AWARENESS OF FEMALE MEDICAL STUDENTS IN KING FAISAL UNIVERSITY ABOUT HAZARDS OF CARBONATED SOFT DRINKS

Community Medicine

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ABSTRACT

BACKGROUND: carbonated drinks are composed of CO₂, phosphoric acid, sugars, coloring and flavoring agents and caffeine. Carbonated drinks cause serious complications like teeth decay, osteoporosis, obesity and type 2 diabetes.

The aim of the study is to assess the awareness about the hazards of carbonated drinks among the medical students.

SUBJECTS AND METHODS: Cross-sectional study was conducted to assess the awareness of the hazards of carbonated drinks among female medical students in King Faisal University in Al-Ahssa, Saudi Arabia. A questionnaire was prepared in English in relation to the knowledge, attitude and practice and was distributed to 50 students.

RESULT: Out of all participants (94%) had knowledge about ill effect of carbonated drinks.

CONCLUSION: Appropriate health education for the students should be incorporated. An additional strategy should be implemented by governments to suppress soft drinks' advertisements and raise its sales tax to combat this problem.

KEYWORDS

Awareness, Hazard, Soft Drinks

1. INTRODUCTION:

The term soft drinks refers to non-alcoholic water based flavored drinks that are potentially sweetened, acidulated and carbonated (1). Carbonation, which produces the characteristic effervescence and bubbling, occurs when carbon dioxide is dissolved in water or an aqueous solution. The acidic nature is derived from conversion of dissolved CO₂ to HCO₃⁻ and H⁺ by interaction with H₂O as well as additives such as citric acid, phosphoric acid (2) and benzoic acid which is commonly used as preservative (3). Sugars, which are added to many carbonated beverages to impart a sweet taste, add calories and increase the osmolality of the beverage. Artificial sweeteners provide a sugary taste without increasing the caloric content of the beverage (2). Also, these drinks contain synthetic coloring and flavoring agents that are allergenic (4). Other additives such as caffeine are also present in cola type of soft drinks and in energy drinks (2).

Scientific studies have shown how as few as one or two soft drinks a day can increase one's risk for numerous health problems (5). First, soft drinks contain no nutrients and they cause nutritional deficiencies because when one consumes carbonated beverages instead of milk, juice and water, body will not get some of the nourishment as per the needs (6). Second, dental cavities are often associated with carbonated beverage because the amount of sugars that are consumed is important in forming caries, in which a cavity affects only the enamel, the outer protective layer of a tooth. Caries are caused by the bacteria *Mutans streptococci* that attach to teeth and produce high amounts of acid from sugars and other types of acid. The acids that are not buffered dissolve the apatite crystals of a tooth's surface; this process is called demineralization. Teeth can be mineralized by calcium, fluoride and phosphate, which are all contained in saliva. Caries are formed when the process of demineralization occurs more often than the process of remineralization (6). Another thing is that caffeine is considered as a mildly addictive stimulation drug which can cause disturb sleep patterns, bedwetting and anxiety in children and young adults (7). Also, it is a natural diuretic, and so can actually make thirstier and encourage dehydration (6). Furthermore, it can cause withdrawal symptoms, such as headache, fatigue, decreased alertness, depressed mood and irritability (7) and it can result in extra heartbeats (6). In addition, caffeine has been identified as a risk factor for osteoporosis (8, 9). Moreover, soft drink consumption has been found to be associated with low bone mineral density (BMD) and fractures in adolescent girls (10, 11, 12), although some suggest that such associations may be due to displacement of milk consumption more than to any direct effect of soft drink components (13). Likewise, the phosphoric acid, which was shown to interfere with calcium absorption and to contribute to imbalances that lead to additional loss of calcium (8, 9). It has also been suggested that the high fructose corn syrup used to sweeten carbonated beverages may negatively affect bone (14). Additionally, sugar-sweetened beverage consumption may lead to type 2 diabetes because of its effect on weight gain (15), as well as its glycaemic effects, inducing rapid spikes in glucose and insulin

and causing insulin resistance (16, 17). Furthermore, caffeine and the acids can cause gastronomic distress, which is characterized by increased stomach acid levels and causes the inflammation of the stomach and erosion of the stomach lining resulting in stomachache and disruption of the digestion (6). Last but not least, Dr. Charles Best claims that teenagers who consume too many soft drinks have cirrhosis of the liver similar to what chronic alcoholics have (6).

Although carbonated drinks have lots of hazards, it was found that carbonated drinks are the third most consumed beverage (18), which indicates that they are very popular, especially among youngsters (19). Soft drinks consumption is associated with a number of personal factors including the taste (20) and parental influences (21) and environmental factors such as the availability of soft drinks, especially in the home (22, 23), portion size (including the small price differential for larger portions) (24, 25) and the level of exposure for marketing (26). Youngsters consume carbonated drinks in breathtaking quantities and are often unaware of the health hazards of the excess consumption (19). So, the present study was conducted with the objective to find out whether the medical students in King Faisal University in Al-Ahssa have the complete awareness about the hazards of carbonated drinks or not.

2. SUBJECTS AND METHODS:

Cross-sectional study was conducted to assess the awareness of the hazards of carbonated drinks among female medical students. 50 female medical students were randomly selected with age ranging from 18 to 24 years old (from the first to six year studying students) in King Faisal University in Al-Ahssa, Saudi Arabia.

For this purpose, a questionnaire consisting of 3 parts was designed. The first section dealt with knowledge of students regarding the carbonated drinks (5 questions) the second section dealt with attitude of the students (2 questions) and the third part was about the practice of the Students regarding the Carbonated Drinks (5 questions). The questionnaire was distributed to the students to be filled by them. The data were collected and analyzed using software program SPSS version 21. Frequency and percentage were calculated.

3. RESULTS:

Number of students who had participated in present study is 50 female medical students from King Faisal University. Table 1 shows the knowledge of the students regarding carbonated drinks. All the 50 (100%) students had ever knew about carbonated drinks. 42 (84%) students know either most of the components or some of them, but 8 (16%) students have no idea about the composition of carbonated drinks. It was shown that 40 (80%) of participants know that carbonated drinks contain sugar, 31 (62%) know about carbon dioxide (CO₂), 29 (58%) know about caffeine, 15 (30%) know about citric acid, 9 (18%) know about high fructose corn syrup and 8 (16%) know about phosphoric acid. Most of the participants 42 (84%) know that

osteoporosis one of the side effects of carbonated drink consumption and the side effect that has the least percentage 7 (14%) is belching. 39 (78%) are aware about obesity, 36 (72%) are aware about teeth decay, 24 (48%) are aware about diabetes type 2 and 21 (42 %) are aware about gastritis.

Table: 1 Knowledge of the students regarding the carbonated drinks (n=50)

Responses:		Frequency	%
Knowing About Carbonated Drinks	Yes	50	100
	No	0	
Reading the ingredients on the bottles:	Yes	34	
	No	16	
knowing about the composition of carbonated drinks	Yes	42	
	No	8	16
Knowing that carbonated drinks contain:	Sugar	40	
	Co2	31	
	Caffeine	29	
	Citric Acid	15	30
	contain high fructose corn syrup	9	18
	phosphoric acid	8	
knowing about the side effects of carbonated drinks	Yes	47	
	No	3	6
	Osteoporosis	42	
	Obesity	39	
	Teeth Decay	36	
	Diabetes Type 2	24	
	Gastritis	21	
	Sleep Disturbance	10	
	Belching	7	

Table: 2 Attitude of the students regarding the carbonated drinks (n=50)

Responses:		Frequency	%
What would you like to prefer	Fruit Juice	33	66
	Carbonated Drinks	9	18
	Water	5	10
	Milk	3	6
Planning to stop carbonated drinks	Yes	13	26
	No	22	44
	I don't know	7	14

Table-3: Practice of students regarding the Carbonated Drinks (n=50)

Responses:		Frequency	%
Drinking Carbonated Drinks	Yes	33	87
	No	7	61
	Already stopped	3	6
Frequency of Drinking Carbonated Drinks	Less-No drinking	35	70
	Sometime Drinking	5	10
	Frequent Drinking	10	20
Reasons to drink carbonated Drinks	Taste	33	66
	Satisfy Thirst	19	38
	Appeal of Drink	10	20
	Feel Energize	8	16
	Easy Access	7	14
	Family Influence	3	6
	Peer Pressure (Friends)	3	6
	Media Advertisements	3	6
	Others	8	16
Number of years drinking carbonated drinks	4-6	2	4
	7-9	8	6
	10-12	17	34
	12-15	9	18

	More than 15	6	12
Favorite Carbonated Drink	Pepsi	21	42
	Cola	7	14
	7Up	6	12
	Shani	3	6
	Mirinda	3	6
	Cade	1	2
	Beer	1	2

Table: 2 Depicts attitude of students regarding consumption of the carbonated drinks. Around 33 (66%) participants prefer to drink fruit juice instead of carbonated drinks, 9 (18%) participants prefer to drink carbonated drinks, 3 (6%) participants prefer milk and 5 (10%) water is their favorite drink. However about 22 (44%) participants responded that they never had tried or thought to stop drinking carbonated drinks, 13 (26%) participants are planning to stop drinking carbonated drinks and 7 (14%) participants had no idea.

Table 3 shows the practice of students regarding consumption of carbonated drinks. There were 8(16%) students who did not drink carbonated drinks at all and 3(6%) students who already stopped drinking carbonated drinks ,but there were 39(78%) participants who still drink carbonated drinks . regarding practice of a frequent consumption, 10 (20%) participants were those who consumed carbonated drinks frequently and 5 (10%) students had responded that they sometimes consumed carbonated drinks and 35 (70%) students who rarely or never drink carbonated drinks. 33(66%) students considered taste as the main influencing factor for the consumption of carbonated drinks and 19(38%) participants considered that the main cause of their consumption of carbonated drinks is to satisfy Thirst and 10 (20%)students drink carbonated drinks because of the appeal of drinking and 8 (16%) participants drink carbonated drinks because they make them feel energize and that followed by easy access 7 (14%) and Media Advertisement 3(6%), Family influence3(6%), Peer Pressure (Friends) 3 (6%).However , there were 8 (16%) participants who drink carbonated drinks for other reasons.

Pepsi 21(42%) was the main brand of carbonated drinks that was consumed commonly followed by Cola 7(14%), 7Up 6 (12%), Mirinda 3(6%), Shani 3 (6%), Cade1 (2%) and Beer 1(2%). The study also shows the number of years of drinking carbonated drinks, there were 17 (34%) students who have drunk carbonated drinks for 10-12 years and 9 (18%) participants who have drunk carbonated drinks for 12-15 years and 6 (12%) students have consumed carbonated drinks more than 15 years while 8

(6%) students who have consumed carbonated drinks for 7-9 years and just 2(4%) participants who have drunk carbonated drinks for 4-6 years.

4. DISCUSSION:

The present study revealed that that all the students (100%) who had participated in this study have heard about carbonated drinks. This finding is similar to what was reported by Kharde A, *et.al.* (18).

In the present study, it was found that more than two-thirds (78%) of medical students drink carbonated drinks this value is comparable to high consumption of carbonated drinks of high school students of united states which was about two-thirds (65%) (27), but it is considered to be higher than US children and youth from 6 to 17 years of age which was found to be increased from 37% to 56% (28). Furthermore, in the present study it was found that the students were highly aware about side effects of carbonated drinks (94%) which is comparable to other studies (6, 18). Moreover, the students were more aware about individual side effects as obesity (78%), osteoporosis (84%) and teeth decay (72 %) This is in controversy to the other study which revealed that only 28.2% of the participants identified the obesity as a side effect, 11% for osteoporosis and only 9.1% for teeth decay (18). Regarding this study, it was found that only 20% of them consume carbonated drinks frequently. This is in controversy to results of Kharde *et al.*, (18) which revealed that (50%) of the participants frequently drink carbonated drinks and the results of Wilson E D *et al* which stated that over half of the boys and more than one third

of the girls reported drinking soft drink daily among adolescents in Australia(29). Moreover , The majority of the participants about 34% have started drinking 10 to 12 years ago which is long period

compared to other study which showed that more than 50% of the participants have started to drink for less than 10 years. Kharde et al., (18). Generally, 84% of the participants knew at least one of the composition of carbonated drinks. Most of them know that they contain sugar (80%), Co2 (60%) and caffeine (58%) but only (18%) had knowledge that soft drinks contain high fructose corn syrup. It was found that Despite fructose and glucose have very similar chemical structure, they are absorbed and metabolized by completely different pathways. Fructose is absorbed through the GLUT-5 receptor in the gut (30), and in contrast to glucose, is metabolized almost entirely in the liver by a pathway that is not dependent on insulin (31). Accordingly, there is evidence to show that fructose consumption does not stimulate insulin secretion or leptin production by adipose tissue (32-33) and thereby is thought to contribute more directly to weight gain (33). Also, excess fructose consumption has been shown to be more related to the specific accumulation of visceral fat and associated metabolic risk factors, such as insulin resistance, than is excess glucose consumption (34). Fructose consumption has also been shown to have a potential negative impact on cardiovascular health: for example, as compared to glucose, fructose consumption has been shown to prompt an acute rise in blood pressure (35) and in triglyceride synthesis (32, 33, and 36). Moreover, only 16% of the students were aware about phosphoric acid which is an important determinant of mortality in patients with chronic kidney disease (37). In addition, our study revealed that Pepsi (42%) was the main brand of carbonated drinks that was consumed commonly followed by Cola (14%). Previous studies referred to a common problem that is associated with consumption of a large number of carbonated drinks which is increased acid levels throughout the body. All soft drinks are very acidic, but dark colas such as Coke and Pepsi are much more acidic (5). The findings of the present study indicated that the main reason (66%) for carbonated drink consumption by students is enjoying the taste of these drinks. This is consistent with a study by Mahmood et al, who declared that female young adults reported enjoying the taste of soft drinks as the main reason (32%) for using them (38). 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 (39). Madani et al reported that the major reasons for drinking carbonated drinks by female students of Jaddeh to be enjoying the taste of drinks, parents' habit for drink consumption, and presence of carbonated drinks at home (40). Also, the study revealed that about 44% of the students will not stop soft drinks and about 14% do not know if they will stop or not and only 6% who already stopped drinking. This is coincides with de Bruin and colleagues who have reported a negative correlation between soft drink consumption and the attitude towards a limited soft drink intake (41).

5. CONCLUSION:

Carbonated drinks consumption is a growing phenomenon affecting all age groups in our community especially the adolescents which is associated with lots of health effects ranging from obesity to tooth and bone problems. In the present study, although the knowledge of participants regarding carbonated drinks were satisfactory. The attitudes of the students had some controversy because most of them had not tried to or planned to stop this habit which is hard to be changed by carbonated drinks consumers because they find it delicious although they were ready to consume fruit juice as an alternative for carbonated drinks if an option is available. Regarding practice, most of them had started to drink carbonated drinks at a very early age of life and this is a main concern. 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 carbonated 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. Moreover, more research needs to be done with larger sample sizes and broader age range to proof the association with different health effects.

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