Research Article

A survey of factors associated with soft drink consumption among secondary school students in Farooj city, 2010

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Abstract

Introduction:
There is a high tendency for consumption of soft drinks in Iran and worldwide. Scientific and medical community is concerned about the harmful side effects of such drinks. This study aimed to determine the factors associated with soft drink consumption in secondary school students in Farooj city in 2010.

Material and Methods:
This is a descriptive-analytical study. A convenience sample included 222 students studying in secondary schools in Farooj city. They were selected through multi-stage sampling method. The data were collected through two questionnaires made by the researcher. Reliability and validity of the scales were estimated. The data were analyzed using SPSS software for Windows.

Results:
The results showed that 94.1% of the students regularly consume soft drink. The majority of the students are drinking it at home and then in the parties. About half of the students reported that soft drink consumption can increase obesity, osteoporosis, teeth decay and reduce the appetite. Important reasons for soft drink consumption among the students were consumption of soft drink by friends, enjoying soft drink with meals, interest in flavored soft drinks and receiving pocket money of parents.

Conclusion:
The rate of consumption of soft drinks among the students is high. Interventional programs focusing on the most important factors affecting its consumption are recommended to be held.

Keywords: Students, Taste, Factors

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Introduction:

Recent years have observed a rapid change in dietary habits throughout the world, including Iran. This change has brought about the replacement of nutritious snacks with worthless and junk food (1-2), such as carbonated drinks (3). Drinks and fast foods are rich in sugar, fat and calories and are abundantly found in schools (4-6) with high popularity among students (7). Iran has one of the highest rates of carbonated drink consumption in the world, with some 48 liters (equal to 144 bottles) consumed annually per capita (8). Figures indicate that transition from childhood to puberty triples the amount of carbonated drinks consumed while reducing the intake of milk and other nutritious foods to a quarter (9). Previous Iranian studies indicate that 51% of children consume cheese snacks, fruit juice, and carbonated drinks every week (10). Sweet drinks, particularly carbonated drinks, may lead to numerous health problems, such as obesity, calcium deficiency, dental problems and tooth decay (11). One meta-analysis conducted on 88 studies investigated the association

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between carbonated drinks and health. The findings indicated that increasing the intake of carbonated drinks is associated with increased calorie intake and weight gain. On the other hand, consuming carbonated drinks will reduce the intake of milk, calcium and other nutrients, resulting in numerous medical problems such as diabetes (12). Previous studies indicate that overconsumption of tartrazine, an additive in condiments such as candy, drinks, chewing gum and jelly, gives rise to allergic disorders including asthma, wheals, hyperactivity and restlessness in children (13). Many reasons justify the intake of carbonated drinks by children, most importantly, low cost, inclination for fast foods which are primarily consumed with carbonated drinks, increased access to carbonated drinks at home and school, parental inclination for using these drinks, gender (boys are more likely to consume these drinks), increased tendency to consume these drinks while watching TV, etc (14-16).

Most studies conducted in Iran or abroad have addressed the nutritional status of students (16-19) or the relationship between consuming carbonated drinks and obesity, bone density, or tooth decay (20-23). However, many international studies have investigated the factors influencing the consumption of carbonated drinks by children (14, 24). Despite the high rate of carbonated drink consumption by children and its potential risks, no study has been conducted so far to evaluate the associated factors in order to provide a ground for designing interventions. Thus, considering the shortage of relevant studies in Iran, we undertook the present study in 2010 to determine the factors affecting the consumption of carbonated drinks among male middle school students in Farooj.

Material and Methods:

This is a descriptive-analytical study conducted in 2010 on 222 male middle school students of Farooj (Northern Khorasan). For this purpose, a questionnaire consisting of two sections was designed by the author. The first section dealt with demographic characteristics (7 questions) and the second section dealt with amount of carbonated drinks used and the associated factors (7 questions). The questionnaire was initially administered to 20 students and their opinions were used to modify the questionnaire. The reliability of the questionnaire was assessed using test re-test and its validity was assessed through measurement of content validity. The correlation coefficient obtained by test re-test (over an interval of 10 days with 10% of sample size) was statistically significant ($r=0.79$, $p=0.005$) for questions dealing with factors associated with drink intake. The inclusion criteria were being a student in middle schools of Farooj, lack of type 1 diabetes and consent for participation. After the study objectives were explained to the students by researchers, any student disinclined to complete the questionnaire would be eliminated from the study. However, no such case occurred. Once the students expressed their consent, they completed the questionnaires. Prior to the study, the Department of Education and middle schools of Farooj were contacted to determine an appropriate time for the study.

The sample size was determined according to the results of a previous study (25) with 95% confidence interval, 80% power and $p=0.18$. Using the equation $n=z^2.pq/d^2$, we determined the sample size to be 226 individuals. 4 students did not return the questionnaires and thus 222 students finally remained in the study. Sampling was completed in a stepwise manner: initially, 3 middle schools of Farooj were selected; subsequently, 25 students were randomly selected from every grade of each school (75 students from each school) to complete the questionnaires.

The collected data were analyzed using SPSS version 16. We used one-way analysis of variance to study the difference between different groups in terms of amount of drink intake for quantitative demographic variables, and chi-square for comparing the amount of weekly drink intake for qualitative variables as well as reasons of intake. P values ≤ 0.05 were considered significant.

Results:

Characteristics of study units: The youngest and oldest participants were aged 12 and 17 years, respectively. The mean age of participants was 14 ± 1.2 years and the mean birth rank was 3 ± 2.1. Regarding the fathers' education, 7.7%

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had university education, 18.5% had high school education, 31.5% had middle school education, 22.1% had elementary school education and 20% were illiterate. As for mothers' education, 11.3% had university education, 12.6% had high school education, 23% had middle school education, 32.5% had elementary school education, and 21.2% were illiterate. The mothers were employees in 11.3% of cases and house makers in 88.7% of cases. As for fathers, 10.4% were employees, 5% were unemployed, 27.5% were workers, 16.2% were farmers and 41% worked in the private sector. The mean number of siblings was 3 ± 2.1.

One-way analysis of variance indicated no significant relationship between the weekly amount of drink intake and mean age ($p=0.2$), mean birth rank ($p=0.6$), and mean number of siblings ($p=0.7$). Chi-square test indicated a significant relationship between weekly amount of drink intake and paternal occupation ($p=0.006$), paternal level of education ($p<0.0001$), maternal occupation ($p<0.0001$), and maternal level of education ($p=0.006$). These findings indicate that students with house-maker mothers and worker fathers tend to use more carbonated drinks compared to others. Moreover, the amount of drink intake decreases with increasing level of parental education. In other words, those students who have mothers with elementary school education and fathers with middle school education tend to use more drinks than others. Therefore, it may be concluded that with increasing level of parental education and occupation status, the amount of drinking carbonated drinks falls for the students.

Drink intake and its associated factors: The findings of the present study indicate that 209 students (94.1%) use carbonated drinks. Furthermore, the frequency of using drinks is daily for 8.1% of students, 5-6 times per week for 10.8%, 3-4 times per week for 22.1%, and 1-2 times for 53.1%. Also, 47.3% of students drink less than one glass (not accounting for ice), 41.4% drink 1-3 glasses, 4.5% drink 4-5 glasses, 1.4% drink 6-8 glasses, and 5.4% drink more than 8 glasses of carbonated drinks per week. The amount of drinks used was always more than the amount of water for 3.2% of students, usually more than water for 11.7%, sometimes more than water for 31.5% and never more than water for the rest of students.

Regarding the place of using drinks, 44.1% of students drank at home, 0.9% on the way from school to home, 36.5% in parties, 13.5% on the street and 5% of students used the drinks in parks. 4.5% of students stated that they always drank soft drinks while watching television. 3.6% stated to drink soft drinks usually and 25.2% sometimes drank soft drinks while watching TV. 66.67% reported that they never drank soft drinks while watching TV.

Table 1 summarizes the absolute and relative distribution of frequency for factors associated with using carbonated drinks. The results of chi-square test indicated a significant relationship between weekly intake of soft drinks and reasons such as presence of drinks at home ($p<0.001$), not liking milk and therefore preferring soft drinks ($p<0.0001$), being accustomed to soft drinks ($p=0.03$), enjoying soft drinks with meals ($p=0.002$), and better digestion with soft drinks ($p=0.03$). However, no significant relationship was found for other reasons including daily allowance, access to soft drinks at school cafeteria and surrounding shops, parental soft drink use, use of soft drinks by friends, and enjoying the taste of soft drinks.

Discussion:

The present study revealed that some 94% of students use soft drinks and the frequency of use is 1-2 times per week. This is higher than the amounts reported in previous studies. For instance, Grimm et al reported that 85% of school-aged American children use soft drinks (14). A study conducted by the North Carolina Nutrition Action Committee revealed that 56% of children aged 8, 72% of children aged 9-13 years, and 83% of children aged 14 use soft drinks (26). The findings of a study by Pourhashemi et al indicated that on the average, children in Tehran use sugar products 2.22 times and drink soft drinks 0.16 times per day (20).

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Table 1: Absolute and relative distribution of frequency of factors associated with soft drink use according to the students in the study

	Yes		No	
	Absolute Frequency	Relative Frequency	Absolute Frequency	Relative Frequency
Enjoying the taste of soft drinks	151	68%	71	32%
Access to soft drinks at home	36	12.2%	186	83.8%
Use of soft drinks by friends	111	50%	111	50%
Parental use of soft drinks	74	33.3%	148	66.7%
Access to soft drinks at school cafeteria and surrounding shops	94	42.3%	128	57.7%
Not liking milk	55	24.8%	167	75.2%
Being accustomed to soft drinks	70	31.5%	152	68.46%
Daily allowance	112	50.5%	110	49.5%
Enjoying soft drinks with meals	146	65.8%	76	34.2%
Better digestion	88	36.6%	134	60.4%

In the present study, only 54% of students stated that their soft drink use always exceeds their water intake. Studies indicate that with increasing amounts of soft drink use, the level of water and milk use diminishes. Forshee et al reported that from 1994 to 2002, the amount of milk intake decreased in children aged 6-11 years alongside an increase in soft drink use, with the mean frequency of soft drink use reaching 1.7 and 1.1 times per day for boys and girls, respectively (27). Libuda et al conducted a study on German children and adolescents to discover an inverse relationship between soft drink and milk use. Moreover, they found an inverse relationship between bone density and amount of carbonated and caffeine-free drinks used (21). Fallah et al reported that 55% of male and 68% of female students aged 11-14 years residing in Damghan receive less than 75% of necessary calcium (17). Ha et al demonstrated that educational classes focusing on prevention of chronic diseases may diminish the use of carbonated drinks and improve the amount of low-fat milk intake in students aged 18-24 years (16).

Most students in the study mentioned that they use the drinks at home. We found a statistically significant relationship between presence of drinks at home and its weekly use. This is consistent with findings of French et al who reported home as the greatest source of soft drinks available to children (7). Horest et al concluded that the nutritional conditions of school have little to do with the amounts of soft drinks and junk food and the role of personal cognition (attitude, arbitrary norms and pattern makings) is greater than that of school (28). Some studies, e.g. one by Meenakshi et al, reported schools as the source of soft drinks for 26% of children (29). Therefore, school principals and parents should consider the health consequences before providing artificially sweetened drinks to children (11). It is essential to orchestrate educational programs through schools and media to improve parents' knowledge about purchasing health drinks (such as yoghurt drinks) and abstaining from carbonated drinks.

In the present study, few students stated that they drank soft drinks while watching television. This finding is inconsistent with those of previous studies. For instance, Grimm et al reported watching TV programs as a motivation for soft drink use, as individuals who watch TV for 3.5 hours or more tend to use more soft drinks (14). This discrepancy may reflect differences in nutritional cultures of different countries; for example, Iranians tend to use dried nuts and seeds when watching TV.

The findings of the present study indicate that the main reason for soft drink use by students is enjoying the taste of these drinks, followed by receiving allowance from parents, enjoying meals with soft drinks, and drink use by friends. In a study by Mahmood et al, female young adults reported enjoying the taste of soft drinks as the main reason (32%) for using them (31). Grimm et al reported that most students (96%) used soft drinks as a result of the inclination to taste carbonated drinks. According to them, individuals with a strong taste for carbonated drinks are 4.5 times more likely to use them during the week (14). Madani et al reported the major reasons for using soft drinks by female

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students of Jaddeh to be enjoying the taste of drinks, parents' habit for drink consumption, and presence of carbonated drinks at home (24).

In the present study, 25% of students mentioned that they disliked the taste of milk and thus replaced it with soft drinks. It must be noted that flavored milk is being produced by the Iranian food industry in order to attract children; nevertheless, there is insufficient marketing and notification regarding these products and they have not been introduced to school cafeterias either.

The present study indicates that 33% of students attribute their soft drink use to the inclination towards soft drink use by their parents. Moreover, we found a significant inverse relationship between parental occupation and education level and the amount of soft drinks used per week, indicating that educated and employed parents are better aware of the adverse effects of soft drinks and are therefore less likely to purchase them. Fisher et al reported that the mother's favorite drink influences the choice made by their daughters between carbonated drinks and milk (15). Similarly, Grimm et al demonstrated a strong relationship between soft drink consumption by parents and access to soft drinks at home and soft drink consumption by students. In other words, students whose parents drink soft drinks regularly are three times more likely to consume soft drinks during the week compared to other students (14). Utter et al concluded that consumption of homemade meals is directly related to the nutritional conditions of the house and positive nutritional behaviors such as parents' support for healthy foods, having fruits at home, consuming five servings of fruit and vegetables per day, having breakfast, taking lunch from home, and not watching TV during meals. Their findings indicated that most families which dine together are those who have healthy food at home and encourage their children to eat healthy food (31).

The present study indicated that consumption of soft drinks by friends is an important factor affecting soft drink use in 50% of students. According to Grimm et al, 30.7% of students aged 8-9 years and 67.6% of those aged 12-13 years stated that their friends drink soft drinks regularly and they would like to consume soft drinks like their friends (14). Furthermore, Horest et al concluded that copying peers and parents is an important factor influencing soft drink and snack consumption (28). As students watch and learn from each other, notifying the students about the adverse effects of soft drinks must be an educational priority in our schools.

Conclusion: The findings of the present study indicate a high rate of soft drink consumption by students. In order to diminish use of carbonated drinks by students, it is necessary to provide appropriate training for the students and their parents about the adverse effects of soft drinks, as well as to lower the price and improve access to healthy drinks such as natural fruit juice, mineral water, and low-fat milk. Additional strategies which may be implemented by governments is to suppress advertisements encouraging soft drink use, produce and promote flavored milks, increase the number of hygienic water dispensers in the streets, and raise the production and sales tax for soft drinks.

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