

Assessment of Dietary Pattern and Nutritional Status of Adolescents in Chikun Local Government Area of Kaduna State, Nigeria

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Abstract

Adolescence is a time of rapid growth and development and nutritional needs are high. However, other factors can also affect adolescents' food choices and nutrient intake, which can lead to malnutrition and its attendant consequences. The aim of the study is to assess the dietary pattern and the nutritional status among adolescents and to propose policy recommendation. A cross-sectional study was launched between November, 2022-March, 2023, in six (6) geo-political wards of chikun local government of Kaduna state Nigeria. Adolescents age 10-19 years were enrolled totalling of 276 (66 males and 210 females) participated in the study. An interviewer and self-administered questionnaires were disseminated to eligible participants to collect relevant data. The dietary pattern was assessed using the Food Frequency Questionnaire (FFQ), and the nutritional status was assessed using the world health organization ANTHRO Plus software. The results/findings indicated that on daily basis, 84.8% of the adolescents consume cereals, roots and tubers, 73.5% consume spices, condiments and beverages, 58.6% consume snacks, soft drinks and sweets, 48.9% consume fats and oil, 38.6% consume legumes, nuts and seeds, 34.1% consume meat, poultry, fish and organ meat, 31.8% consume fruits and vegetables and 26.9% consume eggs. The prevalence of stunting, underweight, overweight and obesity were 37.0, 9.8, 9.8, and 3.2 % respectively. Female adolescents were significantly ($p < 0.5$) more overweight and obese compared to male adolescents. It has become of importance, the need to design cross-sectorial and trans-disciplinary approaches to address adolescent's malnutrition.

Keywords: Adolescents, Dietary Pattern and nutritional Status.

INTRODUCTION

Adequate nutrition during adolescence plays a vital role in shaping the health and wellbeing of adolescents to adult life. Adolescence is a nutrition-sensitive phase for growth, in which the benefits of good nutrition extend to many other physiological systems (Norris *et al.*, 2021).

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Higher physiological demand for Macro- and Micro-nutrients, underlies the nutritional vulnerability of adolescents, which is profound in Low and Middle-income Countries (LMICs). The World Health Organization defines an adolescent as a person between ages 10 and 19 years who is undergoing a transitional and developmental phase between childhood and adulthood (WHO, 2000). According to the Nigeria's 2006 census, adolescents constitute of 22.1% of Nigeria's population. The demographic weight and risky health behaviours of adolescent's fuel concerns about issues regarding their health coupled with the fact that promoting the health of adolescents today guarantees the health of tomorrow's adult population. Adolescence is one of the fastest growth periods of a person's life. As a result of the physical, psychological, hormonal, cognitive and social transformation changes that occur during this growth period, the body's nutritional needs, eating habits and food choices fluctuate. These changes have implications towards the alarming rate of non-communicable disease including obesity, hypocholesteremia, high glucose levels which are emerging public health problems globally especially in developing countries (Onyiriuka, *et al.*, 2013).

On average, adolescents gain 20% of their final adult height and 50% of adult weight during this phase, with a considerable remodelling of the skeleton and an increase in bone mass of up to 40% (Norris *et al.*, 2021).

Adolescence is also characterized by transition, exploration, and openness to change, offering opportunities for radical shifts in diet, physical activity, and other risks for non-communicable diseases. This same novelty-seeking and openness to change also makes adolescents a vulnerable group to commercial exploitation and other unhealthy influences, with lifelong and intergenerational consequences (Hargreaves, *et al.*, 2021).

Good nutrition during this period fuels growing brains and bodies, and improves school enrolment, educational achievement and cognition. Dietary intake during adolescence sets the foundation for a healthy life, but adolescents are diverse in their dietary patterns and in factors that influence food choices (Lynnette *et al.*, 2021). A good dietary pattern which involves consumption of a variety of foods from different food groups in adequate amounts including fruits and vegetables is recommended to meet the body requirements for macro and micro nutrients for general wellbeing while, poor dietary pattern characterizes by consumption of monotonous staples and dependency on plant-based staples and low cost, fat and sugars are a barrier to optimum nutrition especially in Africa.

METHODS

Study Area

The study was carried out in Chikun Local Government Area of Kaduna State. Chikun is a Local Government Area in Central Kaduna State, Nigeria. It has an area of 4,466 km² and its headquarters is in the town of Kujama. The postal code of the area is 2438000. According to the March 21, 2006 National Population Census, the population of Chikun Local Government Area was put at 372, 272. This population was projected by the National Population Commission of Nigeria and National Bureau of Statistics to be 502,500 by March 21, 2016 (Kaduna State Government, 2021). Chikun Local Government Area consists of 12 wards namely: Chikun, Narayi, Kuriga, Kunai, Kujama, Kakau, Gwagwada, Nasarawa, Rido, Sabon Tasha, Ungwan Yelwa and Tirkaniya wards respectively.

Sample Size Determination

The research considered a precision of ± 5 and 95% confidence interval. Sample size was calculated using this formula.

$$N = z^2 p (1-p) / d^2$$

Where; N = Minimum sample size

Z = 95% confidence interval

P = 24% (0.24) (Prevalence of underweight in adolescents according to Sarah et al, 2018)

q = Complementary probability of p

d = Degree precision of 5% = 0.05.

After computation, the sample size for the study was found to be 280.

Study design and data collection

This study followed a cross-sectional study design and a convenience snowballing method. It was conducted between November, 2022-March, 2023, in six (6) geo-political wards of Chikun Local Government of Kaduna state Nigeria namely Narayi, Nasarawa, Rido, Sabon Tasha, Ungwan Yelwa and Tirkaniya wards respectively. A well-structured questionnaire consists of multiple sections was administered to eligible participants to meet the study aims. World Health Organization ANTHRO-plus software was used to determine the adolescent's nutritional status.

Adolescents' eligibility

Based on the World Health Organisation definition of adolescence (period ranging from 10-19 years) 276 adolescents were recruited into this study.

Ethical approval

The study strictly adhered to the ethical guidelines for the conduct of scientific research as approved by the ethical committee of the Kaduna State Ministry of Health, Ref: MOH/ADM/744/VOL.1/1181-NHREC/17/03/2018. Consent of the participating adolescents was also obtained.

Statistical analysis

Collected data were analysed descriptively and inferentially. Descriptive statistics was used to describe the socio-demographic characteristics and other categorical variables while Chi-square was used to inferentially test the association between the variables. All statistical analyses were carried out using Statistical Package for the Social Sciences (SPSS version 21).

Anthropometry

In line with the study objectives, adolescents height, weight and body mass index for each participant were taken and determined following standard procedures according to guide to physical measurement (FANTA III guidelines., 2016). The weight of the participants was measured using an electronic digital weighing scale to the nearest 0.1 kg, in light clothing with no shoes. Height of the participants was measured using meter ruler or height board in meters with no shoes to the nearest 0.1 centimetre.

The World Health Organization ANTHRO Plus software was used in computing the BMI for age and height for age, Z-scores of the participants respectively in order to determine their nutritional status. Stunting was defined as Height for age Z score less than -2SD. Underweight was defined as BMI for age Z score less than -2SD, normal weight ($Z \geq -2SD$ to $Z \leq +1SD$), overweight (Z score greater than +1 to 2SD) and obese (Z score greater than +2SD).

RESULTS

Socio-demographic Characteristics of the participants;

A total of 276 adolescent's age 10-19 years as of the time of the research were recruited in to the study. The mean age of the respondents is 16.38 years (SD = 2.01) with older adolescents aged 15-19 years constituting a higher percentage (76.1%) of the sample than younger adolescents (23.9%). In terms of age, there were more female (66.3%) than male (33.7%) respondents. Majority of the respondents (83.7) were secondary school students, 8.7% were in primary school and 7.6% were in tertiary schools. Regarding their religion, 94.6% of the respondents practiced Christianity while the remaining 5.4% practiced Islam

A higher percentage of the respondents' fathers had secondary school as their highest level of education attained (42.4%), 38.0% had fathers who had tertiary education, 12.0% had Fathers with primary school education and 7.6% had fathers without any formal education. Regarding mother's highest educational qualification, 48.9% said their mother had completed only secondary school education, 34.8% said their mother had tertiary education, 8.7% said their mother had primary school education while 7.6% said their mother had no formal education. More than one-third of the respondents' fathers were civil servants (37.0%) while 32.6%, 23.9% and 6.5% were business men, farmers and without any employment respectively. In terms of Mother's occupation, 34.8% of the respondents' mothers were business women, 27.2% were farmers, 21.7% were civil servants and 16.3% were housewives.

The Nutritional Status of the participants

The adolescents result of height for age indicate that more than one-third of the respondents were stunted (37.0%) while 63.0% had normal height for their current age. stunting was more prevalent among the male respondents (38.7%) compared to the female respondents (36.1%). However, there was no significant association between gender and height for age ($p > .05$). BMI for age, indicates that 79.3% were of normal weight, equal proportion (9.8%) each were underweight and overweight respectively while 1.1% were obese. More males were underweight (12.9%) than females (8.2%). While (1.1%) of the females were obese, none of the male respondent was obese. There was a significant association between gender and BMI for age ($p < .05$).

Table 1: Socio-demographic Characteristics of the participants

Variable	Frequency (n)	Percentage (%)
Age (Mean = 16.38; SD = 2.01)		
10-14 years	66	23.9
15-19 years	210	76.1
Sex		
Male	93	33.7
Female	183	66.3
Educational Level		
Primary	24	8.7
Secondary	231	83.7
Tertiary	21	7.6
Religion		
Christianity	261	94.6
Islam	16	5.4
Father's Level of Education		
None	21	7.6
Primary	33	12.0
Secondary	117	42.4
Tertiary	102	38.0
Mother's Level of Education		
None	21	7.6
Primary	21	8.7
Secondary	135	48.9
Tertiary	96	34.8
Father's Occupation		
Civil Servant	102	37.0
Business/ Artisan	66	23.9
Farming	90	32.6
None	15	6.5
Mother's Occupation		
Civil Servant	60	21.7
Business/ Artisan	96	34.8
Farming	75	27.2
Housewife	42	16.3

Table 2: Nutritional Status of the participants

Variable	Male n (%)	Female n (%)	Total n (%)	X ²	P-value
Height for Age				.185	.667
Stunted	36(38.7)	66(36.1)	102(37.0)		
Normal Height	57(61.3)	117(63.9)	174(63.0)		
BMI for Age				9.447	.024
Underweight	12(12.9)	15(8.2)	27(9.8)		
Normal Weight	78(83.9)	141(77.0)	219(79.3)		
Overweight	3(3.2)	24(13.2)	27(9.8)		
Obese	0(0.0)	3(1.6)	3(1.1)		

Table 3: Dietary Pattern of the participants

Variable	Male n (%)	Female n (%)	Total n (%)	X ²	P-value
Cereals, Roots and tubers				5.519	.137
Once a day	25(28.9)	78(43.3)	103(39.0)		
More than once a day	46(54.8)	75(41.7)	121(45.8)		
Once a week	5(6.0)	7(3.9)	12(4.5)		
Thrice a week	8(9.5)	20(11.1)	28(10.6)		
Vegetables and fruits				25.75	.000
Once a day	9(10.7)	39(21.7)	48(18.2)		
More than once a day	12(14.3)	24(13.3)	36(13.6)		
Once a week	39(46.4)	63(35.0)	42(15.9)		
Thrice a week	18(21.4)	24(13.3)	42(15.9)		
Once a month	0(0)	27(15.0)	27(10.2)		
Never	6(7.1)	3(1.7)	9(3.4)		
Meat, poultry fish and organ meat				44.118	.000
Once a day	12(14.3)	42(23.3)	54(20.5)		
More than once a day	3(3.6)	33(18.3)	36(13.6)		
Once a week	36(42.9)	21(11.7)	57(21.6)		
Thrice a week	30(35.7)	57(31.7)	87(33.0)		
Once a month	3(3.6)	27(15.0)	30(11.4)		
Eggs				5.015	.414
Once a day	20(23.8)	32(17.8)	52(19.7)		
More than once a day	7(8.3)	12(6.7)	19(7.2)		
Once a week	18(21.4)	59(32.8)	77(29.2)		
Thrice a week	17(20.2)	41(22.8)	58(22.0)		
Once a month	16(19.0)	27(15.0)	43(16.3)		
Never	6(7.1)	9(5.0)	15(5.7)		
Fats and oils				31.647	.000
Once a day	21(25.0)	66(36.7)	87(33.0)		
More than once a day	27(32.1)	15(8.3)	42(15.9)		
Once a week	12(14.3)	42(23.8)	54(20.5)		
Thrice a week	9(10.7)	27(15.0)	36(13.6)		
Once a month	9(10.7)	27(15.0)	36(13.6)		
Never	6(7.1)	3(1.7)	9(3.4)		
Legumes, nuts and seeds				7.773	.169
Once a day	30(35.7)	48(26.7)	78(29.5)		
More than once a day	9(10.7)	15(8.3)	24(9.1)		
Once a week	27(32.1)	63(35.0)	90(34.1)		
Thrice a week	18(21.4)	42(23.3)	60(22.7)		
Once a month	0(0.0)	6(3.3)	6(2.3)		
Never	0(0.0)	6(3.3)	6(2.3)		
Snacks, soft drinks and sweets				12.680	.013
Once a day	19(22.6)	69(38.3)	88(33.3)		
More than once a day	17(20.2)	45(25.0)	62(23.5)		
Once a week	16(19.0)	24(13.3)	40(15.2)		
Thrice a week	29(34.5)	33(18.3)	62(23.5)		
Once a month	3(3.6)	9(5.0)	12(4.5)		
Spices, condiments and beverages				5.677	.225
Once a day	11(13.1)	44(24.4)	55(20.8)		
More than once a day	50(59.5)	89(49.4)	139(52.7)		
Once a week	7(8.3)	20(11.1)	27(10.2)		

Variable	Male n (%)	Female n (%)	Total n (%)	X ²	P-value
Thrice a week	15(17.9)	25(13.9)	40(15.2)		
Once a month	1(1.2)	2(1.1)	3(1.1)		

DISCUSSION

This cross-sectional study assessed the adolescents' dietary pattern and their nutritional status in a community-based setting. It is of significant given the importance of improving nutrition among adolescents in the light of rising double burden of malnutrition that is overweight and obesity. This study enrolled a convenient sample of 276 adolescents boys and girls aged 10-19 years old from six wards of Chikun local government of Kaduna state. At the end of the study, the prevalence of stunting was said to be high as compare to underweight, overweight and obesity among the study samples. As indicated by the anthropometric indices, there is high prevalence of malnutrition which is mostly manifested in the adolescents being too short for their age. The high stunting rate in this study is higher than the rate reported from similar studies by various scholars across Nigerian states of Abia, Ebonyi and Oyo. As for underweight, the finding in this study is similar to other studies where less than one out of ten adolescents was underweight. However, the findings contrast several other studies that recorded higher prevalent rates of underweight among different adolescent's samples. In our study, the prevalent of overweight recorded is higher than the report of other studies (Omobuwa *et al.*, 2014). Gender comparisons showed that there is no significant association between gender and stunting. However, a significant association between gender and BMI for age was recorded with female adolescents being more likely to be overweight and obese than male adolescents. This finding is in line with the majority of related literature which also established that overweight or obesity tend to be more prevalent among female adolescents compared to their male counterparts (Olatona *et al.*, 2020), however, one of the most common reasons may be the result of the pubertal hormonal changes experienced by girls which can impact their metabolism and lead to higher growth spurt. The dietary pattern of the adolescents in this study revealed that cereals, roots and tubers constituted the most common food group consumed daily by the adolescents. This is followed by consuming spices, condiments and beverages, snacks, soft drinks and sweets, fats and oil, legumes, nuts and seeds, meat, poultry, fish and organ meat, fruits and vegetables and eggs in that order. These findings corroborate with others that also reported a dietary pattern dominated with the daily consumption of cereals among adolescents. The predominance of cereals, roots and tubers in the diet of adolescents in the current study area may not be unconnected to the wide spread cultivation of food crops such as maize, guinea corn, rice and yam which makes them available and accessible for adolescents and their families. Furthermore, due to their widespread cultivation and availability, these foods are generally cheaper than other types of foods making them an attractive option for families.

The prevalence of daily consumption of snacks, soft drinks and sweets among the adolescents in this study agrees with (Onyiriuka *et al.*, 2013) who found that most of secondary school adolescents consume soft drinks on a daily basis. These studies found that majority of the adolescents eat home-cooked meals, with boys more likely to eat in restaurants or buy food from local food vendors. Availability was found to be the prime factor in determining food choice for most respondents, followed by cost and desire/taste. Interestingly, one third of the adolescents in this study consume fruits and vegetables daily.

CONCLUSION

Addressing adolescent's health and nutrition is crucial in averting potential future health and economic development of the country and nation at large. This study assessed the dietary pattern and nutritional status of adolescents in the study area and there appears to be poor dietary pattern and nutritional status among the adolescents. This study suggests the need to design cross-sectorial and trans-disciplinary approaches to address adolescent's malnutrition. Targeted nutrition programs should be implemented to ensure that adolescents have access to nutritious diet. The current study further suggests the need to conduct in-depth qualitative studies to explore and identify reasons for the high levels of stunting among adolescents.

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