictor was coded as a binary variable, with 1 being female and 0 being male (referent). *Measured hypertension* was ascertained by trained interviewers in three readings of systolic and diastolic blood pressure at the time of the interview. Systolic and diastolic scores were constructed as the mean scores from the second and third measurements, respectively, and coded as normotensive (<140 systolic blood pressure [SBP] and <90 diastolic blood pressure [DBP]) (referent) or hypertensive (≥ 140 SBP or ≥ 90 DBP). *Hypertension awareness* (sensitivity) was included as an additional measure defined only for those with measured hypertension. These respondents were coded as hypertensive aware (1) if they also self-reported that they were hypertensive and as not aware (0) if they did not self-report being hypertensive. We also present the means for hypertension specificity.

Methods

Description of the Site

This is cross-sectional research which concentrated more on civil servants in Agodi Secretariat, Ibadan and also made use of the Secretariat Clinic Daily Outpatient Register from 2021 to 2022. For this study, any civil servant who complained about his/her health at the Secretariat Clinic, Agodi from 2021 to 2022

and also during free health missions were considered for this study (N= 1167).

Description of the Experiments Done

For the years 2021 and 2022, over twenty (20) Ministries including baby Agencies that are present at the Secretariat were considered. The study made use of clinic or OPD registers. Every servant who visited the clinic for treatment would later be subjected to a check of his or her blood pressure which would be recorded by a clinician who was on duty. Looking at the register, we were able to count 1167 civil servants in the year 2021 whose blood pressure readings were taken. Those months with a high number of patients were a result of the Oyo State Omi Titun Free Health Mission.

Dependents Variables

The dependent variable in the study is the measure of blood pressure. The patient's blood pressure readings may or may not be affected by the independent variable. It is something that depends on other factors. For Example, a blood pressure reading, or score could be a dependent variable because it could change depending on several factors such as how much sleep you got in the night before you took the rest, or even how hungry you were when you took it. Any civil servant who entered the clinic was screened for blood pressure reading (mm Hg) as well as asking the risk factors are frequently used to detect hypertension among civil servants in the Secretariat.

Independent Variable

The independent variable is the variable the experimenter manipulates or changes and is assumed to directly affect the dependent variable. They are essential to effective experimental design because they allow scientists to identify cause-and-effect relationships. In a controlled experiment, researchers work to minimize or eliminate the potential for external influences so they can

make conclusions about how one variable influences another.

The independent variables of the study were:

Socio-demographic characteristics: sex, age, religion, educational status, and location address

Risk factors: Alcohol consumption, smoking, physical activity, lifestyle, Obesity feeding practices.

Causes: Headache, body weakness, throat

Statistical Methods

The Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) version 16.0 Statistical software was used for data analysis. A descriptive cross-sectional design such as mean, frequency tables, charts and proportion, was used for data summarization. Inferential statistics was carried out using Chi-square and binary logistic regression at $P < 0.05$. The Chi-square test was used to analyze the relationship between socio-demographic characteristics, risk factors, and hypertension. Variables that are significant on Chi-square and those not significant but have a P value that was $< 20\%$ ($P < 0.2$), were selected for binary logistic regression test. Hypertension was defined as Systolic blood pressure (SBP) ≥ 140 and/or Diastolic blood pressure (DBP) ≥ 90 mm Hg or currently on anti-hypertensive medication. Data were analyzed using descriptive statistics, Chi-square and binary logistic regression tests at $P < 0.05$ which revealed the predictors of hypertension.

Ethical Consideration

This study reviewed adherence to the principles of medical and behavioural science ethics. It was guided by ethical considerations. In addition, institutional ethics approval was obtained from the Ministry of Health of Oyo State. This was in line with the position of the State government on research on health. However, the study obtained the oral consent of the people interviewed before their

participation, and where necessary, prior notices were given.

Results

Socio-demographic Data of Respondents

The results presented in Table 1.0 show the descriptive analysis of the sex, age group, and educational qualification of respondents sampled in this study and the year in which data were obtained, (N = 1124). The table showed that about half (46.2%) of the participants were males and 605 (53.8%) were females. It shows that most (47.2%) of the participants were within the age range of 51 and 60, 40 (3.6%) participants were between 20 and 30 years old, 155 (13.8%) participants were between 31 and 40 years, 322 (28.6) participants were between the age range of 41 and 50, 51 (4.5%) were

between the age range of 61 and 70, 16 (1.4%) were between 71 and 80 years old, while the remaining 9 (0.8%) participants were above 81 years of age.

In terms of education, as represented in the table, just 23 (2.1%) participants had only primary education, 205 (18.2%) had secondary education and about 119 (10.6%) were female also, half of the participants (51.8%) had lower tertiary degree, and the remaining 314 (27.9%) participants had higher tertiary degrees which includes 144(12.8%) of male and 170 (15.1%) females. The sociodemographic characteristics of the respondents differed among men and women. Women were more likely to be educated 605(53.8%) than men 519 (46.2%) In addition, 369 (32.8%) of the sample were collected in 2021 and 755 (67.2%) of the sample were obtained in 2022.

Table 1. Socio-demographic Data of Respondents

Characteristics	Total. N (%)	Men. N (%)	Women. N (%)	p-Value
Sex	1124 (100)	519(46.2)	605(53.8)	
Education				0.0000 ²
Primary	23 (2.1)	11 (1.0)	12 (1.1)	
Secondary	205 (18.2)	86 (7.7)	119 (10.6)	
Lower Degree	582 (51.8)	278 (24.7)	304 (27.0)	
Higher Degree	314 (27.9)	144 (12.8)	170 (15.1)	
Total	1124 (100)	519(46.2)	605 (53.8)	
Year				0.0000
2021	369 (32.8)	190 (16.9)	179 (15.9)	
2022	755 (67.2)	329 (29.3)	426 (37.9)	
Total	1124(100)	519(46.2)	605(53.8)	

Test of Association Between Gender Demographic Data of Respondents and Hypertension Readings

Table 2 shows the association between respondent's socio-demographic characteristics and hypertension. Prevalence of hypertension was slightly higher for females at 92.5% (48.8% - Stage 1, 31.1% - Stage 2, and

12.6% - Hypertensive Crisis) compared to males at 88.8% (46.4% - Stage 1, 28.7% - Stage 2, and 13.7% - Hypertensive Crisis). This difference was however not statistically significant ($\chi^2 = 5.15$; $df = 4$; $p > 0.05$). Age-wise distribution of hypertension showed the highest prevalence of 93.8 (37.5% - Stage 1, 31.3% - Stage 2, and 25.0% - Hypertensive Crisis) in the

71-80 years age-group, while the lowest prevalence of 77.5% (42.5% - Stage 1, 27.5% - Stage 2, and 7.5% - Hypertensive Crisis) was

recorded in the 20-30 years age-group. This difference was statistically significant ($\chi^2 = 70.51$; $df = 24$; $p < 0.01$).

Table 2. Table Showing the Association Between Socio-demographic Characteristics and Hypertension Reading

Variable	Reading on Hypertension n (%)						df	χ^2	p
	Normal	Prehypertension	Stage 1	Stage 2	Hypertensive Crisis	Total			
Sex									
Male	13 (2.5)	45 (8.7)	241 (46.4)	149 (28.7)	71 (13.7)	519 (100.0)	4	5.15	>.05
Female	12 (2.0)	34 (5.6)	295 (48.8)	188 (31.1)	76 (12.6)	605 (100.0)			
Total	25 (2.2)	79 (7.0)	536 (47.7)	337 (30.0)	147 (13.1)	1124 (100.0)			
Age									
20-30	5 (12.5)	4 (10.0)	17 (42.5)	11 (27.5)	3 (7.5)	40 (100.0)	24	70.51	<.01
31-40	8 (5.2)	15 (9.7)	76 (49.0)	37 (23.9)	19 (12.3)	155 (100.0)			
41-50	2 (0.6)	22 (6.8)	161 (50.0)	87 (27.0)	50 (15.5)	322 (100.0)			
51-60	7 (1.3)	31 (5.8)	246 (46.3)	182 (34.3)	65 (12.2)	531 (100.0)			
61-70	0 (0.0)	6 (11.8)	25 (49.0)	15 (29.4)	5 (9.8)	51 (100.0)			
71-80	1 (6.3)	0 (0.0)	6 (37.5)	5 (31.3)	4 (25.0)	16 (100.0)			
81 and +	2 (22.2)	1 (11.1)	5 (55.6)	0 (0.0)	1 (6.3)	9 (100.0)			
Total	25 (2.2)	79 (7.0)	536 (47.7)	337 (30.0)	147 (13.1)	1124 (100.0)			

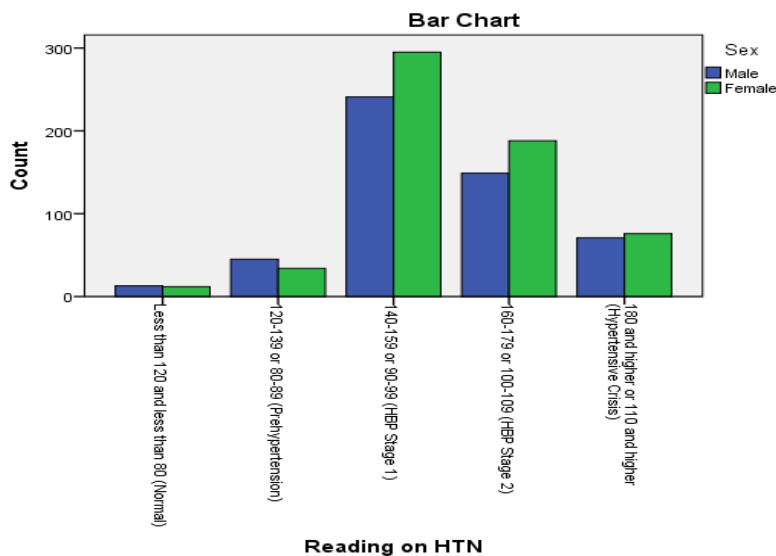


Figure 1. Association of Sex Characteristics of Respondents and Readings of Hypertension in Both Genders

It was predicted from (Fig. 1) that more females are affected with hypertension. Readings from the figure show that one-third of the respondents have a hypertension crisis, while the majority have stage 1 high blood pressure which might eventually lead to hypertension. Also, about half of the respondents have stage 2 high blood pressure and very few have normal blood pressure readings.

Association Between Presence of Risk Factors and Hypertension Reading

Table 3 gives a chi-square analysis summary of the association between reported risk factors and hypertension readings of participants. Most of the study participants 681 (60.6%) reported no risk factors, 155 (13.8%) reported that they were stressed/fatigued, 99 (8.8%) reported having pain/infection, 60 (5.3%) participants reported that they were not very physically active, 56 (5.0%) participants were overweight/obese, 42 (3.7%) participants reported high salt intake and lastly, 31 (2.8%)

reported that they drink/smoke. The prevalence of hypertension was highest among obese participants at 96.4% (17.9% - Stage 1, 48.2% - Stage 2, and 30.4% - Hypertensive Crisis). Respondents who consume alcohol/smoke had the next highest prevalence at 93.5% (19.4% - Stage 1, 38.7% - Stage 2, and 35.5% - Hypertensive Crisis). Presence of pain/infection categorizes the group with the third highest prevalence at 89% (30.3% - Stage 1, 38.3% - Stage 2, and 20.2% - Hypertensive Crisis). Next were respondents that go through a great amount of stress/fatigue at 85.1% (28.4% - Stage 1, 37.4% - Stage 2, and 19.4% - Hypertensive Crisis). Being physically inactive and high intake of salt led to the lowest prevalence among the participants at 85% (36.7% - Stage 1, 31.7% - Stage 2, 16.7% - Hypertensive Crisis) and 83.4% (23.8% - Stage 1, 40.5% - Stage 2, 19.0% - Hypertensive Crisis) respectively. Chi-square analysis revealed that the presence of risk factors was significantly associated with hypertension ($\chi^2 = 162.25$; $df = 24$; $p < 0.01$)

Table 3. Table Showing the Association Between Reported Risk Factors and Hypertension Reading

Risk Factors	Total. N (%)	Men. N (%)	Women. N (%)	df	p-Value
None	681 (60.6)	310 (27.6)	371 (33)	24	>0.01
Overweight	56 (4.9)	13 (1.2)	43 (3.8)		
High salt intake	40 (3.6)	21 (1.9)	19 (1.7)		
Physically Inactive	60 (5.3)	33 (2.9)	27 (2.4)		
Alcohol/smoking	31 (2.8)	26 (2.3)	05 (0.5)		
Eye Problem	7 (0.6)	4 (0.3)	3 (0.3)		
Stress/Fatigue	155 (13.8)	76 (6.8)	79 (7.0)		
Pain/Infection	91 (8.1)	41 (3.7)	50 (4.4)		
Abnormal Cholesterol	2 (0.2)	1 (0.1)	1 (0.1)		
Difficult Breathing	01 (0.1)	0 (0.0)	01 (0.1)		
Total	1124 (100)	519 (46.2)	605 (53.8)		

However, it was observed from the study that women were likely more obese 43 (3.8%) than men 13 (1.2%). It was also discovered that men smoke and drink alcohol more 26 (2.3%) than women 05 (0.5%). More women 79 (7.0%)

were likely stressed than men 76 (6.8%). Difficulty in breathing is observed not to be significant as a risk factor for the prevalence of hypertension.

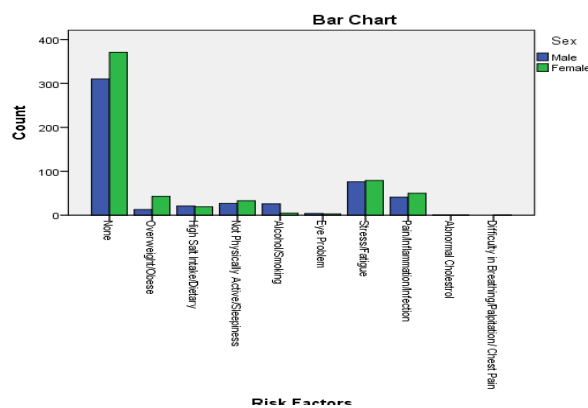


Figure 2. Association Between Reported Risk Factors and Hypertension Reading Sex

Table 4. Table Showing the Association Between Reported Risk Factors and Hypertension Reading

Risk Factors	Reading on Hypertension						df	χ^2	P
	Normal	Prehypertension	Stage 1	Stage 2	Hypertensive Crisis	Total			
None reported	13 (1.9)	37 (5.4)	414 (60.8)	166 (24.4)	51 (7.5)	681 (100.0)	24	162.25	<.01
Overweight/Obese	1 (1.8)	1 (1.8)	10 (17.9)	27 (48.2)	17 (30.4)	56 (100.0)			
High salt intake	3 (7.1)	4 (9.5)	10 (23.8)	17 (40.5)	8 (19.0)	42 (100.0)			
Not physically active	0 (0.0)	9 (15.0)	22 (36.7)	19 (31.7)	10 (16.7)	60 (100.0)			
Alcohol/Smoking	0 (0.0)	2 (6.5)	6 (19.4)	12 (38.7)	11 (35.5)	31 (100.0)			
Stress Fatigue	4 (2.6)	19 (12.3)	44 (28.4)	58 (37.4)	30 (19.4)	155 (100.0)			
Pain/infection	4 (4.0)	7 (7.0)	30 (30.3)	38 (38.3)	20 (20.2)	99 (100.0)			
Total	25 (2.2)	79 (7.0)	536 (47.7)	337 (30.0)	147 (13.1)	1124 (100.0)			

Discussion

Findings from the present study revealed that there was a pronounced incidence of hypertension among the civil servant samples, with only a minute proportion of the participants (9.2%) being categorized as non-hypertensive. This category comprised of participants with normal ranges of blood pressure (less than 120/80mmHg) in both gender, which made up 2.2% of the participants, and participants with blood pressure within the pre-hypertensive stage (120-139/80-89mmHg), which made up 7% of the participants. The most prevalent form of hypertension was concluded to be the Stage 1 hypertensive form, making up 48.8% in female and 46.4% in male among the cases examined. This is an indication of gender difference of a rather high incidence of hypertension among the civil servants which comprised the sample.

The null hypothesis stated therefore failed to be accepted.

It was further observed that among the psychosocial factors examined, which include stress, pain/infection, physical inactivity, obesity/overweight, salt intake (dietary), and use of alcohol or smoking, there was a significant association between risk factors and hypertension, thereby leading to a rejection of the null hypothesis. Even though majority of the participants (60.6%) indicated no risk factors for hypertension, the results showed that among the remaining 39.4% of participants, a greater prevalence of hypertension was associated with obesity and being overweight (96.4%) in which about 3.8% of women are obese and 1.2% are male. Within this risk factor, it was further determined that female obese/overweight civil servants in the study had a higher prevalence of Stage 2 hypertension (48.2%), followed by hypertensive crisis

(30.4%), and Stage 1 hypertension (17.9%). This is particularly alarming because civil servants have a higher risk of obesity as a result of the sedentary nature of their work [20]. Therefore, an increased risk of obesity may provide mechanisms for an increased risk of hypertension.

Another form of prevalence of hypertension was recorded among participants who reported immense stress/fatigue (85.1%). Within this risk factor, it was further determined that civil servants who reported experiencing great amounts of stress/fatigue had a higher prevalence of Stage 2 hypertension (37.4%), followed by Stage 1 hypertension (28.4%) and hypertensive crisis (19.4%). When the body is under stress, stress hormones are released, which in turn make the heartbeat and pump blood faster, increasing the supply of blood and raising blood pressure [21]. This is only short-term, however, because stress levels also tend to be short-lived. It is worth noting that when such stress levels are chronic, there is a higher chance of developing hypertension [22].

The final hypothesis stated that there is no association between the socio-demographic characteristics of Oyo State civil servants and the presence of hypertension. Among the socio-demographic factors examined are sex, age, education and year. The results however revealed that there was a significant association between some socio-demographic characteristics and hypertension (sex, age, education, and year), leading to partial rejection of the null hypothesis stating that there is no significant gender difference of association between sociodemographic characteristics and the presence of hypertension. For sex, there appeared to be a slightly higher prevalence of hypertension associated with being a female (92.5%) when compared with being a male (88.8%). Prevalence of hypertension was slightly higher for females at 92.5% (48.8% - Stage 1, 31.1% - Stage 2, and 12.6% - Hypertensive Crisis) compared to males at 88.8% (46.4% - Stage 1, 28.7% - Stage 2, and

13.7% - Hypertensive Crisis). This difference was however not statistically significant ($\chi^2 = 5.15$; $df = 4$; $p > 0.05$). This means that there is no association between gender and hypertension, indicating that both sexes have a statistically equal prevalence of hypertension.

Also, Age-wise distribution of hypertension showed the highest prevalence of 93.8 (37.5% - Stage 1, 31.3% - Stage 2, and 25.0% - Hypertensive Crisis) in the 71-80 years age-group, while the lowest prevalence of 77.5% (42.5% - Stage 1, 27.5% - Stage 2, and 7.5% - Hypertensive Crisis) was recorded in the 20-30 years age-group. This difference was statistically significant ($\chi^2 = 70.51$; $df = 24$; $p < 0.01$). It was discovered that for age, there was a higher prevalence of hypertension among older participants of 71-80 years (93.8%), while the lowest prevalence was observed in younger participants, aged 20-30 years (77.5%). This association was found to be significant. This therefore means that age has a significant association with the prevalence of hypertension among civil servants in Oyo State.

Conclusions

In this study, we examined how gender differences in hypertension emerge among civil servants. Our results provide new insights into the origins of gender disparities in both hypertension readings and risk factors in several ways. The study found that the prevalence of hypertension was very high among the respondents with 48.8% of females and 46.4% of males among the cases examined having blood pressures higher than the normal range. This was an indication of gender difference of a rather high incidence of hypertension among the civil servants which comprised the sample due to the case of those who were suffering for hypertension which was mentioned when the government was making jingles on a free health mission. Similarly, the majority of the participants (60.6%) indicated no risk factors for hypertension, the results showed that among the remaining 39.4% of

participants, a greater prevalence of hypertension was associated with obesity and being overweight (96.4%) in which about 3.8% of women are obese and 1.2% are male. Within this risk factor, it was further determined that female obese/overweight civil servants in the study had a higher prevalence of Stage 2 hypertension (48.2%), followed by hypertensive crisis (30.4%), and Stage 1 hypertension (17.9%) was also revealed that significant risk factors for hypertension. Despite adherence to the necessary procedures required in this study, some limitations were however encountered. For one, the data obtained for the study were facility data of civil servants who visited the staff clinic for one health challenge or another.

Also, Age-wise distribution of hypertension showed that age group 71-80 years has the highest prevalence of 93.8%, while the lowest prevalence of 77.5% was recorded in the 20-30 years age-group. This difference was statistically significant ($\chi^2 = 70.51$; $df = 24$; $p < 0.01$). It was discovered that for age, there was a higher prevalence of hypertension among older participants of 71-80 years (93.8%), while the lowest prevalence was observed in younger participants, aged 20-30 years (77.5%). This association was found to be significant. This therefore means that age has a significant association with the prevalence of hypertension among civil servants in Oyo State. The gender differences in hypertension awareness may also be larger in our study than in previous research because of the overall lower use of healthcare services among civil servants. While many young women regularly interact with healthcare professionals to access birth control and for

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gynaecological health, young men are not faced with similar reasons to visit healthcare providers.

The researchers recommended that in future research, the investigation should continue if there are behavioural factors that contribute to gender differences in hypertension to understand young men's elevated risk of hypertension beyond biological factors. The results presented in this study also emphasized the role of healthcare use in improving hypertension awareness, particularly among women, and thereby potentially improving hypertension control. Given the extremely low levels of hypertension awareness among civil servants especially adults, public health policymakers should focus on interventions to improve hypertension awareness among young adults, both men and women. The government needs to send civil servants for training on stress management, and self-care and resuscitate every Thursday early morning physical exercise at the secretariat.

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Conflicts of Interest

The authors declare no conflict of interest.

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