Brief Report

Diet Knowledge and Behaviors Related to Prevention of Obesity Among Students Aged 11 to 15 Years in Shiraz, Iran

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Abstract

Background: One of the most challenging issues in public health is childhood obesity in the 21st century. In Iran, the overall prevalence of overweight has increased and the total rate of obesity was estimated to be 12.3% (calculated as 6.5% for individuals less than 18 years).

Objectives: The present study aimed at determining the diet knowledge and diet behavior among students in Shiraz, Iran.

Methods: This cross-sectional study was conducted among 2040 students in 8 selected public high schools in 2013 in Shiraz, Iran. Random sampling method with proportionate allocation to size was used. To collect data, a standardized pretested questionnaire was used. The data were analyzed using SPSS.

Results: Response rate was 97.1%. Most (52.1%) of the students were male. The mean age of the respondents was 13.02 ± 0.724 and ranged from 11 to 15 years. About 61.3% of the students did not notice the label of food calories, and 73.8% did not know that family history of obesity would increase the risk of obesity. Only 16.5% of the respondents ate vegetables 4 to 5 times a week, and 23.6% ate fresh fruit per week; but 64.2% drank soft drink more than 2 times a week, and 82.2% ate fast foods more than 2 times a week.

Conclusions: The findings revealed that student's perception about diet knowledge and diet behavior was low. Thus, targeted education should be implemented to improve healthy lifestyle in this age group.

Keywords: Diet, Knowledge, Behavior, Students, Obesity

1. Background

Non-communicable diseases are a leading cause of death worldwide, constituting 63% of all annual deaths (1). The risk of death from a non-communicable disease increases by some risk factors such as tobacco use, physical inactivity, the harmful use of alcohol, and unhealthy diets (1). Around 70% of all mortalities in 2002 in Iran were related to chronic diseases, and the main reasons of which were obesity and overweight (2). Developing countries, including Iran, due to changes in the lifestyle, have experienced a rapid increase in the prevalence of obesity among children (3). During the last decade, urbanization has caused a decrease in physical activity and an increase in calorie and fat intake, resulting in a rapid nutrition transition in Iran (4). In recent years, various prevalence rates for childhood overweight and obesity have been reported (5). The total prevalence rate of obesity in Iran was estimated to be 12.3%, which was 6.5% for individuals younger than 18 years (6).

A recent global review demonstrated that overweight children were at significantly increased risk of being overweight adults (7). Those adults who grew up as an overweight or obese children are far more susceptible to other preventable diseases early in life than those who are within the normal weight range and were at a normal weight when they were young (8). Childhood overweight and obesity has become the most common pediatric illness (9). Prevention of overweight and obesity among adolescents is of great importance, and improving knowledge and behavior and shaping attitudes towards prevention is of prime importance (10). Past intervention studies in obesity prevention show increased knowledge among adolescences, however, ensuring a positive effect on lifestyle behavior and enhancing health through reduction of risk factors are the final goal of health education (11).

2. Objectives

This study aimed at investigating the level of diet knowledge and diet behavior among students aged 11 to 15 years in Shiraz, Iran.

3. Methods

This cross-sectional study was conducted on students from November 2012 to January 2013. The sample population for this study was 2040 students, who were randomly

selected from public high schools. Selected students fulfilled the following inclusion criteria: studying at one of the 8 selected schools of in Shiraz, age range of 11 to 15 years, both genders, and willingness to participate in the study. Those excluded from the study were 2 students with physical disability, and those with documented chronic illness identified by self-report, or information from the students' departments, and unwillingness to participate in the study.

Sample was calculated based on the following formula: $n = z^2_{1-\alpha/2} (1- p/\varepsilon^2 p)$ (Lemeshow et. al., 1990). An estimated sample size of 1787 multiplied by 20% nonresponse or absenteeism students, considering 95% confidence level, was obtained and the ultimate sample size was estimated to be 2144 students. Random sampling technique with proportionate allocation to size was used. For the first stage sampling, the entire list of high schools in district 1 of Shiraz was served as the sampling frame; and for the second stage sampling, the lists of all classes in each of the selected high schools was served as the sampling frame. Eight schools were randomly selected in Shiraz.

A questionnaire was used for data collection in this study. The researchers developed a questionnaire based on a comprehensive review of the literature. This study utilized a self-generated Persian version questionnaire that consisted of 3 sections. Part A of the questionnaire collected information on the demographic characteristics of the respondents including gender, age, religion, pocket money, transportation status, family size, and family history of obesity. Part B of the questionnaire collected information on diet, based on food frequency questionnaire (FFQ) (Vereecken and Maes, 2003) and NHANES food questionnaire. Part C of the questionnaire collected information on anthropometric measurement, which includes weight and height measured by the researcher. To ensure validity, the questionnaire was pretested before data collection.

Approval was obtained from ministry of education of Shiraz (No: T/394/12 on 5th June 2012) and the Ethic committee of University of Putra Malaysia (No: UPM/FPSK/100-9/2 on 12th September 2012) before data collection. Participants were informed about the purpose of the study and their information was kept anonymous.

Data were analyzed using PASW Statistics 22.0 program. Firstly, the normality of the raw data was checked using Kolmogorov-Smirnov test, and it was found that the data were normally distributed. Descriptive statistical analysis, which included frequency, percentage, mean and standard deviation (SD), was used to describe the data. Parametric tests such as independent sample t-test (for the 2 groups) and ANOVA (for more than 2 groups) were used to compare means between the 2 groups and between more than 2 groups, respectively. Post-hoc tests were used to identify the significant differences. Pearson correlation was used to determine the correlation between knowledge and behavior of the respondents. The level of significance was set at a p value of less than 0.050.

4. Results

4.1. Response Rate

Out of the total 2100 students, 2040 agreed to participate in the study, providing a response rate of 97.1%.

4.2. Demographic Characteristics of Respondents

Table 1 displays the demographic characteristics of the respondents. Kolmogorov-Smirnov test revealed that the data were normally distributed. Most of the respondents (52.1%) were male. The mean age of the respondents was 13.02 ± 0.724 (95% CI, 12.99 - 13.05) and ranged between 11 to 15 years. With respect to religion, most respondents were Muslims. The monthly spending was about 1000 to 10,000 Rials (US$1 = 3500 Rials). Most of the students lived with both parents 1963 (96.3%). Furthermore, about 87.8% of them went to school by taxi or car. In this study, missing data were defined by SPSS and found to be few and inconsiderable.

4.3. Diet Knowledge

Table 2 demonstrates the distribution of the respondents' knowledge related to obesity. The overall mean and standard deviation of knowledge score was 9.05 (± 3.20), with a median of 9.0. For the total knowledge score, the first quartile (25%) was equal to 7, it was 9 (50%) for the the second quartile, and 12 for the third (75%). In this study, 61.3% of the students did not notice the label of food calories and 73.8% did not know that family history of obesity would increase the risk of obesity. However, 45.7% believed that a healthy diet could help prevent some diseases and some cancers, 49.7% believed that obesity was related to heart disease, 52.7% supposed that obesity increased the risk of heart disease, and 37.3% believed that regular physical activity could lower the chance of heart disease.

4.4. Diet Behavior

Table 3 demonstrates the distribution of the respondents' diet behaviors. The overall mean and standard deviation of diet behaviors score of the respondents was 3.09 (± 1.86), with a median of 3, ranging from 0 to 6. Based on the results obtained from the study, 20.4% of the respondents ate breakfast more than 4 times a week; 66.5% believed that obesity was a health problem. Only 16.2% of the respondents ate vegetables 4 to 5 times a week and 24.3%

Table 1. Background Characteristics of the Respondents

Characteristics	Frequency	Percentage
Gender		
Male	1063	52.1
Female	977	47.9
Religion		
Islam-Sunni	13	0.6
Islam-Sheath	1989	98.2
Others	38	1.2
Living with		
Both patents	1963	96.4
Father or mother or	77	3.6
Grand mother /father		
Transportation to school		
Walk and bicycle	183	9.2
Taxi and motorcycle and bus	1857	90.8
Family history of obesity		
Yes	808	38.6
No	1232	61.4
Monthly income, Rials[a]		
1000 - 10000	934	48.7
10000 - 50000	745	38.8
> 50000	239	12.5
Age, y	Mean ± SD 13.2 (0.728)	Range 12 - 15

[a]USD 1 = 3500 Rials.

ate fresh fruit per week, while 61.5% of the respondents drank soft drink more than 2 times a week, and 58.8% ate fast food more than 2 times a week.

4.5. Diet Knowledge and Behaviors and Socio-Demographic Factors

Knowledge related to obesity and diet is closely associated with some demographic factors. Table 4 displays the results of some demographic variables and associated variables. The results showed that gender, age group, transportation type, and monthly income of respondents were significantly associated with the knowledge related to diet and obesity among students. With respect to behavior, the results revealed that gender, religion, transportation type, and monthly income of respondents were significantly associated with the diet behavior among students.

Table 2. Distribution of the Respondents' Knowledge Related to Diet and Obesity[a]

Questions	True	False	I don't know
Eating fatty foods does not affect blood cholesterol levels.	17.7	41.6	40.7
High blood sugar increases cholesterol level.	32.9	12.5	54.6
Only exercising at a gym or in an exercise class will lower a person's chance of developing heart disease.	13.5	41.6	44.8
You should eat a lot of sugar to have enough energy.	7.2	47.9	44.8
All fats in foods are the same.	8.4	46.2	45.4
All fats in food are bad.	13.5	36.0	50.5
Calcium helps to build strong bones and keep them strong.	57.4	6.8	35.8
A healthy diet can help prevent some diseases and some cancers.	45.7	8.5	45.8
All snacks are bad.	11.5	49.3	39.2
You should only eat breakfast, lunch and dinner.	13.7	51.2	35.2
All types of bread are equally nutritious.	9.4	49.0	41.6
If you eat a healthy diet, there is no need to exercise.	9.7	51.0	39.3
Saturated fats are better for you than unsaturated fats.	17.7	21.8	60.5
Vegetables are good for you.	54.5	15.4	30.1
You should eat more servings of fruits and vegetables than any other food group.	43.1	20.5	36.4
Regular physical activity will lower a person's chance of getting heart disease.	37.3	20.0	42.7
Fatty food consumption increases the risk of heart disease.	54.2	8.5	37.3
Physical activity is related to heart disease.	52.5	9.8	37.7
Physical activity decreases the risk of heart disease.	41.4	13.6	44.9
Obesity is related to heart disease.	49.7	10.2	40.1
Obesity increases the risk of heart disease.	52.7	10.1	37.2

[a]Values are expressed as number percent.

4.6. Correlation Between Diet Knowledge and Behavior Score

The correlation between knowledge score and behavior score was examined using Pearson correlation coefficient test (r). The result showed a positive relationship between the total knowledge score and the total behavior score of the respondents (r = 0.134 and P < 0.000). Only 6% of the total variation in the behavior could be explained by knowledge (r^2 = 0.060).

Table 3. Distribution of the Respondents' Diet Behavior[a]

Item	Frequency		
	Never or one time per week	2 - 3 times per week	More than 4 times per week
During the past 7 days, how often did you eat vegetables?	941 (46.1)	771 (37.7)	328 (16.2)
During the past 7 days, how often did you eat fresh fruit?	948 (46.5)	596 (29.2)	496 (24.3)
During the past 7 days, how often did you drink milk?	452 (22.1)	907 (44.5)	681 (33.4)
During the past 7 days, how often did you eat breakfast?	926 (45.3)	699 (34.3)	415 (20.4)
During the past 7 days, how often did you drinks soft drink (such as coca cola, Miranda and so on)?	785 (38.5)	717 (35.1)	538 (26.4)
During the past 7 days, how often did you eat fast food (such as sandwich, hamburgers, hotdog …)?	841 (41.2)	477 (23.3)	722 (35.5)

[a]Values are expressed as No. (%).

Table 4. Results of Bivariate Analysis of Diet Knowledge and Diet Behavior

Variables	ANOVA/t-test	P Value[a]
Factors Associated with Diet Knowledge		
Gender	t = -5.948	0.001
Age Group	F = 6.082	0.001
Religion	F = 2.094	0.123
Living status	t = 1.721	0.085
Transportation	t = 2.178	0.031
Monthly income, Rial	F = 8.147	0.001
Factors Associated with Diet Behavior		
Gender	t = 8.275	0.001
Age group	F = 0.925	0.428
Religion	F = 4.403	0.012
Living status	t = -1.603	0.109
Transportation	t = 3.348	0.001
Monthly income, Rial	F = 7.847	0.001

[a]Level of significance (P < 0.050).

5. Discussion

There is a major gap between research and practice, particularly in risk factors for disease and potential strategies, which prevents the development of diseases (12). Obesity is a serious public health concern and a risk factor that leads to serious diseases. Thus, children and adolescents should be informed about its negative outcomes because prevention is more desirable than finding a cure for negative health outcomes. Indeed, some of the health problems that school-aged children experience are severe enough to affect their academic and social development. Furthermore, the researcher believes that students who lack these social skills and awareness usually find negative means of resolving problems and making decisions (13). Evidence shows that nutrition in youths is one of the important risk factors for chronic degenerative diseases such as osteoporosis and cardiovascular disease (14).

In the present study, the level of knowledge about diet was not satisfactory. Research indicates that an increase in knowledge does not necessarily result in improved dietary behaviors (15) but can influence dietary choices as increased nutrition knowledge brings about an environment that offers concurrent positive nutrition messages. In a study, Conklin et al. (2005) found that the students made better nutritional choices following a nutrition education intervention provided by high schools (16). Therefore, increasing knowledge can be considered as the primary step in the behavior change process.

Research has shown that education and early identification are the keys to prevention (17). Obesity is a multidimensional issue and parents are the key to stop this epidemic. Parents have the power to control what is brought into home and they can teach their children healthy and responsible eating behaviors. Regardless of any other macro- or micro- systems involved, research shows that a child's family will always be an important influential core (17). Awareness of how significant a family's influence is on healthy eating behaviors is the first step. Parents gaining insight into their own behavior and how it affects their children will make a significant difference in their lives as well as in their children's health. Understanding the factors related to diet like nutrition knowledge, attitudes, and behaviors is essential in designing an appropriate nutritional intervention program (18). One of the most impor-

tant reasons for nutritional problems is lack of nutritional knowledge, resulting in insufficient performance, which causes problems and increases the risk of different non-communicable diseases (19).

Fruit and vegetable consumption is an essential factor of diet quality that can play an important role in prevention against certain chronic diseases (15). On average, the diets of these students were low in fruits and vegetables, low in fiber and high in total fat, and saturated fat. Soft drink consumption was also high, while milk consumption was low. Neumark-Sztainer et al. (2004) demonstrated that the strongest correlate of fruit and vegetable intake was the availability of these foods (20). It has been shown that those with lower socioeconomic status have less access to fresh fruits and vegetables (21). Epstein et al. (2012) showed that increased availability of healthier alternatives resulted in increased purchases of these foods (22). Moreover, Haire-Joshu et al. (2004) found that exposure and preference for fruits and vegetables, trying new foods, and intake of fruits and vegetables in adulthood are considerably related to childhood dietary behavior (23). These studies suggest that socio-environmental factors such as greater availability have a significant effect on fruit and vegetable intake in adolescents.

Self-reported food intake does not show the precise habitual energy intake. Although this can have an impact on the accuracy of the analysis, the dietary recall in adolescents seems to work well at least as a reference method for dietary assessments in this age group. Thus, energy intakes could be used as a basis of comparison in groups but not individuals. Similarly, in a study of 35 adolescents, Sjoberg et al. (2003) found that dietary recalls in adolescents seem to work well at least as a reference method for dietary assessments in this age group (24). As overweight and obesity in this group continues to increase, even if these adolescents are consuming lower than recommended amounts of daily calories, it appears that minimal energy expenditure still results in a positive energy balance. Therefore, a physical activity component is imperative to decrease the risk factors in this population.

The strength of this study was its relatively large sample size, which was drawn from 8 public high schools using random sampling method, making it generalizable to the same population. The findings of this study could be used as a basis for developing health education and health promotion programs on prevention of obesity and overweight.

However, it is necessary to take a deep view in facing the cultural factors that affect adolescents and their ability to adjust their knowledge about healthy diet with their cultural beliefs. Furthermore, the questionnaire as a measurement design is not an adequate tool to measure diet be-

havior. Thus, it is recommended that future studies look at different qualitative measurements such as focus groups. A potential limitation is that the knowledge the behavior related questionnaires used in the study relied on the self-report format. The results, therefore, may be subjected to self-report bias.

In conclusion, this study revealed that the level of diet knowledge and behavior among students was unsatisfactory. Thus, it is recommended that a peer educational program on obesity prevention be implemented to eliminate the alarming threat of overweigh and obesity especially among students in Iran.

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Footnote

Conflict of Interests: The authors declare that they have no conflict of interest.

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