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Dietary habits and family correlates whether family has any role in shaping the dietary habits of adolescents? A school based cross-sectional study from Mangaluru, Karnataka State, India

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ABSTRACT

Background: Adolescence is widely defined as the time in life when the developing individual attains the skills and attributes necessary to become a productive and reproductive adult. **Objective:** to study the dietary habits of school going adolescents and role of family in shaping the habits. **Material and methods:** This Cross-sectional study was conducted in Mangalore city of Dakshina Kannada also known as South Canara a coastal district situated in the southern part of Karnataka state for a period of two years from November 2014 to September 2016. Adolescents aged 10 to 19 years studying in grade VII to grade X of two selected schools and their parents/guardians. **Results:** Majority of the adolescents viz., 63.9%, 90.0%, and 68.7% had inadequate intake of proportion of fruits, green leafy vegetables and junk foods per day during the past 7 days respectively. Number of siblings in family, father literacy and religion were the socio-demographic variables found to have statistically significant association with fruit intake with $p<0.05$. **Conclusions:** This study throws light on the existence of various health needs of the adolescents and should be addressed by their parents and they should be offered counseling services.

Key Words: Dietary habits, adolescents, fruits, green leafy vegetables, junk foods

INTRODUCTION

World Health Organization identifies adolescence as the period in human growth and development that occurs after childhood and before adulthood, adolescents individuals are precious human resources in every country and are the future of the society. It is an age of opportunity for children and a pivotal time to build on their development in the first decade of life, to help them navigate risk and vulnerabilities and to set them on the path to fulfilling their potential.[1]It is a phase of rapid growth and development during which physical, physiological and behavioral changes occur.[2]

The world is home to 1.2 billion individuals aged 10-19years.[3]This period is divided into 2 categories, early adolescence (10-14years) and late adolescence (15-19years).[4]

India has the largest adolescent population in the world.[2]According to 2011 census data, every fifth person in India is an adolescent and they constitute nearly one-fifth (20.8 %) of India's total population. Of the total population, 10.9% belong to the 10-14years age group & nearly 9.9% are in 15-19years age group.[5] Karnataka state the adolescent population is 18.9% of its total population.

Adolescent age group comprises of individuals in a transient phase of life requiring nutrition, education, counseling and guidance to ensure their development into healthy adults.

Nutritional needs during adolescence are increased because of the increased growth rate and changes in body composition associated with puberty.[6] Eating practices and behaviors that are consistent with improving, maintaining and enhancing health is known as Healthy eating. Meal pattern and food intake are markers for nutrient intakes and diet quality. Nutrient intake has an influence on health and development of several chronic diseases. Meal patterns affect resting energy expenditure, body fat, bone density, serum cholesterol and many other situations.[7]

The development of healthy eating habits is important as the rapid physical growth in adolescents is associated with increased nutritional needs. Various studies on diet and nutrition intake of adolescents and young adults in the developed world have shown that their diets are often high in fats and refined carbohydrate. Adolescence is also a period of increased vulnerability to obesity. Lack of physical activity and outdoor sports, along with the

consumption of fat-rich 'junk' foods, is the major cause of obesity among the affluent population.

The dietary pattern and the factors associated with this behavior and family's role in adolescent help-seeking has been vastly underexplored in India and especially in Karnataka. Hence this study was undertaken to identify factors associated with dietary pattern among the adolescents. The negative impact of delayed dietary habits on the person, such as delayed diagnosis and treatment, and the poor outcomes identified as a result of help negation have been the driving force behind research in this area. Present study was conducted to study the dietary habits of school going adolescents and role of family in shaping the habits.

MATERIAL AND METHODS

This Cross-sectional study was conducted in Mangalore city of Dakshina Kannada also known as South Canara a coastal district situated in the southern part of Karnataka state for a period of two years from November 2014 to September 2016. Adolescents aged 10 to 19 years studying in grade VII to grade X of two selected schools and their parents/guardians.

This study was conducted in two higher secondary schools selected by purposive sampling, out of 38 higher secondary schools in Mangalore city. These were Yenepoya School, located in Jeppin Mogaru area of Mangalore city, situated in ward no 54 in Mangalore city block with a strength of 170 students (VII to grade X).[8]

The second school was Sri Ramakrishna High School**,** located at S.R.S Home campus, Bunts hostel circle, ward no 35 in Mangalore city. The school has both primary and secondary schools with grades from I to grade X. Total strength was 320 (Grade VIIth to Xth).[9]

Inclusion Criteria: Adolescents aged between 10 to 19 years studying in grade VII to X;Parents/Guardians of the adolescents participating in the study;Students who were willing to participate voluntarily

Exclusion criteria: Those who were not available even after 2 school visits

Sample Size and sampling method: All the adolescents from the two schools who met the inclusion and exclusion criteria were enrolled in the study. Accordingly a total of 384 adolescents were included in the study.

A pre-designed, pre-tested, semi-structured, validated questionnaire (Study tool) was used. The study tool comprises of questions pertaining to Socio-demographic profile and dietary habits of the study participants. Consumption of more than & equal to one per day is considered as adequate intake. To assess the socio-economic status of the respondents, modified BG Prasad classification was used.

Predesigned questionnaire developed on the basis of similar studies[10, 11] and tailor made as per local needs was given to 6 subject experts for content and consensual validity.

Data Collection: The study protocol was approved by the Institutional ethics and research committee. Selected schools were visited and necessary permission was obtained by the respective authority of the schools. Those subjects (Adolescents aged 10 to 19 years), studying under VII to X grade& their Parents/Guardians, which fulfilled the inclusion and exclusion criteria were included. The purpose of the study was explained to them. A written informed assent from the adolescents& consent from their Parents/Guardians was taken prior to the initiation of interview. The information was gathered by one to one interview method from adolescents. using pre-designed, pre-tested and validated questionnaire.

Statistical analysis: Descriptive statistics such as mean, SD and percentage was used to present the data. Associations were established using Chi square test for categorical data. P Value <0.05 was considered to be statistically significant. Univariate & multivariate logistic regression was applied to determine the associated factors.

RESULTS

In the present study, majority of the study participants were belonging to nuclear family (72.2%) and Hindu by religion (60.7%). Majority of the study participants had their parents education above high school and most of them were graduate and above (30.6% mother and 44.9% fathers). Majority of the adolescents mother were unemployed (70.2%) and fathers were in the occupation belonging to semi-professional and professional category (62.1%). As per 2011 census, in urban area, the total population of workers is 69.58 lakhs of which only 24.11 lakhs are females which means that only 34.65% of the women population was workers and rest 65.35% were homemakers. Our study found that majority of the study participants belongs to Class III and below socio-economic status (52.4%) according to modified BG Prasad's classification.

Table 1: Distribution of adolescents according to dietary habits

Dietary pattern	Frequency (n)	Percentage (%)
Fruit		
Adequate	144	36.1
Inadequate	255	63.9
Green leafy vegetables		
Adequate	40	10
Inadequate	359	90
Junk foods		
Yes	274	68.7
No	125	31.3

Majority of the adolescents viz., 63.9%, 90.0%, and 68.7% had inadequate intake of proportion of fruits, green leafy vegetables and junk foods per day during the past 7 days respectively.

As seen in table 2, gender, number of siblings in family, father literacy and religion were the socio-demographic variables found to have statistically significant association with fruit intake with p<0.05.

Table 2: Association of Socio-demographic variables with fruit consumption (n=399)

Variables	Category	Fruit consumption		Chi-square value	P value
		Adequate	Inadequate		
Age group (Years)	13-14	92 (35.1)	170 (64.9)	0.315	0.575
	15-16	52 (38.0)	85 (62.0)		
Gender	Male	42 (27.1)	113 (72.9)	8.888	**0.003***
	female	102 (41.8)	14 2(58.2)		
Sibling	Up to 2	60 (28.0)	154 (72.0)	12.976	**0.000***
	3 and above	84 (45.4)	101(54.6)		
Mother literacy	Up to high school	50 (31.8)	107 (68.2)	2.021	0.155
	Intermediate and above	94 (38.8)	148 (61.2)		
Mother occupation	Employed	38 (31.9)	81 (68.1)	1.271	0.26
	Homemaker	106 (37.9)	174 (62.1)		
Father literacy	Up to high school	12 (18.8)	52 (81.2)	9.937	**0.002***
	Intermediate and above	132 (39.4)	203 (60.6)		
Father occupation	Professional	96 (38.7)	152 (61.3)	2.052	0.359
	Skilled	42(31.3)	92 (68.7)		
	unskilled	6 (35.3)	11 (64.7)		
Staying with	Parents	136 (36.0)	242 (64.0)	0.039	0.844
	Relatives and others	8 (38.1)	13 (61.9)		
Family type	Nuclear	105 (36.5)	183 (63.5)	0.061	0.805
	Joint	39 (35.1)	72 (64.9)		
Religion	Hindu	60 (24.8)	182 (75.2)	34.029	**0.000***
	Muslim and Christian	84 (53.5)	73 (46.5)		
SES	Class I & II	67 (35.3)	123 (64.7)	0.108	0.743
	Class III & below	77 (36.8)	132 (63.2)		

*Statistically significant

Table 3: Logistic regression analysis for association between Socio-demographic variables and adequacy of fruit consumption (n=399)

	Category	Fruit intake adequacy		Odds ratio	P value	CI	
		Yes	No			Lower	Upper
Gender	Male	42 (27.1)	113 (72.9)	1			
	Female	102 (41.8)	142 (58.2)	2.211	**0.001***	1.383	3.535
Sibling	Up to 2	60 (28.0)	154 (72.0)	1			
	3 and above	84 (45.4)	101 (54.6)	1.369	0.202	0.845	2.217
Father literacy	Up to high school	12 (18.8)	52 (81.2)	1			
	Intermediate and above	132 (39.4)	203 (60.6)	2.901	**0.003***	1.434	5.869
Religion	Hindu	60 (24.8)	182 (75.2)	1			
	Muslim and Christian	84 (53.5)	73 (46.5)	3.107	**0.001***	1.909	5.055

*Statistically significant: R2=0.130

Table 4: Association of Socio-demographic variables with green leafy vegetables consumption (n=399)

Variables	Category	Green leafy vegetables		Chi-square value	P value
		Adequate	Inadequate		
Age group (Years)	13-14	24(9.2)	238(90.8)	0.633	0.426
	15-16	16(11.7)	121(88.3)		
Gender	Male	10(6.5)	145(93.5)	3.588	0.058
	Female	30(12.3)	214(87.7)		
Sibling	Up to 2	25(11.7)	189(88.3)	1.405	0.236
	3 and above	15(8.1)	170(91.9)		
Mother literacy	Up to high school	5(3.2)	152(96.8)	13.428	<0.001*
	Intermediate and above	35(14.5)	207 (85.5)		
Mother occupation	Employed	12 (10.1)	107(89.9)	0.001	0.98
	Homemaker	28(10.0)	252(90.0)		
Father literacy	Up to high school	5(7.8)	59(92.2)	0.414	0.52
	Intermediate and above	35(10.4)	300(89.6)		
Father occupation	Professional	29(11.7)	219(88.3)	4.303	0.116
	Skilled	8(6.0)	126(94.0)		
	unskilled	3(17.6)	14(82.4)		
Staying with	Parents	39(10.3)	339(89.7)	0.681	0.409†
	Relatives and others	1(4.8)	20(95.2)		
Family type	Nuclear	26(9.0)	262(91.0)	1.141	0.285
	Joint	14(12.6)	97(87.4)		
Religion	Hindu	19(7.9)	223(92.1)	3.222	0.073
	Muslim and Christian	21(13.4)	136(86.6)		
SES	Class I & II	19 (10.0)	171(90.0)	0	0.987
	Class III & below	21(10.0)	188(90.0)		

*Statistically significant; †Fishers exact test with Yates continuity correction

As depicted in table 3, females had 2.211 odds of adequate fruit intake per day when compared to male adolescents and has been found to be statistically significant ($p<0.05$).

Adolescents with father having intermediate and higher education had 2.901 odds of adequate fruit intake per day when compared to adolescents with father having education up to high school and has been found to be statistically significant ($p<0.05$)

We also found that adolescents belonging to non Hindu religion had 3.107 odds of adequate fruit intake per day when compared to Hindu religion and has been found to be statistically significant ($p<0.001$)

As seen in table 4, education of the mother was the only socio-demographic variable found to have statistically significant association with green leafy vegetable intake with $p<0.001$

After application of logistic regression as shown in Table 5, we found that adolescents with mother having intermediate and above education had 5.140 odds of adequate intake of

green leafy vegetables when compared to adolescents with mother having high school and below education and has been found to be statistically significant (p<0.05)

Age group of the adolescents, number of siblings in family, mother occupation, education of father, religion, type of family and socio-economic status of family were found to have statistically significant association with junk food consumption with p<0.05

Table 5: Logistic regression analysis for association between mothers literacy and adequacy of green leafy vegetable consumption (n=399)

Category	Green leafy vegetables adequacy		Odds ratio	P value	CI	
	Yes	No			Lower	Upper
Up to high school	5 -3.2	152 (96.8)	1			
Intermedia -te and above	35 (14.5)	207 (85.5)	5.14	**0.001***	1.968	13.426
Skilled	52 (38.8)	82 (61.2)				
unskilled	4 (23.5)	13 (76.5)				

Adolescents with unemployed mothers had 1.752 odds of junk food consumption when compared to adolescents with mother being employed and has been found to be statistically significant (p<0.05)

Adolescents with father having intermediate and above education had 1.948 odds of junk food consumption when compared to adolescents with father having high school and below education and has been found to be statistically significant (p<0.05)

Adolescents belonging to Muslim and Christian religion together had 1.730 odds of junk food consumption when compared to adolescents belonging to Hindu religion and has been found to be statistically significant (p<0.05)

We also found that adolescents belonging to joint family had 2.358 odds of junk food consumption when compared to adolescents belonging to nuclear family and has been found to be statistically significant (p<0.05) and

Adolescents belonging to Class I and II socio-economic status had 2.111 odds of junk food consumption when compared to adolescents belonging to Class III and below and has been found to be statistically significant (p<0.05).

DISCUSSION

We interviewed the study participants about the diet during the past 7 days and was classified into adequate and vice versa on the basis of National Institute of Nutrition guidelines with respect to age and gender and found that 36.1% and 10.0%, of the adolescents had adequate intake of fruit, green leafy vegetables respectively, where as 68.7% of the adolescents reported of consuming junk foods in the past 7 days. Similar results were also highlighted in the report by World Health Organization[12] on adolescent nutrition, wherein according to the Indian studies majority of the adolescents across all age group had inadequate intake of green leafy vegetables and fruits.

When assessed to identify the socio-demographic correlates, it was found that female adolescents (OR: 2.211; p=0.001), with father having intermediate and above education (OR: 2.901; p=0.003) and belonging to Muslim and Christian religion (OR:3.107; p=0.001) had higher odds of adequate fruit intake. A study conducted by Omidvar S et al[7] shows that majority of female adolescents (58%) had daily intake of fruits. Similar results were obtained from the study by Xie et al, [13] where girls are more likely to meet the recommended number of servings of fruits and green leafy vegetables. The findings were also in line with the study findings by Nilsenet al[14] and Bereet al[15] where girls had more fruits and green leafy vegetables intake than boys which was found to be statistically significant (p<0.001).

Education of mother and occupation of father were the socio-demographic factors found to be statistically associated with adequate intake of green leafy vegetables and other vegetables. On application of logistic regression as seen in table 6, we found that adolescents with mother having intermediate and above education had 5.140 odds of adequate intake of green leafy vegetables and that was found to be statistically significant (p=0.001). Low level of parental education was also reported by the World Health Organization[12] as a reason for deficient intake of nutrients, which falls in line with our study findings. Findings from our study were also in line with the study findings of Nilsen SM et al, [14] where adolescents both boys and girls had higher odds of daily vegetable intake [girls (46%) and boys (37%)] and also the study by Xie et al[13] suggests that Subjects from families with parents who had higher educational attainment were more likely to meet the recommendations of vegetables.

When association of socio-demographic variables with consumption of junk foods was assessed, we found that, age of the adolescents, number of siblings in family, mother occupation, education of father, religion, type of family and socio-economic status of family were found to have statistically significant association with junk food consumption and on application of logistic regression for the above significant predictors of junk food consumption, we found that adolescents with unemployed mothers (OR: 1.752), with father having intermediate and above education (OR: 1.948), belonging to Muslim and Christian religion (OR: 1.730), Joint family (OR: 2.358) and belonging to Class I and II socio-economic status (OR: 2.111) had more odds of junk food consumption has been found to be statistically significant (p<0.05). study conducted by Antony LCM et al[16] found socio-economic class to be the significant predictor of junk food consumption, wherein adolescents belonging to higher socio-economic status (Class I and II) had more junk food consumption when compared to adolescents belonging to lower and middle socio-economic status (Class III and below). Similar results were also obtained from the study

by French SA et al[17] wherein adolescents belonging to higher socio-economic status calculated by combining parental education, employment, student eligibility for free/reduced lunch and family receipt of public assistance, had more junk food consumption when compared to lower socio-economic status and this correlates with our study findings of adolescents with higher education and higher socio-economic status had higher odds of junk food consumption. **Conclusion:** This study throws light on the existence of various health needs of the adolescents and should be addressed by their parents and they should be offered counseling services. Good practices like more consumption of protective foods like fruits and vegetables need to be nurtured.

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