

## Food Choice and Nutritional Intake of Children and Adolescents



Adeyele, Tolulope Kolade<sup>1</sup>, Adeyele, Victoria Olubola<sup>2</sup>, Akinbisoye, Anthonia Folake<sup>3</sup>

<sup>1, 2, 3</sup> Bamidele Olumilua University of Education, Science and Technology Ikere-Ekiti

**ABSTRACT:** The study examined the food choice and nutritional intake of children and adolescents. Specifically, it investigated the healthiness, convenience, and sensation of the food intake of the participants' sex and age, it also examines the choice of carbohydrate, protein, and vitamin food of the participants. Using survey research design, data were randomly collected from 254 participants of 9-11 years (late childhood) and 12-18 years (adolescent). A research instrument that was adequately validated was used for data collection. The results showed that male participants (58.3%) eat healthy food than female (41.7%) participants, convenience (easy to prepare) and sensation (look, taste and smell) do not affect the nutritional intake of older children and adolescents. Moreover, the result revealed that gender does not contribute significantly to the food choice of children and adolescents, regardless of the age of the participants there is a high rate of consumption of carbohydrate food. The study concludes that the adverse effects of too much carbohydrate food should be taken into consideration, children and adolescents should be encouraged to eat all types of food in their diet except in the case of allergy.

**KEYWORDS:** Food choice, Nutritional Intake, Children, Adolescents

### INTRODUCTION

Nutritional intake affects the everyday life of a child and adolescent, ranging from their growth and development to academic and daily performance. Poor nutritional intake is a determining factor in the development of chronic diseases and may increase the risks of chronic diet-related diseases such as ischemic heart disease and cancer (Oz, Aydin, Onsuz, Metintas and Emiral, 2016; Rodríguez, Saldaña, Leyva, Rojas and Recio, 2019). Theorists such as Jean Piaget, Lev Vygotsky, Lawrence Kohlberg, and Erik Erikson have provided the four key periods of growth and human development as infancy (birth to 2 years old), early childhood (3 to 8 years old), late childhood (9 to 11 years old), and adolescence (12 to 18 years old). Growth at each stage of development can be influenced by several factors such as environment, health, and nutrition among others. Late childhood and adolescence are characterized by rapid growth, maturation, and development (Lai Yeung, 2010). Late childhood is a transitional phase to adolescence. Children (under the age of 14) represent 46 percent and adolescents (15-18 years) represent 13.2% of the population in Nigeria (UNICEF, 2018; Index Mundi, 2019) and half a million children are said to have severe acute malnutrition (UNICEF, 2017).

Nutritional intake helps in promoting the overall health and well-being of young people to reach full growth and capacities. The consumption patterns established by young people are likely to influence long-term eating habits and behaviour's. Studies have shown nutritional shortfalls in children of all ages and adolescents (Frei, Frei and Bobe, 2014; Lee and Park, 2015). Monitoring the nutritional intake is essential to the children, their families, and the society at large because it increases the quality of life and the prospects of personal physical, mental and emotional development (Merkiel-Pawłowska and Chalcarz, 2017), cut down the expenses of health care, nonappearance level at work due to illness and increases the productivity (Ekwaru, Ohinmaa, Loehr, Setayeshgar, Thanh and Veugelers, 2015).

Food consumption is distributed into three main meals daily –breakfast, lunch, and dinner. The common staple foods found in homes are carbohydrate (rice, yam, eba/amala, pounded yam), protein (beans, fish, beef, egg), and accompany with sources of vitamins majorly fruits and vegetables (oranges, banana, spinach, and other green vegetables). Although meat and fish are sources of protein but they are consumed based on the economic status of the family. Good nutrition in children and adolescence is important not only for good health but also for attendance and performance at school as well as the learning process. During this period, the intense increase in vigor and nutrient requirements corresponds with changes in other factors that may affect their food choices, nutritional intake, and hence nutritional status (Dapi, 2010).

Food plays an important part in all our lives in a variety of ways. The choices people make among foods determine which nutrients enter the body. However, food is more than mere sustenance. What people choose to eat is not solely based on their

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biological needs, their choice also addresses many psychological and/or emotional issues (Arganini, Saba, Comitato, Virgili & Turrini, 2012). Food choice is a complex human behaviour and consequently is influenced by many interrelating factors ranging from the biological mechanisms and genetic profiles to social and cultural factors. Food choice refers to what foods are offered to children and what food children choose (Waddingham, Shaw, Van Dam, & Bettiol, 2018). Factors influencing food choice can be related to the food, to the person making the choice, and to the economic and social context in which the choice is made (Dapi, 2010). There are chemical components and physical properties of the food which are likely to have an impact on choice, via sensory perception. However, perceiving a sensory attribute in a food does not necessarily mean that a person will choose to consume that food. It is the person's liking for that specific attribute in that food that influences choice (Berbesque, 2009).

Food choice patterns established during late childhood and adolescence may affect long-term eating behaviour's. Several factors can influence young people's food choices. For example, taste and flavor have consistently been reported as major influences on food choice (Lai Yeung, 2010; Shannon, Story, Fulkerson and French, 2002). Other factors include cost and accessibility of the food, and the perceived healthfulness or energy density characteristics of the food (Story, Neumark-Sztainer, & French, 2002; Shannon et al, 2002). The environmental concern appears to influence food choice (Lai Yeung, 2010; Worsley, 2000). Young peoples' eating habits also appear to be influenced by the family, peers, and the social eating culture, as well as mass media messages (Story, 2002; Giskes, Patterson, Turrell and Newman, 2005).

During the early childhood period, nutritional intake and food choice are mainly influenced by parental nutritional intake, availability, and parental socioeconomic factors (Hallström et al., 2011; Hilsen et al, 2011). Studies have revealed that during adolescence eating habits change. Food preferences, meal size, and dieting are influenced increasingly by the peer group, mass media messages, and the individual body image (Askovic and Kirchengast, 2012; Lai Yeung 2010). Even though much has been said about the nutritional situation of children and adolescents in developing countries, not much data is available on the gender differences of this age group especially between the transitional face to adolescence. This study, therefore examines the impact of gender differences and age on nutritional intake, eating habit and food choice of late childhood and adolescence.

### METHODOLOGY

This study employed a survey research design. The study population consisted of 254 participants within the age 9-11 (late childhood) and 12-18 (adolescent) in Ekiti state. The research instrument titled "Food Choice and Nutritional Intake Inventory" was a survey questionnaire. It was adjudged by two experts to have content and face validity. The research instrument assessed the food choice and nutritional intake of children and adolescents. There were 25-item about the subjects with closed-ended questions using 3-point response scales (not important, moderately important, and very important) to assess the nutritional intake, 2-point response scales (true or false) to evaluate eating habit and 3-point response scales (dislike, neither like nor dislike and like) to examine the food choice of the participants. A pilot test conducted outside the study area, the reliability analysis showed that it had high internal consistency (Cronbach Alpha = 0.88).

### RESULTS

A major objective of the study was to examine gender differences and age on nutritional intake, eating habits, and food choices of late childhood and adolescence. Data collected on each variable were subjected to descriptive and inferential statistics.

The distribution of participants in the study according to gender and age is presented in Table 1.

**Table 1: Descriptive Analysis of Gender of Participants**

	Frequency	Percent	Cumulative Percent
Male	148	58.3	58.3
Female	106	41.7	100.0
Total	254	100.0	

Table 1 revealed the gender of the respondents. The table showed that males were 148 representing 58.3 percent, females were 106 representing 41.7 percentage.

**Table 2: Age**

	Frequency	Percent	Cumulative Percent
9-12 years	73	28.7	28.7

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13-15 years	59	23.2	52.0
16-18 years	122	48.0	100.0
Total	254	100.0	

Table 2 showed the age of the respondents. The table showed that the respondents 9-12 years were 73 representing 28.7%, 13-15 years 59 representing 23.2%, and 16-18 years 122 representing 48%. This implies that the respondents with a higher percentage were those between 16-18 years.

To ascertain the influence of gender on participant levels of nutritional intake, table 3 presents a t-test comparison of the nutritional intake scores of male and female participants.

**Table 3: Difference in nutritional intake of male and female participants**

Nutritional Intake	Gender	N	$\bar{x}$	SD	df	t	Sig.
Healthiness	Male	148	5.21	0.702	252	0.529	<0.05
	Female	106	5.15	0.826			
Convenience	Male	148	2.05	0.688	252	0.520	>0.05
	Female	106	2.01	0.655			
Sensation (look, taste & smell)	Male	148	4.75	0.746	252	1.459	>0.05
	Female	106	4.61	0.725			
Overall Nutritional Intake	Male	148	12.01	1.433	252	1.327	>0.05
	Female	106	11.77	1.403			

\* Significant level  $p < 0.05$

Table 3 presented the total nutritional intake of male and female respondents using t-test statistical analysis. The table also showed the nutritional intake reported by male and female revealed that there is no significant difference in the levels of nutritional intake except on healthiness. The study showed the mean scores of male participants ( $\bar{x} = 5.21$ ) that they eat more healthy food than female ( $\bar{x} = 5.15$ ). This suggests that convenience and sensation (look, taste, and smell) does not affect the nutritional intake of older children and adolescent.

The study also investigated the influence of age on the reported levels of nutritional intake by participants of different age categories using the One-way Analysis of Variance (ANOVA) statistical procedures. The results of the analysis are as shown in Table 4.

**Table 4: Influence of age of participants on levels of nutritional intake**

Nutritional Intake	Source of Variance	Sum of Squares	df	Mean Square	F	P
Healthiness	Between Groups	5.71	2	2.86	5.17*	< 0.05
	Within Groups	138.59	251	0.55		
	Total	144.30	253			
Convenience	Between Groups	3.47	2	1.74	3.92*	< 0.05
	Within Groups	111.21	251	0.44		
	Total	114.68	253			
Sensation (look, taste & smell)	Between Groups	4.41	2	2.21	4.14*	< 0.05
	Within Groups	133.64	251	0.53		
	Total	138.05	253			
Overall Nutritional Intake	Between Groups	8.07	2	4.03	2.01	>0.05
	Within Groups	504.03	251	2.01		
	Total	512.09	253			

\* Significant  $p < 0.05$

Table 4 revealed the influence of age on each level of nutritional intake reported by respondents. The table revealed that healthiness ( $F = 5.17$ ,  $p < 0.05$ ), convenience ( $F = 3.915$ ,  $p < 0.05$ ) and sensation ( $F = 4.143$ ,  $p < 0.05$ ) was influenced by age. Table 5 shows the direction of the influence of age older respondents reporting a higher level of nutritional intake than younger respondents.

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A further attempt was made to ascertain which age category experienced the least and highest levels of nutritional intake. To this end, respondents were classified into three age groups namely: (i) 9-11 years (N=73), (ii) 12-15 years (N=59) and 16-18 years (N=122).

**Table 5: Multiple comparisons of total nutritional intake scores according to age**

\* The mean difference is significant at the 0.05 level.

	Age Group (i)	Compared Group (ii)	N	Mean	Std. Deviation	Mean Difference (i-ii)	Std. Error	p
Healthiness	9-12 years	13-15 years	73	5.25	.760	-.160	.130	.219
		16-18 years				.206	.110	.063
	13-15 years	9-12 years	59	5.41	.591	.160	.130	.219
		16-18 years				.366*	.118	.002
	16-18 years	9-12 years	122	5.04	.797	-.206	.110	.063
		13-15 years				-.366*	.118	.002
Convenience	9-12 years	13-15 years	73	1.95	.780	.047	.117	.688
		16-18 years				-.211*	.098	.034
	13-15 years	9-12 years	59	1.90	.662	-.047	.117	.688
		16-18 years				-.257*	.106	.015
	16-18 years	9-12 years	122	2.60	.589	.211*	.098	.034
		13-15 years				.257*	.106	.015
Sensation	9-12 years	13-15 years	73	4.63	.736	-.302*	.128	.019
		16-18 years				.015	.108	.887
	13-15 years	9-12 years	59	4.93	.583	.302*	.128	.019
		16-18 years				.317*	.116	.007
	16-18 years	9-12 years	122	4.61	.787	-.015	.108	.887
		13-15 years				-.317*	.116	.007
Overall Nutritional Intake	9-12 years	13-15 years	73	11.82	1.388	-.415	.248	.095
		16-18 years				.010	.210	.960
	13-15 years	9-12 years	59	12.24	1.023	.415	.248	.095
		16-18 years				.426	.225	.059
	16-18 years	9-12 years	122	11.81	1.587	-.010	.210	.960
		13-15 years				-.426	.225	.059

Table 5 revealed the mean score of respondents in nutritional intake, healthy food is higher with 13-15 years ( $\bar{x} = 5.41$ ) than the mean score of respondents of 9-12 years ( $\bar{x} = 5.25$ ) and 16-18 years ( $\bar{x} = 5.04$ ), convenience of preparation and time is higher with 16-18 years ( $\bar{x} = 2.60$ ) than 9-12 years ( $\bar{x} = 1.95$ ) and 13-15 years ( $\bar{x} = 1.90$ ). Also the result showed the sensation of intake to be higher with 13-15 years ( $\bar{x} = 4.93$ ) than 9-12 years ( $\bar{x} = 4.63$ ) and 16-18 years ( $\bar{x} = 4.61$ ). This implies that the nutritional intake of children and adolescents is higher with 13-15 years in terms of healthiness, convenience 16-18 years, and sensation (look, taste and smell) 13-15 years. Older respondents reported a higher level of nutritional intake than younger respondents.

**Table 6: Difference in Food Choice of male and female participants**

Food Choice	Gender	N	$\bar{x}$	SD	df	t	Sig.
Protein	Male	148	10.86	1.182	252	-2.041	<0.05
	Female	106	11.15	1.040			
Carbohydrate	Male	148	11.26	1.115	252	1.351	>0.05
	Female	106	11.09	0.879			
Vitamins	Male	148	10.69	1.374	252	-1.874	>0.05
	Female	106	10.98	1.104			
Overall Food Choice	Male	148	32.82	2.571	252	-1.332	>0.05
	Female	106	33.23	2.170			

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\* Significant  $p = < 0.05$

As shown in Table 6, a comparison of the overall food choice scores of male and female respondents using the t-test statistical analysis yielded a t-value of -1.332, which is not significant at the 0.05 level. This implies that there is no significant difference between the overall food choice of male and female participants. However, t-test statistical analysis of the different food choices reported by participants between male and female showed that there is a significant difference in the protein-based food ( $t = -2.041, p < 0.05$ ). The table also showed that there is no significant difference in food choice of male and female participants carbohydrate food ( $t = 1.351, p > 0.05$ ) and vitamins ( $t = -1.874, p > 0.05$ ). This implies that the food choice of male and female differs in terms of protein-based food but no differences in that of carbohydrate and vitamins.

**Table 7: Influence of age of participants on levels of food choice**

Nutritional Intake	Source of Variance	Sum of Squares	df	Mean Square	F	P
Protein	Between Groups	16.72	2	8.36	6.83*	< 0.05
	Within Groups	307.21	251	1.22		
	Total	323.93	253			
Carbohydrate	Between Groups	1.63	2	0.82	0.78	> 0.05
	Within Groups	263.91	251	1.05		
	Total	265.54	253			
Vitamins	Between Groups	7.59	2	3.79	2.36	> 0.05
	Within Groups	403.33	251	1.61		
	Total	410.92	253			
Overall Food Choice	Between Groups	20.72	2	10.36	1.79	>0.05
	Within Groups	1456.24	251	5.80		
	Total	1476.96	253			

\* Significant  $p = < 0.05$

Table 7 revealed the influence of age on different food reported by respondents. The table revealed that the choice of food of protein ( $F = 6.83, p < 0.05$ ), carbohydrate ( $F = 0.78, p > 0.05$ ), and vitamins ( $F = 2.36, p > 0.05$ ) was influenced by age. Table 8 shows the direction of the influence of age older respondents reporting a higher level of food choice than younger respondents.

A further attempt was made to ascertain which age category experienced the least and highest levels of food choice. To this end, respondents were classified into three age groups namely: (i) 9-11 years ( $N=73$ ), (ii) 12-15 years ( $N=59$ ) and 16-18 years ( $N=122$ ).

**Table 8: Multiple comparisons of total food choice according to age**

	Age Group (i)	Compared Group (ii)	N	Mean	Std. Deviation	Mean Difference (i-ii)	Std. Error	p
Protein	9-12 years	13-15 years	73	11.05	1.117	0.529*	0.194	0.007
		16-18 years				-0.109	0.164	0.506
	13-15 years	9-12 years	59	10.53	1.135	-0.529*	0.194	0.007
		16-18 years				-0.639*	0.175	0.000
	16-18 years	9-12 years	122	11.16	1.086	0.109	0.164	0.506
		13-15 years				0.639*	0.175	0.000
Carbohydrate	9-12 years	13-15 years	73	11.07	1.097	-0.152	0.180	0.398
		16-18 years				-0.186	0.152	0.222
	13-15 years	9-12 years	59	11.22	1.084	0.152	0.180	0.398
		16-18 years				-0.034	0.163	0.836
	16-18 years	9-12 years	122	11.25	0.95	0.186	0.152	0.222
		13-15 years				0.034	0.163	0.836
Vitamins	9-12 years	13-15 years	73	11.08	1.412	0.353	0.222	0.113
		16-18 years				0.394*	0.188	0.037

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	13-15 years	9-12 years	59			-0.353	0.222	0.113
		16-18 years		10.73	1.187	0.040	0.201	0.841
	16-18 years	9-12 years	122			-0.394*	0.188	0.037
		13-15 years		10.69	1.213	-0.040	0.201	0.841
	9-12 years	13-15 years	73			0.731	0.422	0.084
		16-18 years		33.21	2.728	0.099	0.356	0.782
Overall Food choice	13-15 years	9-12 years	59			-0.731	0.422	0.084
		16-18 years		32.47	2.238	-0.632	0.382	0.099
	16-18 years	9-12 years	122			-0.099	0.356	0.782
		13-15 years		33.11	2.281	0.632	0.382	0.099

\*The mean difference is significant at the 0.05 level.

From Table 8, the mean value respondents in protein food choice was higher with 9-12 years ( $\bar{x} = 11.05$ ) and 16-18 years ( $\bar{x} = 11.16$ ) than the mean value of respondents in 13-15 years ( $\bar{x} = 10.53$ ), the mean value of respondents in vitamin food choice was higher with 9-12 years than any other age groups, all the age groups make choice of carbohydrate food at the same level. This implies that respondents' choice of food differs in age except with carbohydrate food.

### DISCUSSION

The results of this study have shown the gender and age difference in food choice and nutritional intake of late childhood and adolescence. Data collected revealed that 58.3% of the respondents were male and 41.7% were female. Also, it showed the age range of the respondents 9-12 years were 28.7%, 13-15 years 23.2%, and 16-18 years 48%.

In the study of children and adolescents nutritional intake, gender was a significant factor of healthy nutritional intake, the intakes of convenience (easy to cook) and sensation (look, taste and smell) were not statistically significantly different in girls and boys. This is consistent with the work of Merkiel-Pawłowska & Chalcarz, (2017), Askovic & Kirchengast (2012) and Sadowska, Radziszewska & Krzymuska (2010). The study findings out that whether a type of food is convenient to cook or not, or in terms of sensation (look, taste and smell) it does not affect the nutritional intake of children and adolescents. When a type of food is healthy, children and adolescents were encouraged to eat it. It is also important to note that age contributes significantly to the nutritional intake of children and adolescents. Adolescents reported a higher level of nutritional intake than children younger respondents.

Moreover, the result of the findings which is very inconsistent with the published literature is that gender does not contribute significantly to the food choice of children and adolescents. Alkazemi (2019) compared the food choice of male and female college students and found out that it is different. Based on the findings of this present study, all the age groups chose carbohydrate food at the same level which may account for the relatively high prevalence of overweight and obesity in children and adolescents. This is found to be reliable with the study of Kaufer-Horwitz, Villa & Pedraza (2015) and Arganini et al (2012).

### CONCLUSION

Food choice is a complex human behaviour that is controlled by a blend of characteristics such as biological, psychological, social, cultural, and economic factors (Sommer, 2013). It is a dynamic, flexible concept that is changed or modified throughout the life course, developing from early childhood up until old age (Sobal & Bisogni 2009). This study has generated knowledge that helps in improving the food choice of children and adolescents. The findings of the study indicated that both children and adolescents ingest carbohydrate food at a high rate which may account for the high prevalence of overweight and obesity among this group of people. Taking into consideration the adverse effects of too much carbohydrate food, it is important to ensure that children's and adolescent's diets are adequate, except in the case of food allergy all types of food should be included and encouraged in their diet. Furthermore, since convenience and sensation do not affect nutritional intake, children's and adolescent's food should be fortified with natural ingredients that will improve their health maximally as compared to junk and unhealthy foods. Also, fruits, nuts, and vegetables that will supply both micro and macro nutrients should be included in their intake.

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