International Scholars Journals

International Journal of Medical Sociology and Anthropology ISSN 2756-3820 Vol. 14 (2), pp. 001-009, February, 2025. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Hypertension Prevalence, Dietary Habits, and Nutritional Status of Traders in Sokoto Central Market, Nigeria

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Accepted 07 November, 2025

Poor diet (high consumption of sugar, salt, saturated fat, etc) and unhealthy lifestyle (smoking, alcohol consumption and physical inactivity) have been identified as major risk factors of cardiovascular disease and other non-communicable diseases (NCDs). NCDs are the leading causes of death globally, killing more people each year than all other causes combined. This study was conducted to assess the dietary pattern, lifestyle, nutrition status and prevalence of hypertension among traders in Sokoto, Nigeria. A cross sectional descriptive study was conducted among 390 traders selected by multistage sampling technique from November to December, 2012. Anthropometric and blood pressure measurements were done for the participants, together with questionnaire administration. High prevalence of unhealthy eating habits was recorded among the participants; 50.7% eat their largest meal at dinner, 49.9% eat snacks everyday, 66.7% eat fatty foods, 27.1% and 33.0% drink fruit juice and carbonated drinks, respectively thrice weekly or more, 56.0 and 58.8% eat fruits and vegetables, respectively less than thrice in a week or not at all. Also, 50.7% live a sedentary lifestyle, 5.2% currently smoke cigarette and 10.8% had consumed alcohol within the past 30 days. Similarly, the prevalence of overweight (28.9%), obesity (28.1%) and hypertension (29.1%) was high among the participants. This study demonstrated high prevalence of unhealthy eating habits and lifestyle; together with high prevalence of overweight, obesity and hypertension among traders in Sokoto. Health education and other interventions to promote healthy eating habits and lifestyle, especially among high risk groups are suggested.

Key words: Dietary pattern, lifestyle, nutrition status, hypertension, prevalence.

INTRODUCTION

Nutrition as the science of food and its relationship to health has been recognized in recent years as the cornerstone of socioeconomic development (Parks, 2009). Adequate nutrition is important for a variety of reasons, including optimal cardiovascular function, muscle strength, respiratory ventilation, protection from infection, wound healing and psychological well-being (Martin, 2006). Adequate nutrition entails a diet that contains the

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constituents (carbohydrate, fats, proteins, vitamins and minerals) that are required for body building, energy supply, body defense and regulatory functions in quantities commensurate with the body need. Malnutrition refers to either inadequate intake of nutrients due to lack of food, ignorance, socio-cultural factors, and diseases among other causes, resulting in underweight and other nutrient deficiency diseases; or intake of nutrients in excess of body requirements due to poor dietary habit (erroneously perceived as a sign of affluence), resulting in overweight and obesity.

Poor diet (high consumption of sugar, salt, saturated fat, etc) and unhealthy lifestyle (smoking, alcohol consumption and physical inactivity) have been identified as major risk factors of cardiovascular disease and other non-communicable diseases (NCDs). Central to the aetiogenesis of diet induced cardiovascular disease is atherosclerosis, and the factor most important in causing atherosclerosis is a high blood plasma concentration of cholesterol in the form of low density lipoproteins (LDLs).

Cholesterol is present in the diet of all people, besides the cholesterol absorbed from the gastrointestinal tract which is called exogenous cholesterol, an even greater quantity is formed in the cells of the body (principally by the liver), this is called endogenous cholesterol. An increase in the amount of cholesterol ingested daily increases the plasma concentration slightly. When cholesterol is ingested, the rising concentration of cholesterol inhibits the most essential enzyme for endogenous synthesis of cholesterol, 3-hydroxy-3-methylglutaryl CoA reductase, thus providing an intrinsic feedback control system to prevent excessive increase in plasma cholesterol concentration. A highly saturated fat diet increases blood cholesterol concentration by 15 to 25%. This results from increased fat deposition in the liver which then provides increased quantities of acetyl-CoA in the liver cells for production of cholesterol. It is therefore important to maintain a diet low in saturated fat as to maintain a diet low in cholesterol in order to decrease the blood cholesterol concentration (Arthur and John, 2000). This fact is corroborated by the findings in 'the strong heart study' that reported total fat, saturated fat and monounsaturated fatty acid intake as strong predictors of coronary heart disease (CHD) mortality in American Indians aged 47 to 59 years independent of other established CHD risk factors (Xu et al., 2006). Reports from several studies also show very strong association between diet and development of non-communicable diseases. In a study among female nurses, overweight or obesity was the single most important predictor of diabetes mellitus; also, lack of exercise, a poor diet, current smoking and abstinence from alcohol were all associated with a significant increased risk of diabetes, even after adjustment for the body mass index (Hu et al., 2001).

Similarly, in another study in Taiwan by Hung et al. (2004), consumption of preserved and overheated foods was found to be associated with increased risk of esophageal cancer, whereas intake of fresh fruits, vegetables, and tea was inversely associated with this risk. Fruits and vegetables contain phytochemicals and antioxidants that protect the body cells from developing cancer. Non-communicable diseases are the leading cause of death globally, killing more people each year than all other causes combined. According to the World Health Organization (WHO) estimates, 36 million, out of the 57 million deaths (almost two thirds) that occurred globally in 2008 were due to non-communicable diseases (NCDs), comprising mainly cardiovascular diseases, cancers, diabetes mellitus and chronic lung diseases (WHO, 2011a).

According to the United Nations, nearly 870 million people of the 7.1 billion people in the world, or one in eight, suffered from chronic undernourishment in 2010 to 2012. Almost all the hungry people, 852 million, live in developing countries, representing 15% of the population of developing countries. In Africa, nearly one in four people are hungry; the number of hungry people grew over this period from 175 to 220 million, with nearly 20 million added in the last few years. Only 16 million undernourished people reside in the developed countries (FAO, 2012).

Ironically, overweight and obesity are linked to more deaths worldwide than underweight. For example, 65% of the world's population live in countries where overweight and obesity kill more people than underweight (this includes all high-income and most middle-income countries). Once considered a high-income country problem, overweight and obesity are now on the rise in low- and middle-income countries, particularly in urban settings. In 2008, more than 1.4 billion adults, 20 years and older, were overweight. Of these, over 200 million men and nearly 300 million women were obese. 35% of adults aged 20 years and over were overweight in 2008, and 11% were obese. Overweight and obesity are the fifth leading risk for global deaths. At least 2.8 million adults die each year as a result of being overweight or obese. In addition, 44% of the diabetes burden, 23% of the ischemic heart disease burden and between 7 and 41% of certain cancer burdens are attributable to overweight and obesity (WHO, 2013a).

Although tobacco deaths rarely make headlines, tobacco kills one person every six seconds. Tobacco kills a third to half of all people who use it, on average 15 years prematurely. Today, tobacco use causes 1 in 10 deaths among adults worldwide – more than five million people a year. Tobacco will kill over 175 million people worldwide between now and the year 2030 and by 2030, unless urgent action is taken, tobacco's annual death toll will rise to more than eight million. If current trends continue

unchecked, it is estimated that around 500 million people alive today will be killed by tobacco (WHO, 2008).

Alcohol consumption is the world's third largest risk factor for disease and disability; in middle-income countries, it is the greatest risk. Alcohol is a causal factor in 60 types of diseases and injuries and a component cause in 200 others. Almost 4% of all deaths worldwide are attributed to alcohol, greater than the deaths caused by human immunodeficiency virus/acquired immuned deficiency syndrome (HIV/AIDS), violence or tuberculosis. Alcohol is also associated with many serious social issues, including violence, child neglect and abuse, and absenteeism in the workplace. The harmful use of alcohol is a particularly grave threat to men. It is the leading risk factor for death in males aged 15 to 59 years, mainly due to injuries, violence and cardiovascular diseases. Globally, 6.2% of all male deaths are attributable to alco- hol, compared to 1.1% of female deaths. Men also have far greater rates of total burden attributed to alcohol than women – 7.4% for men compared to 1.4% for women (WHO, 2011b).

Physical inactivity has become a public health problem all over the world. Globally, around 31% of adults aged 15 years and over were insufficiently active in 2008 (men 28% and women 34%). Approximately 3.2 million deaths each year are attributable to insufficient physical activity. The current high level of physical inactivity is believed to be partly due to insufficient participation in physical activity during leisure time and an increase in sedentary behavior during occupational and domestic activities (WHO, 2013b).

Globally, the overall prevalence of raised blood pressure in adults aged 25 years and over was around 40% in 2008. Across the WHO regions, the prevalence of raised blood pressure was highest in Africa, where it was 46% for both sexes combined. Both men and women have high rates of raised blood pressure in the Africa re- gion, with prevalence rates over 40%. Worldwide, raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths. This accounts for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS (WHO, 2013c).

Identification of these major risk factors and the implementation of control strategies (for example, community education and targeting of high risk individuals) have contributed to the fall in NCDs mortality rates observed in industrialized nations (Ford et al., 2007). In addition, dietary regimen (often combined with regular moderate intensity physical activity such as brisk walking, cycling etc, lasting for at least 30 min, to be observed at least thrice weekly) are now available for the prevention and/or treatment of many non-communicable diseases. One of such regimen is the Dietary Approach to Stop Hypertension (DASH) eating plan, which has been found to be more effective in lowering blood pressure if combined with reduced salt intake (National Institute of Health (NIH)/National Heart, Lung and Blood Institute (NHLBI), 2006).

Central to eco-social theory and epidemiological inquiry is a construct known as embodiment; it is the process through which extrinsic factors experienced at different life stages are inscribed into an individual's body func- tions or structures, and the result of such processes. It recognizes humans as simultaneously social beings and biological organisms, and as such their bodies tell stories about, and cannot be studied divorced from the condition of their existence. Such stories often, but not always match peoples stated account; and the bodies even tell stories that people cannot or will not tell either because they are unable, forbidden or chose not to tell (Krieger, 2005).

Embodiment therefore underline the use of a combination of appraisal of dietary intake (based on recall of type and frequency of food eaten) and appraisal of nutritional status (based on anthropometric, clinical and biochemical assessments) for a comprehensive assessment of malnutrition.

The market as a meeting place for distributors of goods (and even producers of some goods, especially food items produced by small scale farmers) and consumers, represents the soul of every community. Traders therefore represent an important productive sector of the economy. A study by Ulasi et al. (2011) reported a high prevalence of hypertension (42.0%) in a market po- pulation in Enugu, Nigeria. Another study by Odugbemi et al. (2012) also reported high prevalence of hypertension (34.8%), physical inactivity (92.0%), cigarette smoking by males (17.5%), obesity (12.3%) and overweight (39.9%) among traders in Lagos. However, previous studies among traders in Nigeria, majorly examined lifestyle and prevalence of non-communicable diseases (NCDs) or their risk factors, there is a dearth of literature on their dietary pattern and its correlation (if any), with the observed high prevalence of NCDs among them, even though they are prone to consuming the high energy dense foods that they sell to people. This study was conducted to assess the dietary pattern, lifestyle, nutrition status and prevalence of hypertension among traders in Sokoto, Nigeria.

METHODOLOGY

Study design and population

This cross sectional descriptive study was carried out among traders in Sokoto Central Market, Sokoto, North Western Nigeria, from November to December, 2012. The Sokoto Central Market is the largest market in North Western Nigeria, built on a 24 hectares land donated by the late Sultan Abubakar III. It was established to cater for the growing population of Sokoto town which has now grown into a city with a population of 427,760 by the 2006 National

Census (National Population Commission (NPC), 2006); and to prevent the frequent fire outbreak at the old market known as 'YAR DOLE', situated along Sultan Bello Way, about 400 m away from the new market. The market has 5,095 stalls (comprised of 3,346 lock up stalls and 1,749 open stalls) grouped into 16 clusters designated as Areas (A to S). The facilities in the market included; mosque, clinic, area court, police station, motor parks, administrative block, fire service unit, restaurants, 18 toilet blocks, workshop and information centre.

Traders aged 18 years and above, and have worked in the market in a stall for at least 6 months were considered eligible, while those aged below 18 years, or have spent less than 6 months, or sell in open spaces were excluded. The sample size was estimated at 367 and adjusted to 390 using the statistical formula for calculating sample size for cross sectional descriptive studies (Ibrahim, 2009), 39.5% prevalence of hypertension among traders from a previous study (Aghaji, 2008), precision level of 5% and an anticipated response rate of 95%. The eligible participants were selected by multistage sampling technique. At the first stage 8 of 16 areas were selected by simple random sampling using the ballot option. At the second stage, selection of stalls in each of the selected area was done by systematic sampling technique using the list of stalls in each area to constitute the sampling frame. Proportionate allocation (based on number of stalls) was applied in the selection of stalls in the selected Areas. From each stall selected, the first trader encountered and fulfilling the eligibility criteria for the study was enrolled. In the event of a selected stall being under lock, or not having an eligible trader, an eligible trader was selected from the next accessible stall.

Data collection

The methods of data collection comprised of personal interview and physical assessment (anthropometric and blood pressure measurements). A standardized, semi-structured, interviewer-administered questionnaire was used to obtain information on the socio-demographic characteristics of the study participants, dietary pattern and lifestyle. The questions on types of food consumed were adapted from the survey tool that was used for the Nigerian Food Consumption and Nutrition Survey (2001 to 2003) (International Institute of Tropical Agriculture (IITA), 2004). The questions on current eating habits were adapted from the National Institute of Health (NIH)/National Heart Lung and Blood Institute (NHLBI) format for the assessment of current eating habit for Therapeutic Lifestyle Change Diet (NIH/NHLBI, 2002). The ques- tions on behavioural measurements were adapted from the WHO STEPS instrument for chronic diseases risk factors surveillance that was used for a national survey on health behaviour monitor among Nigerian adult population (NHF/FMoH, 2003). The instruments were pre-tested in a pilot study among 20 traders at Gawo Nama Market, Sokoto; the necessary adjustment was effected based on the observations made during the pre-test.

Weight was measured with shoes off to the nearest 0.5 kg using a seca optimal scale; it was validated with a standard weight and corrected for zero error. Height was measured without shoes to the nearest 0.5 cm using a stadiometer. Blood pressure was measured using a sphygmomanometer (Dekamet MG3, England) and stethoscope (Littman quality) with all tight clothing and other similar materials removed from the arm and in the sitting position. The first measurement was taken after the participant had rested for at least 10 min in a sitting position with the arm rested on a table such that the middle of the forearm was about the level of the heart. The second measurement was taken at the end of the interview; the mean of the 2 readings was used in the analysis. Four medical officers and four nurses assisted in data collection after pre-training on the objectives, selection of participants and use of survey instruments. Institutional ethical clearance was obtained from the Ethical committee of Specialist Hospital Sokoto; permission was obtained from the management of the market and informed written consent was also obtained from the participants before data collection.

Operational definition of terms

Body mass index (BMI) was calculated as weight (kg) divided by height^2 (m^2) and used as marker for nutritional status (Tsigos et al., 2008). Underweight was defined as BMI less than 18.5 kg/m^2, normal weight was defined as BMI of 18.5 to 24.9 kg/m^2, overweight was defined as BMI of 25.0 to 29.9 kg/m^2, while obesity was defined as BMI of 30.0 kg/m^2 and above. Hypertension was defined using the World Health Organization and International Society of Hypertension criteria (WHO and ISH, 2003) as systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg or both or self reported antihypertensive medication during the past 1 week.

Data analysis

Data was analyzed using the statistical package for social sciences (SPSS) version 17 computer statistical software package. Frequency distribution tables were constructed; cross tabulations were done to examine relationship between categorical variables. The Chi-square test was used to compare differences between proportions. Logistic regression analysis was used to determine the variables that predict nutrition status and hypertension among the participants. All statistical analysis was set at 5% level of significance ($p < 0.05$).

RESULTS

Only 381 of the 390 questionnaires administered were useable. The age of the traders ranged from 20 to 69 years (Mean = 35.38; SD = 8.34). Majority, 168 (44.1%) of the 381 participants were in the 30 to 39 years age group, followed by the 20 to 29 years age group (28.3%). There was a slight preponderance of males (53.0%) com- pared to females (47.0%). Most of the participants were married (62.7%), and practiced Islam as religion (66.1%). A larger proportion of the participants (47.8%) had secondary education, followed by primary education and below (39.4%), only a few among them (12.9%) had tertiary education (Table 1).

Dietary pattern of participants

Majority, 258 (68.8%) of the 375 participants that responded to the question on the number of times they eat in a day, eat thrice daily, 91 (24.3%) eat twice daily, while 25 (6.4%) eat more than three times in a day. Also, 268 (71.5%) reported meal skipping; while 120 (32.0%) reported overeating as a result of stress, majority 211 (56.3%) reported loss of appetite while stressed.

Table 1. Socio-demographic profile of participants

Socio-demographic profile	Frequency (%)
Age groups (in years)	
20-29	108 (28.3)
30-39	168 (44.1)
40-49	86 (22.6)
50-59	14 (3.7)
60-69	5 (1.3)
Sex	
Male	202 (53.0)
Female	179 (47.0)
Marital status	
Single	103 (27.0)
Married	239 (62.7)
Separated	13 (3.4)
Divorced	16 (4.2)
Widowed	10 (2.6)
Education	
Primary and below	150 (39.4)
Secondary	182 (47.8)
Tertiary	49 (12.9)
Religion	
Christianity	252 (66.1)
Islam	129 (33.9)

Table 2 shows the food habit of the participants, most 190 (50.7%) of the 375 participants that responded to the question on the time they eat their largest meal, eat their largest meal at dinner, 143 (38.1%) eat their largest meal at lunch, while 44 (11.2%) eat their largest meal at breakfast. Bread and tea are taken at breakfast by most of the participants (83.4%), likewise pap (65.2%). Fura is mostly taken at lunch (44.8%); likewise, tuwo, pounded yam, semovita, amala and rice (58.2%).

The frequency of snacking and consumption of specified snacks, fruits and vegetables are shown in Table 3. Almost half, 187 (49.9%) of the 375 participants that responded to the question on snacking reported eating snacks every day (mostly once a day). While most of the participants that reported eating doughnut and biscuit do so once in a week, a noticeable proportion of the participants reported eating fried foods (21.4%) and drinking fruit juice (27.1%) and carbonated drinks (33.0%) up to thrice and above in a week. Majority of the partici- pant reported consumption of fruits (56.0%) and vege- tables (58.8%) less than thrice in a week or not at all.

Participants' lifestyle

Figure 1 shows the lifestyle of participants, one hundred and ninety three (50.7%) of the 381 participants live a se-dentary lifestyle (by virtue of; use of motor cycle or car to work, lack of moderate physical activity at work, and lack of moderate leisure exercise). Sedentary lifestyle was marginally more prevalent among males than females (males 50.3%, females 49.7%) but the difference was not statistically significant (χ^2 = 1.196, p = 0.161). Twenty (5.2%) of the 381 participants reported current cigarette smoking. Current cigarette smoking was almost nine times more prevalent among males compared to females (males 8.9%, females 1.1%) and the difference was statistically significant (χ^2 = 11.590, p < 0.001). Forty one (10.8%) of the 381 participants reported alcohol consum- ption within the past 30 days. Alcohol consumption within the past 30 days was more prevalent among males than females (males 11.9%, females 9.5%), but the difference was not statistically significant (χ^2 = 0.562, p = 0.280). Majority, 254 (66.7%) of the 381 participants reported consumption of fatty foods; consumption of fatty foods was slightly more prevalent among males than females (males 68.8%, female 64.2%), the difference was also not statistically significant (χ^2 = 0.890, p = 0.202).

Participants' nutrition status and prevalence of hypertension

Figure 2 shows participants' nutrition status and prevalence of hypertension. Only 5 (1.3%) of the 381 participants were underweight, underweight was slightly more prevalent among females than males (males 1.0%, females 1.7%). One hundred and fifty nine (41.7%) had normal weight, with a larger proportion of participants with normal weight among males compared to females (males 48.0%, females 34.6%). One hundred and ten (28.9%) were overweight, and it was more prevalent among males than females (males 35.1%, females 21.8%). One hundred and seven (28.1%) were obese; obesity was almost thrice as prevalent among females compared to males (males 15.8%, females 41.9%) and the difference was found to be statistically significant (χ^2 = 33.227, p < 0.001). No uniform pattern of variation in nutrition status across the age groups was observed. Also, in logistic regression models, no predictor of nutrition status was obtained.

One hundred and eleven (29.1%) of the 381 participants were hypertensive; hypertension was more prevalent among females than males (males 26.2%, females 32.4%) but the difference was not statistically significant (χ^2 = 1.747, p = 0.113). The prevalence of hypertension increased progressively and statistically significantly across the age groups. The prevalence of hypertension

Table 2. Food habit of participants

Variable	Meal schedule			
	None [N (%)]	Breakfast [N (%)]	Lunch [N (%)]	Dinner [N (%)]
Eat largest meal (N = 375)	-	42 (11.2)	143 (38.1)	190 (50.7)
Eat bread and tea (N = 373)	34 (9.1)	311 (83.4)	8 (2.1)	20 (5.4)
Drink pap (N = 371)	89 (24.0)	242 (65.2)	15 (4.0)	25 (6.7)
Drink fura (N = 368)	146 (39.7)	36 (9.8)	165 (44.8)	18 (4.9)
Eat tuwo / pounded yam/semovita/amala/rice (N = 370)	-	9 (2.4)	215 (58.2)	146 (39.5)

Table 3. Snacking and consumption of specified snacks, fruits and vegetables.

Variable	Frequency of consumption				
	None [N (%)]	Once [N (%)]	Twice [N (%)]	Thrice [N (%)]	More than thrice [N (%)]
Eat snacks in a day (N = 375)	188 (50.1)	160 (42.7)	14 (3.7)	8 (2.1)	5 (1.3)
Eat doughnut in a week (N = 374)	137 (36.6)	123 (32.9)	42 (11.2)	42 (11.2)	30 (8.0)
Eat biscuit in a week (N = 369)	140 (37.9)	127 (34.4)	42 (11.2)	23 (6.2)	37 (10.0)
Eat fried yam or plantain in a week (N = 374)	63 (16.8)	142 (38.0)	89 (23.8)	35 (9.4)	45 (12.0)
Drink fruit juice in a week (N = 373)	103 (27.6)	100 (26.8)	69 (18.5)	32 (8.6)	69 (18.5)
Drink carbonated soft drink in a week (N = 373)	72 (19.3)	117 (31.4)	61 (16.4)	32 (8.6)	91 (24.4)
Eat fruits in a week (N = 375)	25 (6.7)	108 (28.8)	77 (20.5)	48 (12.8)	117 (31.2)
Eat vegetables in a week (N = 374)	46 (12.3)	108 (28.9)	66 (17.6)	37 (9.9)	117 (31.3)

Table 4. Predictors of hypertension among participants.

Variable	Odds ratio (OR)	Sig. (p-value)	95% CI
			Lower Upper
Age	4.158	<0.001	0.105-0.293
Sex	0.134	0.893	- 0.088-0.101
Marital status	0.010	0.992	- 0.059-0.060
Sedentary lifestyle	1.636	0.103	- 0.165-0.016
Cigarette smoking	0.133	0.894	- 0.189-0.216
Alcohol consumption	1.016	0.310	- 0.050-0.157
Overweight / obesity	2.822	0.005	0.061-0.345

hypertension among the participants in their 20s, 30s, 40s, 50s and 60s were; 11.1, 29.8, 41.9, 64.3 and 80.0%, respectively (χ^2 = 38.415, p < 0.001). Hypertension was statistically significantly (χ^2 = 24.597, p < 0.001) twice as prevalent among participants with overweight and obesity (39.2%) compared with those with underweight and normal weight (15.9%). In logistic regression models, the predictors of hypertension among the participants included age (OR = 4.158, p < 0.001, 95% confidence in- terval (CI) = 0.105 to 0.293) and overweight/obesity (OR = 2.822, p = 0.005, 95% confidence interval (CI) = 0.061 to 0.345) as shown in Table 4.

DISCUSSION

High prevalence of unhealthy eating habits was recorded among the participants in this study. While the relatively high prevalence of snacking (49.9%) among the participants in this study is at variance with the very high prevalence of snacking (92.4%) reported in a study by Chung et al. (2003) among female college students in

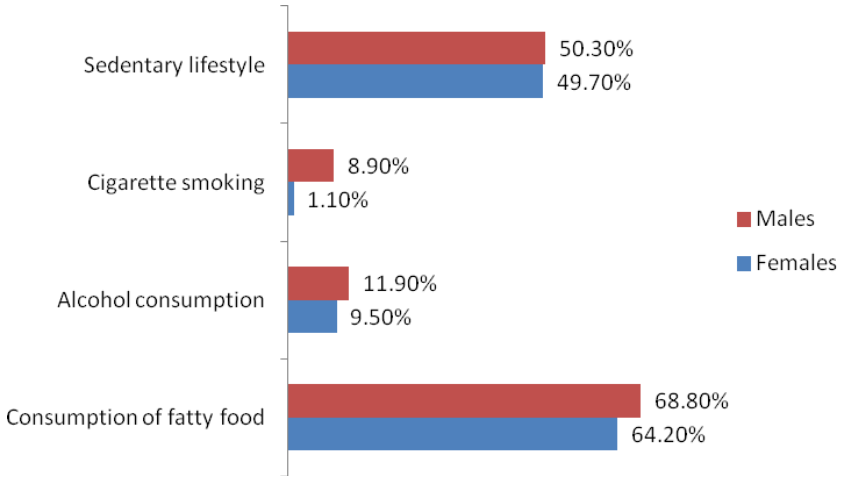

Figure 1. Participants' lifestyle.

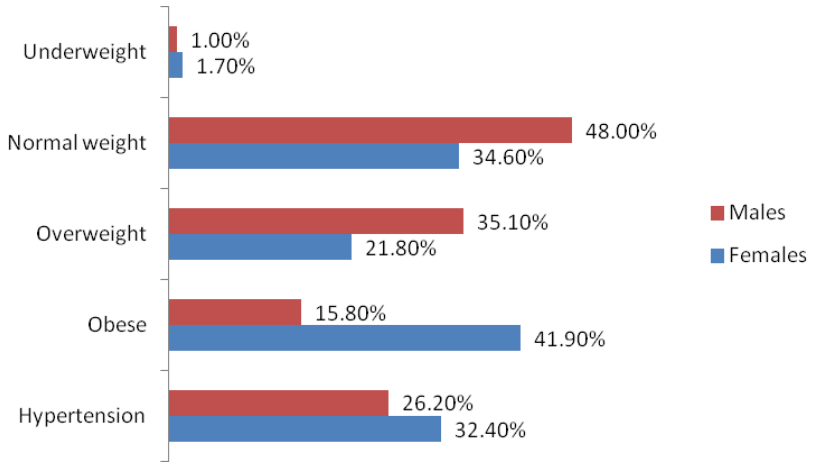

Figure 2. Participants' nutrition status and prevalence of hypertension.

students in Seoul, South Korea, it is in agreement with 33.0% prevalence of snacking reported in another study by Olumaikaye et al. (2010) among adolescents in Osun State, Nigeria. In contrast to the findings in this study wherein majority (56.3%) of the participants reported loss of appetite while stressed, Potocka and Moscioka (2011) reported stronger tendency to habitual and emotional eating among Polish employees with high job stress compared to those with medium level of job stress. This could be due to differences in socio-cultural factors in the two study settings.

Contrary to the high prevalence of consumption of fruit juice (27.1%) and carbonated drinks (33.0%) thrice in a week and above among the participants in this study, Arulogu et al. (2011) reported a lower prevalence (17.1%) of consumption of carbonated drinks in a study among a younger population (undergraduates of the University of Ibadan, Nigeria). The high prevalence of consumption of high energy dense foods and drinks among the participants in this study is of serious concern, considering the fact that apart from the increased impairment of glucose metabolism with advancement in age, epidemiological studies have provided evidence of a trend towards increased incidence and prevalence of type 2 diabetes in

African populations, linked to unhealthy eating habits and lifestyles (sequel to urbanization and industrialization), compared with the 1990s when it was considered a rare medical condition in sub-Sahara Africa (Sobngwi et al., 2001).

The International Diabetes Federation (IDF) had estimated that in 2003 the number of people age 20 to 79 years with diabetes in Sub-Saharan Africa was over 7 million for a population of more than 295 million, giving a prevalence rate of 2.4%. About 65% of those affected with diabetes lived in the urban areas, whereas 35% lived in the rural communities. Nigeria is the first of the top five countries with the highest number of people affected by diabetes in Sub-Saharan Africa with about 1.2 million people affected by the disease. The other countries included; South Africa, the Democratic Republic of Congo, Ethiopia and Tanzania with 841,000, 552,000, 550,000 and 380,000 people, respectively affected by diabetes (IDF, 2003).

The high proportion of participants that eat fruits (56.0%) and vegetables (58.8%) less than three times in a week or not at all, and those that eat fried foods (45.2%) twice or more in a week in this study compares well with the findings in a study by Ganasegeran et al. (2012) that reported consumption of fruits less than thrice in a week by 73.5% of participants, and consumption of fried foods twice or more in a week by 50.5% of participants.

A relatively low prevalence of current cigarette smoking (5.2%) and alcohol consumption (10.8%) was recorded among the participants in this study compared to the high prevalence of smoking (29.3%) and alcohol consumption (38.4%) reported in a study among 11 to 16 years old adolescents in Boenos Aires, Argentina (Mulassi et al., 2010). This could be due to the fact that most of the participants in this study practiced Islam (which prohibits alcohol consumption) as religion. The low prevalence of cigarette smoking among the participants in this study could be related to the low prevalence of alcohol consumption among them. Substance use disorders (such as alcohol consumption and smoking) have been found to be related and co-morbid (Schneider et al., 2009). The high prevalence of daily consumption of snacks (49.9%) among the participants in this study agrees with the high prevalence of snacking (84.3%) reported in a study among employees of Federal Airport Authority of Nigeria in an urban population in Nigeria by Abidoye et al. (2002). A high prevalence of sedentary lifestyle (50.7%) was observed among the participants in this study. This is almost double the 29.6% prevalence of sedentary lifestyle reported in a study among bankers (a profession considered to be largely sedentary in nature) in Ilorin, Nigeria (Jogunola and Awoyemi, 2010).

The high prevalence of overweight (28.9%) and obesity (28.1%) recorded in this study compares well with the reported 31.3 and 16.3% prevalence of overweight and obesity, respectively, among female traders in Ibadan, Nigeria (Balogun and Owoaje, 2007). This could be related to the high prevalence of unhealthy eating habits and sedentary lifestyle among the participants in this study. A study by Bhargava et al. (2002) had reported negative association between physical activity and body weight.

While the 29.1% prevalence of hypertension observed among the participants in this study is higher than the 13.16% prevalence of hypertension reported by Asekun-Olarinmoye et al. (2013) in a rural adult population of Osun State, Nigeria, it compares well with the 31.0% prevalence of hypertension reported by Ogah et al. (2013) in rural and urban populations of Abia State, Nigeria, and less than half of the 68.9% prevalence of hypertension reported by Ordinioha and Brisibe (2013) among an elderly population of traditional chiefs in an urban population in south - south Nigeria.

The findings in these studies not only highlight the high burden of hypertension across the populations in Nigeria, but also corroborate the documented pattern of rise in the prevalence of hypertension with age, and preponderance of its prevalence in urban compared to rural populations in several studies across the globe. To put it succinctly, there is high burden of hypertension and it has become a big challenge to public health in Nigeria, with its pre- valence in rural and semi-urban populations across the country approaching the estimated national prevalence of 42.8% in 2008 (World Health Organization (WHO), 2011c). This underscores the need for a re-invigorated and consistent implementation of public health interventions for its prevention and control in Nigeria.

Conclusion

This study demonstrated high prevalence of unhealthy eating habits and lifestyle; together with high prevalence of overweight, obesity and hypertension among traders in Sokoto. Health education and other interventions to promote healthy eating habits and lifestyle, especially among high risk groups are suggested.

ACKNOWLEDGEMENTS

The authors would like to thank the Management of the Sokoto Central Market, and all the traders who participated in the study for their cooperation.

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