

## Nutritional Status, Breakfast and Snacks Dietary Patterns among Middle School Students in Ramsar City in Northern Iran

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### Abstract

Appropriate nutrition is an essential factor in student learning and educational achievement. This study was down to determine the nutritional Status, breakfast and snacks patterns among middle school students in Ramsar City. In this cross sectional study, 208 public middle school students were selected using cluster sampling. The data was collected by demographic and Harvard's Food Frequency Questionnaire (HFFQ). The results showed, 92.8 percent had breakfast at home and 96.2 percent of them snacked at school. The results demonstrate the necessity for focusing on nutrition education programs for students and parents that are integrated into school curriculums.

**Keywords:** Nutritional status, Dietary pattern, Breakfast, Snacking, Adolescent, Students

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### Background

Adolescence is an important period of growth and development in which healthy nutrition behaviors are expanded on the one hand, while on the other, various risk factors such as obesity, cardiovascular diseases, lipoprotein abnormalities, and hypertension associated with chronic adult diseases, are established (Li & Wang, 2008; McNaughton, Ball, Mishra, & Crawford, 2008; Mirzaie, Ahmadi, Sohrabi, tabatabaie, & Eslami, 2008). The

elimination of breakfast and the high consumption of low-value snacks are becoming more frequent and common among adolescents. Nutrition is a complex behavioral phenomenon that is associated with the specific cultural and environmental issues of each society as well as psychological features (Bastami, Zamani-Alavijeh, Mostafavi, Almasian, & Hydari, 2018).

Rapid physical growth during adolescence leads to an increase in the need for energy and nutrients during this period as compared with other periods. Therefore, the promotion of healthy nutrition during adolescence has the potential to provide significant long-term health benefits and can affect the quality and quantity of growth and especially the quality of sexual maturation (Amini, Mojtahedi, & Mousaiefard, 2009; McNaughton et al., 2008). Inadequate nutrition can have many serious adverse health effects such as slowing down or postponing sexual maturation. It can also delay or stop height growth and decrease bone mass. Receiving enough energy is therefore essential in this period (Education, 2003; Li & Wang, 2008).

Over the past few decades, adolescents often adopt unhealthy eating habits and the diet quality of them has declined with increased energy intake from fast food, soft drinks, and salty snacks, energy-dense snacks, sugar-sweetened beverages and a decrease in grains, fruits and vegetables intake and dairy products (Cutler, Flood, Hannan, & Neumark-Sztainer, 2009; De Cock et al., 2016). Various factors such as the availability of convenience and fast food, misleading advertisements, modern lifestyles, and lack of awareness, have endangered food choice among adolescents in terms of balance, variety and moderation (Salmaani Barough, Pashaeypour, Rezaiepour, & Kazemnejad, 2007). Iranian adolescent

rapid movement towards Western dietary patterns such as eating fatty and salty snacks with no nutritional value (Hamayeli Mehrabani, Mirmiran, Alaiin, & Azizi, 2009), low fruits and vegetables consumption, more junk and convenience food (Omidvar, MINAEI, Samareh, EGHTESADI, & Ghazi, 2003) and less dairy products along with a reduced consumption of local foods, that are major causes of a number of nutritional problems (Hamayeli Mehrabani et al., 2009). Many adulthood diseases among adolescents are associated with dietary patterns of individuals in and since eating habits are formed in childhood (Cooke et al., 2004) and developed in adolescence, modifying dietary habits in this period of life can lead to the prevention of many diseases in adulthood.

Adolescents are the future generation of any country and therefore (Choudhary et al., 2016) supervising and evaluating their nutritional status in school time is of great importance in order to maintain and improve health and augment learning and physical fitness to ensure the natural course of growth. Nutrition-based interventions need to be informed dietary intake and may be related to changes in meal frequency (Larson, Story, Eisenberg, & Neumark-Sztainer, 2016). Due to the lack of sufficient data on certain aspects of middle school and early adolescence dietary patterns, the present study was performed to determine the nutritional status, breakfast and snacks pattern

among middle school students in Ramsar City in Northern Iran.

### Materials and Methods

The cross-sectional descriptive analytical study was carried out in Ramsar-Iran. The participants were all of the students were studied in public Middle schools.

**The inclusion criteria:** Being Middle school student, having an interest and satisfaction to participate in research.

**The exclusion criteria were:** reluctance to continue participating in the study, half of the questionnaire was not complete.

**Sample size:** The sample size was 187 based on the 40% ratio of unfavorable level of main foods consumption frequency in pilot study, using formula 1, 95% confidence interval and 0.07% error difference. Considering a drop-out rate (12 %), 210 students from grades 7 to 9 were enrolled in the study.

**Formula 1:** 
$$n = \frac{(pqz)^2}{d^2}$$

Data were collected using demographic and Harvard's Food Frequency Questionnaire (HFFQ), Demographic questionnaire includes individual (age, gender, birth ranking) and familial characteristics (family size, number of family children, guardianship status, parents' jobs, parents' literacy, sufficiency of family income) was used.

**HFFQ:** The moderated monthly self-administrated consumption frequency questionnaire was used to collect the dietary intake data. Consumption frequency results in the four groups

included: never or less than once a month = never (0 point), 1 to 3 times a month and once a week = rarely (1 point), 2 to 4 times a week and once a day = sometimes (2 points), 2 to 3 times a day or more = always (3 points) were classified and analyzed. The main foods studied based on the food traditions of the region included: milk, cheese, ice cream, meat, eggs, vegetables, fruit and juice. Total scores found from the consumption frequency were 0 to 15. To assess the correlation between these scores and qualitative variables, the main foods consumption frequency was classified into favorable and unfavorable; scores ranging from 0-7 and 8-15 were considered to be unfavorable and favorable respectively. In this study, according to nutritionists, miscellaneous foods included: sausages, hams and hamburgers, biscuits, cakes and cookies, chocolate and candy, and junk food consisting of pickles in brine, pickles, fruit leather, tamarind, chips and cheese-puffs, and beverages included soda pops and tea (Karimi, Sam, & Sajadi, 2008). To evaluate the consumption patterns of breakfast and snacks, some open questions were also added to the questionnaire. The analysis of these questions was done using nutrients coding method. The validity of the questionnaires are determined through content validity and the reliability with test retest ( $r=0.95$ ).

**Procedure:** According to moral considerations, after providing a full

explanation and answering questions of samples accurately, under the researchers' supervision the questionnaires were filled in anonymously by students and immediately collected. Two students were not completed, more than half of the questionnaire and excluded from the study.

#### **Moral considerations:**

During this research, the researchers required to observe the following cases: getting the introduction letter from 1- the Ramsar School of Nursing and Midwifery, 2- Department of Education in Ramsar. Introducing researchers to the middle school principals and participants, mentioning the research goals to participants, freedom of participants to participate or withdraw from the current study.

#### **Data Analysis:**

In the present study, descriptive statistics were used to classify the test scores as well as calculate the frequency, mean and standard deviation, analytic statistics (chi-square and Kruskal-Wallis tests) were used. Statistical analyses were used with SPSS v20. The significance level was considered 0.05.

#### **Results**

According to the research findings, 127 subjects (61.1%) were male and 81 (38.9%) were female. The participants' mean age was 13. Most were first children (54.1%) belonging to families with two children (48.4%), family size of

4 members (51%) and lived under parental supervision (94.8%). 25 participants (12%) were an only child. The majority of them (73.2%) maintained that their family income was sufficient for family expenses.

The majority of participants' fathers had a high school diploma (33.7%) and was self-employed (48.1%). The mothers of most of them studied until primary and secondary school levels (34.6%) and were housewives (86.1%). The average age of fathers and mothers were 43 and 38 respectively.

The majority of participating students in the study (92.8%) usually ate breakfast at home and snacks at school (96.2%). The frequency of participants who never ate breakfast or snacks were 5.3% and 3.4% respectively.

For the majority of samples (21.6%), breakfast consists of bread, dairy products and tea. 20 percent of them had bread, dairy products and tea together with honey and jam, 10.3 percent had bread, honey, jam and tea, 7 percent had nuts, 7 percent had a combination of bread, honey, jam, cream and butter together with tea, and 2.8 percent had eggs. For most of the samples (25%), snacks consist of beverages, cakes and cookies. 3.5 percent had nuts, 3.5 percent had fruit and 2.1 percent had eggs.

Table 1 shows the frequency of the study samples based on food consumption frequency.

**Table 1:** The frequency distribution of main food, miscellaneous, beverages, and junk food consumption on samples

<b>Consumption frequency</b> <b>Food</b>	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Always</b>	<b>Unknown</b>
Milk	8(3.8)	26 (12.5)	118 (56.7)	55 (26.4)	1 (.5)
Cheese	8(3.8)	20 (9.6)	115 (55.3)	64 (30.8)	1 (.5)
Meat	5 (2.4)	92 (44.2)	88 (42.3)	22 (10.6)	1 (0.5)
Egg	24 (11.5)	74 (35.6)	77 (37)	29 (13.9)	4 (1.9)
Vegetables	22 (10.6)	50 (24.2)	99 (47.8)	36 (17.4)	1 (0.5)
Fruits and Juices	5 (2.4)	28 (13.5)	101 (48.6)	71 (34.1)	3 (1.4)
Sausage, ham, hamburger	82 (39.4)	97 (46.6)	21 (10.1)	4 (1.9)	4 (1.9)
Biscuits	39 (18.8)	64 (30.8)	82 (39.4)	14 (6.7)	9 (4.3)
Cakes and cookies	7 (3.4)	59 (28.4)	118 (56.7)	22 (10.6)	2 (1)
Chocolate and candy	74 (35.6)	61 (29.3)	51 (24.5)	17 (8.2)	5 (2.4)
Soda pops	66 (31.7)	95 (45.7)	29 (13.9)	12 (5.8)	6 (2.9)
Tea	14 (6.7)	15 (7.2)	91 (43.8)	82 (39.4)	6 (2.9)
Chips	52 (25)	99 (47.6)	42 (20.2)	13 (6.2)	2 (1)
Puffs	55 (26.4)	91 (43.8)	44 (21.2)	11 (5.3)	7 (3.4)
Fruit leather and tamarind	81 (38.9)	66 (31.7)	45 (21.6)	14 (6.7)	2 (1)
Pickles in brine	40 (19.2)	84 (40.4)	68 (32.7)	16 (7.7)	0(0)
Pickles	51 (24.5)	62 (29.8)	71 (34.1)	20 (9.6)	4 (1.9)
Ice crime	14(6.7)	52(25)	115(55.3)	26(12.5)	1(.5)

The majority of participants sometimes had milk, eggs, vegetables and fruits (respectively 59.1% and 37%, 47.8% and 48.6%); they rarely had meat (44.2%). In terms of main foods consumption frequency, most participants were observed to be at an unfavorable level (56.2%) and the rest (43.8%) were favorable.

Table 2 shows the frequency of the study samples based on food consumption frequency between boys and girls.

**Table 2:** The frequency distribution of main food, miscellaneous, beverages, and junk food consumption between boys and girls

Consumption frequency		Never	Rarely	Sometimes	Always	Unknown	Sig.
Food	Gender						
Milk	Boy	1(8)	18(14.2)	71(55.9)	37(29.1)	0	.08
	Girl	7(8.6)	8(9.9)	47(58)	18(22.2)	1(1.2)	
Cheese	Boy	5(3.9)	10(7.9)	70(55.1)	41(32.3)	1(.8)	.44
	Girl	3(3.7)	10(12.3)	45(55.6)	23(28.4)	0	
Meat	Boy	2(1.6)	71(55.9)	46(36.2)	8(6.3)	0	.0001 >
	Girl	3(3.7)	21(25.9)	42(51.9)	14(17.3)	1(1.2)	
Egg	Boy	13(10.2)	35(27.6)	54(45.5)	23(18.1)	2(1.6)	.002

	Girl	11(13.6)	39(48.1)	23(28.4)	6(7.4)	2(2.5)	
Vegetables	Boy	15(11.8)	27(21.3)	62(48.8)	22(17.3)	(.8)	.96
	Girl	7(8.6)	23(28.4)	37(45.7)	14(17.3)	0	
Fruits and Juices	Boy	3(2.4)	19(15)	63(49.6)	1(8)	2(1.6)	.37
	Girl	2(2.5)	9(11.1)	38(46.9)	31(38.3)	1(1.1)	
Sausage, ham, hamburger	Boy	52(40.9)	54(40.5)	17(13.4)	3(2.4)	1(.8)	.45
	Girl	30(37)	43(53.1)	4(4.9)	1(1.2)	3(3.7)	
Biscuits	Boy	29(22.8)	37(29.1)	49(38.6)	8(6.3)	4(3.1)	.18
	Girl	10(12.3)	27(33.3)	33(40.7)	6(7.4)	5(6.2)	
Cakes and cookies	Boy	3(2.4)	39(30.7)	72(56.7)	12(9.4)	1(.8)	.7
	Girl	4(4.9)	20(24.7)	46(56.8)	10(12.3)	1(1.2)	
Chocolate and candy	Boy	46(36.2)	43(33.9)	24(18.9)	11(8.7)	3(2.4)	.32
	Girl	28(34.6)	18(22.2)	27(33.3)	6(7.4)	2(2.5)	
Soda pops	Boy	38(29.9)	56(44.1)	20(15.7)	7(5.5)	6(4.7)	.58
	Girl	27(33.3)	39(48.1)	9(11.1)	5(6.2)	1(1.2)	
Tea	Boy	7(5.5)	10(7.9)	50(39.4)	57(44.9)	3(2.4)	.12
	Girl	7(8.6)	5(6.2)	41(50.6)	25(30.9)	3(3.7)	
Chips	Boy	33(26)	61(48)	28(22)	6(3.9)	0	.4
	Girl	19(23.5)	38(46.9)	14(17.3)	8(9.9)	2(2.5)	
Puffs	Boy	32(25)	60(47)	25(19.7)	5(3.9)	5(3.9)	.5

		5)	2)				
	Girl	23(28.4)	31(38.3)	19(23.5)	6(7.4)	2(2.5)	
Fruit leather and tamarind	Boy	55(43.3)	41(32.3)	23(18.1)	6(4.7)	2(1.6)	.02
	Girl	26(32.1)	25(30.9)	22(27.2)	8(9.9)	0	
Pickles in brine	Boy	26(20.5)	50(39.4)	41(32.3)	10(7.9)	0	.78
	Girl	14(17.3)	34(42)	27(33.3)	6(7.4)	0	
Pickles	Boy	38(29.9)	39(30.7)	35(27.6)	12(9.4)	3(2.4)	.02
	Girl	13(16)	23(28.4)	36(44.4)	8(9.9)	1(1.2)	
Ice crime	Boy	9(7.1)	29(22.8)	74(58.3)	15(11.8)	0	.8
	Girl	6(6.2)	23(28.4)	41(50.6)	11(13.6)	1(1.2)	

The results showed a significant relationship between gender and the frequency of meat ( $p < 0.0001$ ), eggs ( $p = 0.002$ ), fruit leather- tamarind ( $p = 0.02$ ), and pickles ( $p = 0.02$ ) consumption; the majority of those who, often and always, had eggs, fruit leather - tamarind and pickles were boys and the majority of those who never or rarely consumed these products were girls. On the contrary, girls form the majority of those who always used meat while it was rarely consumed by the majority of boys.

Although there was no significant relationship between the frequency of meat consumption and sufficiency of family income, the results show that in

the group that believes that the income of family members is sufficient for family expenses, the majority of boys (54.3%) rarely consume meat and the majority of girls (57.8%) sometimes consume it. In the two other groups, who believe that the income of family members is almost sufficient or completely insufficient, the majority of samples from both genders rarely consume meat.

There was no significant relationship between gender and having breakfast as well as snacking. However, boys were the majority of participants who usually ate breakfast and snacks.

There was a significant difference between the frequency of cheese consumption and the sufficiency of



family income ( $p=0.008$ ), between mothers' job and the frequency of milk consumption ( $p=0.03$ ) as well as the frequency of main food consumption ( $p=0.01$ ): the mothers of the majority of students who always had milk – and the frequency of their main food consumption was at the favorable level – were housewives (80%), and the mothers of the majority of students who never used milk – and the frequency of their main food consumption was at the unfavorable level – were employed (37.5%). However, there was no significant relationship between mothers' literacy and the frequency of main food consumption. The results revealed that the frequency of main food consumption for most of the samples with mothers who are housewives and illiterate or elementary educational level was unfavorable and, on the contrary, for most of the samples with employed mothers with a secondary level of education, high school diploma or higher, the frequency of main food consumption was favorable.

The results showed significant relationship between participants' age and the frequency of egg consumption ( $p=0.03$ ), so that the frequency of egg consumption increased as a sample's age increased. In addition, fathers' age was significantly associated with the frequency of milk ( $p=0.01$ ), such that as a father's age increased so did milk and dairy consumption. There was reverse relationship between the frequency of chips consumption and mothers'

( $p=0.025$ ) and fathers' ( $p=0.02$ ) age, i.e., as the parents age increased, the frequency of chips consumption decreased.

No significant relationship has been observed between other individual and familial characteristics and the frequency of students' food consumption.

## Discussion

Breakfast and snack consumption had a beneficial effect on students' cognitive functions, learning performance as well as physical activity (Masoomi, Taheri, Irandoust, H'Mida, & Chtourou, 2020). In the current study, 92.8% of participants are used to having breakfast; this percentage has been reported as 75% (Zeininezhad Movasagh & Omidvar, 2008) in 9-13 year-old children and 51.2% (Salmaani Barough et al., 2007) in 12-18 year-old teenagers in Tehran. The findings of another study in the US by Deshmukh-Taskar et al. suggest that 31.5% of adolescents do not eat breakfast (Deshmukh-Taskar et al., 2010); this percentage has been reported to be 16.58% in 10-14 year-old students in Ardebil and 5.2% in the students of three levels of primary, secondary and high school in Zahedan (Mortazavi & Roudbari, 2010; Nemati, Sagha, Nouzad Charvadeh, & Dehghan, 2003). It seems that social and economic factors affect the percentage of individuals who have breakfast and their effects have been seen in different forms in different societies (Veghari & Mansourian, 2013). Students

of Ramsar were therefore in a more favorable condition in terms of having breakfast. The reason behind such a difference could be associated with local culture and traditional customs of the people in Ramsar and their commitment to having at least three meals a day including breakfast, lunch and dinner.

In the current study, 96.2% of samples usually snacked at school, the majority of whom (26%) used beverages, cakes or cookies as snacks. This percentage has been reported to be 56.9% in Tehran according to a study done by Salmani Barugh et al. in which chips and cheese-puffs were the most commonly used snacks (Salmaani Barough et al., 2007). Such a difference could be due to the fact that in the present study, snack consumption has been evaluated at school where the students often have to buy snacks from the school buffet in which beverages, cakes and cookies are found and chips and cheese-puffs are not allowed to be sold. Breakfast skipping was related to lower energy intakes for the total day but had greater energy intakes from non-breakfast meals and snacks (Ramsay et al., 2018).

In this study, milk, meats, eggs, vegetables and fruits were always consumed. The results are consistent with another study on Scottish teenagers (Veugelers, Fitzgerald, & Johnston, 2005). Nutrition quality seems to drop gradually by as adolescents grow older. Some researchers have related the causes of this phenomenon to teenagers'

lifestyle, and developmental, social, and environment changes (Amini et al., 2009). Pickles were the most used junk food in the present study while chocolate intake showed the highest rate in a study by Jafari Rad et al. on female teenagers in the city of Sari-Iran (Jaafari Rad, Keshavarz, & Khalilian, 2007). It is worth noting that pickles, especially local and traditional types, are of relatively high variation and consumption in the city of Ramsar.

In the current study, a significant relationship has been observed between gender and the consumption frequency of meat, egg, fruit leather- tamarind and pickles. In a study by Salmani Barugh et al., a significant relationship was found between gender and the frequency of dairy products, bread, grain, and nuts consumption (Salmaani Barough et al., 2007). In a study by Sanwalka et al. in India, the amount of calcium intake was lower among girls belonging to a poor socio-economic status compared with other samples (Sanwalka et al., 2010).

In the present study, a significant relationship was observed between the sufficiency of family income according to the adolescents' views. The majority of boys rarely consume meat. Adolescents often tend to have their meals outdoors with their friends and they are sensitive to the influence of their environment, including peer influence and the food environment outside of home. Thus, the probability of eliminating of major food

main meals and having fast foods and processed snacks is increased (Hamayeli Mehrabani et al., 2009; Li & Wang, 2008). According to the prevalent culture in Ramsar, the situation for having food outdoors with friends is more possible for boys than girls, and this seems an appropriate reason for the difference in meat consumption between boys and girls. In this study, by students' age, the egg consumption increases meaningfully. Generally, age is the most important factor among the individual variables in determining the type of food consumption (Mausner & SH, 2010). The results of other studies in different cities in England (Cooke et al., 2004), Australia (McNaughton et al., 2008), Iran (Karimi et al., 2008; Pour Abodolahi, Ebrahimi, & Koshavar, 2002; Salmaani Barough et al., 2007) and America (Granner et al., 2004) also indicated that by increased age, the consumption of vegetables and dairy increases as well.

In the present study, there was a significant relationship between mothers' job and the frequency of milk and main food consumption; mothers of the majority of those students who always consume milk, and whose frequency of major food was reported as favorable, were housewives. The results were in accordance with the findings in the US, and Belgium (Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003; Vereecken & Maes, 2010). In a study in Iran, the consumption of breakfast among students with mothers who were housewives was

meaningfully higher than those students whose mothers were employed. Also, in another study by there was a significant relationship between girls' overweight and obesity and mothers' job (Abtahi et al., 2009). It is obvious that housewives have more time to prepare food and also they can better observe the nutritional status of their children.

In the present research, a significant statistical relationship has been found between the sufficiency of family income according to adolescents' views and the frequency of cheese consumption. A significant statistical relationship was also observed between mothers' job and the frequency of milk and major food consumption. Likewise, some studies have suggested a strong association between food choices and socioeconomic status in Australian (Cutler et al., 2009), Finland (Eloranta et al., 2011), Iran (Tehran) and Canada (Ricciuto, Tarasuk, & Yatchew, 2006). Economic status determines the purchasing power, standard of living, quality of life, family size, and inappropriate patterns and deviant behavior in society and it is the key factor in seeking and achieving public health services (J. E. Park & Park, 2004). In addition to financial shortages and limited access to health care, it seems that the existing preventive services are relatively less used by the poor (Baghiani, Ehrampoush, & Mazlomi, 2003).

Dietary patterns are influenced by socio-economic, demographic and other

lifestyle-related factors (S.-Y. Park et al., 2005). In the current study, there was a significant relationship between the frequency of chips consumption and parents' age as well as between the frequency of dairy consumption and father's age that is consist with Salmani Barough et al. study in Iran (Salmaani Barough et al., 2007). Family plays a significant role in promoting positive nutrition among adolescents (Neumark-Sztainer et al., 2003) and parents' criteria are influential on teenagers' consumption patterns at different levels (Videon & Manning, 2003). Tami et al., believe dietary patterns are formed during adolescence in a developmental process influenced by internal and external factors such as nutritional priorities and their availability, individual perceptions of body weight as well as the influence of parents and peers (Vereecken & Maes, 2010).

**Conclusion:** Undoubtedly, a healthy diet is an important factor in learning and the educational progress of students and is essential for maintaining and promoting physical and mental health and growth (Turin, Rumana, & Shahana, 2007), preparing educational programs is necessary for adolescents and parents. In order to stress the importance of snacking and major meals, nutrition education in the school curriculum should focus on strong evaluation, and increase awareness about modifying nutrition behavior to improve nutritional status, increase the

sufficiency of family income, and ultimately to promote adolescents health.

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### References

- Abtahi, M., Jazayeri, S., Eshraghian, M., Dorosti Motlagh, A., Sadrzadeh-Yeganeh, H., & Pouraram, H. (2009). Overweight, obesity and some related socio-economic factors among adolescent girls in Tehran, Iran. *Payesh*, 2, 113-122.
- Amiri, K., Mojtahedi, S., & Mousaiefard, M. (2009). Consumption of fruits, vegetables, dairy products and meat among high school students in Zanzan Province, Iran. *Journal of School of Public Health and Institute of Public Health Research*, 7(2), 25-39.
- Baghiani, M. H., Ehrampoush, M. H., & Mazlomi, S. S. (2003). *Principles and methods of epidemiology*. Tehran-Iran: Cheraghe Danesh.
- Bastami, F., Zamani-Alavijeh, F., Mostafavi, F., Almasian, M., & Hydari, M. (2018). Formative

- research on a social marketing campaign to promote the consumption of healthy breakfast and snacks: a qualitative study. *International Journal of Pediatrics*, 6(3), 7353-7367.
- Choudhary, S., Khichar, S., Dabi, D., Parakh, M., K, P., & DaraPoonam Parakh Suyasha Vyas, B. D. (2016). Urban Rural Comparison of Anthropometry and Menarcheal Status of Adolescent School Going Girls of Jodhpur, Rajasthan, India *J Clin Diagn Res*, 10(10), SC08–SC12.
- Cooke, L., Wardle, J., Gibson, E., Sapochnik, M., Sheiham, A., & Lawson, M. (2004). Demographic, familial and trait predictors of fruit and vegetable consumption by pre-school children. *Public health nutrition*, 7(02), 295-302.
- Cutler, G. J., Flood, A., Hannan, P., & Neumark-Sztainer, D. (2009). Major patterns of dietary intake in adolescents and their stability over time. *The Journal of nutrition*, 139(2), 323-328.
- De Cock, N., Van Lippevelde, W., Goossens, L., De Clercq, B., Vangeel, J., Lachat, C., . . . Eggermont, S. (2016). Sensitivity to reward and adolescents' unhealthy snacking and drinking behavior: the role of hedonic eating styles and availability. *International journal of behavioral nutrition and physical activity*, 13(1), 1-11.
- Deshmukh-Taskar, P. R., Nicklas, T. A., O'Neil, C. E., Keast, D. R., Radcliffe, J. D., & Cho, S. (2010). The relationship of breakfast skipping and type of breakfast consumption with nutrient intake and weight status in children and adolescents: the National Health and Nutrition Examination Survey 1999-2006. *Journal of the American Dietetic Association*, 110(6), 869-878.
- Education, H. D. o. I. s. M. o. H. a. M. (2003). *Community nutrition solutions*. Retrieved from Tehran:
- Eloranta, A., Lindi, V., Schwab, U., Kiiskinen, S., Kalinkin, M., Lakka, H., & Lakka, T. (2011). Dietary factors and their associations with socioeconomic background in Finnish girls and boys 6–8 years of age: the PANIC Study. *European journal of clinical nutrition*, 65(11), 1211-1218.
- Granner, M. L., Sargent, R. G., Calderon, K. S., Hussey, J. R., Evans, A. E., & Watkins, K. W. (2004). Factors of fruit and vegetable intake by race, gender, and age among young adolescents. *Journal of nutrition education and behavior*, 36(4), 173-180.
- Hamayeli Mehrabani, H., Mirmiranl, P., Alaiin, F., & Azizi, F. (2009). Changes in nutritional knowledge,

- attitude, and practices of adolescents in district 13 of Tehran after 4 years of education. *Iranian Journal of endocrinology and metabolism*, 11(3), 235-243.
- Jaafari Rad, S., Keshavarz, S., & Khalilian, A. (2007). Dietary habits in adolescent girls of Sari, Mazandaran Province, Iran. *Journal of Mazandaran University of Medical Sciences*, 16(56), 108-114.
- Karimi, H., Sam, S., & Sajadi, P. (2008). Physical and nutritional status in primary school children in Ramsar city in 2003. *Journal of Babol University of Medical Sciences*, 10(1), 67-76.
- Larson, N., Story, M., Eisenberg, M. E., & Neumark-Sztainer, D. (2016). Secular trends in meal and snack patterns among adolescents from 1999 to 2010. *Journal of the Academy of Nutrition and Dietetics*, 116(2), 240-250. e242.
- Li, J., & Wang, Y. (2008). Tracking of dietary intake patterns is associated with baseline characteristics of urban low-income African-American adolescents. *The Journal of nutrition*, 138(1), 94-100.
- Masoomi, H., Taheri, M., Irandoust, K., H'Mida, C., & Chtourou, H. (2020). The relationship of breakfast and snack foods with cognitive and academic performance and physical activity levels of adolescent students. *Biological Rhythm Research*, 51(3), 481-488.
- Mausner, J., & SH, K. (2010). *Epidemiology an Introduction Text* (M. Janghorbani, Trans.). Kerman-Iran
- Khadamate farhangi
- McNaughton, S. A., Ball, K., Mishra, G. D., & Crawford, D. A. (2008). Dietary patterns of adolescents and risk of obesity and hypertension. *The Journal of nutrition*, 138(2), 364-370.
- Mirzaie, A., Ahmadi, A., Sohrabi, Z., tabatabaie, S. H. R., & Eslami, K. (2008). Dietary pattern in high school student in Shiraz. *Mata: Journal of Iranian Nutrition Society, Suppl: 253*.
- Mortazavi, Z., & Roudbari, M. (2010). Breakfast consumption and body mass index in primary, secondary and high school boys in Zahedan 2005-2006. *Iranian Journal of Endocrinology and Metabolism*, 12(4), Pe345-Pe351, En447.
- Nemati, A., Sagha, M., Nouzad Charvadeh, H., & Dehghan, M. (2003). Evaluation of eating breakfast among adolescent girl students in Ardabil, 1999-2000. *Journal of Ardabil University of Medical Sciences*, 3(1), 39-46.
- Neumark-Sztainer, D., Hannan, P. J., Story, M., Croll, J., & Perry, C. (2003). Family meal patterns: associations with

- sociodemographic characteristics and improved dietary intake among adolescents. *Journal of the American Dietetic Association*, 103(3), 317-322.
- Omidvar, N., MINAEI, S., Samareh, S., EGHTESEADI, S., & Ghazi, T. (2003). Body image and its association with body mass index and eating attitudes in young adolescents in Tehran.
- Park, J. E., & Park, K. (2004). *Textbook of preventive and social medicine* (H. Shojaei Tehrani, Trans. 17 ed. Vol. 2). Tehran-Iran: Samat.
- Park, S.-Y., Murphy, S. P., Wilkens, L. R., Yamamoto, J. F., Sharma, S., Hankin, J. H., . . . Kolonel, L. N. (2005). Dietary patterns using the Food Guide Pyramid groups are associated with sociodemographic and lifestyle factors: the multiethnic cohort study. *The Journal of nutrition*, 135(4), 843-849.
- Pour Abodolahi, P., Ebrahimi, M., & Koshavar, H. (2002). Food intake and growth of preschool children in Tabriz City. *Mata: Journal of Iranian Nutrition Society, Supple*: 55.
- Ramsay, S. A., Bloch, T. D., Marriage, B., Shriver, L. H., Spees, C. K., & Taylor, C. A. (2018). Skipping breakfast is associated with lower diet quality in young US children. *European journal of clinical nutrition*, 72(4), 548-556.
- Ricciuto, L., Tarasuk, V., & Yatchew, A. (2006). Socio-demographic influences on food purchasing among Canadian households. *European Journal of Clinical Nutrition*, 60(6), 778-790.
- Salmaani Barough, N., Pashaeypour, S., Rezaiepour, A., & Kazemnejad, A. (2007). Study of quality of snacking in adolescents (12-18 years old). *Journal of hayat*, 12(4), 21-29.
- Sanwalka, N. J., Khadilkar, A. V., Mughal, M. Z., Sayyad, M. G., Khadilkar, V. V., Shirole, S. C., . . . Bhandari, D. R. (2010). A study of calcium intake and sources of calcium in adolescent boys and girls from two socioeconomic strata, in Pune, India. *Asia Pacific journal of clinical nutrition*, 19(3), 324-329.
- Turin, T. C., Rumana, N., & Shahana, N. (2007). Dietary pattern and food intake habit of the underprivileged children residing in the urban slums. *Iranian Journal of Pediatrics*, 17(3), 227-234.
- Veghari, G., & Mansourian, A. R. (2013). Breakfast consumption amongst school children in northern Iran. *Journal of Nepal Paediatric Society*, 32(3), 193-200.
- Vereecken, C., & Maes, L. (2010). Young children's dietary habits and associations with the mothers' nutritional knowledge and attitudes. *Appetite*, 54(1), 44-51.

- Veugelers, P. J., Fitzgerald, A. L., & Johnston, E. (2005). Dietary intake and risk factors for poor diet quality among children in Nova Scotia. *Canadian Journal of Public Health, 96*(3), 212-216.
- Videon, T. M., & Manning, C. K. (2003). Influences on adolescent eating patterns: the importance of family meals. *Journal of adolescent health, 32*(5), 365-373.
- Zeininezhad Movasagh, E., & Omidvar, Z. (2008). The relationship between body mass index with breakfast intake, snake frequency and total food intake in the students 9-13 years of age in selected district in Tehran city. *Mata: Journal of Iranian Nutrition Society Supple: 268*.