

## Proper Consumption of Sugary Drinks and its Association with Adolescent Girls' Knowledge and Skill

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### Abstract

**Background:** Changes in the nutritional behaviors from consumption of traditional nutrients to intakes of high energy, concerned in powering the increasing problem in adolescents and children's obesity. The current study intended to evaluate Proper consumption of sugary drinks and its association with adolescent girls' knowledge and skill in Shahr-e-kord city, Iran.

**Materials and Methods:** This was a cross-sectional study carried out on girl's students in Shahr-e-kord city. Using random sampling method and based on sampling size formula, a total of 308 of the girls students were randomly selected from the schools and were registered into the study. Then they received a research-made questionnaire containing questions about the knowledge, skill and Food Frequency Questionnaire (FFQ). The collected data were analyzed using SPSS version 18.0 by ANOVA, and Pearson correlation coefficient.

**Results:** The mean age of the participating adolescent girls was  $13.86 \pm 1.3$  years old. The mean score for knowledge was  $36.53 \pm 21.87$  and the mean score for the skill of preparing and consumption of sugar free drinks was  $35.77 \pm 24.67$ . The average amount of daily consumption of sugary drinks among studied adolescent girls was 2.95 glasses. There was a direct significant association between students' knowledge and skill ( $P = 0.002$ ,  $r = 0.182$ ), There was also a significant reverse association between adolescents' skill ( $P = 0.006$ ,  $r = -0.228$ ) and knowledge ( $P = 0.05$ ,  $r = -0.322$ ) with consumption of sugary drinks.

**Conclusion:** According to the findings of this study, to increase the consumption of valuable foods and improving adolescents' nutritional habits, more attention should be paid to the health education and promotion and by using effective relevant patterns and theories.

**Keywords:** Adolescent, Behavior, Knowledge, Skill, Sugary Drinks.

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## 1- INTRODUCTION

The prevalence of obesity in Iran has been increasing in recent years. This dramatic increase may be due to changes in the life style, especially in form of increase in consumption of animal source foods, sugar and sugary drinks and decrease in fiber rich foods (1-5). Recent researches have shown that while consumption of sugary drinks has increased remarkably among students, consumption of fruits and milk has decreased dramatically among 11 to 14 years old students (6, 7).

The choice of students' foods and drinks in these age groups includes a lot of sugary drinks (more than 16 ounces), and also a lot of fat and salty snacks. Obesity is attributed to the consumption of sugary drinks and having a full of fat diet, and also low consumption of fruit and vegetables (7, 8). In America, sugary drinks are the main source of sugar in diet (9). The daily consumption of sugary drinks doubles the probability of overweight and obesity (10, 11). In women, consumption of these drinks has a direct association with gaining weight (12). Consumption of liquid sugar in foods is one of the main causes of weight gain. Sugary drinks also have had an alarming increase, although they have been recently added to the daily diet (10). Consumption of these drinks in America has had 300 percent increase during past 20 years (12, 13), and their role in incidence of obesity is obvious (13).

An Iranian study showed that 51% of teenagers eat snack, unsuitable juice and soda weekly. Therefore, teenagers, currently, eat more fast food compared to preceding compeers (14). In 2013, it was assessed that above 42 million of teenagers were overweight, that 31 million of them being from developing countries. From 1990 to 2010, overweight and obesity in children and adolescents had 2.5% growth at the worldwide level (15).

One of the main predictors of consumption of sugary drinks is ability to behave. Both knowledge and skill are needed to do necessary behaviors. In other words, if someone must do an especial behavior, at first he/she must know that behavior (knowing the behavior) and then must know the way of doing that (skill).

Therefore ability to behave means that one should know the behavior and know how to do it (16). Adolescents' knowledge about the suitable amount of consuming sugary drinks and their skill in preparing sugar free drinks and also their contribution in preparing these drinks and natural juices is considered very important. Many adolescents may be able to recognize healthy foods, but they do not have the basic skills to prepare them. Some obstacles like lack of skill must be identified and if needed, appropriate interventions must be carried on (17). Considering the importance of the mentioned issues, this study was conducted in Shahrekord city, Iran, to investigate the status of proper consumption of sugary drinks and its association with adolescent girls' knowledge and skill.

## 2- MATERIALS AND METHODS

### 2-1. Study Design and Population

This descriptive- analytical study was conducted among girl students in Shahr-e-kord city, Iran, durring 2013-2014. 308 girl students from 8 governmental high schools were carefully chosen randomly by means of attending list. Since the whole Shahr-e-kord city is covered by two regional education departments and according to the quantity of students in each school, 4 schools from the section one, and 4 schools from section two, were nominated randomly to make sure that the entire Shahr-e-kord is enclosed geographically and culturally.

With considering the **p** (30%) and **Z** confidence level (1.96) and **d** accuracy rate (0.05), sample size was considered according to the following formula namely formula 323.

At the end, 15 questionnaires were excluded because they were filled incompletely. Therefore 308 questionnaires were finally analyzed (Percent response=95.3%). The sample size was calculated by using the

following formula which is known as 323 formula:  $n = z^2 p(1-p)/D^2 = 323$

## 2-2. Measuring tools

Researcher made questionnaire was used based on the Knowledge and Skill of sugary drinks in three sections (**Table.1**):

- General characteristics (8-question),
- Knowledge (6-question),
- Skill of sugary drinks (2-question).

**Table.1:** Measurement tools

Scoring method	Knowledge questions
The correct answer, the score is 1 and the wrong answers or "I do not know" is zero score.	How much sugary drinks shall be consumed?
	Which of the following drinks are considered sugary? <ul style="list-style-type: none"> <li>▪ Soda</li> <li>▪ Dry powder drinks</li> <li>▪ Industrial juices</li> <li>▪ Tea</li> </ul>
Scoring method	Skill questions
Never = 0 Rarely = 1 Sometimes = 2 Usually = 3 Always = 4	Have you ever made a sugar free drink?
	Do you make natural juice at home as a snack?

The collected demographic data included number of family members, students' age, parents' age and their job and education level. In order to investigate the students' knowledge about reduction in consumption of sugary drinks, a researcher made questionnaire containing 6 questions was used. In scoring the knowledge questions, the true answers had one point and wrong ones had zero. In order to investigate the adolescents' skill in reducing consumption of sugary drinks, 2 questions were used ("Have you ever made a sugar free drink?" and "Do you make natural juice at home as a snack?"). Answers were scored according to the Likert 5-point scale (never, rarely, sometimes, usually, and always). Choosing

never had zero points, rarely had 1, sometimes 2, usually 3 and always had 4 scores. In this study, in order to evaluate the frequency of consumption of sugary drinks, food frequency questionnaires (FFQ's) questionnaire which includes carbonated drinks, non-alcoholic beer, syrups, homemade juices and industrial juices was used. Students were asked to report the frequency of consumption of each sugary drink based on the scale of a 240 milliliter glass. The duration of evaluating the consumption of sugary drinks was 1 month and the frequency of consumption in a day, week and a month was asked. In order to prevent careless answers, students were asked to take the questionnaires home and

write the number of drinks consumed in a were changed into consumption in a day and therefore the daily consumption of sugary drinks by each adolescent was calculated in glass per day unit. In order to assess the validity and reliability of the questionnaire the following levels were performed: to assess the face validity of the questionnaire, a complete list of items was given to a group of 30 high school girls with the similar demographical, economic and social characteristics to the target population. Their ideas were applied in the questionnaire. In qualitative assessment of the content validity, 5 experts in health education and 4 experts in nutrition were asked to check the concept and coverage of the statements. The reliability was assessed by internal consistency method and it was  $\alpha=0.8$  for knowledge and  $\alpha=0.81$  for skill questions.

### 2-3. Inclusion criteria

The study inclusion criteria consisted of being a first-year female student in a public high-school in Shahr-e-kord, giving a knowledgeable written agreement, preparedness to contribute in every phase of the study.

### 2-4. Exclusion criteria

The study exclusion criteria consisted of being older than 15 years, unwillingness to contribute, and the scholar's absenteeism or moving to other school and unfinished of the form.

### 2-5. Ethical considerations

After random selection of schools, the researcher obtained schools principals' agreement for all phases of the study and made needed coordination to attend classes without interfering teachers and students. Goals of the study were explained for was also a statistically significant association between mothers' age (P=

week. Then the amounts and frequencies participants and after assuring them about confidentiality of their information, consent was obtained from them. While the best was done to not to make any physical or psychological harm to the students, the questionnaire was given to them to fill.

### 2-6. Data analyses

To evaluate the data with respect to attaining the study purposes as well as the qualitative and quantitative variables, using the SPSS statistical software version 18.0, and one way analysis of variance (ANOVA), Pearson test and also Kolmogorov - Smirnov test were used.

Kolmogorov - Smirnov test was used to test the normality of data distribution. In order to examine the sugary drinks consumption skill in various groups (parents education level, age and job) ANOVA was used. Pearson test was used to examine the connotation between structures. P-value less than 0.05 were significant.

## 3- RESULTS

The mean age of the participating adolescent girls was  $13.86 \pm 1.3$  years old. The mean score for knowledge was  $36.53 \pm 21.87$  (out of 100) and the mean score for the skill of preparing and consumption of sugar free drinks was  $35.77 \pm 24.67$  (out of 100). The average amount of daily consumption of sugary drinks among studied adolescent girls was 2.95 glasses which is very high. **Table.2** shows that there is a statistically significant association between mothers' job and adolescents' skill in preparing low sugar drinks (P=0.043). Therefore students whose mothers were housewives, had a higher skill in preparing sugar free drinks or natural juices. There 0.050) and education level (P= 0.029) and knowledge. In contrast, students whose

mothers' age was less than 30 years, had a better knowledge about various types of drinks. In addition, students whose mothers' education level were higher, had a better knowledge about various natural and industrial drinks and had better answers for the questions about daily consumption of sugary drinks. There was no statistically significant association between adolescents' knowledge and skill and other demographic variables (such as father's age and education level) ( $P>0.05$ ) (**Table.2**). In answering the question of "Have you ever made a sugar free drink?" 146 (47.4%) adolescents chose "never" and in answering the question of "Do you make natural juice at home as a snack?" 101 (32.8%) adolescents said they rarely prepare natural juice as a snack at home (**Table.3**). There was a direct significant association between students'

knowledge and skill such that girls who had higher knowledge about drinks, had better skill in preparing sugar free drinks and natural juices ( $r=0.182$  and  $P=0.002$ ). A negative association between adolescent girls' knowledge and consumption of sugary drinks was observed ( $r= -0.322$  and  $P=0.05$ ). In contrast, students who had higher knowledge about various types of sugary drinks reported an averagely lower daily consumption of them.

There was also a significant reverse association between adolescents' skill in preparing natural or low sugar drinks and daily consumption of sugary drinks such that those who had better skill in preparing natural juices or sugar free drinks reported lower daily consumption of sugary drinks ( $r= -0.228$  and  $P=0.006$ ) (**Table.4**).

**Table-2:** The association between knowledge and skill of proper consumption of drinks and demographic variables in girl students

Variables	Sub-groups	Skill	P-value	Knowledge	P-value
Father's age (year)	< 40	34.2±22.45	P=0.469 F=0.759	35.84±25.52	P=0.998 F=0.002
	40-50	31.53±20.64		35.66±23.15	
	>50	29.68±21.34		35.94±27.80	
Mother's age (year)	< 30	30.44±25.23	P=0.103 F=0.288	31.88±21.89	P=0.050 F=0.003
	30-40	31.77±20.00		35.17±24.55	
	>40	39.64±24.91		44.76±27.35	
Father's education level	No education	27.78±16.27	P=0.859 F=0.329	29.63±16.20	P=0.533 F=0.789
	Primary school	30.11±25.78		33.34±23.57	
	Guidance school	32.01±12.03		35.55±25.40	
	High school	32.76±22.07		35.09±24.69	
	Academic	35.13±19.73		41.90±25.04	
Mother's education level	No education	31.25±44.19	P=0.972 F=0.129	41.67±58.93	P=0.029 F=0.249
	Primary school	29.81±18.07		24.36±19.97	
	Guidance school	33.57±24.13		32.62±25.45	
	High school	32.03±19.44		37.41±23.99	
	Academic	33.25±25.44		37.23±25.59	
Father's job	Self-employed	30.92±21.32	P=0.181 F=0.574	37.34±25.52	P=0.582 F=0.715
	Employee	35.51±19.48		36.23±24.25	
	Worker	35.66±23.03		31.42±22.99	
	Job less	21.43±9.45		40.47±16.26	
	Others	27.97±25.89		34.13±27.12	
Mother's job	Self-employed	38.22±24.98	P=0.043 F=0.826	37.62±30.62	P=0.875 F=0.134
	Housewife	31.25±21.24		35.40±24.06	
	Employee	34.61±19.33		36.32±22.90	

**Table-3:** The mean score and frequency of answers to the skill questions

Questions	Mean $\pm$ SD	Never (%)	Rarely (%)	Sometimes (%)	Usually (%)	Always (%)
Have you ever made a sugar free drink?	1.12 $\pm$ 1.10	91 (29.5)	146 (47.4)	32 (10.4)	20 (6.5)	19 (6.2)
Do you make natural juice at home as a snack?	1.47 $\pm$ 1.15	82 (26.6)	101 (32.8)	55 (17.9)	30 (9.7)	20 (6.5)

**Table-4:** The association between consumption of sugary drinks and adolescent girls' knowledge and skill

Variables	Knowledge	Skill	Consumption of sugary drinks
Knowledge	1		
Skill	p = 0.002, r = 0.182	1	
Consumption of sugary drinks	p = 0.05, r = -0.322	p = 0.006, r = -0.228	1

#### 4- DISCUSSION

Some factors like prevalence of inactivity and promotion of high calorie foods with low nutritious value have changed the consumption patterns and made children prone to overweight and obesity (18). In this study, there was a statistically significant association between mother's job and the skill of preparing low sugar drinks; such that students whose mothers were housewives had better skill in preparing sugar free drinks or natural juices. It is probably because housewives have enough time to train their daughters how to make healthy homemade juices.

There was also a statistically significant association between mothers' age, education level and knowledge. Therefore students whose mothers' age was less than 30 years had higher knowledge about various types of drinks. In addition, students whose mothers' education level was higher, had better knowledge about various natural and industrial drinks and also had better answers about daily consumption of sugary drinks. Maybe it is because younger mothers have

more patience and therefore have more friendly relationships with their daughters. In addition, educated mothers have more information about beneficial foods and their calories and therefore they give more information to their children. There was a significant direct association between students' knowledge and skill. In contrast, girls who had higher knowledge about various types of drinks had better skill in preparing sugar free drinks or natural juices. This finding may be related to this issue that when someone has more knowledge and information about an especial behavior, he tries to know how to do that behavior and tries to learn the skill of doing that specific behavior. A significant reverse association was observed between students' knowledge and consumption of sugary drinks. Students who had higher knowledge about sugary drinks and the amount of their consumption, reported lower daily consumption of them. It is obvious that when people have enough knowledge, it may affect their attitude to do a behavior. In this study adolescent girls could avoid or minimize consumption of high calorie drinks and industrial drinks by

having knowledge about their low nutritious value and high calorie. In addition, a significant reverse association between adolescents' skill in preparing natural or low sugar drinks and daily consumption of sugary drinks was reported such that girls who had better skill in preparing natural juices or sugar free drinks had reported averagely lower daily consumption of sugary drinks. When people are able to prepare natural, fresh and healthy juices themselves, it is more probable to avoid consumption of industrial and other harmful carbonated drinks.

Results of this study showed that adolescent girls' knowledge about various types of sugary drinks and amount of their consumption was not sufficient, and it is necessary to pay more attention to the promotion of their knowledge, so that they know various types of natural and industrial drinks and the harms of industrial drinks. Results of this study is consistent with the results of studies conducted to reduce the consumption of sugary drinks or preventing the causing factors of overweight and obesity. For example in a study conducted by Ruyter et al., it was reported that at first the participants' knowledge about various types of drinks and risks of sugary drinks was low and therefore their consumption was high (19).

Branscum and Kaye investigated the factors related to obesity such as knowledge and skill. Then by doing some interventions they could improve the knowledge to choose low calorie snacks, drinks without additional sugar and foods with less additional sugar (20). Azadi et al. conducted a study to investigate the effect of using health promotion program in schools to control the factors related to adolescents' obesity. They could promote the nutritional knowledge of children and reduce the consumption of fast

foods and junk foods (21). Kain et al. (22) and James et al. (23), achieved a lot of successes in prevention of obesity in children via reducing the consumption of sugary drinks and by emphasis on knowledge improvement and encouraging students to consume sugar free drinks (dispensing at schools) and increasing the consumption of water and Sharma et al. (24). In order to promote adolescents' knowledge, the process of peer education may be used to made positive effects on children and adolescents' behavior. The health education program based on peer education approach is an integrated program to make an effective network of peers to encourage and support children and adolescents for the promotion their health. It will provide an opportunity for children and adolescents to acquire the needed knowledge about health related issues by using interactive and participatory values and convey that to other peers (25).

The average daily consumption of sugary drinks in the participating adolescent girls was 2.95 glasses and it shows that consumption of these harmful drinks is high. During past three decades, the prevalence of overweight and obesity in children and adults has had an increasing trend. One of the factors that has been increasing together with obesity, is increase in calorie intake in form of sugary drinks. Some studies have shown that despite of solid foods, liquid sources of calorie do not satisfy the appetite (therefore by using them one feels that he needs more and more calorie) (12). A person should run for 20 minutes to burn the energy of a 300 milliliter sugary drink (150 calories). Carbonated drinks and sugary juices have a lot of sugar and therefore their excessive consumption lead to obesity and its related complications (26). A reason for the incidence of obesity after consumption of sugary drinks is their low saturation rate.

In other words, the consumer will not feel full after drinking them and therefore consumption of sugary drinks will not lead to reduction in consumption of solid foods. So the calorie intake will be increased and obesity will happen (12). It is obvious that one of the key behaviors to prevent overweight and obesity in one's life style is avoiding consumption of sugary drinks or at least limiting it to once a day. Learning these skills will eventually enable adolescents to get the needed information from various channels and use that information in practice, so that they can improve their nutrition and promote their own health.

#### **4-1. Limitations of the study**

The limitations of present study comprise its use of self-report questionnaires; this study measured merely high-school girls' scholars in government schools.

#### **5- CONCLUSION**

According to the findings of this study, the mean score of adolescents' knowledge was  $36.53 \pm 21.87$  and the mean score of skill in preparing and consumption of sugar free drinks was  $35.77 \pm 24.67$  which are low. The average daily consumption of sugary drinks in the studied students was 2.95 glasses which is very high. There was a significant direct association between students' knowledge and skill. A significant reverse association was also observed between adolescents' knowledge and skill and consumption of sugary drinks. In order to increase the consumption of valuable foods and improving adolescents' nutritional habits, more attention should be paid to the health education and promotion; also by using effective relevant patterns and theories, try to enable students to

increase their control on their own health. Beside school based interventions, more attention must be paid to the role of family and peers, because many of the nutritional habits are affected by family, peers and friends.

**6- CONFLICT OF INTEREST:** None.

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