ORIGINAL ARTICLE

Nutrition, Metabolism, and Prevention of NCDs | Public Health Nutrition Policy & Economics

The Association Between Perceived Stress, Lifestyle and Dietary Behaviors, and Hypertension Among University Personnel

Oluwafunke O. Akinbule **Damilola S. Ogunyinka** **Sultan A. Adenusi**

Department of Nutrition and Dietetics, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria. akinbuleoo@funaab.edu.ng / dammonia@gmail.com / sultanadedotun@gmail.com

ABSTRACT

Background: Unhealthy lifestyle behaviors, including poor diet, physical inactivity, and excessive alcohol consumption, are well-established risk factors for hypertension.

Aims: This study aimed to assess the association of perceived stress, lifestyle and dietary behaviors with hypertension among university personnel.

Methods: A cross-sectional survey was conducted on 250 randomly selected university workers was conducted. Data on perceived stress, eating behavior, dietary patterns, smoking habits, alcohol consumption, and physical activity levels were collected employing validated instruments. Blood pressure and nutritional anthropometric measurements were performed using standard procedures. The data were analyzed using descriptive statistics. A Pearson's Chi-square, correlation and logistic regression analyses were conducted. A *p*-value of less than 0.05 was considered statistically significant.

Results: The median age of the respondents was 40 years, with median values for waist circumference, height, and weight of 90.0 cm, 1.69 m, and 69.0 kg, respectively. The prevalence of hypertension was 49.6%, with overweight (26.8%), abdominal obesity (32.8%), alcohol consumption (26.0%), smoking (15.2%), and low physical activity levels (64.4%) also being common. The majority of respondents (92.8 %) reported moderate stress levels, and only one-fifth exhibited adequate dietary habits. Cognitive restraint and emotional eating were prevalent, with high consumption of fried and sugary snacks (70.0%) and carbonated drinks (60.4 %), along with frequent meal skipping. In the logistic regression model, age, body mass index, quantity of alcohol consumed, and cognitive restraint eating behavior were significantly ($p < 0.05$) associated with hypertension.

Conclusions: The prevalence of unhealthy lifestyle behaviors and hypertension is high among university personnel. The findings highlight the critical need for interventions that target stress reduction, dietary modifications, and physical activity promotion are crucial to mitigate the burden of hypertension in this population.

Keywords: Hypertension Risk; Lifestyle Behavior; Eating Behavior; Perceived Stress.

ARTICLE INFORMATION

Check for updates

Corresponding author: Oluwafunke O. Akinbule
E-mail : akinbuleoo@funaab.edu.ng
Tel. (+234) 8061241115

Received: January 09, 2025
Revised: March 22, 2025
Accepted: August 12, 2025
Published: August 27, 2025

Article edited by:
Prof. Khaled Méghit Boumediene
Article reviewed by:
Prof. Mustapha Diaf
Dr. Tonderayi Mathew Matsungo
Dr. Suleyman Demi

Cite this article as: Oluwafunke O. Akinbule., Damilola S. Ogunyinka., Sultan A. Adenusi. (2025). The Association Between Perceived Stress, Lifestyle and Dietary Behaviors, and Hypertension Among University Personnel. *The North African Journal of Food and Nutrition Research, 9* (20): 123 – 135. https://doi.org/10.51745/najfnr.9.19.123-135

1 INTRODUCTION

Hypertension remains a major global health concern, particularly in low-income countries. Globally, hypertension is the leading cause of untimely death in 1.3 billion people, and a major cause of morbidity and mortality associated with cardiovascular diseases (Daniels, 2019). The World Health Organization (W.H.O., 2008) reported that hypertension was responsible for 37% deaths in developing countries. Similarly, the Global Nutrition Report revealed that hypertension prevalence in male and female were 27% and 28%, respectively. High dietary sodium / salt intake has been associated with hypertension. The mean sodium intake of men and women are 5.8 and 5.3 g/day respectively (Global Nutrition Report, 2022), which is higher than the recommended intake of 2 g/day.

Unhealthy lifestyle behaviors including poor dietary practices, low physical activity, chronic stress, tobacco use, excessive alcohol consumption, and unhealthy body weight contribute to the development of hypertension (Akinbule, *et al.* 2021; Oladoyinbo, *et al.*, 2020; Yusuf *et al.*, 2020). Hypertension has been associated with unmodifiable risk factors such as increasing age, family history, and comorbidities (e.g., cardiovascular diseases and diabetes mellitus) (Akinbule *et al.*, 2022; Oladoyinbo *et al.*, 2020).

Similarly, high levels of stress have been associated with less engagement in physical activity, greater likelihood of engaging in unhealthy dietary behaviors, and other lifestyle practices (Yoon & So, 2023). Additionally, high levels of stress might lead to increase in physical activities such as exercise, as a form of coping strategy (Park *et al.*, 2023; Stults-

Kolehmainen & Sinha, 2014). These may have consequential effects on health and increase the risk of hypertension and associated chronic diseases. Previous studies reported high prevalence of cardiovascular risk factors among Nigerian university personnel (Akintunde *et al.*, 2015; Akinbule *et al.*, 2018).

University workers, especially in Nigeria, often burdened with heavy workloads due to shortage of staff and limited resources, are particularly vulnerable to such risk factors (Akinbule *et al.*, 2018). This may be because they are understaffed, arising from the massive relocation of many people, including university personnel, to developed countries in search for greener pasture. Consequently, most public universities have increased student-staff ratio beyond the recommendation, hence exposing them to the risk of increased stress, irregular eating patterns, and even reduced physical activity.

While previous studies have explored cardiovascular risk factors among university personnel, there is a dearth of research specifically investigating the association between lifestyle behaviors and hypertension in this population. The majority of deaths and morbidity occurring among these population groups are hypertension-related. The few studies conducted in this area did not utilize the appropriate classification of hypertension recommended by the American Heart Association, however, rather categorized hypertension as systolic pressure of >140mmHg and diastolic pressure of > 90 mmHg (Ajayi *et al.*, 2016; Odunaiya *et al.*, 2015; Okubadejo *et al.*, 2019; Oladoyinbo *et al.*, 2020) thereby categorizing numerous individuals having elevated, and hypertension stage 1 as having normal blood pressure, hence increasing hypertension related morbidity and mortality. Appropriate information on the prevalence of hypertension among university personnel will promote early-stage detection of hypertension and reduce complication. Moreover, information on the relationship between lifestyle risk behaviors and prevalence of hypertension among university personnel will inform individuals on healthy dietary and lifestyle practices to promote health. Through understanding the prevalence of hypertension and its underlying determinants, the present study may provide beneficial information that can be employed to develop targeted interventions, which may be (institution-based) to promote healthy lifestyle behaviors and decrease the burden of hypertension and other cardiovascular diseases. The current study therefore aims to assess the association between perceived stress, lifestyle and dietary behaviors, and hypertension among university personnel in Abeokuta, Ogun State, Nigeria.

2 Material and Methods

2.1 Study Design

The study adopted a cross-sectional research design.

2.2 Study Population

The population of this study are university personnel in Federal University of Agriculture, Abeokuta (FUNAAB) in Ogun State. FUNAAB is the sole public university in Abeokuta, and the exclusive University of Agriculture in Southwest, Nigeria. In 2024, FUNAAB emerged as the premier University of Agriculture on the African continent and 7th position globally. The university covers about 10,000 hectares land in the Northeastern end of Abeokuta, the capital of Ogun State. The academic staff comprises 592 members while non-academic comprise 1,741. The total number of Staff of Federal University of Agriculture, Abeokuta is 2333 who works in the 10 colleges in the university, namely College of Agricultural Management and Rural Development, College of Animal Science and Livestock Production, College of Plant Science and Crop Production, College of Environmental Resources Management, College of Engineering, College of Food Science and Human Ecology, College of Biosciences, College of Physical Sciences, College of Veterinary Medicine, and College of Management Science. It also include staff working in the 18 centers of the university which encompasses: Directorate of Academic Planning, Central Laboratory and Biotechnology Centre, Centre of Excellence in Agricultural Development and Sustainable Environment, Directorate of Research, Innovations and Partnership, International Scholars' Resource Centre, Bursary, Directorate of Health Services, Directorate of University Farms, Information and Communication Technology Resource Centre, Directorate of Physical Planning, Directorate of Public Relations, Directorate of Works and Services, Directorate of Environmental Management, Agricultural Media Resources and Extension Centre, Centre for Professional Development, and Directorate of Students Industrial Work Experience Scheme (Federal University of Agriculture)

2.3 Sample Size Determination

The sample size utilized in the present study was calculated as described by Araoye (2004).

$$n = \frac{(z^2 x\ p\ x\ q)}{d^2}$$

n = minimum sample size.
z = 1.96 (constant)
d = 0.05 (error)
p = 25% (hypertension prevalence in Nigeria) (Global Nutrition Report, 2022).
q = (1-p)

$$n = \frac{(1.96^2 x\ 0.25\ x\ 0.75)}{0.05^2}$$

The minimum sample size was 288.

Among the 288 questionnaires disseminated among the respondents, solely 250 respondents completed the questionnaires, yielding an 86.7% responsive rate.

2.4 Sampling Procedure

The total number of university personnel is 2333. The university personnel were classified into academic (592) and non-teaching staff (1741). A systematic sampling technique was utilized to select the respondents from the two categories of staff. Academic (72) and non-teaching (216) staff were identified employing a ratio of 3:1. The nth values were 8 for both academic and non-teaching staff. The start value was determined by ballot (between 1 and the n^{th} value).

2.5 Data Collection

2.5.1 Physical and Lifestyle Characteristics of the Respondents

Data on the personal information of respondents, alcohol drinking and smoking were gathered utilizing a semi-structured questionnaire. Physical activity level of the respondents was assessed employing the World Health Organization 18–International Physical Activity Questionnaire (IPAQ). The questionnaire has domains on work, transportation, recreation, and sedentary and was scored based on a continuous variable. Respondents' scores were expressed as Metabolic Equivalent (MET) in minutes/week. Total MET–min/week were categorized as inactive (< 600 MET-min/week), minimally active (600–2999 MET-min/week) and HEPA active (> 3000 MET–min/week) physical activity.

2.5.2 Perceived Stress, Eating Behavior and Pattern

A 5-pont scale, 14-item perceived stress questionnaire by Cohen *et al.* (2015) utilized to assess perceived stress. Reversed scoring occurred in some questions such as 4, 5, 6, 7, 9, 10, 13. The highest attainable score was 56 while the lowest attainable score was 0. Perceived stress was categorized as low stress (0-39%), moderate stress (40-69%) and much stressed (70 and above). A three factor 18–item eating behavior questionnaire by Karlsson *et al.* (2000) was adopted to assess respondents' eating behavior on three domains – emotional (the tendency to consume in response to emotional urges, both positive and negative such as distress and negative emotions), uncontrolled (the tendency to lose control and overeat) and cognitive restraint (efforts and worries to regulate food intake to control body weight and shape), consisting of 3, 6 and 10 questions, respectively. The three domains were summed up and transformed into raw scales of 0 to 100%. Eating behavior was categorized as poor (0-39%), moderate (40–69%) and adequate (70 and above). Also, respondents' dietary habit was assessed using a 4–point scale 18–item validated questionnaire (Paugh, 2005). Items were scored by summing up responses. The attainable score ranged from 18–72 and calculating percentage. It was then classified as excellent (76–100%), good (51–75%), fair (26–50%) and poor (0–25%).

2.5.3 Respondents' Anthropometry

Respondents' body weight, waist circumference, and height were measured as described by the World Health Organization (Bohmann *et al.*, 2025). Body mass index (kg/m^2) was classified as underweight (<18.0 kg/m^2), healthy weight (18.0–24.99 kg/m^2), overweight (25.0–29.99 kg/m^2) and general gross obesity (> 30.0 kg/m^2). Waist circumference was used to assess abdominal obesity (cm). Male respondent with waist circumference of > 102 cm and female respondent of waist circumference of ≥ 88 cm were categorized to have abdominal obesity (Bohmann *et al.*, 2025).

2.5.4 Hypertension

The blood pressure of respondents was assessed on the left arm after respondents were seated and allowed to relax in a comfortable position for about 10 minutes. Respondents were asked to support the back of their arm with the middle upper arm. The measurement was conducted twice using the OMRON M3 sphygmomanometer. The average systolic and diastolic blood pressure were recorded. Respondents' systolic and diastolic pressure was classified as normal (< 120 and < 80), elevated (120-129 and < 80), hypertension stage 1 (130–139 or 80–89), hypertension stage 2 (> 140 or > 90), hypertension crisis > 180 and/or > 120) (Whelton, 2018).

2.6 Informed Consent and Ethical Clearance

Written consent was obtained from each respondent. The ethical review board of the department of Nutrition and Dietetics, Federal University of Agriculture Abeokuta approved the conduct of the study.

2.7 Statistical Analysis

Data obtained from the study was analyzed for using descriptive statistics such as mean, median, interquartile range, frequencies, and percentages. The normality of the data was done using skewness. Categorical variables and continuous variables were analyzed using Pearson's Chi-square and Correlation analysis. Factors associated with hypertension were determined using the Logistic regression at $p < 0.05$. Statistical product and service solution (SPSS) version 25 was used for the analysis.

3 Results

3.1 Physical Characteristics of the Respondents

The median age of the respondents was 40 years with an interquartile range of 16. The median monthly income was $ 227.85, with an interquartile range of $405.1, median weight was 69 kg with an interquartile range of 17, the median height was 1.69 m, with an interquartile range of 0.1, the median body mass index (BMI) was 24.17 kg/m^2, with an interquartile range of 5, and the median waist circumference was 90 cm, with an interquartile range of 12. Similarly, the median systolic and diastolic pressure of the respondents were 126.50 mmHg and 80.00 mmHg, respectively, with interquartile ranges of 13 and 12, respectively. In addition, the median total time spent on physical activity was 320.00 MET–minute/day, while the median total time spent on sedentary activity was 300 MET–minute/day. Respondents spent 287.5 minutes/day, 80.0 minutes/day, 225.0 minutes/day on work, transport, and recreational activities, respectively. Also, the median values for cognitive restraint, uncontrolled and emotional eating behaviors were 75.0, 75.0 and 61.1, respectively (Table 1).

3.2 Prevalence of Overweight, Obesity, Perceived Stress, Lifestyle Behaviors, Hypertension and Eating Pattern of the Respondents

Nine in ten respondents (92.8%) were moderately stressed, more than three-quarter (79.2%) and two-tenth (20.4%) had moderate and adequate dietary habit, about one-quarter (26.8%) were overweight, 13.2% had general obesity, one-third (32.8%) of the respondents had abdominal obesity. In addition, half (49.6%) of the respondents had hypertension, 15.2% were smoking, one-third (26.0%) of them were alcohol drinkers. Furthermore, almost two-third (64.4%) of the respondents engaged in low physical activities, and only 4.8% had high physical activity (Table 2). Most of the respondents with moderate dietary habits and moderate perceived stress were hypertensive (Figure 1). Although more than two-thirds (70.4%) of the respondents consume vegetables, 63.2% consume fruit, 53.2% consume healthy snacks, and 54.0% consumed breakfast at least 3–4 times weekly, however, 38.8% of the respondents consumed fast food, 70.0% consumed fried and sugary snacks, 60.4% consumed carbonated drinks, and 66.8% skipped meal at least 3 times/ week (Figure 2).

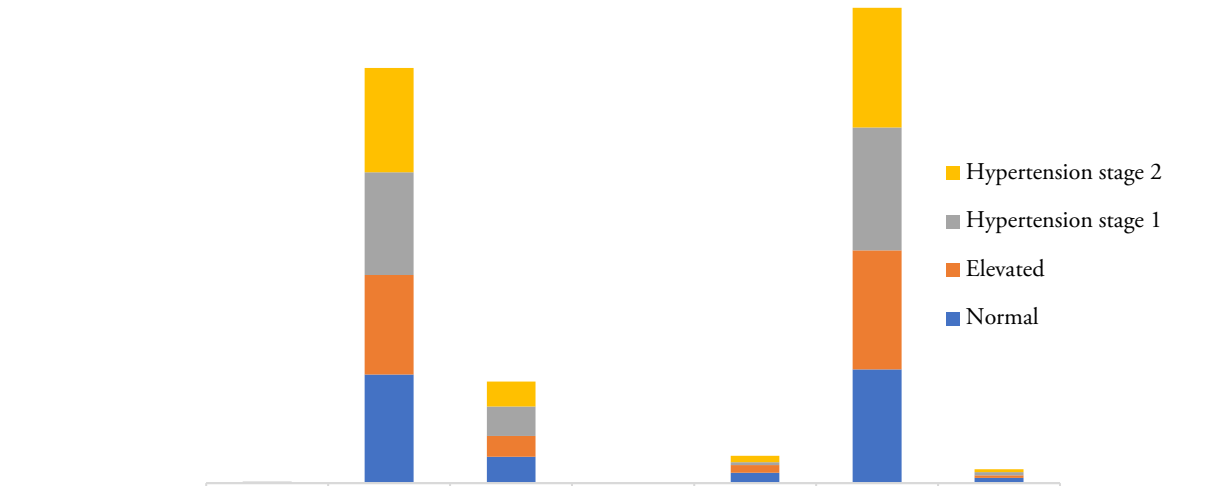
Table 2. Prevalence of Perceived Stress, Lifestyle Behaviors, Anthropometry and Hypertension Among the Respondents

Variables	N	%
Perceived stress low (n, %)	12	4.8
Perceived stress moderate (n, %)	232	92.8
Perceived stress high (n, %)	6	2.4
Dietary habit poor (n, %)	1	0.4
Dietary habit moderate (n, %)	198	79.2
Dietary habit adequate (n, %)	51	20.4
Prevalence of overweight	67	26.8
Prevalence of general obesity	33	13.2
Prevalence of abdominal obesity	82	32.8
Prevalence of hypertension (n, %)	124	49.6
Smoking	38	15.2
Alcohol drinking	65	26
Physical activity low	161	64.4
Physical activity moderate	77	30.8
Physical activity high	12	4.8

Table 1. Physical Characteristics of the Study Population

	Median	LQ-UQ	Skewness	Minimum	Maximum
Age (years)	40.00	32.75–49.00	0.07	24.00	61.00
Monthly Income ($)	227.85	101.27–506.33	0.90	50.63	1,012.66
Weight (kg)	69.00	62.00–79.13	1.12	45.00	125.00
Height (cm)	1.69	1.64–1.73	0.11	1.53	1.86
Body Mass Index (kg/m^2)	24.17	21.69–27.14	0.95	15.09	43.66
Waist Circumference (cm)	90.00	83.38–95.00	0.39	39.00	144.00
Diastolic Blood Pressure (mmHg)	80.00	72.88–85.00	0.26	58.00	110.00
Systolic Blood Pressure (mmHg)	126.50	120.38–133.50	0.52	90.00	179.50
Total Physical Activity (MET-minutes/day)	320.00	0.00–840.00	3.87	0.00	10920.00
Work (MET-minutes/day)	287.50	146.3–33.8	1.57	70.00	720.00
Transport (MET-minutes/day)	80.00	45.0–150.0	2.90	10.00	840.00
Recreation (MET-minutes/day)	225.00	95.0–450.0	0.54	80.00	560.00
Sedentary (MET-minutes/day)	300.00	180.0–420.0	0.09	30	540
Emotional Eating Behavior	75.00	66.67–85.42	-0.41	25.00	100.00
Uncontrolled Eating Behavior	61.11	52.78–66.67	-0.14	33.33	86.11
Cognitive Restraint Behavior	75.00	66.67–83.33	-0.13	41.67	104.17

Note: 1$ = 395



	Poor	Moderate	Adequate		Low	Moderate	High
Hypertension stage 2	0.00%	80.50%	19.30%		4.90%	92.70%	2.40%
Hypertension stage 1	1.20%	79.50%	22.80%		2.40%	95.20%	2.40%
Elevated	0.00%	77.20%	16.00%		5.90%	92.10%	2.00%
Normal	0.00%	84.00%	20.40%		8.00%	88.00%	4.00%
	Dietary Habits				**Perceived Stress**		

Figure 1. Dietary Habits and Perceived Stress Score of the Respondents

3.3 Association of Lifestyle Behaviors and Dietary Pattern of Respondents with Hypertension

Alcohol drinking (p = 0.04) and BMI (p = 0.04) were significantly associated with hypertension (Table 3).

Similarly, intakes of high calorie snacks (p = 0.00), and fried and sugary snacks (p = 0.01) were significantly associated with hypertension (Table 4).

Table 3. Association of Lifestyle Behaviors and Anthropometry of Respondents with Hypertension

Variable	N (%)	Normal	Elevated	Hypertension Stage I	Hypertension Stage II	*p*-value
Total	250 (100.0)	25 (10.0)	101 (40.4)	83 (33.2)	41 (16.4)	
Age						
20–40	126 (50.4)	14 (56.0)	61 (60.4)	37 (44.6)	14 (34.2)	0.10
41–60	121 (48.4)	11 (44.0)	39 (38.6)	45 (54.2)	26 (63.4)	
61–65	3 (1.2)	0 (0.0)	1 (1.0)	1 (1.2)	1 (2.4)	
Gender						
Male	142 (56.8)	12 (48.0)	54 (53.5)	48 (57.8)	28 (68.3)	0.32
Female	108 (43.2)	13 (52.0)	47 (46.5)	35 (42.2)	13 (31.7)	
Educational level						
Secondary	67(26.8)	5 (20.0)	27 (26.7)	23 (27.7)	12 (29.2)	0.05*
Tertiary	128(51.2)	14 (56.0)	52 (51.5)	48 (57.8)	14 (34.1)	
Postgraduate	55(22.0)	6 (24.0)	22 (21.8)	12 (14.5)	15 (36.6)	
Marital Status						
Single	66 (26.4)	9 (36.0)	30 (29.7)	19 (22.9)	8 (19.5)	0.44
Married	160(64.0)	16 (64.0)	61 (60.4)	57 (68.7)	26 (63.4)	

Table 3. *(Continued)*

Alcohol consumption status						
Never Drinkers	185 (74.0)	20 (80.0)	75 (74.3)	64 (77.1)	26 (63.4)	0.04*
Regular Drinkers	59 (23.6)	4 (16.0)	23 (22.8)	19 (22.9)	13 (31.7)	
Lifetime Drinkers	6 (2.4)	1 (4.0)	3 (3.0)	0 (0.0)	2 (4.9)	
Tobacco Smoking Status						
Never Smokers	212 (84.8)	22 (88.0)	90 (89.1)	65 (78.3)	35 (85.4)	
Regular Smokers	26 (10.4)	1 (4.0)	9 (8.9)	12 (14.5)	4 (9.8)	0.11
Lifetime Smokers	9 (3.6)	2 (8.0)	2 (2.0)	5 (6.0)	0 (0.0)	
Occasional Smokers	3 (1.2)	0 (0.0)	0 (0.0)	1 (1.2)	2 (4.9)	
Substance sniffing Status						
Regular Sniffers	5 (2.0)	0 (0.0)	1 (1.0)	2 (2.4)	2 (4.9)	0.40
Never Sniffers	245 (98.0)	25(100.0)	100(99.0)	81 (97.6)	39 (95.1)	
Physical Activity						
Low	161 (64.4)	15 (60.0)	65 (64.4)	53 (63.9)	28 (68.3)	0.88
Moderate	77 (30.8)	8 (32.0)	30 (29.7)	28 (33.7)	11 (26.8)	
High	12 (4.8)	2 (8.0)	6 (5.9)	2 (2.4)	2 (4.9)	
Body Mass Index						
Underweight	10 (4.0)	2 (8.0)	6 (5.9)	2 (2.4)	0 (0.0)	0.04*
Normal	140 (56.0)	17 (68.0)	61 (60.4)	39 (47.0)	23 (56.1)	
Overweight	67 (26.8)	4 (16.0)	25 (24.8)	23 (27.7)	15 (36.6)	
Obesity	33 (13.2)	2 (8.0)	9 (13.0)	19 (22.9)	3 (7.3)	
Abdominal Obesity						
No	168 (67.2)	17 (68.0)	66 (65.3)	55 (66.3)	30 (72.2)	0.88
Yes	82 (32.8)	8 (32.0)	35 (34.7)	28 (33.7)	11(26.8)	

3.4 Relationship Between Quantity of Alcohol Consumed, Dietary Behavior and Total Time Spent on Physical Activity with Hypertension Among Respondents

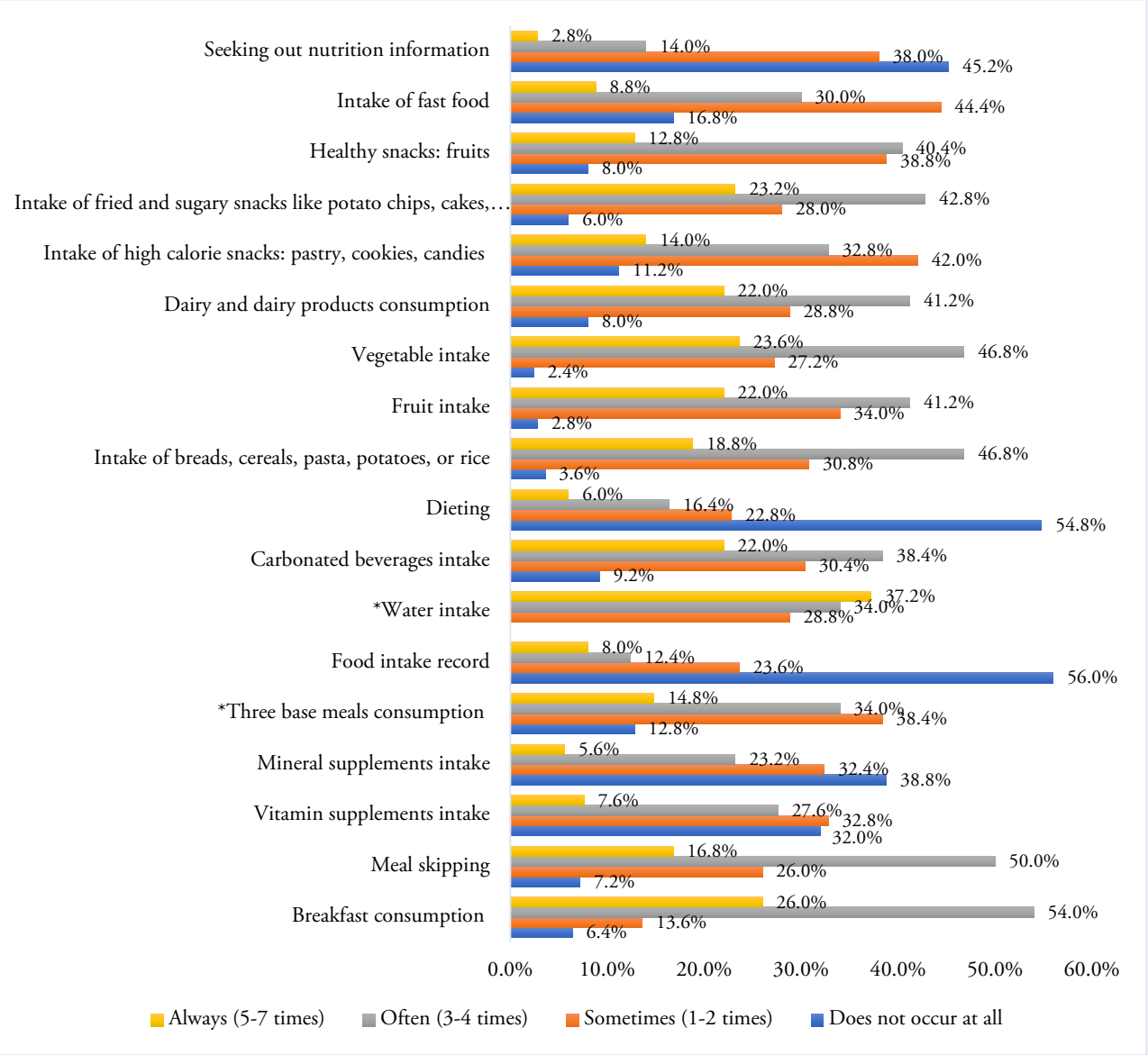
Table 5 data demonstrate that the quantity of alcohol (p = 0.00) consumed, was significantly associated with systolic blood pressure. Furthermore, cognitive restraint (p = 0.03), uncontrolled eating (p = 0.04), emotional eating (p = 0.04) and sedentary activity (p = 0.04) were significantly associated with diastolic pressure (Table 5).

3.5 Logistic Regression of Associated Risk Factors for Hypertension

As the age of the respondents increase, there is increase in the odds of hypertension by 18.53 times (OR = 18.53, 95% CI: 1.14–3.02) among the respondents. Also, respondents with increased BMI had increase odd of having hypertension by 2 times (OR = 1.99, 95% CI: 1.19–3.33). In addition, increase in the quantity of alcohol consumed upsurges the odd of respondents to have hypertension by 24.18 times (OR = 24.18, 95% CI: 1.97–2.96). Furthermore, increase in cognitive restraint eating behavior increased the odd of respondents having hypertension by 2 times (OR = 1.53, 95% CI: 1.06–2.31) (Table 6).

4 Discussion

The present study revealed a high prevalence of hypertension, with nearly half of the respondents exhibiting elevated blood pressure. Hypertension was more prevalent among respondents aged 41-60 years, those who were married, males, had tertiary education, earned above $278.48, and were non-academic staff. Solely educational level was significantly associated (positively) with hypertension. These findings align with previous studies, which demonstrated a higher prevalence of hypertension among adults aged 41–60 years (Egbi *et al.*, 2015), males (Crichton *et al.*, 2016; Khajedaluee *et al.*, 2016; Liew *et al.*, 2019; Momin *et al.*, 2012), and individuals with higher education levels (Singh *et al.*, 2017). However, Ajayi *et al.* (2016) established a contrasting pattern, with higher prevalence among younger age groups (18-39 years) and lower educational levels. Other studies have reported a higher prevalence of hypertension among females (Abebe *et al.*, 2015; Cuschieri *et al.*, 2017; Egbi *et al.*, 2015; Obarisiagbon *et al.*, 2018) although educational level was not consistently associated with hypertension (Cuschieri *et al.*, 2017).



Note: *per day

Figure 2. Dietary Patterns of the Respondents in a Week

Table 4. Associated dietary pattern of respondents with hypertension

Variable	Normal	Elevated	Hypertension Stage I	Hypertension Stage II	Total	*p*-value*
Breakfast consumption						
Not at all	3 (12.0)	8 (7.9)	3 (3.6)	2 (4.9)	16 (6.4)	0.12
1–2 times	6 (24.0)	12 (11.9)	15 (18.1)	1 (2.4)	34 (13.6)	
3–4 times	12 (48.0)	53 (52.5)	42 (50.6)	28 (68.3)	135 (54.0)	
5–7 times	4 (16.0)	28 (27.7)	23 (27.7)	10 (24.4)	65 (26.0)	
Total	25(10.0)	101(40.4)	83(33.2)	41(16.4)	250(100.0)	
Meal skipping						
Not at all	3 (12.0)	7 (6.9)	4 (4.8)	4 (9.8)	18 (7.2)	0.51
1–2 times	9 (36.0)	25 (24.8)	19 (22.9)	12 (29.3)	65 (26.0)	
3–4 times	10 (40.0)	47 (46.5)	49 (59.0)	19 (46.3)	125 (50.0)	
5–7 times	3 (12.0)	22 (21.8)	11 (13.3)	6 (14.6)	42 (16.8)	
Total	25(10.0)	101(40.4)	83(33.2)	41(16.4)	250(100.0)	

Table 4. (Continued)

Fruit Intake						
Not at all	2 (8.0)	3 (3.0)	1 (1.2)	1 (2.4)	7 (2.8)	0.72
1–2 times	6 (24.0)	37 (36.6)	29 (34.9)	13 (31.7)	85 (34.0)	
3–4 times	12 (48.0)	41 (40.6)	31 (37.3)	19 (46.3)	103 (41.2)	
5–7 times	5 (20.0)	20 (19.8)	22 (26.5)	8 (19.5)	55 (22.0)	
Total	25(10.0)	101(40.4)	83(33.2)	41(16.4)	250(100.0)	
Vegetable Intake						
Not at all	2 (8.0)	1 (1.0)	2 (2.4)	1 (2.4)	6 (2.4)	0.72
1–2 times	6 (24.0)	27 (26.7)	24 (28.9)	11 (26.8)	68 (27.2)	
3–4 times	9 (36.0)	48 (47.5)	39 (47.0)	21 (51.2)	117 (46.8)	
5–7 times	8 (32.0)	25 (24.8)	18 (21.7)	8 (19.5)	59 (23.6)	
Total	25(10.0)	101(40.4)	83(33.2)	41(16.4)	250(100.0)	
Intake of High Calorie Snacks						
Not at all	1 (4.0)	10 (9.9)	6 (7.2)	11 (26.8)	28 (11.2)	0.00*
1-2 times	15 (60.0)	44 (43.6)	41 (49.4)	5 (12.2)	105 (42.0)	
3-4 times	6 (24.0)	32 (31.7)	27 (32.5)	17 (41.5)	82 (32.8)	
5-7 times	3 (12.0)	15 (14.9)	9 (10.8)	8 (19.5)	35 (14.0)	
Total	25(10.0)	101(40.4)	83(33.2)	41(16.4)	250(100.0)	
Intake of Fried and Sugary Snacks						
Not at all	2 (8.0)	8 (7.9)	3 (3.6)	2 (4.9)	15 (6.0)	0.01*
1-2 times	11 (44.0)	31 (30.7)	16 (19.3)	12 (29.3)	70 (28.0)	
3-4 times	5 (20.0)	41 (40.6)	49 (59.0)	12 (29.3)	107 (42.8)	
5-7 times	7 (28.0)	21 (20.8)	15 (18.1)	15 (36.6)	58 (23.2)	
Total	25(10.0)	101(40.4)	83(33.2)	41(16.4)	250(100.0)	
Intake of Healthy Snacks*						
Not at all	3 (12.0)	8 (7.9)	5 (6.0)	4 (9.8)	20 (8.0)	0.71
1-2 times	9 (36.0)	42 (41.6)	33 (39.8)	13 (31.7)	97 (38.8)	
3-4 times	8 (32.0)	41 (40.6)	36 (43.4)	16 (39.0)	101 (40.4)	
5-7 times	5 (20.0)	10 (9.9)	9 (10.8)	8 (19.5)	32 (12.8)	
Total	25(10.0)	101(40.4)	83(33.2)	41(16.4)	250(100.0)	

Note: * Healthy snacks are fruits, yoghurt, and popcorn.

Table 5. Relationship Between Quantity of Alcohol Consumed, Eating Behavior and Total Time Spent on Physical Activity with Hypertension Among Respondents

	Median (LQ-UQ)	SP (r)	*p*-value	DP (r)	*p*-value
Quantity of alcohol (mL)	450 (100.0–1200.0)	0.35	0.00*	0.12	0.35
Eating Behaviour					
Cognitive Restraint	75.00 (83.33–66.67)	-0.03	0.61	-0.26	0.03*
Uncontrolled Eating	61.11 (66.67–52.78)	-0.11	0.08	-0.25	0.04*
Emotional Eating	75.00 (85.42–66.67)	-0.06	0.37	-0.24	0.04*
Total time spent on (MET-minute/day)					
Physical Activity	320.0 (0.0–840.0)	-0.04	0.52	-0.08	0.22
Work	287.5 (146.3–33.8)	-0.35	0.40	-0.09	0.84
Transport	80.0 (45.0–150.0)	-0.07	0.34	-0.-3	0.74
Recreation	225.0 (95.0–450.0)	-0.24	0.39	-0.21	0.44
Sedentary Activity	300.0 (180.0–420.0)	0.08;	0.23	0.13	0.04*

Note: SP: Systolic pressure; DP: diastolic pressure; r: correlation coefficient.

Table 6. Logistic Regression of Associated Risk Factors for Hypertension

Variables	AOR	95% CI		*p*-value
		Lower	Upper	
Age	18.53*	1.14	3.02	0.04
Body Mass Index (kg/m²)				
<25.00	Ref			
≥ 25.00	1.99*	1.19	3.33	0.01
Smoking Status				
Regular Smokers	1.56	0.74	3.28	0.24
Non- smokers	Ref			
Substance Sniffing Status				
Regular Substance Sniffers	4.25	0.45	40.43	0.21
Non-Substance Sniffers	Ref			
Alcohol drinking status				
Regular Alcohol Drinkers	1.01	0.60	1.98	0.77
Non-Drinkers	Ref			
Quantity of Alcohol Consumed	24.18*	1.97	2.96	0.01
Perceived stress status				
Perceived Stressed	0.48	0.14	1.65	0.24
Perceived Less stressed	Ref			
Eating Behavior				
Emotional Eating	1.01	0.56	1.74	0.96
Uncontrolled Eating	Ref	0.77	1.32	0.95
Cognitive Restraint	1.53*	1.06	2.21	0.02
Dietary habit of adequacy				
Adequate Dietary Habit	1.24	0.66	2.31	0.50
Inadequate Dietary Habit	Ref			

Note: Adjusted Odds Ratio (AOR).

Nearly a quarter of the respondents were regular alcohol drinkers, one in ten were regular smokers, and 15.2% were regular substance users. These findings are consistent with previous studies, which reported alcohol consumption rates of 23.6% (Egbi *et al.*, 2015) and smoking rates of 11.4% (Kishore *et al.*, 2016). However, other studies have reported higher rates of alcohol consumption (59.3%) and lower smoking rates (1.1%) (Abebe *et al.*, 2015; Ajayi *et al.*, 2016).

While hypertension was more prevalent among non-drinkers, more than half (54.6%) of the regular alcohol drinkers had hypertension stages 1 and 2, and one-fifth had elevated blood pressure. Similarly, almost a quarter of regular smokers (24.3%) and 7.3% of the substance users had hypertension stages 1 and 2. In this study, alcohol consumption was significantly associated with hypertension. Systolic blood pressure was significantly correlated with alcohol consumption. Previous studies have reported mixed findings regarding the association between smoking, alcohol consumption, and hypertension (Ajayi *et al.*, 2016; Paugh, 2005). These findings imply that alcohol consumption could be a contributing factor to the development of hypertension among populations.

In addition, overweight, physical inactivity, gross and abdominal obesity have been associated with hypertension (Willett *et al.*, 2019). In this study, one in four respondents were overweight, more than one in five were obese, one in three had abdominal obesity and two-thirds had low physical activity. Similarly, a study conducted on adults of Ibadan-North local government area, Nigeria revealed an overweight prevalence of 42.8% (Ajayi *et al.*, 2016). Also, in the study of Ruan *et al.* (2018), overweight and obesity prevalence was 36.4% and about two-thirds had low physical activity. More so, Singh *et al.* (2017) reported that 38.3% of their respondents among urban population of Varanasi were overweight and obese and about one-third had abdominal obesity. On the other hand, some studies revealed contrary findings (Onyango *et al.*, 2017; Kishore *et al.*, 2016) however, Egbi *et al.* (2015) reported that 66.5%, and 59.3% of respondents were overweight and obese respectively from their studies.

Furthermore, more than two-thirds of the respondents who were overweight had hypertension stage 1 and 2 while one-third of them had elevated blood pressure. Half of the respondents with low physical activity level had hypertension and less than half had elevated blood pressure. Only 9% of them had normal blood pressure. Almost half of respondents with abdominal obesity had hypertension and less than half of them had elevated blood pressure.

Physical inactivity has been revealed to increase overweight and obesity (Oladoyinbo *et al.*, 2019) and

increased body weight have been linked to cardiometric diseases such as hypertension, diabetes and overall mortality (Colecraft *et al.*, 2018). This suggest that respondents who were physically inactive, had increased body weight and abdominal obesity may be at risk of hypertension and other cardiometric diseases.

In the present study, body mass index is significantly associated with hypertension. However, physical activity was not associated with hypertension (p = 0.88) as well as abdominal obesity and hypertension (p = 0.88). Previous studies revealed that body mass index had significant association with hypertension (Ajayi *et al.*, 2016; Colecraft *et al.*, 2018; Okubadejo *et al.*, 2019), hypertension and abdominal obesity (Abebe *et al.*, 2015; Baig *et al.*, 2015; Egbi *et al.*, 2015; Obarisiagbon *et al.*, 2018; Singh *et al.*, 2017) as well as hypertension and physical inactivity (Baig *et al.*, 2015; Onyango *et al.*, 2017; Obarisiagbon *et al.*, 2018; Ruan *et al.*, 2018; Singh *et al.*, 2017), although, vigorous physical activity was reported to increase hypertension risk (Cuschieri *et al.*, 2017).

Unhealthy dietary habits are a major hypertension risk factor for. Diet high in fat and salt have been implicated in cardiovascular diseases development such as hypertension (Justamente *et al.*, 2020). Eating behavior has been shown to be influenced by stress (Justamente *et al.*, 2020) and hence may contribute to hypertension development. In this study, only one in five respondents had adequate dietary habit and most of them had moderate dietary habit. Hypertension was more prevalent among respondents with moderate than adequate dietary habit, although, there is no association between dietary habit and hypertension. However, habitual unhealthy dietary practices may predispose consumers to the risk of having hypertension. In addition, majority of the respondents perceived to be moderately stressed while only few of them were less stressed. About half of those who were moderately stressed had hypertension while respondents who were less stressed had low hypertension prevalence, although perceived stress had no significant association with hypertension (p = 0.40). Various studies have identified different forms of stress to be a risk factor for hypertension (Colecraft *et al.*, 2018; Egbi *et al.*, 2015; Kishore *et al.*, 2016; Obarisiagbon *et al.*, 2018; Singh *et al.*, 2017). This suggest that respondents who were moderately stressed may be at risk of hypertension.

One-quarter of the respondents always consume breakfast, about two-third consume cereal foods, dairy and dairy products, fruits and vegetables and healthy snacks at least three times per week. On the other hand, almost all of them skipped meals, carbonated beverages, fried and sugary snacks at least three times per week. Also, almost half of the respondents consumed high calorie snacks, and one-third consumed fast food at least three times per week. Studies have shown that good dietary practices such as adequate consumption of fruits and vegetables reduce risk of developing hypertension or its risk factors (Abebe *et al.*, 2015; PloS One Editors, 2023; Onyango *et al.*, 2017; Ruan *et al.*, 2018). However, unhealthy dietary practices such as meal skipping, carbonated beverage intake, intake of fried and sugary snacks and high calorie snacks may predispose consumers to adverse health consequences (Justamente *et al.*, 2020).

In this study, unhealthy dietary habits such as frequent intake of high calorie snacks, fried and sugary snacks were associated with hypertension. This finding aligns with previous research highlighting the importance of dietary factors in hypertension prevention (Abebe *et al.*, 2015; Justamente *et al.*, 2020; Onyango *et al.*, 2017; PloS One Editors, 2023; Ruan *et al.*, 2018). However, the association between specific dietary behaviors (e.g., breakfast consumption, fruit and vegetable intake, meal skipping, and healthy snacks) and hypertension was not significant (p > 0.05) in this study. This may be due to various factors, including the cross-sectional design and the limitations of self-reported dietary intake. Previous studies revealed significant association between hypertension and breakfast consumption as well as fruit and vegetable intake (Kubota *et al.*, 2016; PloS One Editors, 2023; Ofori-Asenso *et al.*, 2019). Further studies showed no significant association with meal frequency, hypertension and breakfast consumption (Kang *et al.*, 2019; Lee *et al.*, 2019). In the logistic regression model, age and body mass index had significant association with hypertension.

5 Conclusions

This study highlights the substantial burden of hypertension and unhealthy lifestyle behaviors prevalent among university personnel. Similarly, the vast majority of respondents experiencing moderate levels of stress. Furthermore, a high prevalence of unhealthy eating patterns was observed, characterized by excessive consumption of fried foods, sugary snacks, and carbonated beverages coupled with frequent meal skipping,

The etiology of hypertension within this cohort is multifactorial, with demographic characteristics, lifestyle behaviors, and dietary habits all constituting significant contributing elements. Advanced age, elevated body mass index, higher quantity of alcohol consumption, and sedentary behavior were all found to increase the odds of a hypertension diagnosis.

The implementation of targeted, institution-based interventions designed to promote healthier lifestyles and improved dietary practices — especially those addressing modifiable risk factors — holds considerable potential for mitigating the burden of hypertension and other

cardiovascular diseases within this population. Subsequent research should endeavor to evaluate the efficacy of such tailored interventions and to elucidate the precise mechanisms through which perceived stress influences eating behaviors and hypertension pathogenesis in this demographic.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
Pre-print deposit: Authors did not share this manuscript as preprint deposit.
Acknowledgment: None.
Authors' Contribution: Oluwafunke O. Akinbule: Conceptualization, Investigation, Validation, Methodology, Writing - original draft, Writing - review & editing. Damilola, Visualization, Formal analysis. **Damilola S. Ogunyinka:** Conceptualization, Investigation, Methodology, Writing – review & editing. **Sultan A. Adenusi:** Writing - review & editing, Formal analysis.
Conflicts of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

Abebe, S. M., Berhane, Y., Worku, A., & Getachew, A. (2015). Prevalence and associated factors of hypertension: A crossectional community based study in northwest Ethiopia. *PloS One*, *10*(4), e0125210. https://doi.org/10.1371/journal.pone.0125210 [Crossref] [PubMed] [Google Scholar] [Publisher]

Akinbule, O. O., Oladoyinbo, C. A., & Omonhinmin, H. (2018). Street food Consumption Score and Nutritional Status of Staff of Federal University of Agriculture, Abeokuta, Ogun State. *Nigerian Journal of Nutritional Sciences*, *39*(1), 96–103. [Google Scholar] [Publisher]

Akinbule, O., Ayotunde, A., Oladoyinbo, C., Adebukola, O., & Adebukola, O. (2021). Socio-economic Determinants, behavioural risk factors for cardiovascular diseases and Nutritional anthropometry of students of public tertiary institutions in Abeokuta, Ogun State, Nigeria. *Omiduran Adebukola and Omonhinmin Imoetin*, *42*(1), 9–21. [Google Scholar] [Publisher]

Akinbule, Oluwafunke O., Okekhian, K. L., Omidiran, A. T., Adenusi, S. A., Lasabi, O. T., & Oladoyinbo, C. A. (2022). Factors associated with hypertension in women of child-bearing age in Abeokuta. *Human Nutrition & Metabolism*, *30*(200160), 200160. https://doi.org/10.1016/j.hnm.2022.200160 [Crossref] [Google Scholar] [Publisher]

Akintunde, A. A., Akintunde, T. 'sade, & Opadijo, O. G. (2015). Knowledge of heart disease risk factors among workers in a Nigerian University: A call for concern. *Nigerian Medical Journal: Journal of the Nigeria Medical Association*, *56*(2), 91–95. https://doi.org/10.4103/0300-1652.150688 [Crossref] [PubMed] [Google Scholar] [Publisher]

Araoye, M. O. (2004). *Sample Size Determination in Research Methodology with Statistics for Health and Social Sciences*. Nathadex Publishers.[Google Scholar]

Baig, M., Gazzaz, Z. J., Gari, M. A., Al-Attallah, H. G., Al-Jedaani, K. S., Mesawa, A. T., & Al-Hazmi, A. A. (2015). Prevalence of obesity and hypertension among University students' and their knowledge and attitude towards risk factors of Cardiovascular Disease (CVD) in Jeddah, Saudi Arabia. *Pakistan Journal of Medical Sciences Quarterly*, *31*(4), 816–820. https://doi.org/10.12669/pjms.314.7953 [Crossref] [PubMed] [Google Scholar] [Publisher]

Bohmann, P., Stein, M. J., Amadou, A., Baurecht, H., Fervers, B., Fontvieille, E., Freisling, H., Friedenreich, C., Konzok, J., Peruchet-Noray, L., Leitzmann, M. F., Sedlmeier, A. M., & Weber, A. (2025). WHO guidelines on waist circumference and physical activity and their joint association with cancer risk. *British Journal of Sports Medicine*, *59*(6), 360–366. https://doi.org/10.1136/bjsports-2024-108708 [Crossref] [PubMed] [Google Scholar] [Publisher]

Cohen, S., ter Stege, J. A., Weijsenfeld, A. M., van der Plas, A., Kuijpers, T. W., Reiss, P., Scherpbier, H. J., Haverman, L., & Pajkrt, D. (2015). Health-related quality of life in perinatally HIV-infected children in the Netherlands. *AIDS Care*, *27*(10), 1279–1288. https://doi.org/10.1080/09540121.2015.1050986 [Crossref] [PubMed] [Google Scholar] [Publisher]

Colecraft, E. K., Asante, M., Christian, A. K., & Adu-Afarwuah, S. (2018). Sociodemographic characteristics, dietary practices, and nutritional status of adults with hypertension in a semi-rural community in the Eastern Region of Ghana. *International Journal of Hypertension*, *2018*, 1–7. https://doi.org/10.1155/2018/2815193 [Crossref] [PubMed] [Google Scholar] [Publisher]

Crichton, G. E., Elias, M. F., & Torres, R. V. (2016). Sugar-sweetened soft drinks are associated with poorer cognitive function in individuals with type 2 diabetes: the Maine-Syracuse Longitudinal Study. *The British Journal of Nutrition*, *115*(8), 1397–1405. https://doi.org/10.1017/S0007114516000325 [Crossref] [PubMed] [Google Scholar] [Publisher]

Cuschieri, S., Vassallo, J., Calleja, N., Pace, N., & Mamo, J. (2017). The effects of socioeconomic determinants on hypertension in a cardiometabolic at-risk European country. *International Journal of Hypertension*, *2017*, 1–7. https://doi.org/10.1155/2017/7107385 [Crossref] [PubMed] [Google Scholar] [Publisher]

Daniels, S. R. (2019). Understanding the Global Prevalence of Hypertension in Children and Adolescents. *JAMA Pediatr*, *73*(12), 1133–1134. https://doi.org/10.1001/jamapediatrics.333 [Crossref] [PubMed] [Google Scholar] [Publisher]

Egbi, O. G., Rotifa, S., & Jumbo, J. (2015). Prevalence of hypertension and its correlates among employees of a tertiary hospital in Yenagoa, Nigeria. *Annals of African Medicine*, *14*(1), 8–17. https://doi.org/10.4103/1596-3519.148709 [Crossref] [PubMed] [Google Scholar] [Publisher]

Global Nutrition Report (2022). 2022 Global Nutrition Report: Stronger commitments for greater action. Retrieved from: https://globalnutritionreport.org/resources/nutrition-profiles/africa/western-africa/nigeria/

Justamente, I., Raudeniece, J., Ozolina-Moll, L., Guadalupe-Grau, A., & Reihmane, D. (2020). Comparative analysis of the effects of daily eating habits and physical activity on anthropometric parameters in elementary school children in Latvia: Pach study. *Nutrients*, *12*(12), 3818. https://doi.org/10.3390/nu12123818 [Crossref] [PubMed] [Google Scholar] [Publisher]

Kang, S.-H., Kim, S.-H., Cho, J. H., Yoon, C.-H., Hwang, S.-S., Lee, H.-Y., Youn, T.-J., Chae, I.-H., & Kim, C.-H. (2019). Prevalence, awareness, treatment, and control of hypertension in Korea. *Scientific Reports*, *9*(1), 10970. https://doi.org/10.1038/s41598-019-46965-4 [Crossref] [PubMed] [Google Scholar] [Publisher]

Karlsson, J., Persson, L. O., Sjöström, L., & Sullivan, M. (2000). Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study. *Int. J. Obes. Relat. Metab. Disord.*, *24*(12), 1715–1725. https://doi.org/10.1038/sj.ijo.0801442 [Crossref] [PubMed] [Google Scholar] [Publisher]

Khajedaluee, M., Hassannia, T., Rezaee, A., Ziadi, M., & Dadgarmoghaddam, M. (2016). The prevalence of hypertension and its relationship with demographic factors, biochemical, and anthropometric indicators: A population-based study. *ARYA Atherosclerosis*, *12*(6), 259–265. [PubMed] [Google Scholar] [Publisher]

Kishore, J., Gupta, N., Kohli, C., & Kumar, N. (2016). Prevalence of hypertension and determination of its risk factors in rural Delhi. *International Journal of Hypertension*, *2016*, 1–6. https://doi.org/10.1155/2016/7962595 [Crossref] [PubMed] [Google Scholar] [Publisher]

Kubota, Y., Iso, H., Sawada, N., Tsugane, S., & JPHC Study Group. (2016). Association of breakfast intake with incident stroke and coronary heart disease: The japan public health center-based study: The japan public health center-based study. *Stroke; a Journal of Cerebral Circulation*, *47*(2), 477–481. https://doi.org/10.1161/STROKEAHA.115.011350 [Crossref] [PubMed] [Google Scholar] [Publisher]

Lee, H. J., Jang, J., Lee, S. A., Choi, D.-W., & Park, E.-C. (2019). Association between breakfast frequency and atherosclerotic cardiovascular disease risk: A cross-sectional study of KNHANES data, 2014-2016. *International Journal of Environmental Research and Public Health*, *16*(10), 1853. https://doi.org/10.3390/ijerph16101853 [Crossref] [PubMed] [Google Scholar] [Publisher]

Liew, S. J., Lee, J. T., Tan, C. S., Koh, C. H. G., Van Dam, R., & Müller-Riemenschneider, F. (2019). Sociodemographic factors in relation to hypertension prevalence, awareness, treatment and control in a multi-ethnic Asian population: a cross-sectional study. *BMJ Open*, *9*(5), e025869. https://doi.org/10.1136/bmjopen-2018-025869 [Crossref] [PubMed] [Google Scholar] [Publisher]

Momin, M. H., Desai, V. K., & Kavishwar, A. B. (2012). Study of socio-demographic factors affecting prevalence of hypertension among bank employees of Surat City. *Indian Journal of Public Health*, *56*(1), 44–48. https://doi.org/10.4103/0019-557X.96970 [Crossref] [PubMed] [Google Scholar] [Publisher]

Obarisiagbon, O., Osayi, E., & Wagbatsoma, D. (2018). Prevalence and Risk Factors of Hypertension among Workers of an Oil Palm Company in Edo State, Nigeria. *Nigeria. J Community Med Prim Heal Care*, *30*(2), 62–74. [Google Scholar] [Publisher]

Odunaiya, N. A., Louw, Q. A., & Grimmer, K. A. (2015). Are lifestyle cardiovascular disease risk factors associated with pre-hypertension in 15-18 years rural Nigerian youth? A cross sectional study. *BMC Cardiovascular Disorders*, *15*(1), 144. https://doi.org/10.1186/s12872-015-0134-x [Crossref] [PubMed] [Google Scholar] [Publisher]

Ofori-Asenso, R., Owen, A. J., & Liew, D. (2019). Skipping breakfast and the risk of cardiovascular disease and death: A systematic review of prospective cohort studies in primary prevention settings. *Journal of Cardiovascular Development and Disease*, *6*(3), 30. https://doi.org/10.3390/jcdd6030030 [Crossref] [PubMed] [Google Scholar] [Publisher]

Okubadejo, N. U., Ozoh, O. B., Ojo, O. O., Akinkugbe, A. O., Odeniyi, I. A., Adegoke, O., Bello, B. T., & Agabi, O. P. (2019). Prevalence of hypertension and blood pressure profile amongst urban-dwelling adults in Nigeria: a comparative analysis based on recent guideline recommendations. *Clinical Hypertension*, *25*(1), 7. https://doi.org/10.1186/s40885-019-0112-1 [Crossref] [PubMed] [Google Scholar] [Publisher]

Oladoyinbo, C. A., Abiodun, A. M., Oyalowo, M. O., Obaji, I., Oyelere, A. M., Akinbule, O. O., & Sobo, A. A. (2020). Risk factors for diabetes mellitus and hypertension among artisans in Ogun state, Nigeria. *Nutrition & Food Science*, *50*(4), 695–710. https://doi.org/10.1108/nfs-01-2019-0007 [Crossref] [Google Scholar] [Publisher]

Oladoyinbo, C. A., Abiodun, A. M., Akinbule, O. O., Okeke, I. U., & John, E. P. (2019). Modifiable Risk Factors for Overweight and Obesity among Traders in Abeokuta South Local Government Area , Ogun State. *Afr. J. Biomed. Res*, *22*, 127–133. [Google Scholar] [Publisher]

Onyango, M. J., Kombe, I., Nyamongo, D. S., & Mwangi, M. (2017). A study to determine the prevalence and factors associated with hypertension among employees working at a call centre Nairobi Kenya. *The Pan African Medical Journal*, *27*, 178. https://doi.org/10.11604/pamj.2017.27.178.13073 [Crossref] [PubMed] [Google Scholar] [Publisher]

Park, S.-E., So, W.-Y., Kang, Y.-S., & Yang, J.-H. (2023). Relationship between perceived stress, obesity, and hypertension in Korean adults and older adults. *Healthcare (Basel, Switzerland)*, *11*(16). https://doi.org/10.3390/healthcare11162271 [Crossref] [PubMed] [Google Scholar] [Publisher]

Paugh, S. (2005). Dietary Habits And Nutritional Knowledge Of College Athletes. California University of Pennsylvania. [Google Scholar] [Publisher]

PloS One Editors. (2023). Expression of Concern: Magnitude and risk factors for hypertension among public servants in Tigray, Ethiopia: A cross-sectional study. PloS One, 18(1), e0279946. https://doi.org/10.1371/journal.pone.0279946 [Crossref] [PubMed] [Google Scholar] [Publisher]

Ruan, Y., Huang, Y., Zhang, Q., Qin, S., Du, X., & Sun, Y. (2018). Association between dietary patterns and hypertension among Han and multi-ethnic population in southwest China. *BMC Public Health*, *18*(1), 1106. https://doi.org/10.1186/s12889-018-6003-7 [Crossref] [PubMed] [Google Scholar] [Publisher]

Singh, S., Shankar, R., & Singh, G. P. (2017). Prevalence and associated risk factors of hypertension: A cross-sectional study in urban Varanasi. *International Journal of Hypertension*, *2017*, 5491838. https://doi.org/10.1155/2017/5491838 [Crossref] [PubMed] [Google Scholar] [Publisher]

Ajayi, I. O., Sowemimo, I. O., Akpa, O.M., & Ossai, N. E. (2016). Prevalence of hypertension and associated factors among residents of Ibadan-North Local Government Area of Nigeria. *Nigerian Journal of Cardiology*, *13*(1), 67. https://doi.org/10.4103/0189-7969.165168 [Crossref] [Google Scholar] [Publisher]

Stults-Kolehmainen, M. A., & Sinha, R. (2014). The effects of stress on physical activity and exercise. *Sports Medicine (Auckland, N.Z.)*, *44*(1), 81–121. https://doi.org/10.1007/s40279-013-0090-5 [Crossref] [PubMed] [Google Scholar] [Publisher]

Whelton, P. K., Carey, R. M., Aronow, W. S., Casey, D. E., Jr, Collins, K. J., Dennison Himmelfarb, C., DePalma, S. M., Gidding, S., Jamerson, K. A., Jones, D. W., MacLaughlin, E. J., Muntner, P., Ovbiagele, B., Smith, S. C., Jr, Spencer, C. C., Stafford, R. S., Taler, S. J., Thomas, R. J., Williams, K. A., Sr, Williamson, J. D., … Wright, J. T., Jr (2018). 2017ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Hypertension (Dallas, Tex.: 1979)*, *71*(6), 1269–1324. https://doi.org/10.1161/HYP.0000000000000066 [Crossref] [PubMed] [Google Scholar] [Publisher]

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., De Vries, W., Majele Sibanda, L., … Murray, C. J. L. (2019). Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. *Lancet*, *393*(10170), 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4 [PubMed] [Google Scholar] [Publisher]

World Health Organization (2008). Waist Circumference and Waist-Hip Ratio Report of a WHO Expert Consultation. (2008). *World Health Organization*. [Publisher]

Yoon, E. S., So, W.-Y., & Jang, S. (2023). Association between perceived psychological stress and exercise behaviors: A cross-sectional study using the Survey of National Physical Fitness. *Life (Basel, Switzerland)*, *13*(10), 2059. https://doi.org/10.3390/life13102059 [Crossref] [PubMed] [Google Scholar] [Publisher]

Yusuf, S., Joseph, P., Rangarajan, S., Islam, S., Mente, A., Hystad, P., Brauer, M., Kutty, V. R., Gupta, R., Wielgosz, A., AlHabib, K. F., Dans, A., Lopez-Jaramillo, P., Avezum, A., Lanas, F., Oguz, A., Kruger, I. M., Diaz, R., Yusoff, K., … Dagenais, G. (2020). Modifiable risk factors, cardiovascular disease, and mortality in 155 722 individuals from 21 high-income, middle-income, and low-income countries (PURE): a prospective cohort study. *Lancet*, *395*(10226), 795–808. https://doi.org/10.1016/S0140-6736(19)32008-2 [Crossref] [PubMed] [Google Scholar] [Publisher]