

Fast Food Consumption Pattern and Its Association with Overweight Among High School Boys in Mangalore City of Southern India

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ABSTRACT

Context: Fast foods are quite popular among children owing to taste, appearance and hype created by mass media. However, the increased incidence of lifestyle disorders seen now-a-days at an early age could be attributed to fast foods.

Aim: This study was done to assess the awareness of health hazards, consumption pattern of fast foods and to find out its association with overweight among high school students.

Settings and Design: This cross-sectional study was done among boys of 3 private schools in Mangalore city in March 2012.

Materials and Methods: Data was collected using a semi-structured self-administered questionnaire.

Statistical Analysis: Chi-square test, one-way ANOVA and binary logistic regression analysis was used for analysis. P-value ≤ 0.05 was considered as statistically significant association.

Results: Mean age of boys was 13.5 ± 0.9 years. Out of 300 participants, 41 (13.7%) were overweight and 8 (2.7%) were obese. 292 (97.3%) were fast food users of which 42 (14.4%) consumed it

every day. Majority of participants were introduced to fast foods through television commercials 193 (64.3%). 73 (57%) developed this habit as they were bored with home food. Awareness of harmful effects of fast food consumption was known to 186 (62%) students and this was found to be associated with the perceived need to control its usage ($p < 0.001$). Parental consumption of fast foods was found to influence fast food consumption among children ($p = 0.024$). As many as 68 (22.7%) and 206 (68.7%) children were not eating vegetables and fruits respectively every day. Increased frequency of fast food consumption in a week was found to be associated with overweight or obesity among children after adjusting the effects of confounders ($p = 0.003$).

Conclusion: Awareness on health hazards of fast foods needs to be taught at schools so as to minimize its consumption. Parents have to set an example themselves by not eating fast foods and improving home food to support discouragement of fast foods. This would minimize life style disorders among children to a greater extent.

Keywords: Awareness, Children, Junk foods, Obesity, Urban area

INTRODUCTION

Consumption of fast foods has become almost a global phenomenon. India's fast-food industry is expanding at the rate of 40% every year. India ranks 10th in the fast food per capita spending figures with 2.1% of expenditure in annual total spending [1].

Popularity of these food stuffs in this age of urbanization has been attributed to quick preparation and convenience of finishing a meal within no time. Great taste, attractive appearance along with advertising has played a major role in attracting people particularly adolescents to the selling joints [2-4]. Unfortunately, the current world's adaptation to a system of consumption of fast foods has resulted in several adverse effects on health. The energy density of fast foods had been found to be more than twice the recommended daily allowance for children [5]. Experts therefore attribute the current childhood obesity epidemic to fast foods [1]. This increase in childhood obesity has led to increase in life-threatening conditions particularly non communicable diseases in developing countries [1,6]. Dental cavities another common ailment in school children can result due to dense sugar content in fast foods [7]. Food additives used in these food stuffs are found to be carcinogenic and can be allergic causing asthma and rashes which are also seen frequently among children [1]. Added to this in developing countries there are problems like poor hygiene during preparation storage and handling of fast foods leading to contamination by microorganisms [8].

As food habits learnt in childhood tend to persist into adulthood it becomes important to educate children about healthy eating habits and make them aware about the health hazards of fast foods right

from school level onwards. It becomes equally important to have a clear understanding of the factors influencing food choices so as to formulate appropriate nutritional educational strategies.

Therefore this study was done to find out the awareness of health hazards of fast foods, consumption pattern of fast foods and its association with overweight among high school students.

MATERIALS AND METHODS

This cross-sectional study was done among high school students of 7th, 8th and 9th standard in three major private schools in Mangalore city in March 2012. The study protocol was approved by the ethics committee of the institution.

The sample size of 230 was obtained at 95% confidence level, 20% relative precision and reported proportion of fast food users among high school students to be 30.3% from a previous study [9]. To make up the anticipated loss due to incompletely filled forms, an extra 50% were added to this number to get 345 as the final sample size. The permission to conduct study was obtained from the respective school principals. Written informed consent from the parents or guardians in addition to assent from each student was obtained through school diaries after providing them information and purpose of this study. Due to problems related with consenting only boys were included in this study.

Later 40 self-administered questionnaires were distributed to as many consenting students chosen simple randomly in each class. The questionnaire was in English and was pretested in a group of 10 students before its usage in the study. Content validation of

the questionnaire was done by experts from Medical Education Unit of the institution. It contained semi-structured questions on food frequency intake of fast foods, vegetables and fruits per week. The list of common food stuffs labeled as fast foods was also mentioned in the questionnaire so as make this concept very clear to all participants. Other questions such as years of fast food consumption, source of information, reasons for consumption, awareness about its health hazards, amount spent in a week on fast foods and parental consumption of fast foods were also enquired. The type and duration of physical activity undertaken by the student was enquired and was compared with guidelines provided by the Centre for Disease Control (CDC), Atlanta, USA [10]. Physical activity of at least 60 minutes in a day was considered as of good level.

The students were asked to note down their recently recorded height and weight and their weight recorded two years ago from the school anthropometry register before handing over the questionnaire to the investigators. Grossly incompletely filled forms were excluded from analysis.

Age and male specific cut-offs for Body Mass Index (BMI) to screen for overweight and obesity among Indian children based on standard guidelines was used to categorize BMI [11]. At the end of data collection investigators educated students on health hazards associated with fast food usage using health educational posters.

STATISTICAL ANALYSIS

Data was entered and analysed using SPSS Inc., Chicago, IL, ver 11.0 Chi-square test and one-way ANOVA was used to test association. Binary logistic regression analysis was done to find out the independent predictors of overweight and obesity among children. p -value ≤ 0.05 was considered as statistically significant association.

RESULTS

The response rate in this study was 83.3% with 300 out of 360 distributed questionnaires being satisfactorily filled by the participants. Mean age of boys was 13.5 ± 0.9 years. Their mean height was 1.5 ± 0.1 meters and mean weight was 42 ± 9.5 kgs. 49(16.4%) children were either overweight or obese [Table/Fig-1].

Almost all children 292(97.3%) were eating fast foods. Age of initiation of fast food consumption was answered by 216 participants. Among them majority 126(58.3%) were consumers since past 2 to 5 years. Commonest source of information about fast foods was television commercials 193(64.3%) followed by friends 161(53.7%) and parents 62(21.2%). As many as 64(21.9%) participants said that they preferred fast foods over usual meals [Table/Fig-2]. Reason for consumption was stated by 128 participants. The various reasons stated were being bored with home food 73(57%), curiosity 64(50%), favourite leisure time activity 32(25%), peer influence 30(23.4%), easy availability 10(7.8%), influence by television advertisements 10(3.3%) and quick to eat and finish as stated by two participants. Out of the 292 consumers of fast foods, 277(94.9%) said that their parents were aware about this habit.

Reasons for non-consumption of fast foods stated by non-users were following parental advice stated by four, tendency of addiction stated by two and one each reported reasons like being aware of its ill effects, spicy to taste, not fresh foods and having fallen ill following consumption. Awareness of harmful effects of fast food consumption was noted in 186(62%) students. The various harmful effects reported were it contains harmful colouring agents 5(2.7%), contains harmful food additives/preservatives 12(6.5%), are unfresh foods 28(15.1%), contains high fat content (5.9%), causes rapid weight gain 31(22%), causes intestinal cancer 6(3.2%), same frying oil being used repeatedly is bad for health 2(1.1%) and poor in nutritive value as stated by two participants. There was no association of awareness of hazards of fast food usage with age of the participants ($p=0.443$).

One hundred and forty one (48.3%) of the total fast food consumers

Characteristics	Number	Percentage
Class		
7 th standard	96	32.0
8 th standard	112	37.3
9 th standard	92	30.7
Age		
12	50	16.7
13	94	31.3
14	121	40.3
15	33	11.0
16	2	0.7
Gender		
Males	300	100.0
Body Mass Index		
Normal/ underweight	251	83.6
Overweight	41	13.7
Obese	8	2.7
Total	300	100.0

[Table/Fig-1]: Socio demographic distribution of school children

Characteristics	Number	Percentage
Current fast food consumption habit (n=300)		
Yes	292	97.3
No	8	2.7
Type of fast foods		
Vegetarian	151	51.7
Non vegetarian/ Mixed	141	48.3
Frequency of consumption per week		
Once a week	183	62.7
Twice a week	45	15.4
Once on alternate days or on most days	22	7.5
Once almost everyday	31	10.6
More than once every day	11	3.8
Duration of consumption (n=216)		
≤ 1 year	22	10.2
1 – 2 years	31	14.4
2 – 3 years	42	19.4
3 – 4 years	42	19.4
4 – 5 years	42	19.4
>5 years	37	17.1
Preference of fast foods over usual meals		
Yes	64	21.9
No	228	78.1
Preferred fast foods		
Pizza	89	30.5
Burger	35	12.0
Samosa	50	17.1
Chocolate	40	13.7
Others	78	26.7
Preference for branded fast foods		
Yes	175	59.9
No	117	40.1
Preference of aerated drinks over fresh fruit juices		
Yes	128	43.8
No	164	56.2
Place of consumption		
At home	75	25.7
School premises	37	12.7
Fast food stall	180	61.6
Total	292	100.0

[Table/Fig-2]: Fast food consumption habits among school children

felt that there was a need to control their present fast food consumption practices. The reasons stated were associated health hazards 78(55.3%), tendency to cause weight gain 61(43.3%), parental pressure to quit 6(4.3%), waste of money 6(4.3%) and

	Need to control	No need to control	Total
Awareness of ill effects	121(65.1%)	65(34.9%)	186
Not aware of ill effects	20(18.9%)	86(81.1%)	106
Total	141	151	292
$\chi^2=57.7, p<0.001$			

[Table/Fig-3]: Association between awareness of ill effects of fast food consumption with perception of need towards its control among participants

Characteristics	Consumes (%)	Do not consume (%)	Total
Age			
12 years	49(98)	1(2)	50
13 years	91(96.8)	3(3.2)	94
14 years	117(96.7)	4(3.3)	121
≥15 years	35(100)	0(0)	35
$\chi^2=1.33, p=0.721$			
Type of diet			
Vegetarian	151(96.2)	6(3.8)	157
Non vegetarian	141(98.6)	2(1.4)	143
$\chi^2=1.693, p=0.193$			
Parental consumption of fast foods (n=155)			
Yes	109(97.3)	3(2.7)	112
No	38(88.4)	5(11.6)	43
$\chi^2=5.08, p=0.024$			
Awareness of health hazards			
Yes	179(96.2)	7(3.8)	186
No	113(99.1)	1(0.9)	114
$\chi^2=2.268, p=0.132$			
Total	292	8	300

[Table/Fig-4]: Association of various risk factors with consumption of fast foods among participants

Fast food consumption	Body mass index		Total
	Normal/underweight (%)	Overweight/obese (%)	
Yes	244(83.6)	48(16.4)	292
No	7(87.5)	1(12.5)	8
Total	251	49	300
$\chi^2=0.088, p=0.766$			
Frequency of fast food consumption			
Once a week	163(89.1)	20(10.9)	183
Twice a week	34(75.6)	11(24.4)	45
Once on Alternate days	17(77.3)	5(22.7)	22
Most days a week	12(75)	4(25)	16
Once everyday	11(73.3)	4(26.7)	15
More than once every day	7(63.6)	4(36.4)	11
Total	244	48	292
$\chi^2=11.953, p=0.035$			

[Table/Fig-5]: Association of consumption of fast foods with body mass index

Characteristics	Unadjusted Odds Ratio (OR)	95% C.I for Unadjusted OR		p-value	Adjusted OR	95% C.I for Adjusted OR		p-value
		Lower	Upper			Lower	Upper	
Physical activity	1.388	0.440	4.379	0.575	1.297	0.402	4.183	0.664
Frequent weekly fast food consumption	2.511	1.023	6.165	0.035	1.339	1.105	1.623	0.003

[Table/Fig-7]: Binary logistic regression analysis of association of duration of physical activity and frequent weekly consumption of fast foods with presence of overweight or obesity among fast food users (n=292)

addiction tendency 3(2.1%). The perception to control usage was associated with awareness of health hazards of fast food usage among participants ($p<0.001$) [Table/Fig-3]. In this study 146(50%) boys spent less than 50Rs, 81(27.7%) spent 50Rs to 100Rs, 35(12%) spent 101Rs to 250Rs, 14(4.8%) spent 251Rs to 500Rs and 16(5.5%) spent more than 500Rs per week on fast foods.

About one fourth and two third of students were not eating vegetables and fruits respectively every day. Consumption of fruits atleast once a day was reported by 94(31.3%) and vegetables by 232(77.4%) participants. Duration of physical activity either at school or at home was reported to be poor by 19(6.3%) of the total 300 participants.

Parental fast food consumption was reported to be present by 112(37.3%), absent by 43(14.3%) and the rest 145(48.4%) participants were not sure. Consumption of fast foods among parents was significantly associated with its usage among children ($p=0.024$) [Table/Fig-4]. The association between frequencies of consumption of fast foods with frequency of consumption of healthy foods like fruits ($p=0.337$) or vegetables ($p=0.234$) were not significant.

Children who consumed fast foods once or more a day had greater proportion of being overweight or obese compared to less frequent consumers ($p=0.035$) [Table/Fig-5]. Although duration of physical activity was found to poor among greater proportion of students who ate fast food on most days a week, this association was not significant ($p=0.339$) [Table/Fig-6]. Association of duration of physical activity with BMI was also not found to be significant. ($p=0.575$) [Table/Fig-7]. Adjusted Odds Ratio of frequent consumption of fast foods per week with overweight or obesity status was found to be 1.339 ($p=0.003$) after controlling the confounding effect of physical activity. For calculating CI of AOR the consumers were divided into two groups namely less frequent users versus frequent users (daily and more than once daily users) of fast foods [Table/Fig-7].

Among the 163 users of fast food for 2 or more years, the mean weight gain over the same period was found to be more among frequent users ($p=0.337$) and those eating it for more than 5 years ($p=0.954$) [Table/Fig-8].

DISCUSSION

Understanding of the faulty dietary habits and the factors responsible

Fast food consumption	Duration of physical activity		Total
	Good	Poor	
Yes	273(93.5)	19(6.5)	292
No	8(100)	0(0)	8
Total	281	19	300
$\chi^2=0.556, p=0.456$			
Frequency of fast food consumption			
Once a week	173(94.5)	10(5.5)	183
Twice a week	42(93.3)	3(6.7)	45
Once on alternate days	20(90.9)	2(9.1)	22
Most days in a week	13(81.2)	3(18.8)	16
Once everyday	15(100.0)	0(0)	15
More than once every day	10(90.9)	1(9.1)	11
Total	273	19	292
$\chi^2=5.677, p=0.339$			

[Table/Fig-6]: Association between frequencies of fast food consumption with physical activity among students

Frequency of fast food consumption	Number	Mean±SD (Kg)
Once a week	106	6.5±4.3
Twice a week	20	6.4±3.4
Once on alternate/ most days a week	17	7.5±5.9
Once or more everyday	20	8.5±6.9
F=1.134, p=0.337		
Duration of fast food consumption		
3 years	42	6.9±5.0
4 years	42	7.3±6.7
5 years	42	7.4±7.4
More than 5 years	37	7.7±5.6
F=0.11, p=0.954		

[Table/Fig-8]: Association between frequency and duration of fast food consumption with weight gain over the past two years (n=163)

is very essential to develop effective intervention for promoting healthy eating and minimizing life style problems like obesity during adolescence which is a critical phase of developmental.

Fast food consumption was reported by 97.5% students in a study done in China [12], 98% in a study done in Lucknow, India [13] and by all students in a study done in Jammu Kashmir, India [14] which was more than our observations. However, in several other studies done worldwide, fast food consumption was seen between 30.3% to 93.5% children which was lower than our observations [9,15-18]. These findings infer that fast food consumption was predominant among children in these settings.

However, frequency of fast food usage almost every day varied from 3.7% to 70% of students in other studies in comparison to 14.4% reported in this study [6,17-23]. Consumption of fast foods thrice a week was reported ranging from 6.9% to 43.3% students elsewhere in comparison to 7.5% students in the present study [6,17,24-26]. This meant that pattern of fast food consumption was not as bad among students in this settings as reported elsewhere. Hence timely interventions in the form of early identification of fast food usage, focusing attention on frequent users by appropriate school and family based interventions might help to promote healthy food choices and avoidance of faulty eating habits.

In a study done in Chandigarh, 58.8% of the adolescents preferred fast food items over regular meals which were higher than the findings of this study [27]. Similar observations were made in other studies where young consumers rather than paying attention to the dietary value are instead preferring tasty and attractive food [12,14,22,27-30].

The preference over home diet among some students reported in this study indicate how tempting and pleasing these food stuffs are and is not easy for health educators to convince children to give up fast foods. Moreover a good number of students feeling bored of home foods indicate the need for familial support and nutritional counseling required at homes.

In a study done in Jammu Kashmir, India 7.4% students preferred branded fast foods which were much lower than our findings [14]. This vast difference could be because this study was done in affluent schools in Mangalore. In a study done in Australia, 25% students usually chose soft drinks instead of water or milk in comparison to the same reported by 43.8% students in this study [22].

In a study done in Saudi Arabia, 88.2% ate fast foods at restaurants in comparison to 61.6% in this study [17]. As majority of students were eating fast foods outside school and home environment it would be difficult to monitor their habits. Hence awareness generation about its health hazards and self-motivation to adopt healthy eating behaviour appears to be the best solution to this problem.

Television was the commonest source of information about fast foods in this study which was similar to observations made in a study done in China where children received information from

advertisement on television (67.9%) followed by parents (9.02%) and newspapers or magazines (6.7%) [12].

Studies have also found that youngsters who watch more television are more susceptible to unhealthy eating habits and unhealthy conceptions about food substances compared to others who watch minimally [31]. This is because the current food advertising rarely promotes healthy choices and rather promotes frequent consumption of unhealthy foods making it even difficult for most parents to promote healthy eating at home [32]. Therefore advertisement guidelines related to quality of food products in mass media needs formulation and strict implementation [8].

In this study fast food consumption as a favourite leisure time activity was reported by one fourth of the students. Eating during emotional states such as eating while feeling bored (56.2%), while feeling depressed (28.8%) and while feeling worried (24.7%) were other reasons for fast food consumption stated by participants in Syria [24] and physiological and psychological factors stated by participants in China [12]. Therefore, psychological factors could also play a role in making children habituated with fast food consumption.

Peer influence stated as a reason for consumption was also mentioned in other studies done in USA [25] and Iran [33]. This is because fast food selling joints are epicenters for socializing with peer group among adolescents when away from their families and a less restricting environment in comparison to schools [34,35]. Easy availability of fast foods at any time of the day as reason for fast food usage stated by few in this study was also mentioned in other studies [14,22,34]. In a study done in Jammu Kashmir, India, influence of media was a cause for eating fast foods in urban areas among 80% respondents which was much more than our findings [14]. The television advertisements on fast foods are known to mislead the viewers and discourage the concept of healthy foods.

Awareness of health hazards associated with fast foods use among 62% participants observed in this study was similar to that of the study done in Chandigarh, India [27] as reported by 64.8% adolescents but was more than that reported in the study done at Beijing, China [12]. We noticed a big gap between knowledge and practice of students in this study. Almost 96% of those aware of health hazards continued to eat fast foods and only 65.1% of them felt the need to control its usage. A study done in Baroda, India found that children despite knowing the harmful effects continued to eat fast foods and for reasons like taste preferences, strong desire to do so and quick to eat [16]. Nutrition counseling could help to reduce this gap between knowledge and practice.

In this study half of the respondents spent less than 50Rs per week on fast foods which was lesser than that reported in the study done in Jammu Kashmir, India where majority of the adolescents spent 20-50 Rs per day [14]. Parents need to be very careful in not giving liberal pocket money to children.

History of fast food consumption among family members was significantly associated with fast food usage among children in this study and in other studies done in Iran [33] and China [12]. This proves that familial influences has a major role to play in shaping the eating behaviour of children. Dietary habits are therefore largely determined by familial and cultural factors rooted in childhood and adolescence period [36]. Fast foods which are presently gaining popularity in nuclear families as working parents have less time for meal preparation at home could hence be detrimental in the long run as children pick up these faulty habits early in life [8,37].

In this study greater proportion of students who were overweight or obese were significantly more among most frequent users of fast foods (once or more in a day) which was similar to findings of studies by Li M et al., [21] and Savige et al., [38]. This substantiates the role of fast foods as a risk factor for childhood obesity. Although weight gain over the past two years was found to be most among frequent fast food users in this study it was not statistically significant.

LIMITATIONS

School girls could not be included in this study due to non-consenting issues raised by majority of their guardians. There could also be a possibility of recall bias of students with respect to their dietary habits.

CONCLUSION

Fast food consumption was reported by most students in this study. Commonest source of information was from television advertisements. Therefore, legislations to regulate marketing of fast foods need to be more stringent. Statutory warning about hazards should also accompany television advertisements promoting fast foods. More than half of the fast food users said that they were eating it because of being bored with home food. Therefore, the views of children on factors at home which affect their desire to eat healthy foods need to be understood and addressed appropriately.

In spite of good number of participants being of health hazards of fast foods, the need to control its usage was felt by 65.1% only. There is thus a need for nutrition counseling to bridge the gap between knowledge and practice about healthy eating behaviour. This would also solve the problem of overweight among children which was found significantly more among fast food users in this study.

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REFERENCES

- [1] Ashakiran, Deepthi R. Fast foods and their impact on health. *Journal of Krishna Institute of Medical Sciences University* 2012;1:7-15.
- [2] Allamani A. Addiction, risk, and resources. *Subst Use Misuse*. 2007;42:421-39.
- [3] Dixon HG, Scully ML, Wakefield MA, White VM, Crawford DA. The effects of television advertisements for junk food versus nutritious food on children's food attitudes and preferences. *Soc Sci Med*. 2007;65:1311-23.
- [4] Fister K. Junk food advertising contributes to young American's obesity. *BMJ*. 2005;331:1426.
- [5] Printice AM, Jebb SA. Fast foods, energy density and obesity: a possible mechanistic link. *Obesity Rev*. 2003;4:187-94.
- [6] Jaisheeba AA, Sornaraj R, Gayathri K. Influence of westernized culture and changed dietary habits on the BMI status of the school children of Tirunelveli. *International Journal of Pharm Tech Research*. 2012;4:1065-77.
- [7] Nisar N, Qadri MH, Fatima K, Perveen SJ. Dietary habits and life style among the students of a Private Medical University, Karachi. *Pak Med Assoc*. 2009;59:98-101.
- [8] Kaushik JS, Narang M, Parakh A. Fast food consumption in Children. *Indian Pediatrics*. 2011;48:97-101.
- [9] Brunner MJ. A Comparison of Food Habits of Middle School Students [dissertation]. Menomonie, WI, USA: The Graduate School University of Wisconsin-Stout; 2006.
- [10] Physical activity [Internet]. Centers for disease control and prevention. Atlanta, USA. Available from: <http://www.cdc.gov/physicalactivity/everyone/guidelines/children.html> [Accessed February 17, 2012].
- [11] Khadilkar VV, Khadilkar AV, Borade AB, Chiplonkar SA. Body mass index cut-offs for screening for childhood overweight and obesity in Indian children. *Indian Pediatrics*. 2012;49:29-34.
- [12] Zhu SP, Ding YJ, Lu XF, et al. Study on factors related to top 10 junk food consumption at 8 to 16 years of age at Haidian District of Beijing. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2008;29:757-62.
- [13] Manjunatha S, Mishra S. Fast Food Consumption Pattern and Obesity among School Going (9-13 Year) in Lucknow District. *International Journal of Science and Research*. 2014;3:1672-74.
- [14] Vaida N. Prevalence of Fast Food Intake among Urban Adolescent Students. *The International Journal of Engineering And Science*. 2013;2:353-59.
- [15] Masse LC, de Niet-Fitzgerald JE, Watts AW, Naylor PJ, Saewyc EM. Associations between the school food environment, student consumption and body mass index of Canadian adolescents. *Int J Behav Nutr Phys Act*. 2014;11:29.
- [16] Kotecha PV, Patel SV, Baxi RK, et al. Dietary pattern of school going adolescents in urban Baroda, India. *J Health Popul Nutr*. 2013;31:490-96.
- [17] Abuzaid OI. Eating patterns and physical activity characteristics among urban and rural students in Saudi Arabian [dissertation]. Lincoln, Nebraska: The Graduate College at the University of Nebraska; 2012.
- [18] Abdel-Hady D, El-Gilany A, Sarraf B. Dietary habits of adolescent students in Mansoura, Egypt. *International Journal of Collaborative Research on Internal Medicine & Public Health*. 2014;6:132-44.
- [19] Steiner-Asiedu M, Jantua JE, Anderson AK. The Snacking Habits in Junior High School Students: The Nutritional Implication-a Short Report. *Asian Journal of Medical Sciences*. 2012; 4:99-104.
- [20] Akman M, Akan H, Izbirak G, et al. Eating patterns of Turkish adolescents: a cross-sectional survey. *Nutr J*. 2010;9:67.
- [21] Li M, Dibley MJ, Sibbritt DW, Yan H. Dietary habits and overweight/obesity in adolescents in Xi'an City, China. *Asia Pac J Clin Nutr*. 2010;19:76-82.
- [22] Denney-Wilson E, Crawford D, Dobbins T, Hardy L, Okely AD. Influences on consumption of soft drinks and fast foods in adolescents. *Asia Pacific Journal of Clinical Nutrition*. 2009;18:447-52.
- [23] A Vancouver Elementary School Feedback Report on Student Eating Habits. Vancouver, Canada. April 2011. Available from URL:http://www.phabc.org/userfiles/file/EatingHabitsAndSaladBarEvaluation_April2011FINAL-1.pdf [Accessed June 3, 2012].
- [24] Musaiger A, Kalam F. Dietary habits and lifestyle among adolescents in Damascus, Syria. *Ann Agric Environ Med*. 2014;21:416-19.
- [25] Larson NI, Neumark-Sztainer DR, Story MT, Wall MM, Harnack LJ, Eisenberg ME. Fast food intake: longitudinal trends during the transition to young adulthood and correlates of intake. *J Adolesc Health*. 2008;43:79-86.
- [26] Jain A, Dhanawat J, Kotian MS, Angeline R. Assessment of risk factors of non-communicable diseases among high school students in Mangalore, India. *International Journal of Health & Allied Sciences*. 2012;1:249-54.
- [27] Puri S, Bhatia V, Swami H, Rai S, Mangat C. Impact of a diet and nutrition related education package on the awareness and practices of school children of Chandigarh. *The Internet Journal of Epidemiology*. 2007;6(1). Available from URL: <https://ispub.com/IJE/6/1/9452> [Accessed June 5, 2012].
- [28] Klonaridou V, Papadapoulou SK. Physical activity effect on snacks choice of children. *Nutrition and Food Science*. 2006;36:400-06.
- [29] Brown K, McIlveen H, Strugnell C. Nutritional Awareness and food preferences of young consumers. *Nutrition and Food Science*. 2000;30:230-35.
- [30] Johnson F, Wardle J, Griffith J. The Adolescent Food Habits Checklist: Reliability and validity of a measure of healthy eating behaviour in adolescents. *Eur J Clin Nutr*. 2002;56:644-49.
- [31] Signorile N, Lears M. Television and children's conceptions of nutrition: unhealthy messages. *Health Commun*. 1992;4:245-57.
- [32] Kourlaba G, Panagiotakos DB, Mihos K, et al. Dietary patterns in relation to socio-economic and lifestyle characteristics among Greek adolescents: A multivariate analysis. *Public Health Nutr*. 2009;12:1366-72.
- [33] Sharifirad G, Yarmohammadi P, Azadbakht L, Morowatisharifabad MA, Hassanzadeh A. Determinants of fast food consumption among Iranian high school students based on planned behaviour theory. *J Obes*. 2013;2013:147589.
- [34] Fung T, Anyan WR. Adolescence: life in the fast lane. In: Tamborlane WV, editor. *The Yale guide to children's nutrition*. New haven: Yale University Press; 1997.
- [35] Trusswell AS, Hill ID. Course manual for adolescent health. Part-II: Indian perspective. In: Bhav SY, editor. *Adolescent health*. New Delhi: Indian Academy of Pediatrics; 2002. pp. 51-57.
- [36] Stacy Brethauer, Sangeeta Kashyap, Philip Schauer. Obesity [Internet]. Available from: URL:<http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/endocrinology/obesity/> [Accessed June 2, 2012].
- [37] Klausner A. Study reveals parents' poor eating habits are to blame for childhood obesity, not fast food [Internet]. Available from: <http://www.dailymail.co.uk/news/article-2540248/Study-reveals-parents-poor-eating-habits-blame-childhood-obesity-NOT-fast-food.html> [Accessed June 2, 2012].
- [38] Savige G, MacFarlane A, Ball K, Worsley A, Crawford D. Snacking behaviours of adolescents and their association with skipping meals. *Int J Behav Nutr Phy*. 2007;4:2-4.

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