Tropical Journal of
Medicine & Dental Practice

Website: http://www.tjmdp.org

Open Access

Original Research Article

Trop J Med Dent Pract
December 2021;2(4):85-91
doi: 10.47227/tjmdp.v2i4.1

Assessment of dietary pattern of primary school pupils in Egbaen Community in Edo State

Otaniyenuwa E Obarisiagbon[1,2*]

Ogbonna Janet Chizoba[2]

[1]Department of Community Health, University of Benin, Benin City, Nigeria

[2]University of Benin Teaching Hospital, Benin City, Nigeria

***For correspondence:**

Email:
otaniyenuwa.obarisiagbon@uniben.edu

Abstract

Background: Understanding dietary patterns in the study of the diet-disease relationship are crucial for designing dietary behaviour interventions. This study aimed to assess the dietary pattern as well as determine associations between dietary patterns and sociodemographic characteristics among primary school children (9–15 years) in a community Edo State.
Methods: This was a descriptive cross-sectional study of 400 pupils of a selected primary school in Egbaen community, Benin City. Data was obtained using an interviewer-administered questionnaire and analysed. Dietary pattern was assessed on the basis of eating frequency, the constituent of food and adequacy of food. A Chi-square test was used to identify statistically significant associations between variables. A p-value of ≤ 0.05 was considered significant.
Results: There were more males 217 (54.3%) than females with a mean age of 9.0 ± 2.0 years. All the respondents 400 (100%) ate at least once a day with the majority 290 (72.5%) eating three times a day. Majority of the respondents 284 (71%) had a good dietary pattern. Age of the pupils (p=0.007) and the size of the household (P=0.037) were significantly associated with dietary pattern of the respondents.
Conclusion: The dietary pattern among in the pupils of Egbaen community was good. However, parents should monitor their wards ensuring they have adequate food, do not skip meals and eat an adequate diet.

Keywords: Dietary pattern, Dietary behaviour, pupils, Community

Introduction

Dietary pattern is defined as the quantities, proportion, variety or combination of different food, drinks and nutrients in the diet and the frequency with which they are habitually consumed [1]. The dietary pattern can be used to assess diet quality as well as assess the nutritional status of an individual(s) [2,3,4]. The analysis of dietary patterns has been identified as a more realistic representation of dietary habits,[5] since it takes into account the complex interactions between nutrients and other components of a diet, thus making interventions to change eating habits possible [6,7].

Dietary intake, as a rule, follows a pattern of consumption and diet itself is a modifiable risk factor; understanding dietary patterns can provide useful information about the associations between diet quality and its influence on health, especially concerning obesity [6,7].

The WHO reported 41 million overweight children aged <5 years worldwide [8]. Among the most serious public health problems of the 21st century, both in developed and developing countries, being overweight in childhood and childhood obesity are recognized as predictors of the risk of obesity in adulthood [9,10]. It is estimated that 40% to 60% of obese children will become obese adults, with consequences for their health and the world economy [9,11,12]. This is because dietary habits are established in childhood and track into adulthood.[13] Thus it is necessary to develop effective approaches to prevent childhood obesity as a public health priority [14].

As a complex condition, childhood obesity is a risk factor for several non-communicable diseases, such as hypertension, dyslipidemia, liver disease, diabetes, polycystic ovary syndrome, and obstructive sleep apnea, as well as psychosocial problems, including discrimination, social isolation, and low self-esteem, which can affect health, education, and quality of life [11.12.15]. The increased prevalence of obesity has

been linked to an increase in the consumption of snacks and beverages, particularly in urban areas. The dietary intake of school children in developing countries is limited in diversity, mainly comprising energy-based food sources and limited intake of fruits and vegetables [16].

Since the risk of many non-communicable diseases is closely related to dietary habits, various dietary education programs aimed at establishing healthy dietary habits in children have been implemented worldwide [17]. The world food programme has helped in providing a meal to about a 97million pupils across about 88 countries.[18] Nigeria's school feeding programme launched in December 2016 operates in 20 out of Nigeria's 36 States and has fed nearly 7 million pupils in about 40,000 public schools [19]. However, the Egbaen community does not benefit from this programme.

This study, therefore, seeks to assess the dietary pattern of pupils in the Egbaen community as findings from this study will provide data needed by policymakers and other stakeholders for interventions targeted at improving dietary patterns to promote health in the studied population.

Methods

The study was carried out in two primary schools namely Beacon of Success School which is a privately owned primary school that started in 2014 and Egbaen Community Primary School which is a public primary school that began in 1990. Both schools are located in in Egbaen community which is located in Ovia North-East Local Government Area (LGA) in Benin City, Edo State with staff strength of 20 and 30, respectively.

Study design, sample size determination and selection of participants

A descriptive cross-sectional study design was used for this study. The sample size was calculated using Cochran's formula; $n=z^2pq/d^2$ [20] where z is standard normal deviate set at 1.96, p is 0.27 (proportion of underweight children in Nigeria) [21], q is 0.69 (1-p), d is level of precision set at 0.05 which gave a sample size of 330. A 10% non-response rate [22] was used and the minimum sample size was 370 participants. However, 400 pupils (from both schools) participated in the study as the total population of both schools were used.

Survey instrument

An interviewer-administered questionnaire containing open and closed-ended questions was used to obtain data for the study. The questionnaire was pretested among 37 pupils in Olua Primary school, Oredo LGA, Benin City, Edo State. The aim was to assess clarity of the questions and time to complete administration of the questionnaire. Appropriate corrections were made where application to the questionnaire before commencement of this survey.

Data collection and analysis

Questionnaires were screened for completeness and analysis of the data done using IBM SPSS version 22.0 software. Quantitative variables were expressed as frequencies, percentages, means and standard deviation. Univariate analysis was done to assess the distribution of variables. Bivariate analysis was done to determine the association between socio-demographic variables and dietary pattern using Chi-square test, A p-value of < 0.05 was considered as statistically significant.

The age of respondents was grouped into two; 5-9 years and 10-14 years. Occupation of parents/ guardians of the students was coded into skill levels 1 to 4 based on ILO-ISC-08 classification. This classification was adapted to include skill level 0 which comprises housewives, students, retired and unemployed.[23]

A total of 18 questions were used to assess for dietary patterns under 3 domains (eating frequency, a constituent of food, adequacy of food. Eating frequency was assessed as how many times pupils ate.[24] Responses of three times were scored as 1 while the response of fewer than three times was scored as 0. The adequacy of food was assessed using 3 questions; eating alone, the number of persons that eat together and sufficiency of food [24]. Responses of 2 and fewer persons eating together were scored as 1 and those of greater than 2 were scored as 0. Responses of food being sufficient were scored as 1 and those that reported food as insufficient were scored as 0.

The constituent of food was assessed using a 24-hour dietary recall. A total of 10 questions was used to assess the constituent of food. Constituents of food were as assessed as food containing carbohydrate, protein, fat, fruits and vegetables.[24] Responses that included pupils eating that day, breakfast, lunch and dinner of the previous day were each scored as1 and responses that did not were scored as 0. Responses that included carbohydrate (examples include yam, garri, bread), protein and fat per meal (Examples include beans cooked with oil, moi moi) were each scored as 1 and those that did not include all three were scored as 0. Responses that included fruits and vegetables in the last 24 hours were each scored as 1, responses that did not were scored as 0

The scores were totaled, the maximum score obtainable was 13 and the minimum score was 0. Scores were then converted to percentages. A score of less than 50% was said to be a poor dietary pattern and a score of above 50% was a good dietary pattern [24].

Ethical consideration

Ethical approval was obtained from the Ethics and Health Research Committee of the University of Benin Teaching Hospital (UBTH). The purpose of research was explained to each respondent and written informed consent was obtained. Assent was obtained from the pupils and permission was obtained from the heads of the schools and parents.

Results

Four hundred respondents participated in the survey. Socio demographic characteristics are presented in Table 1.

The mean age was 9.0 (± 2.0) years with 217 (54.3%) males. The class with the highest proportion of respondents 114 (28.5) was primary 1. A majority of the respondents were Christians 385 (96.3%), came from nuclear families 312 (78%) and were from a monogamous family structure 358(89.5%). About half 217 (54.3%) of the respondents were from a household size of more than 5 individuals with the majority 335 (83.8%) having less than 5 siblings and within the birth order of the first five children 369 (92.3%). Majority (316, 79%) of them lived with both parents. The highest proportion 146 (41.8%) of fathers of the respondents fell into skill level 2 of the ILO classification. Two-third 244 (66.6%) of the mothers of the respondents fell into skill level 1 of the ILO classification. The majority 17(89.5%) of the caregivers of the respondents fell within skill level 1.

All the respondents 400 (100%) ate at least once a day with the majority 290 (72.5%) eating three times a day (Table 2). More than half of the respondents 236 (59%) ate with someone from the same plate. A higher proportion 109 (46.2%) of the respondents ate with more than two persons.

The majority of the respondents 365 (91.25%) had had a meal at the time of the interview. Most (330, 82.5%) of them had snacks, less than half 144 (36%) of respondents took fruits in the last 24 hours; less than half of respondents 170 (42.5%) consumed vegetables in the last 24 hours. The composition of the meals the children took is provided in Table 3.

Majority 191(74%) of respondents within ages 5-9 had a good dietary pattern compared with two thirds 93(65.5%) of respondents aged 10-14. The relationship between the age and the dietary pattern of the respondents was statistically significant (p<0.007). Males 157(72%) and females 127(67.4%) had a good dietary pattern.

The prevalence of good dietary pattern reduced with increase in household size as household size of 1-5 {113 (72.4), household size 6-10, 155 (71.4), and household size >10 16 (59.3)}. The association between the household size and dietary pattern of the

Table 1: Sociodemographic characteristics of primary school pupils in Egbaen community

Variable	Frequency (n=400)	Percent
Age group(years)		
5-9	258	64.5
10-14	142	35.5
Mean age ± SD (9.0 ± 2.0)		
Sex		
Male	217	54.3
Female	183	45.7
Class		
Primary 1	114	28.5
Primary 2	71	17.8
Primary 3	75	18.7
Primary 4	70	17.5
Primary 5	58	14.5
Primary 6	12	3.0
Family type		
Nuclear	312	78.0
Extended	88	22.0
Family structure		
Monogamous	358	89.5
Polygamous	42	10.5
Household size		
1-5	156	39.0
6-10	217	54.25
>10	27	6.75
No of siblings		
1-5	335	83.8
6-10	59	14.8
>10	6	1.4
Birth order		
1-5	369	92.3
>5	31	7.7
Caregivers		
Both parents	316	79.0
Single parents	62	15.5
*Other relatives	22	5.5
Religion	**n=400**	
Christianity	385	96.3
Islam	8	2.0
African traditional	7	1.7
Skill level of father	**n=349**	
Skill level 0	0	0.0
Skill level 1	132	37.75
Skill level 2	146	41.75
Skill level 3	34	9.75
Skill level 4	37	10.75
Skill level of mother	**n=365**	
Skill level 0	11	3.00
Skill level 1	244	66.75
Skill level 2	61	16.75
Skill level 3	28	7.75
Skill level 4	21	5.75
Skill level of other caregivers	**n=19**	
Skill level 0	0	0.00
Skill level 1	17	89.50
Skill level 2	0	0.00
Skill level 3	2	10.50
Skill level 4	0	0.00

***Aunty, grand mother, uncle

Table 2: Feeding frequency and adequacy of primary school pupils in Egbaen community

Variables	Frequency (n=400)	Percent
Eating Frequency		
Once	4	1.00
Twice	90	22.50
Thrice	290	72.50
> 3 times	16	4.00
Adequacy of food		
Eats alone	164	41.00
Eats with someone	236	59.00
No of the individuals respondents eat with	**(n=236)**	
1	69	29.20
2	58	24.60
>2	109	46.20

respondents was statistically significant (p=0.037).

Most (110, 75%) of the respondents with fathers in skill level 2 had a good dietary pattern. The relationship between the occupation of respondents' fathers, mother and caregivers versus the dietary pattern of the respondents was not statistically significant (Table 4). The majority 169 (69.3%) of respondents with mothers in skill level 0 had a good dietary pattern. Majority 10 (58.8%) of respondents with caregivers in skill level 1 had a good dietary pattern.

Discussion

In this study, majority of the respondents 284(71%) had a good dietary pattern. The mean age (SD) of pupils was 9 (±2) years which is similar to a study done in South Adamawa which showed the mean age in the primary school was 9 years.[25]. Two-thirds of the respondents were boys possibly because African parents favour male education over female education.[26] Poor education of the girl child is associated with poor health-seeking behaviour and poor nutritional practices in the future.[27] This is similar to a study done in Turkey in 2018 which showed a higher proportion of males in primary schools in Turkey [28]. More than half of the pupils ate with family members which may be due to the belief that eating together strengthens unity and bond among family members.[29] Eating together reduces the food available for children and this can result in undernutrition as the child is not consuming enough nutrients for growth and development resulting in wasting, stunting or even retardation.[3] This finding is in line with a study done in Korea in 2018 which showed a majority of the pupils ate with a family member.[30]

In this study, the majority of the pupils had taken a snack in the last 24 hours. This could be because of the increase in consumption of snacks and beverages, particularly in urban areas.[15] Excessive snacking may contribute to obesity which may lead to chronic illnesses later in life and hence excess snacking should be reduced.[31] This is in tandem with a study done in Iran in 2014 which showed that most of the students had at least one snack in 24 hours.[32]

Majority of the respondents had a good dietary pattern and majority of the pupils ate three times a day with most of them consuming carbohydrates, fat and protein three times a day with poor consumption of fruits and vegetables. The overall dietary pattern was good and maybe because the major occupation in the community was farming hence the pupils ate the farm produce of their parents. Growing children require energy (from carbohydrates and fat) in addition to proteins, fruits and vegetables to achieve their full growth potential as diversification as well as adequate

Table 3: Food constituents of primary school pupils in Egbaen community in a 24- hour dietary recall

FOOD CLASSES	HAVE EATEN TODAY Freq (%)	BREAKFAST Freq (%)	LUNCH Freq (%)	DINNER Freq (%)
Carbohydrate only	20 (5.5)	14 (3.9)	55 (15.3)	6 (1.6)
Protein and fat	2 (0.56)	2 (0.6)	8 (2.2)	8 (2.1)
Carbohydrate and protein	86 (23.8)	86 (23.9)	42 (11.7)	33 (8.8)
Carbohydrate and fat	41 (11.3)	37 (10.25)	50 (13.9)	58 (15.5)
Carbohydrate, protein & fat	213 (58.8)	221(61.4)	205 (56.9)	270 (72.0)
Snacks	330(82.5)	0(0.0)	0(0.0)	0(0.0)
Fruits	0(0.0)	0(0.0)	0(0.0)	144(36)
Vegetables	0(0.0)	0(0.0)	80(20.0)	90(22.5)

Table 4: Association between the sociodemographic characteristics of pupils in Egbaen community and their dietary pattern

Variables	DIETARY PATTERN		Chi square (χ^2)	p value
	Good n = 284(%)	Poor n = 116(%)		
Age group				
5-9	191 (74.0)	67 (26.0)	3.243	0.007
10-14	93 (65.5)	49 (34.5)		
Sex				
Male	157 (72.4)	60 (27.6)	0.420	0.517
Female	127 (67.4)	56 (30.6)		
Size of Household				
1-5	113 (72.4)	43 (27.6)		
6-10	155 (71.4)	62 (28.6)	1.983	0.037
>10	16 (59.3)	11 (40.7)		
Class				
Primary 1	82 (71.9)	32 (28.1)		
Primary 2	51 (71.8)	20 (28.2)		
Primary 3	54 (73.3)	20 (26.7)	4.054	0.542
Primary 4	52 (74.3)	18 (25.7)		
Primary 5	38 (65.5)	20 (34.5)		
Primary 6	6 (50.0)	6 (50.0)		
Caregiver				
Father	14 (70.0)	6 (30.0)		
Mother	29 (69.0)	13 (31.0)	0.510	0.917
Both Parents	224 (70.9)	92 (29.1)		
Others	17 (77.3)	5 (22.7)		
Marriage Type				
Monogamy	255 (71.2)	103 (28.8)	0.087	0.768
Polygamy	29 (69.0)	13 (31.0)		
Family Type				
Nuclear	219 (70.2)	93 (29.8)	0.449	0.503
Extended	65 (73.9)	23 (26.1)		
Group of siblings				
1-5	237 (70.7	98 (29.3)		
6-10	42 (71.2)	17 (28.8)	0.455	0.797
>10	5 (83.3)	1 (16.7)		
Father's Occupation	**n = 288 (%)**	**n = 101 (%)**		
Skill level0	0 (0)	0 (0)		
Skill level 1	89 (64.4)	43 (32.6)		
Skill level 2	110 (75.3)	36 (24.7)	2.347	0.499
Skill level3	24 (70.6)	10 (29.4)		
Skill level 4	25 (67.6)	12 (32.4)		
Mother's Occupation	**n=260 (%)**	**n=105 (%)**		
Skill level 0	9 (81.8)	2 (18.2)		
Skill level 1	169 (69.3)	75 (30.7)		
Skill level 2	48 (78.7)	13 (21.3)	5.199	0.268
Skill level 3	17 (60.7)	11 (39.4)		
Skill level4	17(81.0)	4(19)		
Caregiver's Occupation	**n=12(%)**	**7(%)**		
Skill level 0	0(0)	0(0)		
Skill level 1	10(58.8)	7(41.2)		
Skill level 2	0(0)	0(0)		
Skill level 3	2(100)	0(0)		
Skill level 4	0(0)	0(0)		

meals are recommended to derive the full benefits from food [33]. This is similar to a study done in Southwestern Nigeria, which revealed that most of the pupils had a good dietary pattern [34].

The majority of pupils with the poor dietary pattern were older. This could be because older children are picky eaters and are more selective with food.[35] Adolescence, as well as the prepubertal period, is a period with the greater nutritional requirement [36]. A poor dietary pattern can lead to nutrient deficiencies which can result in a diseased state or even death [37] This is in tandem with a study in Kenya that showed that more pupils in older age groups had a poor dietary pattern [38].

The study also revealed that a high proportion of pupils from smaller households had a poor dietary pattern. This may be due to the reduced income capacity of the household as households with smaller sizes may have fewer working youths. Household food insecurity has insidious effects on the health and development of children as there is increased hospitalizations, poor school performance and poor growth [39]. This is in contrast with a study done in China which associated larger households with a poor dietary pattern [40].

Conclusion

The dietary pattern seen in the pupils of Egbaen community was good. However, parents should monitor their wards ensuring they have adequate food, do not skip meals and eat a balanced diet. Pupils should also desist from skipping meals.

List of abbreviations

LGA – Local Government Area
UBTH – University of Benin Teaching Hospital

Declarations

Ethical approval

None provided.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

No conflict of interest associated with this work.

Acknowledgement

The authors are grateful to the head of Egbaen community and the proprietor, staff, pupils of Egbaen.

Funding

No funding was received for this work

Contribution of Authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

References

1. United States Department of Agriculture, Center for Nutrition Policy and Promotion, Nutrition Evidence Library, Dietary Patterns Technical Expert Collaborative. *A Series of Systemic Reviews On The Relationship Between Dietary Pattern And Health Outcomes*. Available at: https://nesr.usda.gov/sites/default/files/2019-06/DietaryPatternsReport-Fullfinal2.pdf. (Accessed 4th April 2021)
2. Obionu C. Primary health care for developing countries. 3rd edition. Enugu. *Ezu books publishers*. 2017:160-167.
3. Liese A, Krebs-Smith S, Subar A. The Dietary Pattern Methods Project: synthesis of findings across cohorts and relevance to dietary guidance. *Journal of Nutrition*. 2015;145(3):393-402. DOI: 10.3945/jn.114.205336.
4. Moeller S, Reedy J, Millen E. Dietary Patterns: challenges and opportunities in dietary patterns research; an experimental Biology workshop. *Journal of American Diet Association*.2007;107(7):1233-1239. DOI: 10.1016/j.jada.2007.03.014
5. Cunha D, Bezerra I, Pereira R, Sichieri R. At-home and away-from-home dietary patterns and BMI z-scores in Brazilian adolescents. *Appetite*. 2018;120:374–380.
6. So E, Kim J, Joo S. Association of dietary patterns with overweight risk and all-cause mortality in children with cancer. *Nutritional Research Practice*. 2017;11:492–499.
7. Johnson L, Toumpakari Z, Papadaki A. Social gradients and physical activity trends in an obesogenic dietary pattern: Cross-sectional analysis of the UK National Diet and Nutrition Survey 2008–2014. *Nutrients*.2018;10:388
8. World Health Organization. Childhood overweight and obesity on the rise. Available at www.who.int/dietphysicalactivity/childhood/en (Accessed 4th April, 2021)
9. Katzmarzyk P, Barlow S, Bouchard C. An evolving scientific basis for the prevention and treatment of pediatric obesity. *International Journal of Obesity*. 2014;38:887–905.
10. Umer A, Kelley G, Cottrell L. Childhood obesity and adult cardiovascular disease risk factors: A systematic review with meta-analysis. *BioMedical Central Public Health*. 2017;17:683
11. Rito A, Sousa R, Mendes S, Graca P . Childhood Obesity Surveillance Initiative. World Health Organization.Available at: www.who.int/activities/portugal (Accessed 4th April 2021).
12. Yanovski JA. Pediatric obesity: An introduction. *Appetite.* 2015;93:3–12.
13. Keiko A, Hidemi T, Satoshi S. Relationship between nutrition knowledge and dietary intake among primary school children in Japan: Combined effect of children's and their guardians' knowledge. *J Epidemiol*.2017;27:483-491
14. Waters E, Gibbs L, Tadic M. Cluster randomised trial of a school-community child health promotion and obesity prevention intervention. *BioMedical Central Public Health*. 2018;18:92
15. Estrada E, Eneli I, Hampl S. Children's Hospital Association consensus statements for comorbidities of childhood obesity. *Childhood Obesity*. 2014;10:304–317
16. Ochola S, Masibo P. Dietary intake of school children and adolescents in developing countries. *Annual Nutritional Metabolism*. 2014;64(2):24-40. Available from Doi: 10.1159/000365125.
17. Carraway-Stage V, Hovland J, Showers C, Diaz S, Duffrin MW. Food-based science curriculum yields gains in nutrition knowledge. *Journal of School of Health*. 2015;85:231-240.

18. World Food Programme. Overview. 2020. Available at: www.wfp.org/overview [Accessed 4th April 2021]
19. United Nations Children Fund, Improving Child Nutrition: The achievable imperative for global process. United Nations Children Fund. 2018;6:100-120Available at: www.unicef.org/nutrition_ [Accessed 4th April 2021]
20. Cochran W. Sampling Technique. 3rd Edition. New York. *John Wiley and Sons*. 1997:76-78.
21. Nigeria Population Council. Nigerian Demographic Survey. *The Demographic Health Survey Program*. 2018:35-38
22. Lavrakas P. Non response rates; Encyclopaedia of Survey Research Methods. *Sage Publishing*. 2008: 14-15. Doi: https://dx.doi.org/10.4135/9781412963947.n342
23. International Labour Organization. International standard classification of occupations. 2012;20(1):200-230. Available at: www.ilo.org/international/standard/ classification_occupants [Accessed on 23rd February, 2021]
24. Food and Agriculture Organization of the United Nations. Dietary Assessment. A resource guide to method selection and application in low resource settings. 2018:10-37.
25. Ahmadu B, Rimamchica M, Ibrahim A, Nnanubimom A, Godiya A, Emmanuel P. State of Personal hygiene among primary school children; Community based cohort study. *Journal of Paediatrics*. 2013;3:38-42.
26. Olukayode A, Ayoola A. Gender disparity in Enrolment into basic formal education in Nigeria: Implications for National Development. *African Research Review*. 2015;9(3):13-15.
27. World Bank. Girl Child Education 2020. Available at: www.worldbank.org/en/topic/girlseducation#/
28. Arslan D, Ergun O, Karatas Z. Analysis of Gender roles in primary school children in Turkey. *Eurasian Journal of Educational Research*. 2019;5:23-24.
29. Berge J, Hoppmann C, Hanson C, Sztainer D. Perspectives about family meals from single headed and dual headed households. *Journal of the Academy of Nutrition and Dietetics.* 2013;14:5-6.
30. Chae W, Junju Y, Park E. Association between eating behaviour and diet quality; eating alone vs eating with others. *Nutritional Journal*. 2018;12:5-6.
31. Bastami F, Alavijeh F, Mostafari F. Factors behind snack consumption in primary school children. *BioMedical Central Public Health*. 2019;15:20-23.
32. Amini M., Pirajhaj M., Abtahi M., Abdollahi M., Houshiarrad A., Kimiagar M. Nutritional assessment for primary school children in Tehran; An evaluation of dietary pattern with emphasis on snacks and meals consumption*. International journal of preventive medicine.* 2014;11:611-615.
33. Ndukwu C. Feeding pattern and health challenges of Nigerian Primary School Children in a South Eastern urban centre. *British Journal of Medicine and Medical Research*. 2014;12: 5-7.
34. Bello B., Ekekezie O., Afolabi O. Dietary patterns and nutritional status in primary school pupils in a South Western Nigerian State; a rural-urban comparison*. African Journal of Food and Science*. 2016;14:13-16.
35. Horst K, Deming D, Lesniauskas R, Carr B, Reidy K. Picky eating: Associations with child eating characteristics with food intake. *Appetite*. 2016;10(3):286-293.
36. Das J, Rehana S, Thornburg K, Prentice A, Campisi S, Lassi Z, Koletzko B, Bhutta Z. Nutrition in adolescents: physiology, metabolism and nutritional needs. Annals of the New York Academy of Sciences. 2017;1393(1):21-33. DOI: 10.1111/nyas.13330.
37. Adamu A, Grace A, Kubreziga K. Effects of Dietary Patterns on the Nutritional Status of Upper Primary School Children in Tamale Metropolis. *Pakistan Journal of Nutrition.*2012;11(7):591-609
38. Mwaniki E and Makokha A. Nutritional status and associated factors among children in public primary schools in Dagoretti, Nairobi, Kenya. *African Health Sciences.* 2013;3:11-13.
39. Jones E and Ke J. Food insecurity and hunger: A review of the effects on child's health and behaviour. *Paediatrics Child health Journal*. 2015;14:9-12.
40. Chen C, Yu T, Jin Z, Yang Y, Jiang Y, Hong L, Yu X, Mei H, Jiang F, Huang H, Liu S, Jin X. Association of number of siblings, birth order and thinness in 3-12 year old children; A population based study in Shanghai China. *BioMedical Central Public Health.* 2020;3:5-6.