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Research Article

Assessment Of Carbonated Beverages Consumption And The Influencing Factors Among Students Of Jazan University, Saudi Arabia.

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Abstract

Background: Carbonated beverages Consumption is now recognized as a controversial as well as a public health and policy concern. Carbonated beverages have been targeted as an approach to help reduce the growing rate of obesity since many people believe they are an important contributor to obesity and associated health issues, such as elevated risk of type II diabetes and cardiovascular disease. So the present study was conducted to assess the pattern of Carbonated beverages consumption and to identify the influencing factors associated with its consumption among students at Jazan University.

Material and Methods: The present study was a Cross-sectional study, conducted in University, Jazan University Saudi Arabia. In which 114 Saudi adults who were eligible respond to an electronic questionnaire from 1st September- November 2023.

Results: In the present study 114 students were participated, 83.3% of the participants consume Carbonated beverages and only 16.7% of the participants reported never consumption. The strongest correlation was highly significant for eating at home, and was only significant for availability, Advertisement and TV/electronic device use $R= .975$ $R= 0.944$, $R= 0.946$ and $R= 0.921$, respectively).

Conclusion: The present study shows that the consumption of Carbonated beverages among Jazan Students is higher i.e. 83.3%. There is a need for strategies aimed at educating people about the adverse health consequences of the habitual consumption of Carbonated beverages.

Keywords: Carbonated beverages, Soft drinks, University Students, Saudi adults.

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Introduction

Carbonated beverages are consumed by people all over the world. The World Health Organisation (WHO) advocates limiting the intake of free sugars since

excessive sugar intake raises the risk of diabetes, obesity, and dental issues (Vartanian et al., 2007a; World Health Organization (WHO), 2020)

One of the highest rates of obesity worldwide is recorded in Saudi Arabia. Over the previous three decades, there has been a notable increase in the overall prevalence. More than one-third (35.6%) of adults had been influenced by 2021. The 13 regions (Salem et al., 2022) of the nation vary in rate of prevalence, with the Eastern Area and urban areas having greater rates (Althumiri et al., 2021; Salem et al., 2022).

Saudi Arabia had the highest rates of Carbonated beverages consumption among Middle Eastern nations, with an average of 113.8 L per person-year in 2020 (Statista, 2020).

The Saudi government adopted a multipronged strategy to combat obesity, including legislative initiatives, regulatory actions, and pledges to support healthier eating habits (Alsukait et al., 2019; Bin Sunaid et al., 2021).

A selective taxing approach was put into place in 2018, which resulted in a 50% increase in Carbonated beverages prices. As a result, Carbonated beverages are perceived by Saudi consumers as costly and unhealthy (Euromonitor International, 2019). Leading to that, the amount of Carbonated beverages sales reduced by 57.64 % between 2010 and 2017 (Megally & Al-Jawaldeh, 2021) This decline was especially reported in SA, according to (Alsukait et al., 2020).

From a nutritional perspective, Carbonated beverages are considered unhealthy because of their poor nutritious value and high density of energy. Consequently, Carbonated beverages are considered detrimental from nutritional perspective due to their significant amount of energy and low nutritional content. As a result, excessive Carbonated beverages consumption is associated with major health issues, such as increased risk of type 2 diabetes and obesity due to inflammation and resistance to insulin (Ferretti & Mariani, 2019; Rivera-Paredes et al., 2020; Tseng et al., 2021; Vartanian et al., 2007b). Similarly, because Carbonated beverages are a significant source of high fructose corn syrup, they have been linked to non-alcoholic fatty liver disease (Nseir, 2010). Additionally, frequent Carbonated beverages consumption has been positively associated with a higher risk of cancer (Chazelas et al., 2019). According to a multi-national analysis of 75 nations, including the Middle East, a 1% rise in the Carbonated beverages consumption related to a 4.8 % increase in the prevalence overweight and a 2.3 % increase in obesity rates among adolescents (Basu et al., 2013). Moreover according to Martin-Calvo et al., (2014) daily use of Carbonated beverages elevated the relative risk of obesity by 69%.

Dietary preferences and habits that are likely to continue into adulthood are also established throughout adolescence, a crucial time for substantial physical and cognitive growth (Sinai et al., 2021)

It should be mentioned that the majority of people in this age range are university students. A study conducted with female students, it was demonstrated that beverages were mostly consumed for enjoyment and to improve academic performance (Rahamathulla, 2017). The consumption of energy drinks in Saudi

Arabia Arabian university students was found to be influenced by male gender, married status, and college type (medical or non-medical) according to Alabbad and colleagues (Alabbad et al., 2019)

Leading to that, dietary choices chosen at this critical stage might influence a person's health trajectory for the future. These health issues are particularly prevalent in the younger population, where unhealthy eating habits can have a particularly negative effect (Al-Zalabani, 2024).

Therefore, this paper aims to investigate the pattern of carbonated beverage consumption and to identify the influencing factors associated with its consumption.

1 Methods: Study design and subjects:

This is an observational cross-sectional study was A study was carried out from September-November 2023 as a survey using online questionnaire. The study included 114 eligible Saudi students 66 males and 48 females from Jazan University aged from 18-27 years an recruited by the use of snowball technique. Students who are following-diet, severe weight changed and sudden change in weight due to hormone deficiency of 3 kg in the last 3 months, diabetic, diagnosed with osteopenia and/or osteoporosis, were excluded from the study to rule out possible bias. Students who will agree upon the study will assigned a consent paper included the objective of the study and the inclusion criteria and be enrolled in the study, while those disclosed disapproval will be excluded. During the study, they were also made aware of their right to withdraw at any time, All data were confidential and analyzed anonymously.

Research instrument: An electronic self-filling questionnaire was distributed. The questionnaire was composed of the following parts:

Part I: Sociodemographic information, such as educational attainment, age, sex, and monthly income. Part II: Patterns of use of carbonated beverages: This included data regarding the amount and frequency of usage. The amount of Carbonated beverages consumed at each time was classified as less than one can, one can, two cans, or more than two cans. Consumption was expected to occur 1-2 times per week, 3-4 times per week, 5 or more times per week, and never. Part III: The availability of Carbonated beverages, social gatherings, the usage of technological devices, advertising, and eating indoors or outside were the factors that influenced the patterns of Carbonated beverages consumption. Prior research has indicated these characteristics as harmful causes (Leng et al., 2017; Pettigrew et al., 2015; Pollard et al., 2002).

Participants asked to rate their agreement or disagreement with the statement that the giving factor increased the chance or frequency of Carbonated beverages consumption on a scale of 1 to 5. Likert (1932) used a 5-point Likert scale to categorize the responses: (1) I strongly disagree, (2) I disagree, (3) I

neither disagree nor agree, (4) I agree, and (5) I strongly agree.

Before the extensive online survey, Two focus groups with ten participants which were used to test the questionnaire to make sure it would be simple for respondents to understand. The reliability of the questionnaire was demonstrated by the Cronbach's coefficient alpha ($\alpha = 0.72$) (CI: 95%).

Ethical approval: Ethical approval was obtained in September 2023 from the Research Ethics Committee of Jazan University Reference No.: REC-45/07/539. (Jazan, KSA).

Statistical analysis: To display the sample characteristics, means and standard deviation (SD) for continuous variables and percentages for categorical variables were used. To evaluate group differences based on frequency of intake and factor scores, a one-way ANOVA test was employed. Statistical Data Analysis Software (SPSS) employed the chi-square test to evaluate correlations between various parameters, with a significance cut-off point of a p-value of less than 0.05.

1- Results

3.1. Sociodemographic profile

Sociodemographic characteristics and pattern of Carbonated beverages consumption are presented in **table 1**. 114 responses in all were collected. The age range was 18–26 years old. Male students represented most responses (N = 66, 57.9%).

Responses were collected from students across all academic years and about 60% of them were from health college (N = 66, 59.9%). The economic statuses showed different levels, as 68.4% reported a salary income between 3000 and 5000 Saudi Riyal.

Table 1: Shows the sample's demographics and patterns of consumption of carbonated beverages.

Parameters	Percentage (n =114)	
Female	48	42.1 %
Male	66	57.9%
AGE	18-27	
Education		

Table 3: Attitudes toward factors Affecting Carbonated beverages consumption among participants (n = 114)

	I strongly disagree	I disagree	I neither disagree nor agree	I agree	I strongly agree
Availability	36 (31.58%)	13 (11.40%)	43 (37.72%)	13 (11.40%)	9 (7.89%)
My food habits	28 (24.56%)	12 (10.53%)	33 (28.95%)	26 (22.8%)	15 (13.16%)
Advertisement	39 (34.21%)	20 (17.54%)	37 (32.45%)	11 (9.6%)	7 (6.14%)
Eating out	16 (14.03%)	15 (13.15%)	22 (19.29%)	35 (30.7%)	26 (22.8%)
Eating at home	26 (22.8%)	18 (15.78%)	27 (23.68%)	27 (23.68%)	16 (14.03%)
Family gathering	17 (14.91%)	13 (11.40%)	24 (21.05%)	41 (35.96%)	23 (20.17%)
During using electronic devices	23 (20.17%)	17 (14.91%)	29 (25.43%)	27 (23.68%)	18 (15.78%)

3.4. Patterns of Carbonated beverages consumption

The present study also demonstrates the association between consumption patterns and its determinant factors (Table 4). The frequency of consumption was positively related to all

Health collage	66	57.9%
Others	48	42.1%
Income		
3000-5000	78	68.4%
6000-9000	10	8.8%
>10000	26	22.8%

3.2. Patterns of Carbonated beverages consumption

Table 2 Shows the pattern of Carbonated beverages consumption among the participants. While 83.3% of individuals said they had ever consumed a Carbonated beverages, only 16.7% reported never consumption. Analysis of the frequency of consumption found that 38.6% of the participant consumes Carbonated beverages one or twice a week. However 18.4% consumes three to four times weekly. Moreover, about half of the participants (49.1%) consume one can each time while only 7.9% consume more than 2 cans each time.

Table 2 Frequency, quantity of Carbonated beverages consumption pattern.

Frequency of Carbonated beverages consumption (times per week)		
1-2	44	38.6%
3-4	21	18.4%
5 or more	30	26.3%
Never	19	16.7%
Quantity each time		
Less than 1 can	41	36%
1 can	56	49.1%
2 can	8	7%
More than 2 can	9	7.9%

3.3. Table 3 Illustrates the attitude toward factors affected the consumption of Carbonated beverages among the participants, the most common causes impacting consumption were family gathering followed by eating outside home, followed by when using electronics (22.8, 20.1 and 15.7% respectively). Interesting, the lowest percentage of the consumption were observed due to the advertisements and the availability followed by food habits and eating at home (6.1, 7.8, 13.1 and 14% respectively).

factors, and this relationship was statistically significant for: availability, Advertisement, eating at home and use of electronic devices. The strongest association was extremely highly significant for eating at home, and was only

significant for availability, Advertisement and TV/electronic device use R= .975 R= 0.944, R= 0.946, and R= 0.921, respectively). Interestingly, there were also strong relationships between the other factors detected, including availability and family gathering, advertisement and family

gathering, eating at home and food habits, and availability and social gathering, while using electronic devices and eating.

Table 4: correlation between various factors affecting Carbonated beverages consumption among participants

	Family gathering	Availability	Advertisement	My food habits	Eating out	Eating at home	During using electronic devices
Family gathering	1						
Availability	.944*	1.000					
Advertisement	.946*	.806	1.000				
My food habits	-.381	-.064	-.614	1.000			
Eating out	.681	.810	.582	.239	1.000		
Eating at home	-.267	.036	-.494	.975**	.390	1.000	
During using electronic devices	.636	.817	.429	.432	.921*	.566	1.000

Discussion

The present study examined the factors that affected the intake of carbonated beverages by Saudi Arabian students at Jazan University. According to the present study, 83.3% of the sample drank carbonated beverages, whereas only 16.7% never did. 49.1% of people drank one can (330 mL) at a time. This result confirms that Saudi Arabia is the Middle East's biggest Carbonated beverages consumer (Euromonitor International, 2015. Carbonated beverages in Saudi Arabia. Country Report, 2015). Despite the fact that consuming carbonated beverages is known to increase the risk of serious health issues such as cardiovascular illnesses, metabolic syndrome, dental cavities, and type 2 diabetic mellitus (Lane et al., 2024; Malik et al., 2010; Schiano et al., 2021). According to a prior study, the risk of obesity increased by 60% for every can of Carbonated beverages consumed daily (Rangan et al., 2009).

Our results also indicated that the frequency and amount of Carbonated beverages consumption were found to be significantly positively correlated.

This implies that reducing the consumption frequency, rather than the quantity, should be the strategy used to reduce overall consumption. Therefore, it is necessary to investigate the potential confounding factors that influence frequent intake to reduce the consumption of carbonated beverages among Saudi Arabian adults. Participants more strongly reported family gathering (35.96%) and eating outside (30.7%) as the most significant factors influencing the frequency of consumption of carbonated beverages. This might occur as a result of Saudi Arabia's quick societal change over the last thirty years toward a Western way of life. Which includes having access to store-bought beverages, dining out, and social conventions surrounding the use of harmful drinks such as Carbonated beverages (Hijazi, 2000). These findings imply that laws and

regulations governing advertising and availability should be the primary concern of measures to reduce the frequency of Carbonated beverages intake. Nutrition education programs should be used as a supportive tool to address individual issues like eating at home, utilising electronic devices, and personal routines.

The current study showed that meal behaviors, dining at home, advertising, and the availability of Carbonated beverages were all substantially linked to higher consumption frequency.

Bere *et al.* (Bere et al., 2008) found that having Carbonated beverages available at home was linked to higher consumption, which is consistent with our findings. Additionally, a longer commute to a store seemed to lower Carbonated beverages intake (Bere et al., 2008). Van Der Horst *et al.* (van der Horst et al., 2008) showed a negative relationship between the distance of 200–300 meters to the closest store and the consumption of Carbonated beverages. This finding indicates that the frequency of Carbonated beverages consumption is significantly influenced by availability.

Regarding the advertisement, It is well recognized that food marketing encourages people to make purchases The results of the current study demonstrated a strong relationship between advertisements and the frequency of Carbonated beverages consumption. In line with the results of the present investigation, Tsochantaridou et al., (2023) reported that the second-most successful method of influencing adolescents' capacity to regulate their behaviour in the USA was through commercials that promoted the consumption of Carbonated beverages, which is in line with the current study's findings.

According to the current study, utilizing electronic devices is positively correlated with consuming Carbonated beverages more frequently. Students in

secondary school who used electronic devices for more than two hours a day were found to consume more Carbonated beverages (Bradbury et al., 2019), which parallels the current study's findings.

CONCLUSION

The present study showed that the pattern of Carbonated beverages intake was substantially associated with the Saudi adults drink a lot of sugary Carbonated beverages. The current study's results also showed an association between these consumption behaviours and availability, advertisements, eating at home, and using electronics.

Therefore, government policies and regulations that limit the availability and advertising of Carbonated beverages must be supplemented by nutrition education programs to address Saudi adults' excessive consumption of carbonated beverages.

There needs to be more healthy food options available in order to further cut down on Saudis' consumption of sugary Carbonated beverages.

Aim of the Study:

To assess the prevalence of carbonated beverages consumption and identifying the influencing factors among male and females students of Jazan University

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