



Breakfast and Snack Patterns among Iranian Children and Adolescents: A Systematic Review

Farzane Rouhani¹, *Hamidreza Alidoost¹

¹Pediatric Endocrinologist, Aliasghar Children's Hospital, School of Medicine, Iran University of Medical Sciences, Tehran, Iran.

Abstract

Background: Breakfast is the most important meal of the day, but many children and adolescents miss the morning meal every day. This study aims to investigate the pattern of breakfast and snack consumption and their effective factors among primary and high school students in Iran.

Materials and Methods: In this systematic review, two independent researchers selected articles that reported on the status of breakfast and snacks among students in the Scopus, EMBASE, Cochrane Library, Web of Science, CINAHL, Medline, CIVILICA databases, and Google Scholar search engine, without time restrictions up to December 2022.

Results: A total of 21 studies involving 45,778 children and adolescents were included. The results showed that 32.2% (9.3-32.2) of school children and 32.08% (2.1-32.08) of high school students skipped breakfast. Also, 97.7% (10.5-97.7) of children and 92.8% (17.3-92.8) of adolescents reported regular breakfast. The midmorning snack intake was reported among 97.7% (13-97.7) of children and 96.2% (48.6-96.2) of adolescents. The primary reasons for missing breakfast were low appetite, waking up late in the morning, non-flavored foods, and inattention of mothers. A significant relationship was found between snack consumption and maternal age, maternal educational level, gender, urban inhabitants, and birth order of the students ($p < 0.045$). There was an inverse relationship between students' age, economic situation, and breakfast consumption ($p = 0.01$ and $r = -0.143$).

Conclusion: Breakfast skipping and snack consumption were frequent among children and adolescents. The most important reasons for missing breakfast were low appetite, waking up late in the morning, non-flavored foods, and mothers' inattention. It is necessary to plan school health promotion programs for parents and students to encourage students to eat healthy breakfasts and snacks.

Key Words: Adolescents, Breakfast, Children, Iran, Snack.

*Please cite this article as: Rouhani F, Alidoost H. Breakfast and Snack Patterns among Iranian Children and Adolescents: A Systematic Review. Health Provid 2023; 3(1): 9-25. doi: **10.22034/HP.2022.375576.1029**

*Corresponding Author:

Hamidreza Alidoost, MD, Aliasghar Children's Hospital, School of Medicine, Iran University of Medical Sciences, Tehran, Iran.

Email: dr.hr.alidoost@gmail.com

Received date: Feb. 10, 2023; Accepted date: Jun.22, 2023

1- INTRODUCTION

Breakfast is the first meal of the day and is usually eaten in the morning (1). The word in English refers to breaking the fasting period of the previous night (2). Various “typical” or “traditional” breakfast menus exist, with food choices varying across regions and traditions worldwide. Nutrition is one of the essential factors in creating and maintaining health and varies depending on the activity of children and adolescents. Childhood and adolescence are two crucial periods in the formation of nutritional habits throughout life (3, 4).

Nutrition, especially through breakfast, can be important in the health and academic success of students, so not eating breakfast is associated with a decrease in accuracy, mental concentration, and academic failure, and missing this meal can cause a decrease in the nutrients available to the brain and, ultimately, a decline in cognitive function (5). The results of a study in the country show that about 40% of children do not eat breakfast (4), even though breakfast is the most important daily meal, and its regular consumption affects people’s physical, mental, and social health. This essential meal is ignored by children and teenagers more than others (6, 7).

The rate of skipping breakfast varies across populations (8). Children and adolescents who skip breakfast tend to have poorer nutrient intakes than those who do not (9-11). Eating a regular breakfast has been linked with a greater intake of fiber, calcium, iron, vitamin C, and other nutrients and a lower intake of fat, cholesterol, and sodium (12-14). Breakfast skipping among children and adolescents is associated with several poor health outcomes and health-compromising behaviors, including higher blood cholesterol and insulin levels, smoking, alcohol use, physical inactivity, disordered eating, and unhealthy weight management

practices (15-20). When students miss a healthy morning meal, they go to class hungry. Hunger is associated with lower physical activity, stomachache, headache, depression, anxiety, and a lower ability to focus (21). Also, children and adolescents experiencing hunger have lower math scores and generally poorer grades and are more likely to fail a grade (22, 23).

Studies show that students with inadequate appetite and opportunity to eat breakfast are irritable in the classroom and show little interest in learning due to fatigue (24, 25), and use snacks at school to satisfy their hunger. High consumption of low-value food in children and adolescents has consequences such as obesity, tooth decay, and chronic diseases (26). Proper nutrition and appropriateness of the food program are essential to maintaining the health of children, especially at school age, due to their greater vulnerability, forming a high percentage of the country’s population, and the higher effectiveness of health-therapeutic interventions (27, 28).

Based on the above, good nutrition, especially through breakfast, is a substantial factor in human progress in society. An indicator of social well-being is the state of nutrition and health of society. A lack of proper nutrition hinders the growth of children and adolescents, spreads diseases, reduces physical and intellectual capacity, and leads to conditions like depression among students. Therefore, in line with the government’s policies to improve nutrition in the target groups, especially students, understanding the eating patterns of children and adolescents and the reasons for skipping breakfast during school is of particular importance to healthcare providers. Nevertheless, statistics vary in different regions of the country, and a comprehensive review of different studies to determine the prevalence of breakfast consumption and the reasons for its omission in different age groups of

students is lacking. The present study aimed to investigate and review the pattern of breakfast and snack consumption and their effective factors among primary and high school students in Iran.

2- MATERIALS AND METHODS

The Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) statement was used as the template for this review (29).

2-1. Eligibility criteria

The participants, interventions, comparators, and outcomes (PICO) framework was used to formulate the review objective and inclusion criteria.

2-1-1. Participants: Iranian primary and high school students (6-19 years old)

2-1-2. Interventions: The included studies are non-interventional, so an intervention group did not exist.

2-1-3. Comparison: See above.

2-1-4. Outcome: Breakfast consumption/skipping and snack consumption.

2-2. Included studies: The review included studies containing any form of quantitative assessment, measurement, and evaluation of breakfast consumption/skipping and snack consumption in primary and high school students only in Iran published up to December 2022, written in English or Persian.

2-3. Exclusion criteria: The exclusion criteria were abstracts without the full article, articles not written in English or Persian, review articles, systematic reviews and meta-analyses, letters to the editor, editorials, short reports, case reports, and briefs.

2-4. Information sources

A systemic search of electronic databases Medline (via PubMed), Scopus, Web of

Science, Cochrane Library, CINAHL, CIVILICA, and Google Scholar search engine was conducted. The search was done independently by two reviewers, and any disagreement between the reviewers was resolved by the supervisor.

2-5. Search

The titles and abstracts of the identified records were initially screened for relevance. When an article could not be rejected with certainty based on the title or abstract, the full-text paper was retrieved for further evaluation. Keywords were obtained from MeSH and extracted from related articles. Search words were a combination of (students, primary school children, elementary students, high school students, breakfast consumption, breakfast skipping, snack, snack consumption, junk food, and Iran).

2-6. Study selection

A database search was done for possible studies, abstracts were screened for eligible studies, full-text articles were obtained and assessed, and a final list of included studies was made. In addition to primary articles, their references were also searched for additional studies. This process was done independently and in duplication by two reviewers, and any disagreement was resolved by the third reviewer. References were organized and managed using EndNote software (version X8).

2-7. Data collection process

From each of the included studies, the following information was recorded in the data extraction table: first author's name, year of study, study design, study population, study city/province, participant characteristics (age and sex), and the main results.

2-8. Risk of bias in individual studies

The risk of bias was assessed using the standard tool of STROBE (STrengthening

the Reporting of Observational Studies in Epidemiology) positioning guidelines (30). STROBE is a valuable tool for evaluating the quality of observational studies. This checklist has 22 items, scored based on the importance of each item according to the present study. The final score of the checklist was 30, and the minimum score was 15.0. The assessment was done by two reviewers independently and in duplication, and any discrepancies were resolved by the third reviewer.

2-9. Synthesis of results

Due to the difference in the included studies, study designs, age groups in studies, sample size, and the type of questionnaire used, a meta-analysis was not conducted.

2-10. Ethics statement

Ethical approval was not required for this study as it is a systematic review.

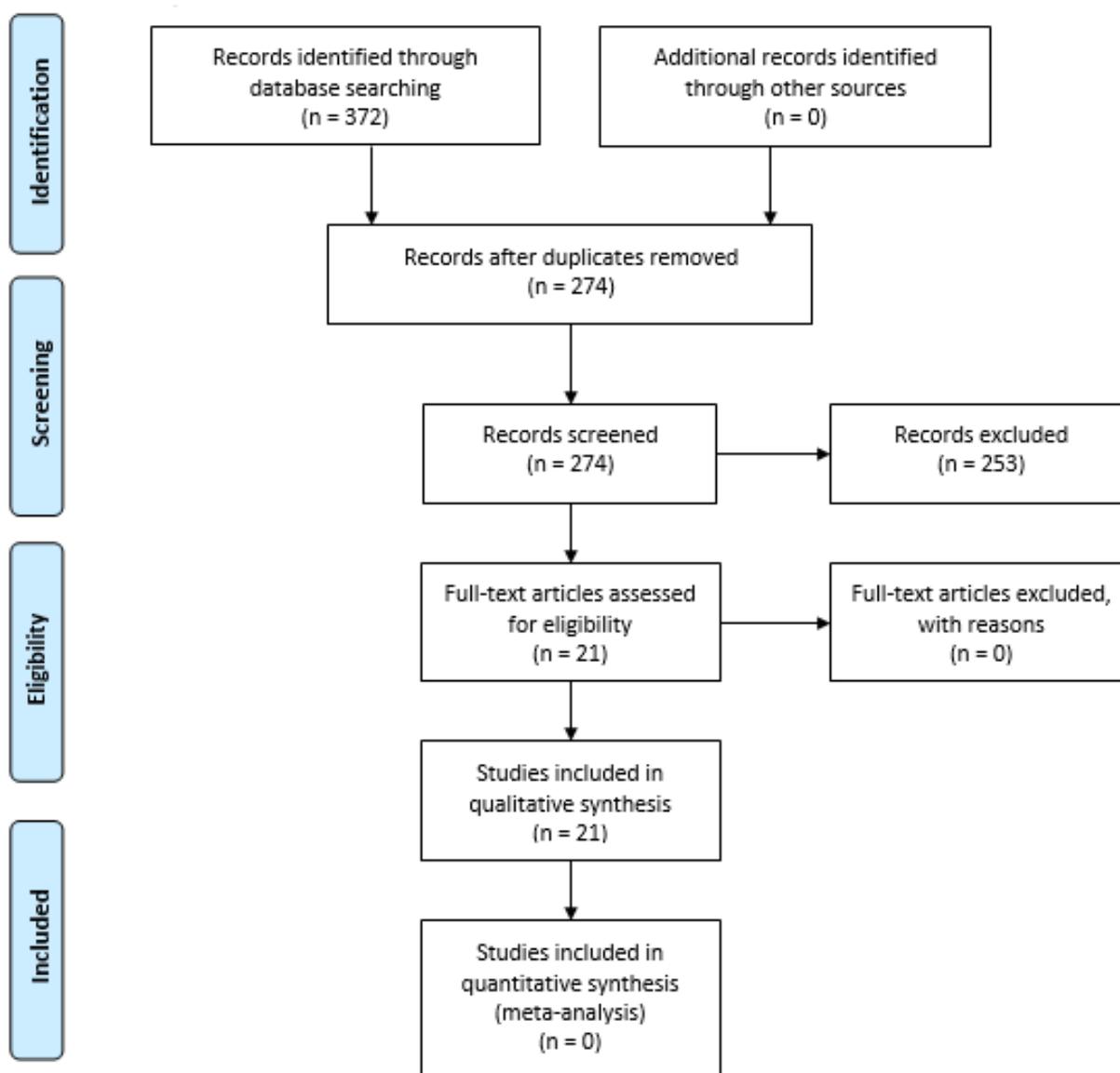


Fig.1: PRISMA Flowchart.

3- RESULTS

At the end of the search process, 21 related studies, including 45,778 children and adolescents (schoolchildren=10,599, high school students=35,179) were selected (**Figure 1**). The main characteristics of the selected studies are summarized in **Table 1** and the following:

1. A descriptive study on 223 elementary fourth-grade students in Zahedan (2012) aimed to determine the knowledge and perceived threat level of elementary school students about breakfast and snack consumption. The results showed that 51.6% of students were eating breakfast every day, and 22% reported that they consumed snacks every day. The Pearson test showed a significant positive relationship between knowledge and perceived susceptibility and severity and behavior ($p < 0.05$) (31).

2. A descriptive-analytical study on 180 elementary students in Torbat Heydariyeh (2014) aimed to determine the level of knowledge and perceived benefits and barriers concerning breakfast and snacks. The results showed that 45.6% of students had breakfast every day, 10.4% of students went to school without breakfast, and only 22.5% ate snacks every day. The Pearson test showed a significant positive relationship between knowledge and behavior and perceived susceptibility and severity and behavior, but such a relationship was not observed between perceived benefits and behavior (32).

3. A descriptive-analytical study on 1300 students in primary schools of Qazvin (2007-2008) aimed to investigate the pattern of breakfast and snack consumption and their effective factors among primary school students. The results showed that 89.5% of students had breakfast before going to school. The most important reason for not having breakfast was waking up late in the morning. Also, 85.4% of the students had bread and

cheese, and only 20.1% had milk for breakfast. Only 8.5% of students ate no snacks during school time. Cakes and cookies were the most frequent snacks consumed (85.1%) among students (33).

4. A descriptive-analytic cross-sectional study aimed to investigate the factors affecting breakfast consumption in 312 elementary school students of Esfarayen (2017). The results showed that 97.7% of the students consumed breakfast on an average of 6.11 ± 1.3 days a week. Most students tended to have breakfast with their families (86.5%), and 80.8% liked to have breakfast at home. The largest food group consumed by students was bread and grapes (50.5%), and the smallest was fruits (5.5%). The results showed a significant correlation between protein consumption at breakfast and daily breakfast consumption ($p < 0.05$, $r = 0.112$) (34).

5. A cross-sectional study on 245 students from eight elementary schools in Gonbad (2013-2014) aimed to assess snack patterns and some associated factors among elementary school students. The results showed that 97.7% of the students consumed snacks, with biscuits, cakes, and cookies being the most popular (49%). A significant relationship was found between snack consumption and maternal age ($p < 0.045$), maternal educational level ($p < 0.001$), and birth order of the students ($p < 0.045$) (35).

6. A cross-sectional study on 360 primary school students (2017) aimed to investigate breakfast consumption behavior and self-efficacy, outcome expectations and evaluation, and knowledge in elementary students. The results showed that the mean weekly breakfast consumption score was 2.4, with a standard deviation of 1.7. Only 10.5% of students had breakfast daily. There was a significant relationship between breakfast consumption and self-efficacy, outcome expectation, and outcome evaluation

($p < 0.001$). There was an inverse relationship between students' age, economic situation, and breakfast consumption ($p = 0.01$, and $r = -0.143$). Multiple regression analysis showed a significant relationship between self-efficacy, type of school, student age, and having breakfast and predicted a 24.3% breakfast consumption variance (36).

7. A descriptive study on 7,426 students from urban and rural areas (2012) aimed to evaluate the results of skipping breakfast among primary school children in the north of Iran. The results showed that 91.7% of schoolchildren had breakfast before going to school. Skipping breakfast was significant among 9.3% of students (female = 9.9%, and male = 6.7%), but significantly less ($p = 0.001$) in the Turkman ethnic group (6.0%) than other ethnic groups such as Fars (9.6%) and Sistani (9.4%). The most important reasons for missing breakfast were low appetite (70.1%), non-flavored foods (11.8%), inattention of mothers (5.2%), and other factors (13%). In addition, the higher educational level of parents, good income, and unemployed fathers were among the most important risk factors for skipping breakfast by schoolchildren in this region (37).

8. A cross-sectional study on 298 children of primary schools in Ilam City (2016) aimed to assess the eating breakfast patterns in a sample of primary students. The results showed that 32.2% of the studied schoolchildren skipped breakfast, and 5% of these never had breakfast. There was a significant difference in breakfast habits between boys and girls ($p < 0.05$). It was also shown that 13.1% of the schoolchildren had not eaten anything at breakfast the morning before completing the questionnaire (38).

9. A cross-sectional study on 155 primary school girls in Omidieh, Khuzestan province (2015) aimed to evaluate the breakfast and snack patterns of primary

school girls. The results showed a satisfactory breakfast consumption pattern in the studied population, as 79.5% of students reported that they regularly ate breakfast during the 14 days of the study. In addition, 22% of students consumed junk food, including puffs, chips, and candy, while 13% consumed traditional snacks, such as dried fruits and nuts. The reason for not eating breakfast in 49% of students was a lack of appetite. Regarding breakfast types, 28% of the students used bread, cheese, and tea, and 12% used traditional foods. Only 2.5% consumed bread, cheese, and walnuts (39).

10. A case-control study on 100 girls from primary schools in Tehran (2010-2011) aimed to evaluate the association between educational achievement and having breakfast and snacks among primary school children. In the study, 50 children with scores lower than 17 were randomly selected as the case group and 50 children with scores higher than 17 as the control group. The results showed a statistically significant difference ($p < 0.05$) between the two study groups in terms of breakfast consumption. In the case group, 22% of participants reported that they typically have breakfast, while this figure was 80% in the control group. There was also a significant difference ($p < 0.0001$) between the two groups in terms of daily consumption of snacks. Of the participants in the control group, 72% typically used the snack, while 54% of the case group reported normally having snacks. This means children in the case group consumed less breakfast and snacks compared to the control group ($p < 0.05$) (40).

11. A cross-sectional study on 2,444 students aged 12-14 from five Iranian ethnicities (Arab, Kurdish, Sistani and Baluchi, Turkish, and Turkmen) aimed to determine the status of breakfast and snacks among the students of five Iranian ethnicities in 2015. The results showed

that the mean type of food at home was 2.2 for breakfast, and the mean amount of snacks at school was 1.8. A total of 17.3% of the students did not have breakfast at home, and 16.2% of students did not consume any food at school. The least frequently consumed nutrition content group was fruits and vegetables, and the highest nutrition was from the miscellaneous group. The quality of 16% of the food received was poor. There was a significant relationship between the quantity and quality of foods consumed and the ethnic groups ($p < 0.05$) (41).

12. A descriptive study on 120 female students aimed to determine the knowledge, attitude, and nutritional practice of female middle school students in district four of Isfahan (2008). The results showed that 37.5% of students had poor nutritional knowledge, and 90% had poor nutritional practice. The daily consumption of bread and cereals was higher than other food groups. The average consumption of milk and dairy, meat, fruit, and vegetable groups was lower than the minimum recommended for this age group. The most commonly consumed snacks were fruits, cakes, and biscuits (42).

13. A descriptive-analytical study on 100 secondary school girls (2009-2010) aimed to determine breakfast consumption and its predictors among Qom school girl students based on Pender's health promotion model constructs. The results showed that only 25% of the studied students had breakfast seven days a week, and 21% went to school without eating breakfast. Based on Pender's model constructs and personal factors having a potentially significant correlation with behavior, a 69% variability in breakfast consumption by the girl students ($R^2 = 0.69$, $F = 12.68$, $p < 0.0001$) was predicted by the following variables: prior related behaviors, perceived barriers, self-efficacy, and competing demands and preferences (43).

14. A cross-sectional descriptive-analytical study on 208 governmental middle schools (2013) aimed to determine the dietary pattern and breakfast and snack consumption in middle school students in Ramsar. The results showed that the main food group consumption of most participants (56.2%) was unsatisfactory, 92.8% ate breakfast at home, and 96.2% had snacks in school. Participants always consumed milk and dairy products (34.1%), meat (10.6%), eggs (13.9%), vegetables (17.4%), and fruits (34.1%). There was a significant relationship between sex and frequency of milk, meat, and egg consumption ($p < 0.05$) (44).

15. A cross-sectional study aimed to determine the pattern of food consumption and physical activity among 450 high school students in the North Khorasan province. The results showed that the prevalence of obesity was higher in girls than boys. Up to 60.2% and 64.5% of boys and 38.6% and 47.4% of girls in the morning and evening shifts of the school had breakfast during the weekdays, respectively (45).

16. A secondary study was conducted on 13,486 students (mean age of 12.50 ± 3.36 years) in 30 provinces of Iran in 2011-2012. Data were obtained from the fourth national school-based surveillance survey "CASPIAN-IV", aimed to assess the frequency of consuming different types of snacks among Iranian students according to the socioeconomic status (SES) of their living region. The results showed that fresh fruits were the most commonly used category of healthy snacks (55.74%). Boys had more daily consumption of milk (48.65% vs. 43.27%), and girls had more daily consumption of fresh fruits (58.07% vs. 53.47%). Urban residents had lower consumption of vegetables (30.53% vs. 37.55%), dried fruits (18.29% vs. 23.02%), and fresh fruits (45.33% vs. 50.09%), than their rural counterparts. Among unhealthy snacks, sweets had the highest daily

consumption (34.15%). Boys had higher consumption of sweetened beverages (22.57% vs. 17.6%) and fast foods (3.51% vs. 2.17%). At the national level, consumption of other junk snacks (except for salty snacks, 16.24% rural vs. 11.83% urban) had no significant difference between urban and rural residents (46).

17. A study as part of an epidemiological survey on 2,302 school girls in Guilan province (2005-2006) aimed to evaluate the current status of overweight/obesity among high school girls in urban and rural areas. The results showed that a high percentage of the studied students, especially the overweight/obese ones, skipped breakfast in urban and rural areas. Also, consuming energy-dense, low-nutrient snack food was highly common during school hours among overweight/obese and normal-weight girls alike, especially in rural areas. School buffets provided most food consumed during the school day, especially in rural areas (47).

18. A cross-sectional study on 569 students (12-16 years) in Yazd (2020) aimed to estimate and compare the macro- and micro-nutrients intake in breakfast and mid-morning snacks. The results showed that the prevalence of irregular breakfast was 61.9% among the students. A higher daily energy intake was reported among adolescents who had irregular breakfasts. The mid-morning snack intake was reported among 85.6% of adolescents. The breakfast of 96.3% of the students was prepared at home. Energy intake from breakfast was significantly higher in males ($p<0.05$). The adjusted mean total carbohydrate, total fat, saturated fat, fat-soluble vitamins, vitamin B complex, vitamin C, and caffeine in breakfast was significantly higher among male students ($p<0.05$). Given the mid-morning snacks,

boys consumed significantly higher adjusted mean total carbohydrate, protein, saturated fat, vitamin C, zinc, calcium, and iron than girls (48).

19. A national cross-sectional study was conducted on 14,880 students with a mean age of 12.47 ± 3.36 years, selected by the multistage cluster sampling method from rural and urban areas of 30 provinces of Iran (2016-2017). The study aimed to assess the relationship between snack consumption and meal skipping in Iranian children and adolescents. The results showed that 32.08, 8.89, and 10.90% of the studied population skipped breakfast, lunch, or dinner, respectively. The frequency of meal skipping was higher in girls, urban inhabitants, and students in higher school grades ($p<0.05$) (49).

20. A cross-sectional study with descriptive-analytic aspects on 300 high school students aimed to assess the relationship between eating breakfast and snacks with awareness level in the students of a high school in Tehran. The results showed that 72.6% of students had breakfast every day, and only 2.1% went to school without it. A total of 64.6% ate snacks every day. There was no correlation between having breakfast and attention in classes, but math scores were correlated to having breakfast ($p=0.045$, $r=0.107$). There was a significant relationship between taking breakfast and body mass index ($p<0.05$) (50).

21. A cross-sectional study on 320 students from public high schools in Yazd (2013) aimed to investigate their nutritional and health behaviors. The results showed that 18% of students did not always have breakfast, and 48% consumed carbonated soft drinks at least once a day. More than 64% of students had consumed prepared foods at least once in the previous seven days (51).

Table-1: The general characteristics of included studies (n=21).

Author, Year, Reference	Study design	Study population	Study city/province	Gender	Main results
Lotfi et al., 2012, (31)	Descriptive study	223 elementary students	Zahedan	Male/ female	51.6% of students reported that they were eating breakfast every day and 22% reported that they were consuming snacks every day.
Alizadeh Siuki et al., 2014, (32)	Descriptive-analytical study	180 elementary students	Torbat-Heydariyeh	Male/ Female	45.6% of students ate breakfast every day, and 10.4% of students went to school without breakfast and only 22.5% ate snacks every day.
Rezakhani et al., 2007-2008, (33)	Descriptive-analytical study	1300 elementary students	Qazvin	Male/ Female	89.5% of students had eaten their breakfast before going to school.
Rohani et al., 2018, (34)	Descriptive-analytic cross-sectional study	312 elementary students	Esfarayan	Male/ Female	97.7% of the students consumed breakfast and reported an average breakfast of 6.11 ± 1.3 days a week.
Abedi et al., 2013-2014, (35)	Cross-sectional study	245 elementary students	Gonbad	Male/ Female	97.7% of the students consumed snacks.
Sadr Hashemi et al., 2017, (36)	Cross-sectional study	360 elementary students	Isfahan	Male/ Female	10.5% of students were eating breakfast daily. The mean breakfast consumption (in a week) score of 2.4 with a standard deviation of 1.7.
Veghari et al., 2012, (37)	Descriptive study	7,426 elementary students	North of Iran	Male/ Female	91.7% of school children ate breakfast before going to school. Skipping breakfast was significant among 9.3% of students and in Turkman ethnic group it was significantly less than other ethnic groups.
Mirzaei et al., 2016, (38)	Cross-sectional study	298 elementary students	Ilam	Male/ Female	32.2% of study schoolchildren skipped breakfast. There was a significant difference between boys and girls breakfast habit ($p < 0.05$).
Karimi et al., 2015, (39)	Cross-sectional study	155 elementary students	Omidieh	Female	79.5% of students reported that they regularly eat breakfast. In addition, 22% of students consume Junk foods, while 13% of them consumed traditional snacks including dried fruits and nuts.
Nazari Nasab et al., 2010-2011, (40)	Case-Control study	100 elementary students	Tehran	Female	22% of participants in the case group reported that they typically have breakfast, while this figure was 80% in the control group.
Motlagh et al., 2015, (41)	Cross-sectional study	2,444 high students	Iran	Male/ Female	The mean type of food at home was 2.2 for breakfast and the mean amount of snacks at school was 1.8. 17.3% of the students at home breakfast and 16.2% of students at the school did not consume any food.
Hazaveheei et al., 2008, (42)	Descriptive study	120 high students	Isfahan	Female	37.5% of students had poor nutritional knowledge, and 90% of the students had a poor nutritional practice.
Rahimi et al., 2009-2010, (43)	Descriptive-analytical study	100 high students	Qom	Female	25% of the studied students ate breakfast 7 days a week and 21% of students went to school without eating breakfast.
Karimi et al., 2013, (44)	Cross sectional descriptive analytical study	208 high students	Ramsar	Male/ Female	92.8% of samples ate breakfast at home and 96.2% had a snack in school

Hosseini et al., 2011, (45)	Cross-sectional study	450 high school students	North Khorasan province	Male/ Female	Up to 60.2% and 64.5% of boys and 38.6% and 47.4% of girls in the morning and evening shift of the school eat breakfast during the weekdays, respectively.
Bahreynian et al., 2011-2012, (46)	Secondary study	13,486 students mean age of 12.50±3.36 years	30 provinces of Iran	Male/ Female	Among unhealthy snacks, sweets had the highest daily consumption, and fresh fruits were the most commonly used category of healthy snacks. Boys had more daily consumption of milk and girls had more daily consumption of fresh fruits.
Maddah et al., 2005-2006, (47)	Secondary study	2,302 high school students	Guilan province	Female	A high percentage of the study students, especially the overweight/obese ones, skipped breakfast both in urban and rural areas.
Karandish et al., 2020, (48)	Cross-sectional study	569 high school students	Yazd	Male/ Female	The prevalence of irregular breakfast eating was 61.9% among the students. The midmorning snacks intake was reported among 85.6% of adolescents.
Kelishadi et al., 2016-2017, (49)	Cross-sectional study	14,880 students with a mean age of 12.47±3.36 years	30 provinces of Iran	Male/ Female	32.08, 8.89, and 10.90% skipped breakfast, lunch, and dinner, respectively.
Jafari et al., 2013, (50)	Cross-sectional study	300 high school students	Tehran	Male/ Female	72.6% of students take breakfast every day and only 2.1% went to school without it. 64.6% ate snacks every day.
Shahbazi et al., 2013, (51)	Cross-sectional study	320 high school students	Yazd	Male/ Female	18% of students do not always eat breakfast and 48% of students consume carbonated soft drinks at least once a day.

4- DISCUSSION

Students are the future builders of society and are in one of the most important periods of development. As food patterns are formed in the early years of life, especially during childhood and adolescence, and stabilized over time, this period is the most appropriate time to identify nutritional problems and improve the existing situation. Childhood and adolescence determine dietary habits in adulthood. This study aimed to investigate and review the pattern of breakfast and snack consumption and their effective factors among primary and high school students in Iran. The systematic review demonstrated that 32.2 and 32.08% of schoolchildren and high school students skipped breakfast, respectively. The mid-morning snack intake was reported among 97.7% of children and 96.2% of adolescents. A significant relationship was

found between snack consumption and maternal age, maternal educational level, and birth order of the students. Also, there was an inverse relationship between students' age, economic situation, and breakfast consumption ($p=0.01$, $r=-0.143$). Students form a large part of society. The student population in Iran is close to 13 million, and their physical and mental health are substantial to a dynamic and healthy society (52-55). Childhood and adolescence are two crucial periods in the formation of nutritional habits throughout life (56-58). Nutrition, especially through breakfast, is a significant factor in the health and academic success of students, so not eating breakfast is associated with decreased accuracy and mental concentration, and academic failure (59-70). Nutritionists divide meals into three main parts: breakfast, lunch, dinner, and two or three snacks. Among these, breakfast is essential as it increases

metabolism in the morning and compensates for the decreased blood glucose in the brain after a night's sleep. Also, as most of the intellectual activity is in the early hours of the day, breakfast should include food that can provide one-third of the total daily energy requirement (27, 28, 71). However, the results of the present review indicated that 32.2% (9.3-32.2), and 32.08% (2.1-32.08) of schoolchildren and high school students skipped breakfast, and the frequency of meal skipping was higher in girls, urban inhabitants, and schoolchildren.

Studies show that going to school hungry and without breakfast leads to distraction, neglect of natural stimuli, and lower active behaviors in children. Breakfast is the most important daily meal due to its calming effect at the beginning of the day, relieving the hunger of body cells, especially brain cells, regulating blood sugar regulation, and having direct effects on body weight (27, 28, 72). Children experiencing hunger may have lower physical functioning, more frequent stomachaches and headaches, mental health problems (e.g., depression, anxiety, behavioral problems), and poorer health (73-78). The study by Zamani et al. showed that students (6-18 years old) had unfavorable nutritional behaviors, and 51% of children ate various types of puffs, industrial juices, carbonated drinks, candies, chocolates, and junk food as snacks during the week (79). Studies show that students who skip breakfast generally have slower memory recall, make more errors, and are more likely to be absent or late and to repeat a grade (80-82).

In the present review, the primary reasons for missing breakfast were low appetite, waking up late in the morning, non-flavored foods, and inattention from mothers. In addition, higher educational levels of parents, good socio-economic conditions, and unemployed fathers were among the most important risk factors for

skipping breakfast by schoolchildren in this region. Snacks play an important role in learning and concentration. Around noon, even children who have eaten breakfast get hungry, and the concentration necessary for learning is lost. Thus, eating the right snack can increase students' work capacity and learning ability. However, the consumed snack must have sufficient nutritional value and guarantee satisfaction, must be healthy, and fit in the family's economy. In choosing a suitable snack, in addition to the interest and appetite of the student, it is necessary to consider the required nutrients for growth and health, as well as the economic status of the family, and not to decrease the child's appetite so they miss the main meals (83). Such healthy snacks include fresh fruits, fresh vegetables, natural juices, nuts (e.g., walnuts, pistachios, almonds, hazelnuts), and biscuits (28, 85-87). Other studies have reported that the snack consumption rates in urban and rural areas of the country were puffs and chips at 20.3% and 25.8%, carbonated drinks at 21.5% and 27.2%, and chocolate and sweets at 30.8% and 33.2% (88, 89).

Based on the current review, fresh fruits (55.7%), biscuits, cakes, and cookies were the most frequently consumed snacks (49%). Among unhealthy snacks, sweets had the highest daily consumption (34.15%). Boys had higher consumption of sweetened beverages (22.57% vs. 17.6%) and fast foods (3.51% vs. 2.17%).

In general, students who eat breakfast have better vitamin and nutrient intake, enjoy overall healthier diets, and are less prone to overweight or obesity. Regularly eating breakfast has been linked with a greater intake of fiber, calcium, iron, vitamin C, and other vitamins and minerals and a lower intake of fat, cholesterol, and sodium (12-14). Children and adolescents who eat breakfast have more favorable weight-related outcomes (e.g., lower body mass index, lower waist circumference,

decreased likelihood of being chronically obese, and decreased obesity risk) in the short and long term than those who skip breakfast (10, 13, 89-95). In addition to breakfast frequency and composition, other factors such as dinner quality, healthy back-to-school breakfast, physical activity, and SES are also effective for adolescents (46). Nutrition, especially through breakfast and snacks, plays an essential role in students' health and academic efficiency. Schools are an effective platform for plans and policies to prevent bad eating habits, as students spend much of their time at school. It is necessary to improve the nutritional status of students through education and nutritional awareness and using nutritional support strategies such as providing snacks in schools supplemented with nutrients such as iron and zinc. Attention to proper nutrition and higher nutritional awareness among students and families to choose healthier foods can be effective in their physical health and academic success (27, 28, 96).

5- CONCLUSION

Students should start the school day with a healthy breakfast. Breakfast is often called the most important meal of the day as it provides sustenance and energy (i.e., calories) for the activities ahead. Based on the results, mid-morning snack intake was reported among 97.7% (13-97.7) of children and 96.2% (48.6-96.2) of adolescents. The most important reasons for missing breakfast were low appetite, waking up late in the morning, non-flavored foods, and inattention from mothers. There was an inverse relationship between students' age, economic situation, and breakfast consumption. Schools should conduct health promotion programs for parents and students to encourage students to eat healthy breakfasts and snacks.

6- CONFLICT OF INTEREST: None.

7- REFERENCES

1. Breakfast – definition of breakfast. Free Online Dictionary, Thesaurus and Encyclopedia. 2012. Retrieved 28 March 2012.
2. Anderson, Heather Arndt (2013). *Breakfast: A History*. AltaMira Press. ISBN 0759121656.
3. Karimi H, Shirinkam F, Sajjadi P, Sharifi M, Bayandari M. Dietary pattern, breakfast and snack consumption among middle school students. *Journal of Holistic Nursing and Midwifery*, 2015;25(2):73-83.
4. Solamane N. Effect of breakfast eating on the cognitive performance and educational of the fourth grad students of elementary schools of garmsar in the academic years of 2010- 11. *Research in curriculum planning*. 2010-11;13(2):139-50.
5. Vaghari Gh, Somali L. Study of breakfast in elementary school students. *Quarterly Journal of Monitoring*. 2012;3: 327-36.
6. Dwyer JT, Evans M, Stone EJ, Feldman HA, Lytle L, Hoelscher D, et al. Adolescents' eating patterns influence their nutrient intakes. *J Am Diet Assoc* 2001; 101(7): 798-802.
7. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metz J. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *J Am Diet Assoc* 2005; 105(5): 743- 60.
8. Mullan BA, Singh M. A systematic review of the quality, content, and context of breakfast consumption. *Nutr Food Sci*. 2010; 40(1): 81-114.
9. Naghi bi SA, Ramezani. Evaluation of Breakfast Consumption among Elementary School Students in Ahwaz Based on BASNEF Model. *Iranian Journal of Health Education & Promotion*. 2016; 4(3):236-43.
10. Deshmukh-Taskar, P. R., Nicklas, T. A., O'Neil, C. E., Keast, D. R., Radcliffe, J. D., Cho, S. 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*, 2010;110(6): 869-78.

11. Rampersaud, G. C., Pereira, M. A., Girard, B. L., Adams, J., & Metz, J. D. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *Journal of the American Dietetic Association*, 2005;105(5): 743-60.
12. Affenito, S. G., Thompson, D. R., Barton, B. A., Franko, D. L., Daniels, S. R., Obarzanek, E., Schreiber, G. B., & Striegel-Moore, R. H. Breakfast consumption by African-American and white adolescent girls correlates positively with calcium and fiber intake and negatively with body mass index. *Journal of the American Dietetic Association*, 2005;105(6): 938-45.
13. Affenito, S. G., Thompson, D., Dorazio, A., Albertson, A. M., Loew, A., & Holschuh, N. M. (2013). Ready-to-eat cereal consumption and the School Breakfast Program: relationship to nutrient intake and weight. *Journal of School Health*, 2013;83(1): 28-35.
14. Kerver, J. M., Yang, E. J., Obayashi, S., Bianchi, L., & Song, W. O. Meal and snack patterns are associated with dietary intake of energy and nutrients in US adults. *Journal of the American Dietetic Association*, 2006;106(1): 46-53.
15. Kapantais, E., Chala, E., Kaklamanou, D., Lanaras, L., Kaklamanou, M., Tzotzas, T. Breakfast skipping and its relation to BMI and health-compromising behaviours among Greek adolescents. *Public Health Nutrition*, 2011;14(1): 101-8.
16. Keski-Rahkonen, A., Kaprio, J., Rissanen, A., Virkkunen, M., & Rose, R. J. Breakfast skipping and health-compromising behaviors in adolescents and adults. *European Journal of Clinical Nutrition*, 2003;57(7): 842-53.
17. Schembre, S. M., Wen, C. K., Davis, J. N., Shen, E., Nguyen-Rodriguez, S. T., Belcher, B. R., Hsu, Y. W., Weigensberg, M. J., Goran, M. I., & Spruijt-Metz, D. Eating breakfast more frequently is cross-sectionally associated with greater physical activity and lower levels of adiposity in overweight Latina and African American girls. *American Journal of Clinical Nutrition*, 2013;98(2): 275-81.
18. Smith, K. J., Gall, S. L., McNaughton, S. A., Blizzard, L., Dwyer, T., & Venn, A. J. Skipping breakfast: longitudinal associations with cardiometabolic risk factors in the Childhood Determinants of Adult Health Study. *American Journal of Clinical Nutrition*, 2010;92(6): 1316-25.
19. Zullig, K., Ubbes, V. A., Pyle, J., Valois, R. F. Self-reported weight perceptions, dieting behavior, and breakfast eating among high school adolescents. *Journal of School Health*, 2006;76(3): 87-92.
20. Solaimane N. Effect of breakfast on cognitive and educational functions Fourth grade elementary students in the city Garmsar school year. *Research in curriculum planning*. 2015;13(2):139-50.
21. Alaimo K, Olson CM, Frongillo EA Jr, Briefel RR. Food insufficiency, family income, and health in US preschool and school-aged children. *Am J Public Health*. 2001;91(5):781-6. doi: 10.2105/ajph.91.5.781.
22. Alaimo, K., Olson, C. M., & Frongillo, E. A., Jr. Food insufficiency and American school-aged children's cognitive, academic and psychosocial development. *Pediatrics*, 2001;108(1): 44-53.
23. Shanafelt, A., Hearst, M. O., Wang, Q., Nanney, M. S. Food insecurity and rural adolescent personal health, home, and academic environments. *Journal of School Health*, 2016;86(6): 472-80.
24. Cooper SB, Bandelow S, Nevill ME. Breakfast consumption and cognitive function in adolescent schoolchildren. *Physiol Behav*. 2011 Jul 6;103(5):431-9. doi: 10.1016/j.physbeh.2011.03.018. Epub 2011 Mar 23. PMID: 21439306.
25. DeLong CM, Bragg R, Simmons JA. Evidence for spatial representation of object shape by echolocating bats (*Eptesicus fuscus*). *J Acoust Soc Am*. 2008; (6)123. 4582-98.
26. Millimet, Daniel L. and Tchernis, Rusty and Hussain, Muna, School Nutrition Programs and the Incidence of Childhood Obesity. IZA Discussion Paper No. 3664, Available at SSRN: <https://ssrn.com/abstract=1261449>.
27. Abstract of Fifteenth Congress of the Iranian Society of Pediatric Nutrition. Child Nutrition Society of Iran, Tehran, Iran, 2020.

28. Health of students with proper nutrition. Hormozgan Province Health Deputy, December 2014.
29. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA; PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev.* 2015 Jan 1;4(1):1. doi: 10.1186/2046-4053-4-1.
30. Von Elm E, Altman DG, Egger M, Pocock SJ, Gotsche PC, Vandenbroucke JP, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *Preventive Medicine.* 2007; 45(4): 247-51.
31. Behrooz Lotfi, Fatemeh Rakhshani. Knowledge and perceived threat of students in relationship with their behavior in context of consumption of breakfast and snack in primary boy schools in Zahedan. *Payesh* 2014; 13(1):61-71.
32. Alizadeh siuki, Heshmati, KHademi, ShamayianRazavi, Khalafi. Knowledge and perceived benefits and perceived barriers of students in relationship with their behavior in context of consumption of breakfast and snack in primary schools in Torbat Heydariyeh. *JMS* 2013; 1 (3) :23-31.
33. Rezakhani H, Soheili Azad A, Razaghi M, Nemati A. Pattern of Breakfast and Snack Consumption and Their Effective Factors among Primary School Students, Qazvin. *j.health* 2012; 2 (4):57-63.
34. Rohani H, Sadeghi A, Bidkhorji M, Kazemian S, Siyavashi M, Davari MA. The Survey of Effective Factors of Breakfast Consumption in Elementary School Students of Esfarayen City in 2017. *Beyhagh*, 2019; 24(1): 20-29.
35. Jalili Z, Saboohi Z, Tavakoli R. Effect of Training Program on Snack Consumption in Elementary School Girls: Application of the BASNEF Model. *Journal of Education and CommunityHealth.*2021; 8(1):3-9.
36. Sadr Hashemi, F, Soltani, R, Hassanzadeh, A, Eslami, A. Relationship between Breakfast Consumption and Self-Efficacy, outcome Expectations, Evaluation and Knowledge in Elementary Students. *International Journal of Pediatrics*, 2017; 5(1): 4163-74.
37. Veghari G, Mansourian AR. Breakfast Consumption amongst School Children in Northern Iran. *Journal of Nepal Paediatric Society*, 2012; 32 (3):193-200. ISSN 19907974 (ISSN).
38. Mirzaei A, Ghofranipour F, Ghazanfari Z, Ahmadi Vasmehjini A. The study of primary schoolchildren eating breakfast status in Ilam: A pilot study. *JBRMS* 2016; 3(1):3-9.
39. Karami K, Ghaleh S. Breakfast and snack patterns of primary school girls in Omidieh, Khuzestan Province, Iran. *J Prevent Med* 2015; 2(3):67-72.
40. Nasab MN, Yosae S, Marghi MB, Khosravi AA. Association between the educational achievement and consumption of breakfast and snack in students. *Intl. Res. J. Appl. Basic. Sci.*, 2013;7 (10): 699-703.
41. Motlagh M, Taheri M, Ghadimi R, nasrollapour shirvani D. Breakfast and Snack Status among the Students of Iranian Ethnicities . *Iranian J Nutr Sci Food Technol*, 2017; 12(1):29-36.
42. Hazaveheei M.M, Pirzadeh A., Entezari MH, Hasanzadeh A, Bahreynian N. Investigating the Knowledge, Attitude and Nutritional Practice of Female Middle School Second Graders in Isfahan in 2008. *Knowledge and Health*, 2010; 4(3):24-7.
43. Rahimi T, Dehdari T, Ariaeian N, Gohari M. Survey of breakfast consumption status and its predictors among Qom students based on the Pender's health promotion model constructs. *Iranian J Nutr Sci Food Technol* 2012; 7(2):75-84.
44. Karimi H, Shirinkam F, Sajjadi P, Sharifi M, Bayandari M. Dietary pattern, breakfast and snack consumption among middle school students. *J Holist Nurs Midwifery* 2015; 25 (2):73-83.
45. Hosseini S, Rajabzadeh R, ShoraKa H, Alavinia S, Sodmand M, Jalilvand M. Physical activity, dietary habits of high school students in the North Khorasan province. *JNKUMS* 2014; 6 (3): 553-62.
46. Bahreynian M, Qorbani M, Heshmat R, Esmaeil Motlagh M, Djalalinia Sh, Ardalan G,

- et al. Snack Consumption among Iranian Children and Adolescents: The CASPIAN-IV Study. *Iran J Public Health*, 2015; 44(Supple. No. 1):62-75.
47. Maddah M, Rashidi A, Mohammadpour B, Vafa R, Karandish M. In-school snacking, breakfast consumption, and sleeping patterns of normal and overweight Iranian high school girls: a study in urban and rural areas in Guilan, Iran. *J Nutr Educ Behav*. 2009 Jan-Feb;41(1):27-31. doi: 10.1016/j.jneb.2008.03.115. PMID: 19161917.
48. Karandish M, Mozaffari-Khosravi H, Hadianfard A M, Azhdari M, Amiri R, Mirzavandi F, et al . Distribution of Nutrients in Breakfast and Midmorning Snacks among Overweight or Obese Adolescents of Yazd, Iran. *JNFS* 2020; 5(4):306-15.
49. Kelishadi R, Mozafarian N, Qorbani M, Motlagh ME, Safiri S, Ardalan G, Keikhah M, Rezaei F, Heshmat R. Is snack consumption associated with meal skipping in children and adolescents? The CASPIAN-IV study. *Eat Weight Disord*. 2017 Jun;22(2):321-328. doi: 10.1007/s40519-017-0370-4.
50. Jafari F, Rezaeipor N, Malek V. G, Kholdi N, Aminzadeh M. Association Between Breakfast Consumption and Math Scores of High School Students in Tehran. *Biomed Pharmacol J* 2013;6(2).
51. Shahbazi H, Baghiani Moghaddam MH, Khajeh Z, Esmaeili A, Karimi M, Alian Ajam Sh, et al. Survey of health and nutritional behaviors among high school students. *Iran J Health Educ Health Promot* 2013; 1 (4):69-80.
52. Statistical Center of Iran. National Population and Housing Census 2011. Available from: <http://www.sci.org.ir>.
53. Imani M, Rakhshani F, Tabatabaei S. M. T. Knowledge about students' health needs among teachers of Zahedan Primary Schools. *Zahedan Journal of Research in Medical Sciences (Tabib-E-Shargh)* 2004; 8(3):227-31.
54. Ramezankhani A. Comprehensive Textbook of Public Health, Chapter Eleven: School Health. Deputy of Research, Ministry of Health and Medical Education: 1795-1817.
55. Sharifirad Gh.R, Amidi Mazaheri M & Akbarzadeh K. Hygiene of School Food-Shops And Effects of Training on Their Keepers in Esfahan. *Journal of Ilam University of Medical Sciences* 2004- 2005; 12(44-45): 17-23.
56. Karimi H, Shirinkam F, Sajjadi P, Sharifi M, Bayandari M. Dietary pattern, breakfast and snack consumption among middle school students. *Journal of Holistic Nursing and Midwifery*. 2015;25(2):73-83.
57. Solamane N. Effect of breakfast eating on the cognitive performance and educational of the fourth grad students of elementary schools of garmsar in the academic years of 2010- 11. *Research in curriculum planning*. 2010-11;13(2):139-50.
58. Li J, Wang Y. Tracking of dietary intake patterns is associated with baseline characteristics of urban low-income African-American adolescents. *J. Nutr*. 2008;138:94-100.
59. Vaghari Gh, Somali L. Study of breakfast in elementary school students. *Quarterly Journal of Monitoring*. 2012;3:327-36.
60. Holt, S.H., Delargy, H.J., Lawton, C.L., Blundell J.E. The effects of high-carbohydrate vs high-fat breakfasts on feelings of fullness and alertness, and subsequent food intake. *Int J Food Sci Nutr*, 1999; 50(1):13-28.
61. Ernst, J. Rising Blood Sugar Impairs Cognitive Function. Wednesday, February 11 Sth, 2009.
62. Gajre, N.S., Fernandez, S., Balakrishna, N., Vazir, S. Breakfast eating habit and its influence on attention-concentration, immediate memory and school achievement. *Indian Pediatr* 2008;45 :824-28.
63. Institute of food research and resources, United nation children's fund of Iran. Micronutrient status of iron, zinc and vitamin A and D in different age groups in Iran. Tehran: Institute of food research and resources 2011.
64. Montazeri Far F, karaji Bani M, Ghanbari MR, Mousavi Gilani SR .The study of risk factors of malnutrition in children under 5 years attending to health centers in Zahedan city. *Scientific Journal of Hamadan University of Medical Sciences & Health Services*. 2003; 10(28): 63-8.

65. Acham H, Kikafunda JK, Malde MK, Oldewage-Theron WH, Egal AA. Breakfast, midday meals and academic achievement in rural primary schools in Uganda: implications for education and school health policy. *Food Nutr Res.* 2012;56. doi: 10.3402/fnr.v56i0.11217. Epub 2012 Feb 14.
66. Adolphus, K., Lawton, C. L., Dye, L. The Relationship between Habitual Breakfast Consumption Frequency and Academic Performance in British Adolescents. *Frontiers in Public Health*, 2015;3(68). <http://doi.org/10.3389/fpubh.2015.00068>
67. Adolphus, K., Lawton, C. L., Dye, L. The effects of breakfast on behaviour and academic performance in children and adolescents. *Frontiers in Human Neuroscience*, 2013;(7)425. doi: 10.3389/fnhum.2013.00425.
68. Affinita, A., Catalani, L., Cecchetto, G., Lorenzo, G. De, Dilillo, D., Donegani, G., et al. Breakfast: a multidisciplinary approach. *Italian Journal of Pediatrics*, 2013;10(39): 1–10. doi: 10.1186/1824-7288-39-44.
69. Defeyter MA, Russo R. The effect of breakfast cereal consumption on adolescents' cognitive performance and mood. *Front Hum Neurosci.* 2013 Nov 20;7:789. doi: 10.3389/fnhum.2013.00789.
70. Edefonti, V., Rosato, V., Parpinel, M., Nebbia, G., Fiorica, L., Fossali, E., Agostoni, C. The effect of breakfast composition and energy contribution on cognitive and academic performance: A systematic review. *American Journal of Clinical Nutrition*, 2014;100(2): 626–56.
71. Hanson, T., Austin, G., Zheng, C. Academic performance and school well-being. Paper prepared for the California Education Supports Project. Los Alamitos: WestEd, 2011.
72. Berg F, Buechner J, Parham E; Weight Realities Division of the Society for Nutrition Education. Guidelines for childhood obesity prevention programs: promoting healthy weight in children. *J Nutr Educ Behav.* 2003 Jan-Feb;35(1):1-4. doi: 10.1016/s1499-4046(06)60318-7.
73. Moore L, Moore GF, Tapper K, Lynch R, Desousa C, Hale J, Roberts C, Murphy S. Free breakfasts in schools: design and conduct of a cluster randomised controlled trial of the Primary School Free Breakfast Initiative in Wales [ISRCTN18336527]. *BMC Public Health.* 2007 Sep 21;7:258. doi: 10.1186/1471-2458-7-258.
74. Slack, K. S., & Yoo, J. Food hardship and child behavior problems among low-income children. *Social Service Review*, 2005;79(3): 511–36.
75. McLaughlin, K. A., Green, J. G., Alegría, M., Jane Costello, E., Gruber, M. J., Sampson, N. A., et al. Food insecurity and mental disorders in a national sample of U.S. adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 2012;51(12), 1293-1303.
76. Ryu, J. H., & Bartfeld, J. S. Household food insecurity during childhood and subsequent health status: the early childhood longitudinal study - kindergarten cohort. *American Journal of Public Health*, 2012;102(11), e50-e55.
77. Goldman, N., Ettinger de Cuba, S., Sheward, R., Cutts, D., & Coleman, S. *Food Security Protects Minnesota Children's Health*. Boston, MA: Children's HealthWatch, 2014.
78. Kimbro, R. T., Denney, J. T. Transitions into food insecurity associated with behavioral problems and worse overall health among children. *Health Affairs*, 2015;34(11), 1949-55.
79. Zamani AF, Faghihzadeh S, Sadeghi F. Application of the Health Belief Model for Unhealthy Eating Prevention among Primary School Children in Arak / Iran (2004-2005). *Behood* 2008; 11(4 (35):352-67.
80. Adolphus K, Lawton CL, Dye L. The effects of breakfast on behavior and academic performance in children and adolescents. *Front Hum Neurosci.* 2013 Aug 8;7:425. doi: 10.3389/fnhum.2013.00425.
81. Frisvold, D. E. Nutrition and cognitive achievement: an evaluation of the School Breakfast Program. *Journal of Public Economics*, 2015;124: 91–104.
82. Anzman-Frasca, S., Djang, H. C., Halmo, M. M., Dolan, P. R., & Economos, C. D. Estimating impacts of a breakfast in the

- classroom program on school outcomes. *JAMA Pediatrics*, 2015; 169(1): 71-77.
83. Khazaie PM, Ebadi AF, Silhi M, Asadi LM, Abdi N. A study in the effect of education through health belief model on the perceptions of girl students in primary schools about breakfast and snack in Noshahr-2007. *Toloo Behdasht* 2008; 7 (1-2):51-63.
84. Alavi Naeini S, Jazayeri SA, Moghaddam Banaem N, Afrooz GA. The effects of taking snacks on the learning ability and educational achievement of elementary school children, 1997-98. *Tehran Univ Med J* 2000; 58 (1):38-44.
85. Karimi H, Shirinkam F, Sajjadi P, Sharifi M, Bayandari M. Dietary pattern, breakfast and snack consumption among middle school students 2015. *Holist Nurs Midwifery* 2015; 25 (2):73-83.
86. Khazaei pool M, Ebadi fard Azar F, Solhi M, Asadi Lari M, Abdi N. Investigating the effect of education through the health belief model on the nutritional perceptions of fourth-year female students of Nowshahr primary schools about breakfast and snacks. *The Journal of Toloo-e-behdasht*, 2009; 7(1-2): 51-63.
87. Damari B, Riazi-Isfahani S, Hajian M, Rezazadeh A. Assessment of the situation and the cause of junk food consumption in Iran and recommendation of interventions for reducing its consumption. *Community Health* 2015; 2 (3):193-204.
88. Torabi M, PourEslami HR, Sajadi A, Karimi Afshar M, Karimi Afshar M. Evaluation of type and frequency of snacks consumption in 3-6-year-old children in Rabor and Baft cities (2011). *J Health Based Res* 2015; 1 (2):145-53.
89. Mohammadi Zeidi I, Pakpour A. Effectiveness of educational intervention based on theory of planned behavior for promoting breakfast and healthy snack eating among elementary school students. *Razi J Med Sci*, 2013; 20 (112):67-78.
90. Alexander, K. E., Ventura, E. E., Spruijt-Metz, D., Weigensberg, M. J., Goran, M. I., Davis, J. N. Association of breakfast skipping with visceral fat and insulin indices in overweight Latino youth. *Obesity*, 2009;17(8), 1528-33.
91. Niemeier, H. M., Raynor, H. A., Lloyd-Richardson, E. E., Rogers, M. L., Wing, R. R. Fast food consumption and breakfast skipping: predictors of weight gain from adolescence to adulthood in a nationally representative sample. *Journal of Adolescent Health*, 2006;39(6): 842-49.
92. Timlin, M. T., Pereira, M. A., Story, M., & Neumark-Sztainer, D. Breakfast eating and weight change in a 5-year prospective analysis of adolescents: Project EAT (Eating among Teens). *Pediatrics*, 2008;121(3): e638-45.
93. Wojcicki, J. M., Schwartz, N., Jiménez-Cruz, A., Bacardi-Gascon, M., Heyman, M. B. Acculturation, dietary practices and risk for childhood obesity in an ethnically heterogeneous population of Latino school children in the San Francisco bay area. *Journal of Immigrant and Minority Health*, 2012;14(4): 533-39.
94. Blondin, S. A., Anzman-Frasca, S., Djang, H. C., & Economos, C. D. Breakfast consumption and adiposity among children and adolescents: an updated review of the literature. *Pediatric Obesity*, 2016;11(5):333.
95. Bruening, M., Afuso, K., Mason, M. Associations of Eating Two Breakfasts with Childhood Overweight Status, Sociodemographics, and Parental Factors among Preschool Students. *Health Education & Behavior*, 2016;43(6): 665-73. <http://doi.org/10.1177/1090198116629421>.
96. Soleimani N, Khani R. The effect of eating breakfast on the cognitive and academic performance of fourth grade students in Garmsar city, academic year 1389-1390. *Research in Curriculum Planning*, 2012; 11(13): 139-50.