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**PROF. M. O. LIASU**  
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1. LAUTECH Journal of Nursing (LJN) has the goal of becoming the most widely cited Nursing Journal in West Africa with Impact Factor Value of 0.861 based on International Citation Report (ICR) for the year 2020-2021.
2. The LJN has the tripartite mission of:
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  - (c) Disseminating information on nursing related development that are not usually easily available to academics and practitioners.
3. The Journal will accordingly encourage the publication of the following categories of papers.
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4. LJN is published biannually in any area of nursing interest or relevant to needs of academics and practitioners.

In this volume, sixteen (16) manuscripts scale through the eye of the needle of the Editor-in Chief. The title of the papers in this edition are: Evaluation of Nurses' Actions and Opinion on Pain Assessment of Hospitalised Patients; Ultraviolet Radiation on Gunshot Wounds: Clinical Case Reports; Assessment of Knowledge and Compliance with Coronavirus Protocols Among Healthcare Professionals; Availability of Essential Components of Maternal Healthcare in Health Institutions; Factors Associated with Overweight and Obesity among Adolescents; Health-Seeking Behaviours, of Women Presenting with Advanced Stages of Breast Cancer: Sociocultural Beliefs and Practices on Placenta Disposal and Processing among Multiparous Women; Parental Control, Social Media Utilisation And Risky Sexual Behaviour Among Adolescents; Assessment of Nosocomial Infection Preventive Measures Utilized by Clinician Nurses in Intensive Care Unit; Alternative Medicine Use and its Perceived Effectiveness in Management of Hypertension; Assessment of Modern Contraceptives Uptake among Women of Reproductive Age; Community Health Extension Workers and Traditional Birth Attendants' Neonatal Resuscitation Practices of Babies Born with Asphyxia; Midwives' Current Screening Practice of Intimate Partner Violence among Pregnant Women in Northern Nigeria; Assessment of Cancer Patients' Quality of Life; Knowledge, Attitude and Practice of School Health Program among Secondary School Teachers and Traditional Birth Attendants' Knowledge of First-Aid Management and Skills of Selected Labour Emergencies in Ogbomosho, Oyo State, Nigeria: an Intervention Study.

## **EDITORIAL DESK**

Welcome to LAUTECH Journal of Nursing!

LAUTECH Journal of Nursing focuses on but not limited to research findings in the different areas of nursing: Nursing Care, Nursing Education, Medical Surgical Nursing, Maternal and Child Health Nursing, Community Public Health Nursing, and Psychiatric/Mental Nursing. This journal is published to promote quality scholarly writing and hence instigating and generating vibrant discourse in the different areas of nursing. Apart from providing an outlet for publications of research findings, it offers opportunities for professionals and students to disseminate their views or position on topical issues and emerging theories within the scope of the journal. The Journal is peer reviewed by seasoned scholar. Six-three authors have contributed in one way or the other to the tenth edition of the journal.

In this regard, the journal welcomes articles from individuals and corporate organisations for the ninth edition. Interested contributors may forward copy of their manuscript; computer-typed in double line spacing, using Times New Roman 12 point font, with abstract not more than 250 words on a separate page. Manuscript should not be more than 15 pages and sent to [doctoradeyemo@yahoo.com](mailto:doctoradeyemo@yahoo.com) or [lautechjournal@gmail.com](mailto:lautechjournal@gmail.com).

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# FACTORS ASSOCIATED WITH OVERWEIGHT AND OBESITY AMONG ADOLESCENTS

GRACE O. DANIEL, TRENG N. URBANUS, EMMANUEL A. OYEDELE, FOLASHADE WINA, NADYEN J. SHIKPUP, PETER UDEH & BONJI GAKNUNG

## ABSTRACT

*Overweight and obesity in adolescent is on the increase and has become a serious problem to the society in recent times. This study determines associated factors of overweight and obesity among adolescents in selected secondary schools in Jos North, Plateau State. A multi-stage sampling technique was used to select 292 adolescents (140 males and 152 females) A structured questionnaire with items selected from modified Food Frequency Consumption Questionnaire and modified Physical Activity Questionnaire for adolescent (PAQ-A) was adapted to collect data. An analog bathroom scale was used to measure students' weight to the nearest 0.1 kilogram and a meter rule was used to measure the students' height to the nearest 0.1 meters. BMI of students were calculated and categorized using WHO (2007) BMI for age and sex cut-offs. Statistical Package for Social Science (SPSS) version 23.0 was used to analyse data. The result of this study showed that the prevalence of overweight among adolescents in selected secondary schools in Jos North, Plateau State is low (8.9%). This study observed that the associated behavioural factors in terms of nutritional intake among adolescents include consumption of breakfast, adding 1 or 2 teaspoon of sugar to beverage, eating fried food 1 or 2 times a week, and sometimes take snacks and processed food. The associated factors in terms of physical activities involve regular body exercise, walking and duration of physical activities is less than 60mins. The study reveals that there is a statistically significant ( $P>0.05$ ) association between physical activity and selected characteristics such as eating processed food ( $P=0.000$ ) snacks ( $P=0.032$ ) and gender ( $P=0.016$ ) but there is no significant association between weight and exercise ( $P=0.133$ ) among adolescents in selected secondary schools. IT is therefore recommended that parents and government should be encouraged to plan for healthy food and make it available for students.*

**KEYWORDS:** Obesity; Overweight; Associated Factors; Adolescents.

## INTRODUCTION

Overweight and Obesity are global epidemics not just among adults but also among children and adolescents (Sabageh & Ojofeitimi, 2013). While obesity refers to excess adipose tissue (to the extent that it presents a risk to health), overweight can be defined as body weight above pre-defined reference level (Kautianen, 2008). Worldwide, overweight/obesity is becoming one of the most challenging current health concerns with the worrisome rise in children and adolescents (Gebrie, Alebel, Zeeye, Tesfaye & Ferede, 2018). Globally, around one in 10 young people aged 5–17 years are overweight or obese, with levels increasing rapidly in many countries and regions in recent years (WHO, 2017). It has been revealed that globally, an estimated 1.9 billion adults aged 18 years and above were overweight, and of these, 650 million are obese; 41 million children under the age of 5 are overweight or obese; and over 340 million children and adolescents aged 5-19 years are overweight or obese in 2016 (WHO, 2018). In Africa the number of children who are overweight or obese has nearly doubled from 5.4 million in 1990 to 10.3 million in 2014 (WHO, 2016). It is estimated that in the whole sub-Saharan Africa, 10.7 million children are overweight or obese with higher incidence in boys than in girls (Gebremedhin, 2015). In Nigeria, the prevalence of overweight individuals ranges from 20.3% - 35.1%, while the prevalence of obesity ranged from 8.1% - 22.2% (Chukwuonye, Chuku, John, Ohagwu, & Imoh, 2013).

The World health Organization (WHO) classifies overweight/obesity as the 5th leading cause of global mortality and determinants for various chronic diseases (Maturi, Francis, Wachira, LeBlanc et al, 2014). Obesity increases the risk of developing type 2 diabetes, hypertension, sleep apnoea and cardiovascular disease. Obesity also diminishes adolescents' quality of life and is related to various emotional and behavioural problems

(WHO, 2017). Sahoo, Sahoo, Choudhurg, Sofi, Kumar, and Bhadoria, (2015) posit that those overweight and obese children are likely to stay obese into adulthood and more likely to develop non-communicable diseases like diabetes and cardiovascular diseases at a younger age, though the mechanism of obesity development is not fully understood but believed to be a disorder with multiple causes. According to (WHO) 2017, about four in every five adolescents who become obese will continue to have weight problems as adults. Studies have shown that obesity in adolescents is defined as a Body Mass Index in the 85th percentile and above, have a direct link with the incidence of bladder, urinary tract, and colorectal cancers in adulthood (Levi et al, 2011; & Leiba et al, 2012). Researchers have discovered that childhood obesity is also linked to cancer development in adulthood (Levi et al, 2011 & Leiba et al, 2012).

Studies have shown that environmental factors, lifestyle preferences, and cultural environment play pivotal roles in the rising prevalence of obesity and overweight worldwide. Overweight and obesity are assumed to be the results of increase in caloric and fat intake. On the other hand, there is supporting evidence that excessive sugar intake by soft drink, increases portion size, and steady decline in physical activity have been playing major roles in the rising rates of obesity all around the world. In few cases, genetics may cause a rise in vulnerability to weight gain for youth but it must exist in combination with environmental and behavioral factors to have significant impact on the development of obesity (Gebrie et al, 2018)

In many developing countries, increase in the prevalence of obesity is of great concern. In Nigeria, reports from the Western and Eastern parts of the country show a prevalence ranging from 1% to 18%. It has been projected that by 2025, 11% of African children will be overweight, thus lifestyle diseases such as diabetes, hypertension, cardiovascular diseases and cancer, previously known only in older adults now occur in children and adolescents (Anumah, et al, 2020). Early intervention towards reducing excess weight in adolescent and maintaining weight in adulthood can reduce the incidence of cardiovascular diseases and metabolic disorders. In Plateau State, there is little or no information about the current prevalence of and factors associated with obesity and overweight among adolescents. Therefore, this study sought to

examine the prevalence and factors associated with overweight and obesity among adolescents in selected secondary schools in Plateau state.

#### **Objectives of the study**

1. To determine prevalence of overweight among adolescents in selected secondary schools in Jos North, Plateau State?
2. To determine the associated behavioural factors in terms of nutritional intake among adolescents in selected secondary schools in Jos North, Plateau State?
3. To identify the associated factors in terms of physical activities among adolescents in selected secondary schools in Jos North, Plateau State.
4. To determine the association between some selected behavioural characteristics and being overweight among adolescents in selected secondary schools in Jos North, Plateau State?

#### **Research Question**

1. What is the prevalence of overweight among adolescents in selected secondary schools in Jos North, Plateau State?
2. What are the associated behavioural factors in terms of nutritional intake among adolescents in selected secondary schools in Jos North, Plateau State?
3. What are the associated factors in terms of physical activities among adolescents in selected secondary schools in Jos North, Plateau State?
4. What is the association between some selected behavioural characteristics and being overweight among adolescents in selected secondary schools in Jos North, Plateau State?

#### **METHODOLOGY**

**Design:** The study adopts a descriptive Cross-sectional survey.

**Setting:** This study was carried out in selected secondary schools in Naraguta B Ward of Jos North Local Government of Plateau State, Nigeria. Naraguta B ward is one of the 14 Wards in Jos North. The selected secondary schools include: Government Secondary School (GSS) Naraguta,

Government Secondary School (GSS) Gwong and Nobles Secondary School, Jos. GSS Naraguta is a public secondary school with junior and senior sections, located at Farin Gada, off Zaria Road Jos. There was not much physical activities equipment, only a football field was available. GSS Gwong is also a public secondary school with junior and senior sections, located opposite University of Jos Staff Quarters, Ring Road, Jos North. It also has a football field. Nobles Secondary School, Jos, is a private school, located along New Road, Angwan Rukuba, Jos North. Football field and swing are present in this school.

**Target Population:** The target population is adolescents in Secondary schools in Jos, Plateau State.

**Sample Size Determination:** The size was determined statistically by applying the population proportion sample size determination formula. Therefore  $n = 1.96^2 \times 0.214 \times (0.786) / (0.05^2) = 258$ . In order to provide an allowance for attrition, a 12% margin was given hence giving a sample size of 292. A total of 292 students were purposively selected to participate in the study.

**Sampling Technique:** A multi-stage sampling technique was used to select respondents for this study.

Stage 1: one ward was purposely selected out of the 14 Wards in Jos North. (Naraguta B ward) Stage2: simple random sampling was used to select 3 schools

Stage 3: cluster sampling technique was used to select samples of students from the three schools (GSS Naraguta, GSS Gwong, and Nobles secondary school), A total of 292 adolescents (140 males and 152 females) were selected for the study.

**Instrument for Data Collection:** A self- designed questionnaire was used to collect data. The questionnaire had five (5) sections which were geared at collecting data on; Socio-demographic data (7 items), prevalence of overweight (2 items), behavioral factors in terms of nutritional intake and physical activities among adolescents (11 items). In order to take weight and height measurements, an analog bathroom scale was used to measure students' weight to the nearest 0.1 kilogram and a meter rule was used to measure the students' height to the nearest 0.1 meters. The 11 items were selected from modified Food Frequency Consumption Questionnaire produced by Harvard University on adolescent food consumption pattern (Lee & Nieman, 2010), and modified Physical

Activity Questionnaire for adolescent (PAQ-A) constructed from Global Physical Activity Questionnaire (GPA-Q).

**Validity of Instrument:** The study was presented to experts in the field to ensure face and content validity. Necessary corrections were made on the questionnaire based on the findings.

**Reliability:** Twenty-nine (29) students were randomly selected for the pilot-test. To ensure reliability of the instrument, a test-retest method was carried out in Salama High school, Jos North. This school was conveniently selected and it was not part of the schools selected for the main study. A reliability coefficient score of 0.814 was obtained.

**Method of Data Collection:** Anthropometric data of the adolescent secondary students was collected by the researcher and two research assistants using meter rule and a weighing scale. The students were weighed one after the other when wearing light clothing; their feet placed side by side and were pointing straight with their hands by their sides with no heavy object on them. Students' heights were measured when the students stood erect with heels, shoulder, back and head all resting on the wall. Food consumption and physical activity questionnaires were administered to the students individually when they were comfortably seated in the classroom. The optional responses on the questionnaires were ticked accordingly in response to the corresponding question on the questionnaire. Data were collected for the period of two weeks. A research assistant was employed for the collection of data.

**Analysis:** The measurements obtained from the height and weight, were used to determine the BMI of the student using WHO (2007) BMI for age and sex cut-offs. The BMI was calculated using the formula weight (kg)/height square ( $m^2$ ). The BMI for age were categorized into underweight, normal weight, overweight, and obese and each category of the BMI for age was expressed as percentages to determine the prevalence of overweight and obesity. The information on demographic characteristics and factors associated with overweight were analysed using Statistical Package for Social Science (SPSS) version 23. Inferential statistics (chi-square) was used to test the hypotheses at  $p < 0.05$ .

**Ethical consideration:** Letters of introduction and request to conduct a research was sent to the heads of the secondary schools selected for the study.

Permission and informed consent were obtained from the schools heads. Assurance of the students' privacy and confidentiality was given to the students by explaining to the students that the information given will not be used for any other purposes apart from the academic publications. Informed consent was obtained from each respondent.

## RESULTS

### The Demographic Characteristics of Participants

As presented in Table 1, the study population comprises of three secondary schools in Naraguta B district, Jos North local government area of Plateau state in Nigeria. A total of 292 adolescents participated in the study, 47.9% are boys and 52.1% are girls. The participants in this study are

adolescents whose ages are between (10-19) years and 50% are (14 -15.9) years. The sampled schools are 47.3% GSS Naraguta, 38.4% GSS Gwong and 14.4% Nobles Secondary School. The study findings shows that 231 (79.1%) of the participants lives with their parents, only 20.9% the participants lives with their guardians. The educational background of the participants' parents or guardians shows that 0.7% has not attained any formal education, 5.5% complete primary school level of education, 36.3% complete secondary school level of education, 51.4% complete university level of education and 5.8% complete other types of formal education. The participant's parent and guardian engage in different occupations of which 28.8% are involved in business activities, 22.6% are civil servants, 7.5% are artisans, 6.2% are famers and 30.1% are in other

**Table 1: Demographic characteristics of participants**

Demographic characteristics		Frequency	Percent
Gender	Male	140	47.9
	Female	150	52.1
	Total	292	100
Age	10-11	12	4.1
	12-13	52	17.8
	14-15	146	50.0
	16-17	72	24.7
	18-19	10	3.4
	Total	292	100
Schools	GSS Naraguta	138	47.3
	GSS Gwong	112	38.4
	Noble Sec Sch	42	14.4
	Total	292	100
Who respondent live with	Parent	231	79.1
	Guardian	61	20.9
	Total	292	100
Education level of parent/guardian	None	2	0.7
	Primary	16	5.5
	Secondary	106	36.3
	University	150	51.4
	Others	17	5.8
	Total	292	99.7
Occupation of participants parent or guardian	Civil servant	66	22.6
	Artisan	22	7.5
	Farmer	18	6.2
	Business activities	84	28.8
	Others	88	30.1
	Total	278	95.2
Participant's means of transportation to school	Bicycle	10	3.4
	Motorcycle	14	4.8
	Public transport	44	15.1
	Trekking	194	66.4
	Parent's car	30	10.3
	Total	292	100

As presented in table 2, the body mass index (BMI) for age of the respondents as classified by (WHO, 2007) shows that 8.2% are underweight, 80.8% are of normal weight, 8.9% are overweight and 2.1% obese. Furthermore, based on the sex of the participants, 4.3% of the male participants are underweight, 5.7% are overweight and 2.9%

are obese. Also, 11.8% of the female participants are underweight, 11.8% are overweight and 1.4% is obese. This study implies that the prevalence of overweight among adolescents in selected secondary schools in Jos North, Plateau State is low (8.9%).

BMI for age	Categories of weight status	Male participants n=140		Female participants n=152		Total participants n=192	
<15 <sup>th</sup> percentile	Underweight	6	4.3%	18	11.8%	24	8.2%
15 <sup>th</sup> – 84.5 <sup>th</sup> percentile	Normal	122	87.1%	114	75%	236	80.8%
85 <sup>th</sup> – 97 <sup>th</sup> percentile	Overweight	8	5.7%	18	11.8%	26	8.9%
>97 <sup>th</sup> percentile	Obese	4	2.9%	2	1.4%	6	2.1%
	Total	140	100.0%	152	100.0%	292	100.0%



Table 3 shows the participants' breakfast meal consumption shows that, 80.1% usually eat breakfast before going to school daily while 19.9% skip breakfast. **Findings further reveals that 24.7% of the participants never take breakfast away from home, while 19.2% of the participants take breakfast away from home 5 or more times weekly.** The results of daily sugar intake of the participants indicate that 51% add 1-2 teaspoons of sugar to their beverages daily and 8.2% add 6 or more teaspoons of sugar. The results of weekly intake of fried food by participants indicate that 45.2% of the participants eat fried food 1 – 2 days per week and 26.7% of them eat fried food every day. The participants' intake of snacks shows that 1.4% of the

participants hardly ever take snacks, 53% sometimes take snacks and 32.2% always take snacks. The results further show that 4.1% of the participants hardly ever consume processed food, 59.6% sometime consume processed food and 22.6% always consume processed food. The daily hours of sleep by participants indicate that 8.2% sleep for 3 - 4 hours and 32.2% sleep more than 8 hours daily. The behavioural factors in terms of nutritional intake among adolescents in this study indicate that majority of respondents consume breakfast, adding 1-2 teaspoon of sugar to beverage, eat fried food 1 – 2 times in a week, sometimes take snacks and processed food.

**Table 3: Associated Behavioural Factors in Terms of Nutritional Intake (n = 292)**

Variables	Frequency	Percentage
Breakfast consumption by participants		
Yes	234	80.1
No	58	19.9
Number of teaspoons of sugar added to beverage		
<1 Teaspoon	30	10.3
1 – 2 Teaspoon	149	51
3 – 4 Teaspoon	89	30.5
> 5 Teaspoon	24	8.2
Number participants eat fried food in a week		
1 – 2 Times	132	45.2
3 – 4 Times	64	21.9
5 – 6 Times	18	6.2
Everyday	78	26.7
How often participants take snacks		
Hardly ever	4	1.4
Sometimes	155	53
Quite often	39	13.4
Always	94	32.2
How often participant eats processed food?		
Hardly ever	12	4.1
Sometimes	174	59.6
Quite often	40	13.7
Always	66	22.6

On Table 4, the findings reveal that 20.5% engage in a little bodily exercise daily, 3.4% are rarely involved in physical activity daily, 42.5% sometimes engage in bodily exercise daily, 26.7% engage in regular daily body exercise and 6.8% do not engage in daily body exercise. The results of types of physical activities involved-in by the participants indicate that 51.4% are involved in walking. The distribution of the respondents' activeness in physical activities during physical education class indicate that 39.7% of the

participants sometimes are active and 20.5% are hardly ever active in physical education class. The study findings indicate that majority of the participants sometimes participate in boy exercise, the type of physical activity involved in by the participants are walking, the participants are sometimes active during physical education and the duration of physical activity by participants is less than sixty (60) minutes daily

**Table 4: Associated Factors in Terms of Physical Activities**

Variables	Frequency	Percentage
<b>How often participant exercise body daily?</b>		
A little	60	20.5
Rarely	10	3.4
Sometimes	124	42.5
Regularly	78	26.7
None	20	6.8
<b>Type of physical activity involved in</b>		
Skipping	27	9.2
Walking	150	51.4
Cycling	14	4.8
Jogging/Running	79	27.2
Others	22	7.4
<b>Activeness of participants during physical education</b>		
Hardly ever	60	20.5
Sometimes	116	39.7
Quite often	54	18.5
Always	62	21.2
<b>Duration of physical activity by participants daily</b>		
< 30 minutes daily	71	24.2
30 – 40 minutes daily	56	19.1
40 – 50 minutes daily	53	18.3
50 – 60 minutes daily	32	11
> 60 minutes	80	27.4

**2. Research question Four**

There is no significant association ( $p > 0.05$ ) between selected behavioural factors and being overweight among adolescents in selected secondary schools in Jos North, Plateau State?

3. Factors considered include; Exercise, eating of processed food, eating snacks and gender. As seen in Table 5, Chi square is used to test this hypothesis and the result is presented in table 5

4. The result of this study reveals that there is a significant association between overweight and selected characteristics such as eating processed food ( $P = 0.000$ ), snacks ( $P = 0.032$ ) and gender ( $P = 0.016$ ) of participants. The second result of this study shows that there is no significant association between overweight and selected characteristic such as Exercise ( $P = 0.133$ )

**Table 5: Association between selected behaviours and overweight**

Variabes	Not overweight	Over-weight	Total	X2	P value
How often student exercise daily					
A little	52(86.6)	8(13.3)	60	17.451	0.133
Rarely	10(100)	0(0)	10		
Sometimes	110(88.7)	14(11.3)	124		
Regularly	72(92.3)	6(7.7)	78		
Not at all	16(80)	4(20)	20		
How often they eat processed food					
Hardly Ever	10(83.3)	2(16.7)	12	31.339	0.000*
Sometimes	158(90.8)	16(9.2)	174		
Quite often	38(95)	2(5)	40		
Always	54(81.8)	12(18.2)	66		
How often they eat snacks					
Hardly Ever	4(100)	0(0)	4	18.282	0.032*
Sometimes	132(84.6)	24(15.4)	156		
Quite often	36(94.7)	2(5.3)	38		
Always	88(93.6)	6(6.4)	94		
Gender of participants					
Male	128(91.4)	12(8.6)	140	10.308	0.016*
Female	132(86.8)	20(13.2)	152		

**Fishers exact p value. Bold value is statistically significant**

## DISCUSSION OF FINDINGS

This study examines the prevalence and factors associated with overweight and obesity among adolescents in selected secondary schools in Plateau state. The demographic characteristics of this study revealed that majority of the participants are females within the ages of 14 to 15 years. Majority of the participants are from GSS Naraguta and majority of their parents/guardian educational level is the University and their occupation is business. Findings also reveal that majority of the participants walk to school.

The study reports that the prevalence of overweight among adolescents in selected secondary schools in Jos North, Plateau State is low. This result is consistent with Kakele et al (2018) that found that prevalence of overweight and obesity in Kano is low, (8.9% and 3.3%). obesity prevalence is low. This study is not in agreement with Eme and Onuoha (2014) where they report the prevalence of overweight to be high in both genders, 3.0% and 6.7% in males and females respectively. This study is not in line with El-Kabbaoui (2018) who opine that the prevalence of overweight is 23.6% among boys and 27.9% among girls in the United Kingdom and, in the USA, the prevalence is estimated to be 35.3% for boys and 34.1% for girls.

The associated behavioral factors in terms of nutritional intake among adolescents in this study indicate that majority of respondents consume breakfast, add 1-2 teaspoon of sugar to beverage, eat fried food 1 – 2 times in a week, sometimes take snacks and processed food. This study supports Hallstrom et al., (2013) indicated that breakfast meal is an important aspect of food consumption pattern, although most of the study's participants usually skip breakfast resulting in excess consumption of next meal, which further results in excess weight gain. WHO (2017) recommends that adolescents should consume five portions (400 grams) of fruit and vegetables every day, free sugars, of which sugar-sweetened beverages provide the main source for adolescents, can increase overall energy intake but displace nutrient-rich foods. The researchers posit that food is a major factor that affects overweight and obesity. To be healthy, young people must have the right kinds and amounts of food; health and nutrition are closely linked. Reduced Sugar intake and an increase of fruit and vegetables in diet are fundamental to a healthy diet and are associated

with good health and well-being. Excessive intake of sugar is associated with weight gain and a factor associated to metabolic syndrome (MS), insulin resistance, type 2 diabetes, cardiovascular diseases, hypertension, gout and non-alcoholic fatty liver disease (Brand-Miller, Atkinson, & Rowan, 2013; Caballero, 2015; Grimes, Riddell, Campbell, & Nowson, 2013; Irabor, 2015).

In this study, results reveal that majority of the respondents eat breakfast before going to school which is similar to the findings of Lateef et al, (2016). The breakfast eating behavior of the participants may have influence on the reduced level of obesity. This study is not in line with the study of Naja et al, (2015) that identify dietary patterns among a nationally representative sample of Lebanese adolescents aged between 13 and 19 years an observe that high consumption of red meat, eggs and fast-food sandwiches are associated with an increased risk of overweight. WHO (2017) posits that promoting healthy eating should be a key public health priority for adolescents, and establishing healthy dietary habits early in life can help reduce the risk of future health problems. Policies to support improvements in diet and sustainable interventions within the context of schools, families, communities and food environments are needed for all young people. Educating today's young people has the potential to also improve outcomes for future generation.

The associated behavioral factors in terms of physical activities among adolescents in this study, indicate that majority of the participants sometimes exercise body, the type of physical activity involved in by the participants are walking, the participants are sometimes active during physical education and the duration of physical activity by participants is less than sixty (60) minutes daily. This study is in agreement with WHO, (2017) that shows that many adolescents are still inactive probably because they are involved in sedentary behaviors. Sedentary behaviour is complex and represents a distinct class of behaviour while sitting or lying and with a low level of energy expenditure. Screen-time-related sitting is the most common sedentary behaviour, covering between 40% and 60% of overall sitting time. This study is in line with Peltzer et al, (2014) that found out that physical inactivity is one among many factors that are associated with overweight and obesity. This study is similar to Sagbo et al, (2018) that also report that watching television

more than four hours on weekends and medium sedentary diversity score are independently associated with overweight and obesity.

6. The result of this study reveals that there is a significant association between overweight and selected characteristics such as eating processed food ( $P=0.000$ ), snacks ( $P=0.032$ ) and gender ( $P=0.016$ ) of participants, but there is no significant association between overweight and selected characteristic such as Exercise ( $P=0.133$ ) among adolescents in selected secondary schools in Jos North, Plateau State. This study is not consistent with Navti et al's (2017) view that there is a significant relationship between physical activity and overweight (physical activity  $> 4 - 7$  times per week is significantly ( $p = 0.010$ ) associated with a lower prevalence (5.9%) of overweight/obesity). El-Kabbaoui et al, (2018) review of the influence of physical activity on adiposity among 5–18-year-olds shows that adiposity is reduced and aerobic capacity increased with more time spent in intense physical activity.

## CONCLUSION

Overweight and obesity is prevalent among adolescents. In this study, it indicates an emerging problem because the results are relatively higher than those of other studies. Factors that are significantly associated with being overweight or obese are eating processed food and snacks intake.

## RECOMMENDATIONS

It is recommended that parents and guardians should acquire a good knowledge of healthy eating pattern for their children. Even though the Nigerian Government has a school feeding programme, it is not all schools that benefit from the programme. So, it's important that parents know aspects of nutrition for children and make their wards feeding of high nutritional benefit. Educating today's young people has the potential to also improve outcomes for future generation. Schools are to establish good sporting activities and ensure that all school children actively participate in such activities. Topics about healthy eating behaviors and their benefits should also be integrated into the children curriculum.

Finally, Government should introduce fiscal measures, such as tax on sugar sweetened beverages, school food policies that define standards for foods available to children and adolescents, marketing

restrictions and clear targets for the food industry to improve the nutritional quality of food products; Policies to support improvements in diet and sustainable interventions within the context of schools, families, communities and food environments are needed for all young people. Policies and programmes should seek to promote a supportive social and physical environment, reduce practical, social and psychological barriers to participation, promote opportunities for physical activity within the context of families, schools and communities, and ensure an enabling environment with safe and accessible public spaces and supportive Infrastructures.

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