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Food Preferences of Primary School Students in Yazd, Iran: A Cross-Sectional Study

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ABSTRACT

Background: Studies have shown that children's food preferences play a main role in the formation of long-term eating habits and nutritional patterns in their future lives. This study aimed to investigate food preferences of primary students in Yazd, Iran. **Methods:** This cross-sectional study was conducted on 420 primary school students of Yazd, both male and female, using two-stage sampling method. The data collection tool was a self-administered questionnaire including demographic variables and food preferences checklist. The data were entered in SPSS 23 software and analyzed by Mann-Whitney U test and Kruskal-Wallis test. The significance level of the tests was considered as P-value < 0.05. **Results:** Starchy food category with the mean score of 3.70±0.44 was reported as the highest food preference and protein category (3.17±0.69) was reported as the lowest food preference among food categories in students. Gender, economic status, and body mass index (BMI) were related to students' food preferences ($P < 0.05$). The median score of food preference for vegetables, fruits, and proteins in girls was higher than boys ($P < 0.05$), and for starchy food, fast foods, snacks, and fats was higher for boys than for girls ($P < 0.01$). The mean score of starchy food preference in students with lean and normal BMI was higher than students in overweight and obese group ($P = 0.01$). **Conclusion:** Starchy food and protein categories were reported as the highest and lowest food preferences among primary school students, respectively. It seems necessary to pay special attention to increase the awareness of students as well as their parents and primary schools principals about healthy foods in childhood and healthy food environments.

Keywords: *Food preferences; Nutrition; Student; Children*

Introduction

Achieving balanced and proper nutrition is one of the health goals in the early years of a child's life. The optimal growth and development of children depends on proper nutrition and proper eating habits. Since the root of the most health behaviors goes back to childhood experiences (Baghdari *et al.*, 2014), childhood can be considered as a fundamental period for establishing healthy food preferences of children affecting their health throughout life (Alles *et al.*, 2014).

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Researchers believe that preventing malnutrition and performing intervention programs should begin in childhood (Baghdari *et al.*, 2014) .

Research has shown that children's food preferences predict their eating patterns. Therefore, understanding children's food preferences, factors related to the development of food cravings, and how these preferences change over time, are important for planning nutrition education for children (Skinner *et al.*, 2002). The term "preference" refers to the selection of an item among others. Preference implicitly implies that "desire" is the basis of choice. Desire, however, is only one of -the stimuli influencing food choices. Food preferences are obtained through experience (Rozin, 1996). In general, genetically predisposed contexts in food acceptance or rejection and its interaction with the eating environment form food preferences (Birch, 1999). In other words, food craving or reluctance plays an important role in food choices. In the case of children in particular, food preferences are formed by a combination of genetic and environmental factors, the better understanding of which is crucial for the development of nutritional interventions (Wardle and Cooke, 2008). In this regard, in the study of the role of heredity and environment on the food preferences of twins in the UK, it was found that these two factors together affect the desire for food groups and in some food groups the role of heredity was more predominant, while for others, the role of the environment was predominant (Fildes *et al.*, 2014). Another study of twins in London found that aspects of the environment that were not shared by a family were responsible for making lasting differences in their food preferences (Wardle and Cooke, 2008).

Food preferences play a key role in food selection and diet quality (Birch, 1999). Children's food preferences play a vital role in the formation of lasting eating habits and nutritional patterns in the later years of their lives and unhealthy food choices in childhood are effective in the incidence of obesity and the spread of chronic diseases in adulthood. Given that studies carried out on the children's food preferences in Iran are limited and most of the studies examined eating habits and behaviors of children, the present study was conducted to determine food preferences of school-age children (primary schools) and related factors in Yazd, Iran.

Materials and Methods

Study design and participants: This was a descriptive cross-sectional study to determine food preferences of primary students in Yazd in 2020. The target population of this study was male and female students studying in mainstream primary schools in Yazd. Inclusion criteria were being in the fourth, fifth, and sixth grades of primary school (aged 9 to 13 years), having Iranian citizenship, living with parents, willingness of students and parents to participate in the study, and parental satisfaction. In order to determine the sample size, considering the type I error of 0.05 and the statistical power 80% and considering the initial values of variance of 1 for food score as well as assuming precision of 1%, the sample size was estimated to be 420 people selected by two-stage sampling method. So that from every 5 districts of Yazd city, 2 girls' schools and 2 boys' schools were randomly selected and then in each school, from each fourth, fifth and sixth grade, 7 students were randomly selected (21 students in each school). Finally, 420 male and female students from 20 schools were included in the study.

Measurements: The questionnaire included two sections of demographic information and food preferences. Demographic information included age, sex, educational background, and number of students' family members, as well as parents' education and occupation, which was completed by students. Two questions were related to the family's economic situation and income adequacy, which were answered by parents after obtaining written consent for their children to participate in the study. Variables of height and weight of students in school were measured by a standard height gauge in meters and Beurer digital weight in kilograms, respectively, and body mass index (BMI) was separately calculated for male and female students based on the CDC standard

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reference (Tuan and Nicklas, 2009).

Food preferences were assessed in seven food categories including fruits and vegetables (apple, orange, banana, watermelon, tangerine, cucumber, carrots, and lettuce), proteins (meat, chicken, fish, liver, egg, and beans), dairy (milk, yogurt, cheese, curd, and ice-cream), starchy food (rice, bread, spaghetti, and corn), fast foods (pizza, hamburger, sausages, fried mushroom, fried chicken, baked potato, and falafel), snacks (soft drink, cake, biscuits, chocolate, chips, and fruit leather), and fats (butter, cream, mayonnaise, and nuts). Each food category consisted of a number of food items which were answered in the form of a five-point Likert scale from "I like it very much" to "I do not like it at all". They were scored from five to one. The food preferences tool (check list) was researcher-made and developed after the review of previous studies and based on the Iranian food culture. The content validity of the tool was assessed both quantitatively and qualitatively. In the quantitative part, content validity ratio (CVR) and content validity index (CVI) were used. In this regard, items with CVR above 0.75 and CVI above 0.79 were approved and included in the questionnaire. To check qualitative content validity, the questionnaire was provided to an eight-member panel including nutrition and health education experts. The experts' opinions were implemented about issues such as observing grammar, the use of proper words, the importance of the items, placement of the items in their proper place, and the time required to complete the tool. Finally, the content validity of the tool was confirmed. The reliability of the tool, with seven food categories, was approved by calculating the Cronbach's alpha coefficients of 0.64, 0.61, 0.60, 0.54, 0.75, 0.72 and 0.70 for fruits and vegetables, proteins, dairy, starchy food, fast foods, snacks, and fats, respectively.

Data analysis: Data analysis was performed using SPSS software 23. Nominal and ordinal variables were presented as frequency, percentage, and numerical variables were reported as mean, median, and standard deviation. Normality for numerical variables was examined using Kolmogorov-Smirnov test. Nonparametric tests including Mann-Whitney and Kruskal-Wallis statistical tests were used to determine the relationship between food categories and demographic variables. Significance level of tests in this study was considered P-value < 0.05.

Ethical considerations: This study was approved by the Ethics Committee of the Vice-Chancellor's Office for Research at Shahid Sadoughi University of Medical Sciences, Yazd, Iran; with code of ethics: IR.SSU.SPH.REC.1398.103. Ethical considerations of the study including the required information about the study objectives, voluntary participation in the study, and confidentiality of data were completely explained to parents and students. Written consent was obtained from parents of all students participating in the study.

Results

The sample consisted of 420 primary school students, including 210 female students and 210 male students with mean age of 10.80±0.94. Moreover, 140 of fathers (33.3%) and 164 of mothers (39%) had junior high school degrees. Most fathers (152 people (36.2%)) were self-employed and most mothers (285 people (67.9%)) were housewives. Most of the parents (41.7%) reported that their income is sufficient, and 257 of them (61.2%) assessed their economic status as moderate (**Table 1**). Regarding BMI, 67 students (16.0%) were thin, 264 (62.9%) had normal weight, 57 (13.6%) were overweight, and 32 students (7.6%) were obese.

Comparing the mean score of food preferences, the category of starchy food with the highest mean (3.70±0.44) was reported as the highest food preference of students and the group of proteins with the lowest mean (3.17±0.69) was the lowest food preference among food categories (**Table 2**).

According to the results, except for dairy category, where the mean score of preference did not differ significantly between the genders (P = 0.07), the mean score of food preference for vegetable and fruit (P = 0.01) and protein (P <0.001) categories was higher in girls than boys

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and food preference of starchy food (P = 0.002), fast foods (P = 0.002), snacks (P = 0.037) and fats (P = 0.003) was reported less in girls than in boys (**Table 3**).

Table 4 reveals that there was a statistically significant difference between the economic status of the household and food preference mean scores for proteins (P = 0.001) and starchy food (P = 0.02). According to the results of the post hoc test, the median preference score of proteins in the group with good economic status was reported to be significantly higher than the other two groups and the food preference median score of starchy food category in the group with moderate economic status was reported to be higher than the group with weak economic status.

There was also a significant difference between the status of BMI and the mean score of starchy food preference (P = 0.01). The preference of starchy food in groups with lean and normal BMI status was higher than overweight and obese groups (P = 0.012, **Table 5**).

Table 1. Absolute and relative frequency distribution of demographic characteristics of the studied students (N=420).

Variables		N	%
Age (y)	9	25	6.0
	10	139	33.1
	11	133	31.7
	12	117	27.8
	13	6	1.4
Gender	Female	210	50.0
	Male	210	50.0
Grade	Fourth	140	33.3
	Fifth	140	33.3
	Sixth	140	33.3
Family size	3	52	12.4
	4	209	49.7
	5	126	30.0
	6 and more	33	7.9
Father's education	Illiterate	4	1.0
	Primary	43	10.2
	Junior high school	78	18.6
	High school	140	33.3
	Associate degree	37	8.8
	Bachelor's degree	95	22.6
	Master's degree and higher	23	5.5
Mother's education	Illiterate	9	2.2
	Primary	45	10.7
	Junior high school	58	13.8
	High school	164	39.0
	Associate degree	44	10.5
	Bachelor's degree	89	21.2
	Masters' degree and higher	11	2.6
Father's occupation	Employee	117	27.9
	Manual worker	86	20.5
	Self-employed	152	36.2
	Retired	21	5.0
	Unemployed	6	1.4
	Other occupations	38	9.0
Mother's occupation	Housewife	285	67.8
	Working outdoors	88	21.0
	Working indoors with income	47	11.2

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Table 1. Absolute and relative frequency distribution of demographic characteristics of the studied students (N=420).

Variables		N	%
Sufficiency of income	Insufficient	142	33.8
	To some extent enough	175	41.7
	Enough	103	24.5
Economic status	Weak	57	13.5
	Moderate	257	61.2
	Good	106	25.3
Weight status	Thin	67	16.0
	Normal	264	62.8
	Overweight	57	13.6
	Obese	32	7.6

Table 2. Mean scores of food preferences of the students in each food category N=420).

Food category	Min	Max	Mean±SD
Vegetables and fruits	1.56	4	3.40±0.45
Proteins	0.67	4	3.17±0.69
Dairy pruducts	1.60	4	3.69±0.43
Starchy foods	1.00	4	3.70±0.44
Fast foods	0.00	4	3.35±0.73
Snacks	0.00	4	3.26±0.70
Fats	0.00	4	3.21±0.74

Table 3. Comparison of students' food preference scores by gender (N=420).

Food category	Males		Females		P-value[a]
	Mean±SD	Median	Mean±SD	Median	
Vegetables and fruits	3.46±0.40	3.55	3.34±0.48	3.44	0.012
Proteins	3.36±0.59	3.50	2.98±0.73	3.16	<0.001
Dairy products	3.72±0.40	3.80	3.65±0.45	3.80	0.071
Starchy foods	3.76±0.40	4.00	3.64±0.46	3.75	0.002
Fast foods	3.42±0.74	3.66	3.28±0.71	3.50	0.002
Snacks	3.31±0.72	3.50	3.21±0.68	3.33	0.037
Fats	3.33±0.64	3.50	3.09±0.81	3.25	0.003

[a]: Mann-Whitney test

Table 4. Comparison of food preferences of students in terms of self-assessment of family economic status (N=420).

Food category	Weak		Moderate		Good		P-value[a]
	Mean±SD	Median	Mean±SD	Median	Mean±SD	Median	
Vegetables and fruits	3.27±0.57	3.33	3.41±0.43	3.44	3.45±0.40	3.55	0.222
Proteins	2.89±0.67	3.00	3.19±0.72	3.33	3.27±0.57	3.50	0.001
Dairy products	3.57±0.51	3.80	3.68±0.44	3.80	3.76±0.34	3.80	0.103
Starchy foods	3.52±0.60	3.75	3.73±0.42	4.00	3.73±0.34	3.75	0.022
Fast foods	3.22±0.71	3.33	3.36±0.77	3.66	3.41±0.63	3.50	0.126
Snacks	3.25±0.68	3.50	3.24±0.76	3.50	3.31±0.56	3.50	0.932
Fats	3.03±0.93	3.25	3.25±0.75	3.50	3.23±0.57	3.25	0.160

[a]: Kruskal-Wallis test

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Table 5. Comparison of food preference scores of the students according to weight status (N=420).

Weight status	Thin		Normal		Overweight		Obese		P-value[a]
	Mean±SD	Median	Mean	Median	Mean	Median	Mean	Median	
Vegetables and fruits	3.46±0.38	3.55	3.38±0.45	3.44	3.39±0.48	3.44	3.39±0.51	3.61	0.685
Proteins	3.11±0.80	3.50	3.21±0.66	3.33	3.03±0.74	3.16	3.17±0.58	3.16	0.403
Dairy products	3.75±0.35	3.80	3.68±0.43	3.80	3.68±0.47	3.80	3.63±0.53	3.80	0.716
Starchy foods	3.72±0.42	4.00	3.73±0.42	4.00	3.59±0.48	3.75	3.57±0.49	3.75	0.012
Fast foods	3.25±0.76	3.50	3.39±0.74	3.66	3.42±0.54	3.50	3.17±0.81	3.41	0.200
Snacks	3.17±0.81	3.50	3.28±0.67	3.50	3.30±0.66	3.50	3.21±0.75	3.33	0.904
Fats	3.24±0.70	0.70	3.26±0.72	3.50	3.14±0.83	3.25	2.91±0.81	3.25	0.098

[a]: Kruskal-Wallis test

Discussion

This study aimed to investigate food preferences and related factors in primary school students in Yazd. In the present study, starchy food samples had the highest preference and proteins had the lowest preference among students. In a similar study by Garcia et al. on the food preferences of primary school students in Mexico City, cereals and proteins had the lowest preference scores (Sánchez-García *et al.*, 2014). In another study by Caine et al., "Food Preferences for School Children and Adolescents in Ohio", high-calorie and high-fat food types such as pizza and hamburgers were the most popular (Caine-Bish and Scheule, 2007). Children usually do not have much desire for different types of meat, and on the other hand, starchy food types such as bread, rice, pasta, and corn are among their favorite food, especially bread and rice, which are among the two main items in Iranian family diet. Spaghetti and corn with different forms of cooking such as grilled corn, boiled corn, Mexican corn, popcorn, etc. have always been of interest to children. The Western culture diet is mostly based on high-calorie food types such as fast foods, various drinks, and sweets, which may be the reason why children are interested in this type of food (Caine-Bish and Scheule, 2007, Sánchez-García *et al.*, 2014).

In this study, the mean score of food preference in girls was higher than boys in the category of vegetables, fruits, and proteins. For the categories of starchy food, fast foods, snacks and fats, the mean score of food preference was higher in boys than girls. This finding is in line with the results of a similar study in London, which aimed to investigate the effect of age and gender differences on children's food preferences in 1291 children aged 4-16 years (Cooke and Wardle, 2005). Rashidi's study on eating habits of children and adolescents showed that weekly consumption of fast food and carbonated beverages in girls was 26.4%, while in boys, these values were 31.8% and 35.4%, respectively (Hossein Rashidi *et al.*, 2018). In a study by Russell *et al.*, similarly, the mean score of food preference for fruits and vegetables was higher in girls than in boys (Russell *et al.*, 2015).

Another finding of this study on the relationship between household economic status and food preferences was that in students with good economic status, the mean score of protein preference was higher than students with moderate and poor economic status. In students with moderate economic status, the median score of food preference for starchy food was higher than that of people with weak economic status. In a study by Barroso *et al.* in Brazil, consumption of fruits increased and consumption of starchy food decreased by increasing household income (dos Santos Barroso *et al.*, 2014). Food environments in which children's food preferences are formed and nurtured are also influenced by household income, so that the amount of parents' income is one of the factors affecting children's nutrition (Scaglioni *et al.*, 2008).

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In the present study, the median score of food preference for starchy food in participants with lean and normal BMI was higher than in overweight and obese subjects. It could be due to students' awareness of their BMI status and perceived risks. Different findings are reported regarding eating habits and consumption of food groups, so that in the study by Mehrabian *et al*., the consumption of snacks, fruits, dairy products, and home-made snacks in overweight and obese students was higher than the other two groups (Mehrabian *et al.*, 2018). However, in the study by Jahani *et al*., there was no relationship between the consumption of snacks, fast foods, and proteins with BMI. Thus, in general, the findings in the field of food preferences can be different from the findings of studies in the field of eating habits and food consumption (Jahani *et al.*, 2012).

Development of the tool for measuring food preferences of primary school students is one of the strengths of this study. Future studies are required to expand the category of starchy food in this tool, by adding other food items to increase its reliability.

Conclusion

According to the results of the present study, starchy food types had the highest preference among primary school students and there was an association between demographic factors such as gender, family economic status and BMI with students' food preferences. It is required to pay attention to primary schools and use their potentials to create healthy food environments and employ health educators to increase the awareness of students and their parents with healthy food environments. Further studies on the differences in food preferences of girls and boys can also be useful in planning healthy food environments for these two groups.

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Authors' contributions

Abbasi-Shavazi M, Tavakoli- Bahabadi M, and Nadjarzadeh A conceived and developed the idea for the research; Tavakoli- Bahabadi M conducted the research and collected the data; Tavakoli-Bahabadi M and Jambarsang S contributed to the statistical analysis. Tavakoli- Bahabadi M wrote the manuscript draft and Abbasi-Shavazi M, Tavakoli- Bahabadi M, Jambarsang S, and Nadjarzadeh A revised the and approved the final manuscript.

Conflict of interest

The authors declare that there is no conflict of interest.

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