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Knowledge and perceptions of obesity prevention and reducing sugar-sweetened beverages consumption among high school girl students in Shahrekord

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ABSTRACT

Background and aims: The prevalence of obesity among children and adolescents is increasing worldwide. One of the key lifestyle behaviors that helps prevent obesity and being overweight among children and adolescents is to avoid drinking sugar-sweetened beverages (SSBs) or to take, at most, one serving per day. The present study intended to evaluate knowledge and perceptions of high school girl students in Shahrekord on reducing SSBs consumption based on the health belief model (HBM).

Methods: The present descriptive-analytical study, conducted in 2013–2014, randomly recruited 308 female students aged 13–14 years. The data were collected using a researcher-made questionnaire based on HBM and a food frequency questionnaire (FFQ). The validity and reliability of the questionnaire were evaluated using face validity, content validity, and inter-rater reliability. The Chi-square test, Pearson's correlation, and Spearman's correlation tests were used in SPSS software to analyze the data. The participants declared their informed consent for participation.

Results: The research findings showed that the mean score of students' knowledge was 36.53 ± 21.87; mean scores of perceived susceptibility and perceived severity were 31.88 ± 15.04, and 34.76 ± 19.82, respectively; perceived benefits of reducing the consumption of SSBs was 43.51 ± 20.18, and perceived barriers was 41.56 ± 15.69. There was a direct significant relationship between knowledge and perceived susceptibility as well as between perceived susceptibility and perceived severity. The students' intake of SSBs was calculated as 2.95 glasses per day. There was a direct significant relationship between perceived benefits and mother's job, between perceived barriers and father's job, and between knowledge and mother's age. There was an inverse relationship between perceived susceptibility and father's job.

Conclusion: Considering the high intake of SSBs among students, along with their little knowledge and perception about its negative effects, it seems necessary to plan for proper educational and theory-based interventions for adolescents in order to improve their knowledge and develop a positive attitude toward reducing SSBs consumption.

Keywords: Knowledge, perception, Health belief model, Sugar-sweetened beverages.

INTRODUCTION

Obesity and being overweight are major risk factors for noncommunicable diseases (NCDs).[1] The prevalence of obesity among children and adolescents is rapidly increasing worldwide such that the rate of childhood obesity among children aged 6–11 years has risen from 6.5% to 17%.[2-7] According to the Centers for Disease Control and Prevention

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(CDC), the prevalence rate has increased with more intensity among adolescents aged 12–19 years from 5% to 17.6%.[8] The World Health Organization (WHO) predicted that about 2.3 billion people would suffer from being overweight, and more than 700 million would be obese by 2020.[9]

Obesity was once the major health dilemma in developed countries, but it is a global concern these days.[10,11] Developing countries like Iran are joining the obesity pandemic.[12,13] Recent studies have shown that Iran suffers from numerous nutritional problems and, although the problem of malnutrition is not resolved yet, there has been an increase in being obese or overweight and their associated diseases.[14] It is estimated that about 15% of children and adolescents of Iran are overweight or obese.[15] The national survey on "Risk factors of non-communicable diseases" conducted by the Ministry of Health revealed that 20% of women aged 15–24 years in the Chaharmahal and Bakhtiari province were either obese or overweight.[16] Recent studies have shown that consuming SSBs is sharply increasing among students aged 11–14 years while fruits and milk consumption are rapidly decreasing in return.[17,18] Students' food and beverage choices at this age contain high amounts of sweet drinks (above 16 ounces), high fat content foods, and salty snacks (3.75 ounces fried potatoes). Consuming SSBs, having a high fat diet, and low consumption of fruits and vegetables are associated with the prevalence of obesity.[18,19]

The perceived susceptibility and perceived severity would show people's attitudes toward this issue. Attitudes are basically associated with an individual's emotions. Most adolescents not only deny their poor health status, but assess themselves as being in good health and express their lack of concern regarding obesity. Even in cases that obesity was considered a disease by adolescents, they felt no urge to take immediate actions.[1] Also, there was the incorrect perception that the children of the obese and chubby are in better condition.[20] The health belief model (HBM) is one of the oldest health behavior models and one of the first models that seriously consider perceived susceptibility.[21,22] It should also be noted that negative effects of obesity appear on the broader settings of personal, family, social, economic, and cultural aspects.[20]

A study revealed that 62% of adolescents aged 12–17 years and 41% children aged 2–11 years consume at least one fizzy drink, or other sweetened drinks, per day. Consumption of every single glass of SSBs on a daily basis would increase the risk of obesity by 60%.[23] Another study showed that adolescents consumed one or more glasses of sweetened beverages per day.[24] Scientific evidence indicates that there is a strong relationship between consuming SSBs with gaining weight and other health problems (diabetes, cardiovascular diseases, tooth decay, etc.) compared to other foods.[25] SSBs comprise more than 50% of the added sugar to the diet of adolescents aged 12–17 years and about one third of children aged 2–11 years.[25]

Reducing the consumption of SSBs has widely been recommended by health and medical professionals and governmental organizations. Most SSBs contain caffeine, which is addictive, and should not be consumed by children and adolescents.[25] The

HBM is one of the few models that addresses perceived severity. As discussed earlier, HBM, as an individual model, covers personal factors associated with obesity very well, and its fundamental concepts provide proper responses to these factors among adolescents. Adolescence is an important period for the prevention of obesity. The behaviors associated with the prevention of obesity reduce as adolescents grow up. Furthermore, childhood obesity would most likely continue into adolescence and would escalate in adulthood. Since adolescence is a crucial period of life for establishing healthy eating habits, identifying important factors in developing and promoting healthy eating habits, and especially reducing the consumption of SSBs, can have a significant role in improving an individual's health status. Thus, the present study intended to investigate knowledge and perceptions of female high school students in Shahrekord toward reducing their consumption of SSBs using the HBM.[1]

METHODS

This descriptive-analytical study was conducted in Shahrekord on female high schools for five months during the school year 2013–2014, and 308 students of the first grade were randomly selected from eight governmental schools using class rolls (each of whom were given an individual code). This research proposal is approved with the row number of 8992/4, and all questions are assessed and then approved by the University Research Council, Department of Education, and the Security Department.

The inclusion criteria were studying at the first grade, written informed consent, and voluntary participation in all stages of the study, along with having a Body Mass Index (BMI) of less than 25. The exclusion criteria were being older than 15 years, unwillingness to continue participation in any stage of the study, and absence or transferring to other schools. After obtaining official letter from Shahid Beheshti University of Medical Sciences and presenting it to the Department of Education of Chaharmahal-Bakhtiari province, the researcher received letters of reference to choose schools within districts one and two of Shahrekord.

The researcher asked for the permission and cooperation of the principals of the randomly selected schools for conducting all stages of the research. The researcher entered classes while trying not to disrupt the schedule and the work of the teachers and principals, as well as not to interfere with students' homework and curriculum. The subjects were given comprehensive information about the objectives of the study, and the researcher asked for their consent and willingness to participate in the research. The subjects were also assured that their information would remain confidential and all efforts would be made so as not to impose any physical or psychological harm to them. Finally, the students were asked to fill out the questionnaires.

The demographic data were analyzed using the aspects of family size, student age, parental age, job and education, and student BMI. Weight was measured barefoot in minimal clothing, using a digital scale with 100 g precision (Camry Digital scale), and height was measured barefoot while standing with shoulders in normal position using a tape measure. The students' BMI was calculated by dividing the body weight (in kilograms) by the square of the height (in meters).

Food frequency questionnaire (FFQ) was used to evaluate the SSBs consumption which included soda, nonalcoholic beer, syrups, homemade juices, and commercial juices. The students were asked to report the frequency of each of the drinks based on their unit of measurement (240 cc). The consumption patterns of SSBs were assessed over the previous year, and the students were asked about the frequency of consumption per day, week, and month. Then, the values of total consumption and the frequency of intake were converted into intake per day, so that the SSBs consumption pattern of each adolescent was calculated as glass per day.

The following constructs forming the HBM were assessed: perceived susceptibility, perceived severity, perceived benefits by consuming less SSBs, and related perceived barriers. The construct of perceived susceptibility included six questions with a 5-point Likert scale (completely disagree, disagree, neither agree nor disagree, agree, completely agree). Likewise, the constructs of perceived severity, perceived benefits, and perceived barriers included five, four, and four questions respectively, and they were all assessed using the same Likert scale. In the 5–point Likert scale, the responses of completely disagree, disagree, neither agree nor disagree, agree, completely agree were given scores of 0, 1, 2, 3, and 4, respectively.

Validity and reliability of the questionnaire were evaluated as described below: Face validity of the research tool was evaluated using a complete list of items delivered to a group of 30 female high school students, with similar demographics, economics, and social characteristics to the target population, and their comments on the questionnaire were taken into consideration. Content validity was evaluated by asking five professionals in health education and four nutrition experts to evaluate how much the research tool covers the content and areas of the study. Quantitative content validity was evaluated using the content validity ratio (CVR) and content validity index (CVI).

CVR, developed by Lawshe, considers the judgment of each member of the expert panel, about every single item, using the three options of "The item is essential," "The item is useful but not essential," and "The item is not essential." CVR was calculated after collecting the experts' opinions. According to Lawshe table, the items with CVR values higher than 0.59 were maintained.

CVI was evaluated using the Walts-Basel method. This index was used to ensure that research tool items were properly designed for measuring the constructs of the HBM. Therefore, three criteria of simplicity, clarity, and relevancy with a 4-point Likert scale were used. CVI was measured 0.72-0.80 for different parts of the questionnaire. Internal consistency of the questionnaire was evaluated by Cronbach's alpha coefficient, which was found as 0.8 for knowledge questions and was less than 0.7 for HBM construct questions.

The data were analyzed via SPSS version 16 software using Chi-squared test, Pearson's, and Spearman's correlation tests.

RESULTS

About 76% of participants' mothers were housewives and about 48.70% of fathers were self-employed and 46.10% of fathers and 53.80% of mothers had a high school diploma (Table 1).

Table 1: Demographic characteristics of female students in Shahrekord

Variable		Number	Percent
BMI	18.55-24.99	286	85.92
	Over 25	22	7.15
Father's age	Less than 40 years	140	45.50
	40-50 years	136	44.20
	Above 50 years	32	10.40
Mother's age	Less than 30 years	46	14.90
	30-40 years	227	73.70
	Above 40 years	35	11.40
Father's education	Illiterate	9	2.90
	Primary school	22	7.10
	Junior high school	98	31.80
	High school diploma	142	46.10
	University	37	12.00
Mother's education	Illiterate	2	6.00
	Primary school	13	4.20
	Junior high school	70	22.70
	High school diploma	176	53.80
	University	47	13.00
Father's job	Self-employed	69	22.40
	Employee	150	70.48
	Worker	61	80.19
	Unemployed	7	2.30
	Others	21	6.80
Mother's job	Self-employed	39	12.70
	Employee	35	11.40
	Housewife	234	76.00

Table 2 presents the mean scores of knowledge and the HBM constructs (perceived susceptibility, perceived severity, perceived benefits, and perceived barriers). There was a direct and significant relationship between knowledge and perceived susceptibility, as well as between perceived susceptibility and perceived severity, though there was no significant relationship between knowledge and perceived severity, perceived benefits, and perceived barriers. Furthermore, there was

no significant relationship between other HBM constructs.

There was a direct and significant relationship between perceived benefits and a mother's job, between perceived barriers and a father's job, and between knowledge and a mother's age. There was an inverse relationship between perceived susceptibility and a father's job (Table 3). According to the findings of the present study, the consumption of SSBs by students was calculated as 2.95 glasses per day.

Table 2: The mean and standard deviation of knowledge and perceptions of students on obesity prevention

Variable	Mean ± SD
Knowledge	36.53±21.87
Perceived susceptibility	31.88±15.04
Perceived severity	34.76±19.82
Perceived benefits	43.51±20.18
Perceived barriers	41.56±15.69

Table 3: The correlation coefficients between students' knowledge and perceptions and demographic variables

Variable		Knowledge	Perceived susceptibility	Perceived severity	Perceived benefits	Perceived barriers
BMI	P	0.061	0.082	0.068	0.056	0.521
	r	0.047	-0.085	0.096	0.034	0.021
Father's age	P	0.021	0.102	0.058	0.069	0.301
	r	0.019	0.085	0.100	-0.034	0.291
Mother's age	P	0.028*	0.543	0.541	0.061	0.080
	r	0.026	0.052	0.053	0.023	-0.872
Father's job	P	0.832	0.006*	0.052	0.310	0.041*
	r	-0.017	-0.037	0.021	0.132	0.074
Mother's job	P	0.361	0.512	0.418	0.036*	0.091
	r	0.051	0.071	0.112	0.014	0.132
Father's education	P	0.321	0.832	0.317	0.081	0.061
	r	0.032	0.100	0.760	0.042	0.057
Mother's education	P	0.453	0.921	0.342	0.073	0.073
	r	0.021	0.043	0.081	0.052	0.056

**: P<0.05*

DISCUSSION

Obesity is a multifactor metabolic disorder whose occurrence and development is caused as a consequence of multiple interactions between genetic, physiological, metabolic, socioeconomic factors, lifestyle, especially physical activities, and diets.[26] Recent studies have shown that the prevalence of this disease in the world is rapidly increasing, especially among adolescents, such that overweight and obesity among this age group has become a major public health concern.[27]

The research findings showed that there was a direct and significant relationship between perceived benefits and a mother's job, between perceived barriers and a father's job, as well as between knowledge and a mother's age. However, there was a reverse relationship between perceived susceptibility and a father's job. Akbari et al. did not report a significant relationship between a mother's job and perception of obesity, or education and perception of obesity.[28] In Campbell et al.'s study, there was no significant correlation between demographic variables and a mother's perception, while in the study of Amy et al., a relationship existed between the lower level of a mother's education and her perception of obesity in that the prevalence of obesity was higher among children whose mothers were less educated.[29,30] The reason might be explained by a mother's little knowledge about obesity and health issues, or more importantly, due to the impact of a social culture that considers obese children healthy. In such cases, people consider a certain level of obesity and overweightness as normal, or even crucial, for children and adolescents, so these groups would not be considered as obese; as a result, they would feel no obligations to take steps to prevent obesity and being overweight.

The results showed that students' knowledge of different SSBs and their consumption pattern on a daily basis was not adequate, so it requires great attention. The results of the present study are supported by the result of studies of researchers.[31-36]

Knowledge is an important aspect in education and before expecting an individual to carry out a certain behavior, the person should first be introduced to the nature of that specific behavior and receive information about it. Therefore, before any action is taken, raising the knowledge of individuals about certain issues should be taken seriously. However, the first step in promoting health education is informing people about a healthy lifestyle so that they will benefit from a complete physical, mental, and social well-being.

As seen, knowledge plays a very important role in creating, maintaining, and improving desired health behaviors. Students can only be expected to carry out those behaviors successfully when they are fully aware of these actions, they know the nature of the behaviors, and they receive the information precisely and completely.

The mean scores of perceived susceptibility and perceived severity in the participants were 31.88±15.04 and 34.76±19.82, respectively. The mean scores of perceived benefits in reducing the consumption of SSBs and perceived barriers in this regard were 43.51±20.18 and 41.56±15.69, respectively. These findings showed a low level of students' perceptions, and perhaps of their parents and those around them, of obesity and the attitudes toward health, and its association with being chubby and fat. As mentioned earlier, a certain level of fatness and overweightness is considered normal in society, and it is even considered crucial for children and adolescents; so the society does not consider them obese, and

consequently, they would not commit themselves to take preventive actions against the prevalence of obesity and being overweight.

It should be noted that recent years have witnessed a shift in children's and adolescents' food preferences from traditional foods and healthy snacks to high-calorie, low nutrient foods. Studies show that unhealthy eating habits have become common in Iran, and it is often observed that nutrition is limited to certain foods with no diversity in dietary patterns. The research results indicate that half of Iran's population is suffering from a lack of micronutrients such as iron, iodine, calcium, and vitamins.[37]

According to several studies, unhealthy eating habits are common among children and adolescents worldwide. For instance, according to the reports of United Health Group of the U.S., 61% of American adolescents consume snacks that are high in fat and carbohydrates and low in fiber, which leads to diseases like obesity and being overweight, raises blood cholesterol levels, and causes the development of chronic diseases which would also impose economic burden to countries due to high health care costs.[37] Thus, emphasizing the benefits of drinking water and consuming natural juices instead of soft drinks and artificial drinks is an important and effective step in developing adolescents' perceptions to prevent obesity.

Although many forms of malnutrition among children and adolescents of our society are controlled, and better health and nutrition status are provided for them, following a sedentary lifestyle and especially food preference changes had put them at the risk of many adult chronic diseases. Developing countries are increasingly shifting toward high-calorie, low-value food that would affect them with an epidemic of noncommunicable diseases in coming years.[38]

One of the important solutions in preventing consumption of such low-value foods, especially sodas and artificial juices, is promoting education, especially among adolescents. This age group becomes independent in terms of nutrition mainly during the school hours. They would choose food without the supervision and consultation of their parents and consume high-calorie foods due to various reasons, including exotic tastes of drinks or peer pressure etc. Accordingly, barriers that prevent consumption of fresh/natural juice and water, as the best drink, should be identified, and proper actions should be taken to eliminate or reduce them. As a result, the high consumption of low-value SSBs would be reduced and obesity and many other dangerous and chronic diseases would be prevented.

The research findings reported daily consumption of 2.95 glasses of SSBs among students, which indicates adolescents' high consumption of such harmful drinks. During the previous three decades, the prevalence of obesity and being overweight has increased among adults and children. As discussed earlier, one of the main reasons is the increase in calorie intake in the form of liquid calories and sweet drinks. Some studies support the hypothesis that decreasing the consumption of high-calorie drinks would result in a decrease in weight, too, which is even more effective than decreasing the consumption of high-calorie solid food.[39]

About 24% of adults, 62% of adolescents aged 12–17 years, and 41% of children aged 2–11 years consume soft drinks at least once a day. The risk of obesity and being overweight is 15% more common among people who occasionally drink soft drinks and 27% more common among people who drink them once or more per day than people who do not consume SSBs.[40] The studies conducted by

Neumark-Sztainer et al.[41], Ruyter et al,[31] and Veugelers and Fitzgerald[42] have also indicated high consumption of SSBs among students.

Developing and implementing effective health education interventions and effective theory-based health promotion among adolescents seems necessary. Adolescence is an ideal period for providing nutrition information and developing positive attitudes toward food,[43] since growth during adolescence is associated with an increase in appetite and food consumption.[44] Students who lack proper knowledge and perceptions of obesity consume a lot of sweet drinks. It should be noted that, although schools are an important environment for providing nutrition interventions, families play effective roles in improving healthy attitudes toward food too. Family is the first social institution that an individual experiences. In many cases, parents provide the main patterns of health behaviors, so family plays the most important role, although many other factors can affect people's lifestyles and health behaviors. The adolescents' perceptions of their parents' behaviors are effective in developing a group of health and social behaviors. Therefore, it is recommended to pay more attention to families and hours spent at home for improving obesity prevention measures.

CONCLUSION

Meanwhile, peer pressure should not be ignored. Sometimes eating habits are developed only for being accepted among peer groups and unhealthy eating behaviors are developed as a consequence of lack of access to healthy food. The attractive and eye-catching appearance of foods is also important in making food choices. Attractive, colorful packaging of high-calorie, low-value food might affect eating behaviors and food choices of adolescents, and they might choose unhealthy food even if they are aware of its low nutritional value. Therefore, it is recommended to employ health education, health promotion theories, and patterns based on personal, environmental, and social factors influencing an individual's behaviors in future studies.

The important limitation of the study was students' self-report which might have caused inaccuracy in answering the questions. Also, the questionnaires were filled during hours that students had more free time during physical education classes. So, the questionnaires might have been filled carelessly.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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