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Determinants of Fruit Consumption among In-school Adolescents in Ibadan, South West Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author OSI designed the study and performed the statistical analysis. Author FFI wrote the first draft of the manuscript. Author ITI did most of the literature searches. All authors read and approved the final manuscript.

Original Research Article

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ABSTRACT

Background: Fruit consumption helps to promote health and prevent chronic diseases. Adequate knowledge of the determinants of fruit intake is necessary in order to be more effective in promoting its intake among adolescents.
Objective: This study aimed to examine the determinants of fruit consumption among adolescent in Ibadan, Nigeria.
Methods: A cross-sectional study was carried out among Senior Secondary School students in a public school in Ibadan- North Local Government Area, Ibadan, Nigeria. A total of 294 respondents completed a structured self-administered questionnaire. Associations were explored with the chi square test, predictors of fruit intake were determined with logistic regression; level of significance was 5%.
Results: Respondents above 14 years were 159 (54%). Only 244 (83%) lived with both parents. In all 233 (79%) had four or less siblings. Apple is the fruit preferred by 165(56%) of the respondents. Only 27 (12%) out of the 229 that had fruit consumption the month preceding the study had adequate intake. Among children of mothers who were civil servants 23 (89%) ate fruit in the month preceding the study ($p<0.05$). The significant

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determinants of fruit intake were mothers who were professionals (OR:3.8(1.562- 20.690)), supportive physical environment (OR: 3.0 (1.148- 5.744)) and number of siblings ≤4 (OR:2.3 (1.093- 4.83)) P<0.05.
Conclusions: Fruit intake has been shown to be low in the study population. Personal interest is not a determinant of fruit intake in this study there is therefore need to increase the level of awareness with regard to the benefit of fruit consumption in ensuring health. Effort to reduce the price of fruits and increase its availability is also important.

Keywords: Fruit; health; diseases; awareness; adolescents.

1. INTRODUCTION

Fruit and vegetables are an extremely important part of a healthy diet [1,2]. Morbidity has been linked to low fruit and vegetables consumption [3,4]. However, this study considered fruit rather than vegetable. Increment in fruit consumption is relatively easier to document. School interventions in most countries are targeted towards increasing fruit intake, rather than vegetable since it is easier to promote in schools and health programmes than vegetables [5].

In most Western countries, large population groups, including children and adolescents eat far less than the recommended amount of fruits [6]. Interventions to improve fruit intake have to be directed towards its most important determinants [7]. Maternal education and high socioeconomic status have been shown to have significant association with adequate fruit intake among adolescents in several countries [8-10].

In view of this, adequate knowledge of the determinants of fruit intake is necessary in order to be more effective in promoting its intake among adolescents. Food preferences and eating habits established in adolescence have a tendency to be maintained into adulthood [11]. Data on adequacy of fruit intake and its determinants are scarce in Nigeria [1]. This study therefore aimed to examine the intake level, its adequacy and determinants among in-school adolescents in Ibadan, Nigeria to enable recommendation to improve its intake.

2. METHODOLOGY

The study was conducted in Ibadan the capital of Oyo State, one of the 36 states of the Federal Republic of Nigeria. This was a cross-sectional study with an exploratory component involving all the senior secondary school students. Appropriate sample size was calculated using the WINPEPI software [12]. A multi-stage sampling technique was used. A senior secondary school was finally chosen in Ibadan- North Local Government Area, Ibadan, Nigeria. All the students in the selected school participated. A total of 294 female respondents aged 12-19 years completed a structured self-administered questionnaire on socio-demographic variables, perceived personal interest, perceived social and physical environment.

Adapted version of validated questionnaires from a review done in 5 European countries was used in data collection [13]. Permission was obtained from the head of the selected school. Participation was voluntary and consent was obtained from participants after detailed information on the study had been given.

3. ANALYSIS

Data was cleaned and analyzed using Statistical Package for Social Sciences version 21 software. Frequencies and proportions were used to summarize variables of interest. Respondents with more than 50% score in the domains (perceived personal interest, perceived social and physical environment) mentioned above were categorised to have had good score and supportive environment. Associations were explored with the chi square test and predictors of fruit intake were determined with logistic regression. Odds ratios (OR) and 95% confidence intervals (CI) were presented. The level of significance was set at 0.05, two-tailed.

4. RESULTS

The mean age of respondent was 15±1(years) Standard Deviation. The youngest respondent was 12 years while the oldest was 19 years. More than half 159 (54%) of the respondents were above 14 years. Only 244 (83%) lived with both parents. Table 1 shows other socio-demographic variables of respondents.

Table 2 shows the response of the respondents to questions on fruit intake based on the following domain personal interest, perceived social environment and perceived physical environment.

Fig. 1 shows that apple is the fruit preferred by 165 (56%) of the respondents. Concerning the reasons why fruit intake may not be adequate: 108 (37%) do not have a reason while 93 (32%) felt fruit was expensive, 57(19%) felt it was not always available and 36 (12%) did not like fruits. About 229 (78%) had fruit intake in the month before the study. Only 27(12%) out of the 229 had adequate fruit intake based on their self-reported fruit consumption.

Table 3 shows that children of mothers who were civil servants 23 (89%) ate fruit in the month preceding the study ($p<0.05$). Children of mothers who had tertiary education also had fruit 138 (86%) ($p<0.05$). Respondents with 4 siblings or less 189 (82%), those who board at school 41 (91%), those who had supportive social environment146 (85%), Supportive Physical environment 149 (88%) and personal interest 218 (80%) had fruit consumption in the month before the study ($p<0.05$).

Table 4 shows the determinants of fruit intake. Children of mothers who were professionals were about 4 times more likely to eat fruit compared to artisan mothers (OR:3.8 (1.562- 20.690) 0 $p<0.05$. Students who had supportive physical environment were three times more likely to eat fruits compared to those who did not have supportive physical environment (OR: 3.0 (1.148- 5.744)) $p<0.05$. Respondents with four or less siblings were about two times more likely to eat fruit (OR: 2.3 (1.093- 4.83)) $p<0.05$.

Table 1. Socio-demographic variables of respondents

Variables	n(%)
Age	
≤ 14 years	135(45.9)
>14 years	159(54.1)
Religion	
Christianity	249(84.7)
Muslim	45(15.3)
Who the respondents lived with	
Both Parents	244(83)
Others	50(17)
Parent family type	
Monogamous	269(91.5)
Polygamous	25(8.5)
Mothers Occupation	
Artisan	33(11.2)
Trader	166(56.5)
Civil servants	26(8.8)
Professional	69(23.5)
Fathers Occupation	
Artisan	30(10.2)
Trader	117(39.8)
Civil servants	34(11.6)
Professional	113(38.4)
Mothers Educational Level	
No Formal Education	14(4.8)
Primary	15(5.1)
Secondary	104(35.4)
Tertiary	161(54.8)
Fathers Educational Level	
No formal education	18(6.1)
Primary Education	9(3.1)
Secondary	71(24.1)
Tertiary	196(66.7)
Number of siblings	
≤4	233(79.3)
>4	61(20.7)
Boarding at school	
Yes	45(15.3)
No	249(84.7)

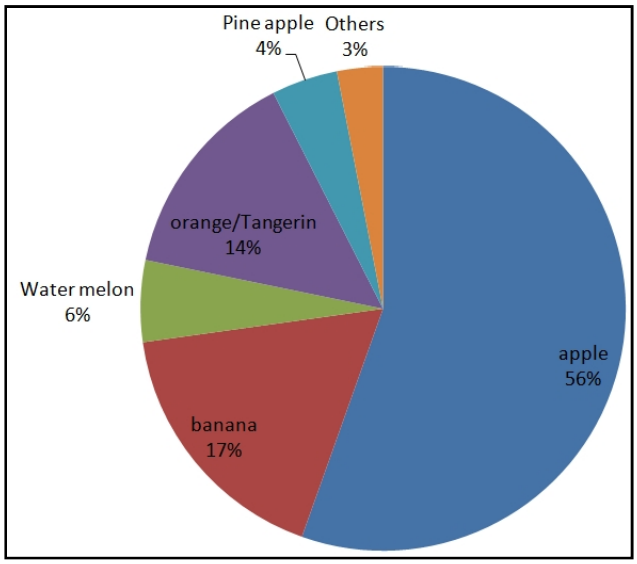

Fig. 1. Fruit preferred by the respondents

Table 2. Personal interest of respondents, perceived social environment of respondents and perceived physical environment and fruit intake

	Personal interest of respondents		
s/n	**questions**	**Yes n(%)**	**No n(%)**
1	To eat fruit every day makes me feel good	287(97.6)	7(2.4)
2	I like to eat fruit every day	265(90.1)	29(9.9)
3	It is difficult for me to eat fruit every day	59(20.1)	235(79.9)
4	I want to eat fruit every day	235(79.9)	59(20.1)
5	To eat fruit every day is a habit for me	173(58.8)	121(41.2)
	Perceived social environment of respondents		
s/n	**questions**	**Yes n(%)**	**No n(%)**
1	My mother eats fruit every day	142(48.3)	152(51.7)
2	My father eats fruit every day	132(44.9)	162(55.1)
3	My best friend eats fruit every day	134(45.6)	160(54.4)
4	My mother encourages me to eat fruit every day	205(69.7)	89(30.3)
5	My father encourages me to eat fruit every day	182(61.9)	112(38.1)
6	Do your parents demand that you eat fruit every day?	170(57.8)	124(42.2)
7	Are you allowed to eat as much fruit as you like at home?	193(65.6)	101(34.4)
	Perceived physical environment		
s/n	**questions**	**Yes n(%)**	**No n(%)**
1	If you tell your parent at home what fruit you like, will it be bought?	236(80.3)	58(19.7)
2	Are there usually different kinds of fruits available in your home?	162(55.1)	132(44.9)
3	Is there usually fruit available at home that you like?	180(61.2)	114(38.8)
4	Can you get fruit at school either by buying it or getting it for free?	172(58.5)	122(41.5)
5	Can you get fruit at your friend's house, when you spend the afternoon there?	142(48.3)	152(51.7)
6	Can you get fruit at the place where you have your leisure-time activity (e.g. club, sports place), either by buying it or getting it for free?	211(71.8)	83(28.2)

Table 3. Association of some variables with intake of fruit in the month before the study

Variables	Fruit intake		Chi-square	p- Value
	Yes n(%)	No n(%)		
Religion				
Christianity	191(76.7%)	58(23.3%)	1.325	0.25
Islam	38(84.4%)	7(15.6%)		
Parent family type				
Monogamous	208(77.3)	61(22.7)	0.592	0.44
Polygamous	21(84.0)	4(16.0)		
Whom respondents live with				
Both parents	193(79.1)	51(20.9)	1.214	0.27
Others	36(72.0)	14(28.0)		
Fathers Occupation				
Artisan	19(63.3)	11(36.7)	4.3	0.23
Trader	93(79.5)	24(20.5)		
Civil servant	28(82.4)	6(17.6)		
Professional	89(78.8)	24(21.2)		
Mothers Occupation				
Artisan	19(57.6)	14(42.4)	14.4	0.002
Trader	126(75.9)	40(24.1)		
Civil servant	23(88.5)	3(11.5)		
Professional	61(88.4)	8(11.6)		
Fathers Educational Level				
No Formal Education	13(72.6)	5(27.8)	3.697	0.30
Primary	6(66.7)	3(33.3)		
Secondary	51(71.8)	20(28.2)		
Tertiary	159(81.1)	37(18.9)		
Mothers Educational Level				
No formal education	7(50)	7(50)	18.7	<0.001
Primary Education	8(53.8)	7(46.7)		
Secondary	76(73.1)	28(26.9)		
Tertiary	138(85.7)	23(14.3)		
Number of siblings				
≤4	189(81.9)	44(18.9)	6.78	0.01
>4	40(65.6)	21(34.4)		
Do you board at school				
Yes	41(91.1)	4(8.9)	5.39	0.02
No	188(75.5)	61(24.5)		
Social Environment				
Supportive	146(84.9)	26(15.1)	11.8	0.001
Not supportive	83(68)	39(32)		
Personal Interest				
Supportive	218(79.9)	55(20.1)	8.5	0.003
Not supportive	11(52.4)	10(47.6)		
Physical Environment				
Supportive	149(88.2)	20(11.8)	24.4	<0.001
Not supportive	80(64.0)	45(36.0)		

Table 4. Determinants/Predictors of fruit intake among respondents

Variables	Odd Ratio Exp (B)	95% Confidence Interval Upper	Lower	P-value
Mothers Occupation				
Artisan	1			
Trader	3.0	0.524	15.789	0.22
Civil servant	4.0	1.079	13.887	0.22
professional	3.8	1.562	20.690	0.001
Social Environment				
Supportive	1.5	0.784	2.904	0.22
Not supportive	1			
Personal Interest				
Supportive	3.4	1.14	10.26	0.28
Not supportive	1			
Physical Environment				
Supportive	3.0	1.148	5.744	0.002
Not supportive	1			
Number of siblings				
≤4	2.3	1.093	4.83	0.03
>4	1			

5. Discussion

Knowing the determinants of fruit intake is required so that more effective intervention can be instituted in promoting its intake among adolescents in South West Nigeria. This is a cross sectional study capturing the domains and socio-demographic characteristics that may affect decision about fruit intake. Multivariate analysis was used to identify the predictors of fruit intake among the adolescents studied.

This study revealed that fruit consumption in Nigerian female adolescents is lower than recommended. This is similar to findings in developed and developing countries [6,14,15]. Up to a quarter of respondents did not take fruits in the past one month and among those who took fruits, the intake was grossly inadequate. This duplicates findings of other studies in both developed and developing countries of the world [16-19]. A study among America Students showed that students who had supportive social and physical environment, personal interest and those who board at school had adequate fruit consumption [20].

This study also revealed that having mothers with tertiary education and coming from a smaller family, as shown by having 4 or less siblings, are determinants of adequate fruit consumption among female adolescents. Studies in different countries have consistently revealed maternal education as a determinant of adequate fruit intake in adolescents [8,21]. Having a mother with tertiary education is a determinant of adequate fruit intake probably because having a high education increases the decision making power of women relative to men and this has been found to be a determinant of fruit intake among adolescents in a sub-Saharan Africa multi country study [22].

Respondents from family with high socioeconomic status had adequate fruit intake. Almost all studies looking into the determinants of fruit intake revealed this [9,23]. This is likely because, most people with higher income are likely to be able to afford the cost of fruit. This is the case in this study in which the most quoted reason for not having consumed adequate

fruits was due to fruits being expensive. A study in Ghana also revealed that adolescents considered fruits expensive [10].

This study did reveal family size to be a determinant of adequate fruit intake [24]. Some studies have revealed no association between family size and adequate fruit intake [25,26]. This could be due to number of people that have been defined to form a small family size in this study. This study defined households with seven people or less as a small family, another study in China defined small family size as 3 persons or less [26]. The use of 3 persons or less is not applicable in Nigeria.

Personal preference was assessed in this study and while apples were found to be the fruit most preferred there was no association between personal preference and overall fruit intake as opposed to other studies that have revealed preference to be a determinant of adequate fruit intake [27-29]. This study has showed that there is a need for more enlightenment among adolescents on the benefit of fruit intake. This will improve the personal interest of the students.

6. CONCLUSION

This study shows that fruit intake is inadequate among adolescents in Ibadan, South West Nigeria. We have found that personal interest is not a determinant of fruit intake in this study there is therefore need to increase the level of awareness with regard to the benefit of fruit consumption in ensuring good health. In this environment with inadequate fruit intake emphasis may not be on any particular fruit but its intake compared to other non-nutritious food item is worthy of promotion. Efforts at making fruit affordable and available will also increase its consumption among adolescents.

7. LIMITATIONS

Recall bias was reduced by limiting all enquiries on fruit intake to one month.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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