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Nutritional knowledge of the parents and home food environment of 10 to 12 year old children of Mumbai

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Abstract

Home food environment contributes in the development of the eating habits and influences the consumption patterns of the children thus impacting their health and nutritional status. The present study aims to evaluate the parent's nutritional knowledge and the home food environment (HFE) of the children between the ages of 10 to 12 years residing in Mumbai city.

Methodology: A Cross-sectional study was conducted in three schools of Mumbai suburb region. 125 parent and child pairs were the participants of the study selective via convenience sampling method. The variables used in the study are Parent feeding styles, Home food environment and Nutritional knowledge of the parents. Multiple linear regression analysis was used to predict the relationship between the dietary intakes of the children with the HFE factors.

Results: The study found frequent availability and visibility of fruits, vegetables as well as energy dense snacks in most of the households. The availability of GLV was found to be associated with its consumption by the children ($p = 0.05$), consumption of chocolates was associated with parent's consumption and its availability ($p = 0.031$ and $p = 0.004$ respectively). Consumption of wafers / chips by the children was observed to be higher when the parents did not decide the snack timings of the children ($p = 0.030$). Parents nutritional knowledge about vegetable consumption was positively associated with its intake in the children ($p = 0.017$).

Conclusion: The home food environment factors work in an interrelated manner in influencing the consumption patterns and the health of the children.

Keywords: Home food environment, food availability, parent's role, nutrition knowledge, feeding styles

Introduction

Eating behavior can be considered as a complex process which is influenced by various factors which ultimately determines food intake of the individual. A preference towards a food is constructed from a complex and interdependent interaction between the genetic as well as environmental factors (Scaglioni *et al* 2011)^[1]. Hence researchers are now considering the role of environmental factors as an important determinant which may affect the traditional dietary patterns and influence the transitions. Different food environmental factors have been described by the researchers which seem to impact the consumption patterns of the children (Glanz K *et al* 2005, SWINBURN *et al.* 2000, Gerards, S. M., & Kremers, S. P., 2015)^[2, 3, 4]. A child's home food environment (HFE) is an important setting that determines his/her diet quality, activity level and ultimately his nutritional and weight status. Various studies have evaluated the impact of different environmental factors on the consumption patterns of the children.

A large number of studies have found positive associations between the impact of availability and accessibility of the foods on consumption patterns of the children (WJC van Ansem *et al* 2012; N. Pearson *et al* 2017; Wyse *et al* 2011; Cook, L. T., 2015; Loth, K. A. 2016; C Vereecken *et al* 2010; Freeland-Graves JH 2016)^[5, 6, 7, 8, 9, 10]. Along with the availability of healthy foods the availability of unhealthy and energy dense snacks is also positively associated with its consumption (N. Pearson *et al* 2017; H Vepsäläinen *et al.* 2015)^[6, 11]. Parent's nutritional knowledge influences the different aspects of home food environment and will determine the food choices and consumption patterns of the children. Dietary patterns, food preferences as well as the parent's knowledge about food modulates the children's food

determining the health and nutritional status of the children and adolescents. (SL Anzman *et al* 2010, Birch *et al* 2007) [12, 13]. Various studies have found significant association between the parent's nutrition knowledge level and consumption of fruits and vegetables, their dietary intakes of the children (C. Vereecken, L. Maes 2010) [10] as well as with the children's weight status and BMI, indicating that parents with greater knowledge had a better control on the eating habits of their children (Johri *et al*, 2016) [14]. Parenting styles encompass the different attitudes and styles of the parents which will eventually influence the children and adolescent's eating behaviors (Ventura A. and Birch L 2007) [15]. Various studies have evaluated the association between the parent feeding styles and practices and its impact on the dietary patterns as well as the weight status of the children and adolescents (Uruwan Yamborisut *et al* 2017; SS Altan & M Bektas 2017) [16, 17].

The home food environment (HFE) involves the role of parents in the home setting that is modulated by factors like the availability and accessibility of food items, parents nutritional knowledge, their parenting styles and feeding practices, role modelling which determines the children's and adolescents dietary patterns (Hendrie *et al* 2013) [18]. Consistent findings have shown significant associations between the different aspects of home food environmental such that the availability, food related rules, parent feeding styles, parents consumption of certain foods are significantly associated with the children's consumption patterns. However limited studies have evaluated these HFE factors and its influence on the consumption patterns of the children of India which highlights an urgent need of evaluating the home food environments of children of India.

Given the significance of home food environment and parent's role in the consumption patterns of the children the present study was conducted to assess parent's nutritional knowledge and evaluate the home food environment of children belonging to 10 to 12 years of ages residing in Mumbai. The specific objectives of the study were to understand the home food environment and assess the availability and accessibility of various food items in the households, to understand feeding styles of parents in the setting of home environment and to assess parent's knowledge about healthy eating recommendations.

Materials and Method

A cross sectional study was conducted with the children between 10 to 12 years of age and their parents who were selected via convenience sampling method from 3 schools of Mumbai suburban region. A list of 20 schools was prepared and the schools that provided their consent were included in the study. The parents of the children were provided with consent forms which had detailed information of the study and those who signed the consent letters and approved the participation of themselves and their children were included in the study. Ethical Approval was sought from Inter System Biomedica Ethics Committee (ISBEC), Vile Parle, Mumbai, before the commencement of the study.

A self - reported close ended questionnaire that was prepared after reviewing the literature was administered to the parents. The questionnaire included 4 parts - Questions on demographic details, Home food environment survey (HFES) which included questions on the frequency of availability, accessibility and visibility of healthy foods, energy dense foods, soft drinks, beverages and bakery products at home. Parental Feeding Styles questionnaire (Wardle *et al* 2002) [19]

which had questions on the use Control feeding, emotional feeding, instrumental feeding and encouragement feeding styles by the parents. Nutritional Knowledge Questionnaire consisting of 22 questions about healthy eating recommendations, knowledge of food groups and nutrient sources, diet and disease problems and importance of physical activity. The questionnaire was translated in hindi language and pilot tested with a sample before its administration with the study participants.

Statistical analysis

Analyses were performed using SPSS software for Windows (version 20, 2017, IBM). Descriptive measures like mean, SD, and percentage was calculated. Multiple linear regression analysis was used to predict the relationship between the dietary intake of the children and HFE factors, parent feeding styles and parent knowledge. P value of < 0.05 was considered as significant.

Results

Socio- demographic characteristics: A total of 125 parent and child pairs were the participants of the present study. Around 65% of the total parent participants were the mothers (n=81) and 20%, 3.2% were the fathers and guardians respectively. Table 1 show the highest education and work situation of the parent participants of the study. Out of 125 children, 54% were girls and 46.4% were boys. The mean age of the children was 11.8 years (SD \pm 0.74). The socio-demographic characteristics of the participants is demonstrated in Table 1.

Table 1: Demographic details of the parent and children participants

Parent participants		Children participants		
Relation to the child	N (%)	Gender	N (%)	
Mother	91 (71.8)	Girl	67 (53.6)	
Father	30 (25)	Boy	58 (46.4)	
Guardian	4 (3.2)	Age	N	
Highest education of parents	N (%)	10 – 11 years	40(32)	Mean 11.8 \pm 0.74
1. Completed class 8 th	21(16.8)	12 – 13 years	85(68)	
2. Completed class 10 th - 12 th	78(62.4)			
3. Batchelors degree	15 (12)			
4. Master's degree	10 (8)			
Work Status of parents	N (%)			
1. Full time	54 (43.2)			
2. Part time	13 (10.4)			
3. At home caregiver	58 (56.4)			

n = Frequency, % - percentages of the total frequency.

Frequency of availability of food items

The availability of fruits and vegetables and various foods was reported by the parents. More than three fourth of the households had fruits and vegetables available more than thrice a week (85% and 82% respectively) while it was available daily in nearly one fourth of the households (27.2% and 25.6% respectively). More than one third of the households (37%) reported that sweet snacks like cakes and pastries was available more than thrice a week and 48.4% of the parents reported its availability atleast once or twice a week. Around 60% of the households had biscuits, cookies and chocolates available more than thrice a week and around half of the households had ice-creams (49.8%) more than thrice a week. Chocolates was reported to be available atleast two times in a week in around one fourth of the households while 61.3% of the households had chocolates more than

thrice a week. Salty snacks like wafer/ chips and farsan like namkeen, chakli was available more than thrice a week in more than half of the households 51.2% and 60.8% respectively. According to the results the availability of fruits and vegetables as well as energy dense snacks like wafers, chocolates was frequent in most of the households.

Visibility of healthy and energy dense snacks in the households

Parents reported the frequency of visibility of fruits, salty snacks, sweets snacks and carbonated beverages. Fresh fruits were stored in easily reachable places in approximately in three fourth of the households more than 5 times a week. Most of the households rarely or never stored any kind of snacks in hiding places. Around three fourth of the households stored sugared drinks and sodas less than twice a week in hiding places (51.2% and 20% respectively). Cookies and ice- creams was stored less than twice a week in hiding places in 56.8% of the households and wafers / chips was stored in hiding places less than twice a week in 62.4% of the households. The results demonstrate that most of the

households stored FV as well as energy dense snacks in easily reachable places making always it accessible to the children.

Frequency of availability, visibility, parents intake and children's intake of food items more than thrice a week

The frequency of availability, visibility and parent's intake of fruits, vegetables, sweet snacks, salty snacks and carbonated beverages was compared with the children's consumption as shown in Figure 1.

Biscuits/cookies was consumed more than thrice a week by 47.2% parents and 61.6% of the children. Wafers / chips was reported to be consumed by nearly 40% of the parents and children and chocolates to be consumed by more than half of the children. 17.6% of the parents and 24.8% of the children's consumed soft drinks more than thrice a week. Despite higher availability and parents consumption of FV, the children's intake of FV was poor as compared to the intake of other food items indicating that the HFE factors influenced the consumption of energy dense snacks more than the consumption of FV.

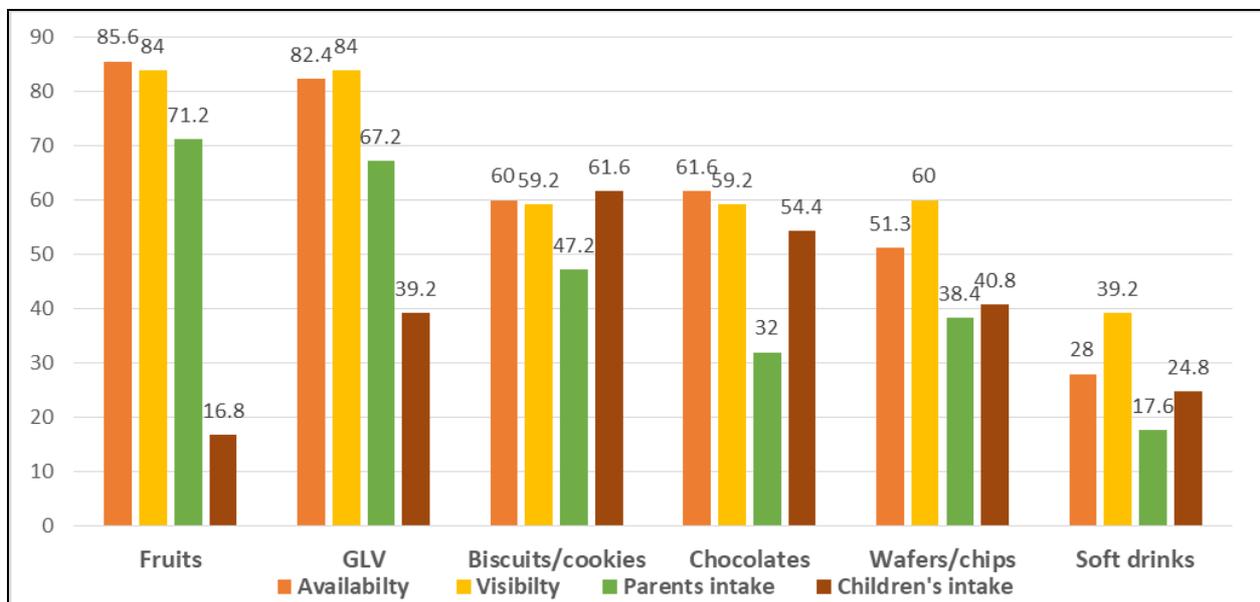


Fig 1: Frequency of availability, visibility, parents and children's intake of food items more than thrice a week

Frequency of family dietary habits

The results show that around half of the parents reported that they have daily one meal together with the family and around one fourth of the parents reported to have meals with their family less than twice a week. More than one fourth of the parents reported ordering meals more than 3 times a week (27.6%) while 55.2% have meals atleast once or twice at the restaurants. The study also observed that 25.6% families always had their meals while watching TV.

Factors influencing the purchase of fruits and vegetables:

The parents were asked about the importance of various factors that play a role in purchasing fruits and vegetables. Among the various factors, 74.4% the parents reported the quality of fruits and vegetables as the most important factor in determining their purchase followed by the price of fruit and vegetables which was reported to be very important by 50.4% of the parents. Proximity to the house, 'Near or on the way to other places' and 'friend/relatives shop at this store' was not considered to be important by most of the parents.

Parents food purchasing behaviors

Parents reported their food purchasing behaviors by responding to set of 8 statements which were related to their purchasing behaviors. More than half of the parents (56.8%) agreed that while purchasing food items they notice signs which encourage them to purchase healthy food and nearly one fourth parents disagreed to it. Around 50% of the parents reported to buy foods that are placed at the eye level on the shelves. A high percentage of the parents 'strongly agreed' on checking nutrition labels before purchasing (44.0%) the packaged food items. More than half of the parents considered it "difficult to find healthy food choice in the restaurants" as well as agreed that "healthy foods costs more" (60% and 54.4% respectively). Making a healthy food choice when eating out was important to nearly three fourth of the parents (74.4%).

Frequency of use of various feeding styles by the parents

The study observed that nearly one third of the parents allowed their children to choose the foods that they would eat in their meals (often-16%, always-21.6%) while one fourth

allowed their children to decide the timings of the meals. Only 16.5% of the parents reported to monitor the quantity of snacks their children ate while 1/4th of the parents rarely or never monitored the quantities. The study also observed that one fourth of the parents (23.2%) ‘always’ gave their children to eat when the children were upset / worried / angry in order to make them feel better and only 8.8% disagreed to it. More than 50% of the parents reported that they praised their children when they ate what they were offered and encouraged their children to try variety of foods and taste each food that is served. The results show that most of the parents have reported that they often use various encouragement methods while feeding children. Nearly one fourth (24.8%) of the parents reported that they ‘always’ withhold their children’s favourite food when they misbehaved and around one fourth (26.4%) parents reported

to reward the children with something when they well behave indicating the use of instrumental feeding style. More than half of the parents (56%) reported that they were ‘always’ aware of what and when their children eats.

Parent’s nutritional knowledge

The results for parent’s knowledge about food groups and nutrient sources, diet related problems and physical activity were analyzed based on their scores in the 3 sections of the questionnaire and these scores were divided as poor, average, good and excellent scores as shown in Figure 2. The study observed that the most of the parents got moderate scores in the food groups and nutrients and the diet related problems sections (44.8% and 61.6% respectively) while their scores in physical activity section was poor.

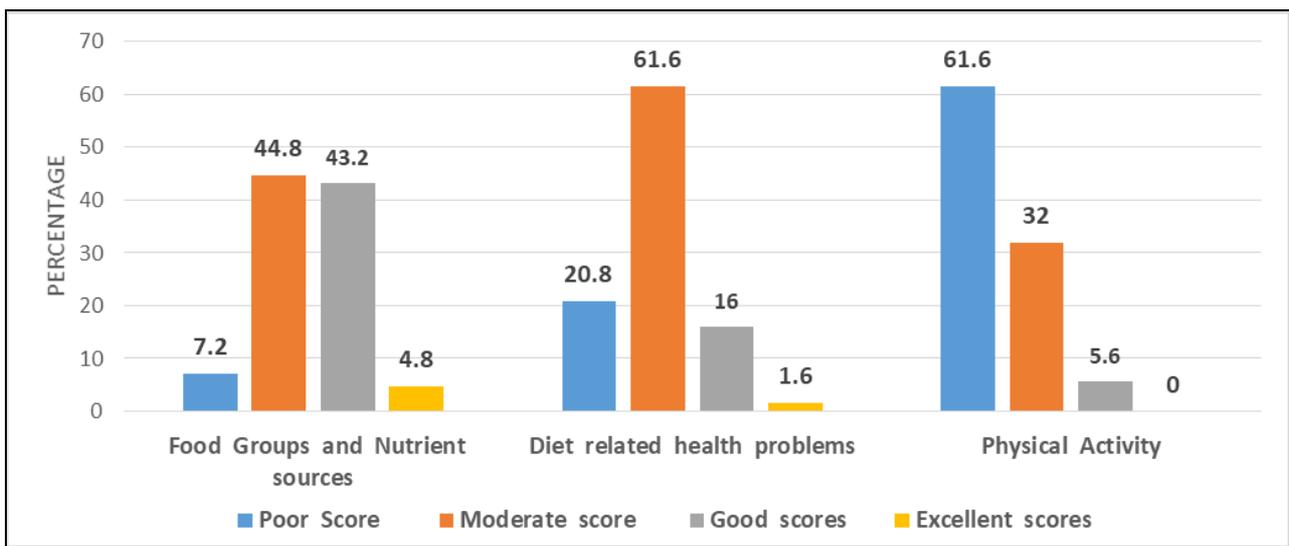


Fig 2: Percentage distribution of parents nutritional knowledge scores

Comparison between parents nutritional knowledge scores and their education level

The mean scores obtained by the parents in each section of the nutritional knowledge questionnaire was compared with their education level as shown in Table 2. The results show

that the mean scores of the parents who had higher education level was greater than the mean scores of the parents who lower education level in the all the sections of the knowledge questionnaire (Table 2).

Table 2: Parents knowledge scores and education level

Education Level	n	Knowledge about food groups and nutrient sources. Mean ± S.D	Knowledge about diet related problems Mean ± S.D	Knowledge about physical activity Mean ± S.D
Completed class 8th	22	17.24 ± 4.8	6.86 ± 2.6	1.1 ± 0.9
Completed class 10th/12 th	78	18.59 ± 6.0	8.22 ± 3.8	2.2 ± 1.7
Completed graduation	15	23.2 ± 5.4	10.73 ± 3.8	3.47 ± 2.0
Post graduated	10	24 ± 5.4	8.7 ± 3.0	2.9 ± 1.5

Multiple linear regression analysis of children’s consumption patterns with home food environment (HFE) factors

The results of regression analysis for the different aspects of home food environment, parent’s nutritional knowledge, feeding styles and its association with children’s food consumption patterns are shown in Table no 3. Parents nutritional knowledge about consumption of vegetable and total knowledge scores was positively associated with the intake of vegetable in the children ($\beta = 0.21, p = 0.017$) and ($\beta = 0.17, p = 0.049$ respectively). The consumption of vegetable by the children was however not associated with

parents intake of vegetables, its availability in the house and the feeding styles

The study did not observe any significant associations between the availability, parent’s knowledge, feeding styles and parent’s intake with the children’s consumption of fruits. The consumption of wafers and chips by the children was found to be negatively associated with control feeding style of the parents such that consumption of wafers and chips by the children is higher when the parents do not decide the snack timings of the children ($\beta = - 0.195, p = 0.030$). The consumption of wafers was however not associated with its availability, knowledge and parents intake.

Table 3: Association between consumption of by the children and home food environmental factors

HFE factors and association with the children's consumption.	B (S.E)	β	Adjusted R ²	P value
Home availability and children's consumption				
Availability of vegetables and its consumption		0.150 ^c		0.090
Availability of fruits and its consumption	-	0.016	-	0.860
Availability of salty snacks and its consumption		0.97 ^c		0.279
Availability of chocolates and its consumption	0.241(0.110)	0.200	0.130	0.031 ^c
Availability of biscuits and its consumption		0.129 ^b		0.151
Availability of soft drinks and its consumption		0.031 ^c		0.740
Parents Total nutritional knowledge scores and children's consumption				
Total Nutritional Knowledge score ^b and vegetable consumption	0.40(0.16)	0.211	0.42	0.017 ^b
Knowledge about vegetable consumption	0.417(0.20)	0.174	0.65	0.049 ^c
Total Nutritional Knowledge score ^b and fruits consumption	-	0.033	-	0.718
Total Nutritional Knowledge and chocolate consumption		-0.44 ^b		0.622
Total Nutritional Knowledge and biscuit consumption		-0.74 ^b		0.413
Total Nutritional Knowledge and soft drinks consumption		0.05 ^c		0.557
Parents and children's consumption				
Parents vegetable consumption		-0.10 ^c		0.213
Parents fruit consumption	-	0.091	-	0.309
Parents consumption of wafers		0.26 ^c		0.773
Parents consumption of chocolates	0.319(0.99)	0.258	0.059	0.004 ^b
Parents consumption of biscuits		0.055 ^b		0.542
Parents consumption of Soft drinks	0.303(0.13)	0.194	1.44	0.025 ^c
Parent feeding styles and children's consumption				
Parent Feeding Style and wafers consumption – I decide when is the time for my child to have snack	-0.214(0.09)	-0.195	0.056	0.030 ^c
Parent Feeding Style and biscuits consumption – I decide how many snacks the child will have	-0.195(0.92)	-0.189	0.28	0.036 ^b

- Dependent variables (Consumption of fruits, vegetables, sweet and salty snacks, soft drinks by the children)
- Predictors in the model (Total knowledge scores, Knowledge of healthy eating recommendations, PFS, Availability in the house and parents consumption)
- Predictors in the model (Total knowledge scores, Knowledge of healthy eating recommendations, PFS, Availability in the house and parents consumption)
 - B - Unstandardized Coefficient; S.E- Standard error
 - Standardized coefficient – β
 - Values are significant when $p < 0.05$

The study observed that consumption of chocolates among children was positively associated with parent's consumption of chocolate and its availability in the house ($\beta = 0.20$, $p = 0.031$ and $\beta = 0.258$, $p = 0.004$ respectively). The study observed that the consumption of biscuits and cookies increases when parents do not decide snacking frequency of the children ($\beta = -0.18$, $p = 0.036$) while parents higher consumption of soft drinks was associated with children's higher consumption of soft drinks ($\beta = 0.19$, $p = 0.025$).

Discussion

The impact of home food environment (HFE) on the children's and adolescents consumption patterns is multifactorial and complex and it plays a crucial role in determining their food choices and consumption patterns. One of the primary objective of our study was to assess the availability and visibility of fruits, vegetables, energy dense snacks and beverages. The study observed that fruits and vegetables as well as snacks like biscuits, cakes, chocolates, wafers was available in most of the households. Indicating that despite the availability of healthy foods at home the consumption of energy dense snacks was higher in the children

The study did not find any association between the availability of fruits and its consumption by the children indicating that despite the availability of healthy foods at home the consumption of energy dense snacks was higher in the children. This finding contradicts the findings of similar studies which found strong associations between the availability and consumption of fruits by the children (Couch

et al 2014)^[20]. The present study found a correlation between the availability of vegetables and its consumption by the children which is similar to the findings of other studies (Ding *et al* 2012; Couch *et al* 2014; N. Pearson *et al* 2017)^[21, 20, 6]. Assessing the parent's nutritional knowledge was another primary objective of the present study and the study observed that most of the parents had moderate nutritional knowledge about healthy eating recommendation and diet and disease relations. Parent's nutritional knowledge increased with their education level, a finding which also was seen in a previous study (Mabiala Babela *et al* 2016)^[22], thus highlighting the need for parent education and awareness. Studies have also found significant impacts of parent's nutritional knowledge on the eating habit of the children however the present study did not find any significant associations between knowledge and consumption.

The study observed that encouragement feeding style and emotional feeding style was more frequently used by the parents as compared to control and instrumental feeding style however a stronger association was found between control feeding style and children's dietary intake. Several studies have underlined the significant impact of home food environmental factors on the consumption by the children hence it can be considered as impactful target for proposing future interventions that develops healthy eating habits among the children.

Conclusion

The different aspects of HFE factors such as availability, accessibility, parent's intake, role modelling, feeding styles

and their knowledge everything works in an interrelated and a complex manner to influence the consumption patterns of the children. The study shows that these home environment factors can be considered for the development of future interventions which can improve the consumption patterns and the health of the children and adolescents. Additional research however is needed to further justify the association between the HFE factors and the consumption patterns of the children.

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