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Original article

Factors Influencing the Relationship between Coffee, Tea Consumption and Dental Caries in Saudi Arabia

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Abstract

Background: The relationship between coffee and tea consumption and dental caries in Saudi Arabia has not been covered adequately. The aim of this cross-sectional study was to assess the association between the frequency and quantity of coffee and tea consumption and dental caries severity among adolescents (middle and high schools) in the Eastern Province, Saudi Arabia. ***Methods:*** A cross-sectional observational survey study that was carried out in Eastern Province, Saudi Arabia. Validated interview-based questionnaires were used to ask about the background information and the frequency and quantity of coffee and tea consumption with two sections of the survey: the first section was about the demographic data and the second section assessed the frequency and quantity of coffee and tea consumption and examination was done during daylight using disposable dental mirror and blunt probe. ***Result:*** A total of 2265 middle school children with a response rate of 77.8%. Out of them, Females accounted for 1288 (56%) and the mean age (±SD) was 14 (±1.322). Regarding parents' education, 1916 (84.6%) of participants' fathers and 1836 (81.1%) of their mothers had a high school certificate or higher. There was a significant association between the frequency of coffee and tea consumption and caries (p=0.013). ***Conclusion:*** There was a significant association between the frequency of coffee and tea consumption and caries (p=0.013). The frequency of coffee and tea consumption, the higher the caries. However, there was no association between the quantity of coffee and tea consumption and D nor with the overall DMF score.

Keywords: ***Tea Consumption, Coffee Onsumption, Dental Caries.***

Introduction

Coffee and tea are the second most consumed drinks after water [1]. Numerous studies have been conducted in KSA to find out the prevalence of the caries among adolescents. A systemic review studied the national prevalence of dental caries and its severity in children in Saudi Arabia and concluded that 70% of children's permanent teeth were carious with mean DMF score of 3.5 [2]. The effect of consuming coffee and tea on dental caries is controversy. A study done in Bangalore reported that coffee and tea consumed alone had anti-carious action, but in the presence of additives the antibacterial and anti-carious action was totally minimized [3]. On the other hand, a study in Thailand found that coffee and tea consumption is related to caries among middle school children [4].

The relationship between coffee and tea consumption and dental caries in Saudi Arabia has not been covered adequately. This study hypothesized that there is a relationship between the frequency and quantity of coffee and tea consumption and dental caries severity among middle school children in Eastern Province, Saudi Arabia. Investigating such an association can be used to increase the awareness of the society regarding the effects of different beverages in the dental health.

The aim of the study was to assess the association between the frequency and quantity of coffee and tea consumption and dental caries severity among adolescents in the Eastern Province, Saudi Arabia.

Subjects and Methods

Study design:
This cross-sectional, survey-based study was conducted among middle and high schools in Eastern Province (Dammam and Al-Khobar), Saudi Arabia from January to February 2019. The participants were included if they were regular attendees in the schools, have written consents from their parents and willing to be interviewed and examined. Students were excluded from the study if they had medical problems and/or special health care needs. The schools were randomly selected and stratified by gender then the students sampled using cluster sampling.

Data collection:
Data was collected using a validated interview-based questionnaires and examination was done during daylight using disposable dental mirror and blunt probe. A Validated interview-

based questionnaire was used to ask about background information and the frequency and quantity of coffee and tea consumption (exposure) [5,6]. The survey was divided into two sections: the first section was about the demographic data and the second section assessed the frequency and quantity of coffee and tea consumption. Responses to frequency questions were categorized as never, daily and weekly or monthly. Responses about the quantity were categorized into never, ≤149 ml-299 ml, 300 ml-599 ml and 600 ml-≥750 ml. Dental caries (outcome variable) was measured by DMF index using WHO criteria [5]. The examination was carried by 18 calibrated examiners (Kappa≥0.6).

Statistical analyses and sample size calculation:

Data were represented in the form of frequencies (number of responders) and valid percentages for categorical variables. Mean (SD) and frequency and percentage were calculated. The association between the frequency and quantity of coffee and tea consumption and DMF was analyzed using one-way ANOVA. P-value of ≤0.005 was considered significant. All P values < 0.05 were considered statistically significant. IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) was used to perform all statistical calculations, version 23 for Microsoft Windows.

Considering a confidence level of 95%, a marginal error of 5%. A total of 2265 eligible participants responded to the questionnaire and examination was done were included in the statistical analysis.

Ethical considerations:

All participants written consents from their parents and willing to be interviewed and examined if they agree or not to take part in the study. Only those who agreed to participate were included. Before conducting any study-related procedures, ethical approval was obtained from Research Ethics Committee at Imam Abdulrahman bin Faisal University, Saudi Arabia.

Results

Data was collected during the period from January to February, 2019. A total of 2265 pmiddle school children with a response rate of 77.8%. Out of them, Females accounted for 1288 (56%) and the mean age (±SD) was 14.08 (±1.322). Regarding parents' education, 1916 (84.6%) of participants' fathers and 1836 (81.1%) of their mothers had a high school certificate or higher. A total of 2265 participants met the eligibility criteria and were included in the statistical analysis. The socio-demographic characteristics of the participants are shown in table 1.

Table 1: Socio-demographics characteristics of the study participants (n=2265)

Socio-demographics characteristics			**Mean**	**±SD**
Age			14.08	1.322
			Count	**Percent**
Gender	Male		977	43.1%
	Female		1288	56.9%
Educational Level	Mother Eduction	Less than high school	429	18.9%
		high school or higher	1836	81.1%
	Father Education	Less than high school	349	15.4%
		high school or higher	1916	84.6%

The mean (±SD) DMF of participants was 3.99±3.33 where D was 3.14±3.06. The percentage of children who had never consumed coffee and tea was 502 (22.2%) where 305 (69.9%) of females and 151 (30.1%) of males never consumed coffee and tea. From the participants, 817 (36%) of them drank coffee and tea once or more daily while the highest consumption rate (defined as consuming ≥600 ml) of coffee and tea was reported only by 23 (1%) of the participants.

There was a significant association between the frequency of coffee and tea consumption and D component (p=0.013) whereas the association was not significant with the overall DMF score (P=0.095). Figure 1 shows the relationship between the frequency of coffee and tea consumption and caries.

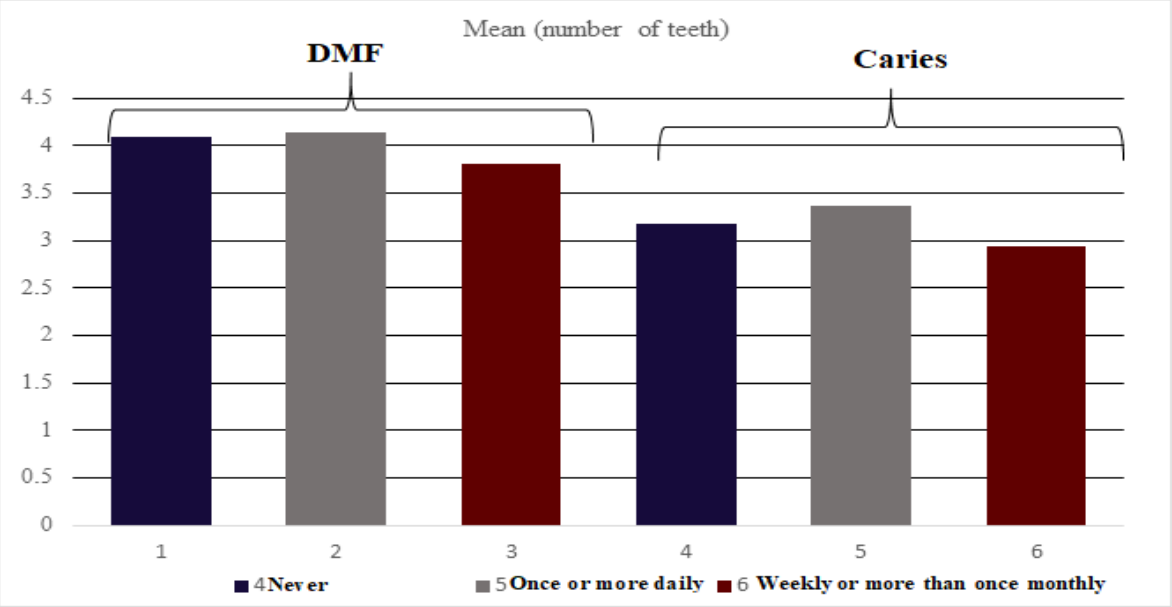

Figure 1: The relationship between the frequency of coffee and tea consumption and DMF and caries

In the same context, no association was found between quantity of coffee and tea consumption and D nor with the overall DMF score (p=0.745;0.572 respectively). Figure 2 shows the relationship between the quantity of coffee and tea consumption and caries.

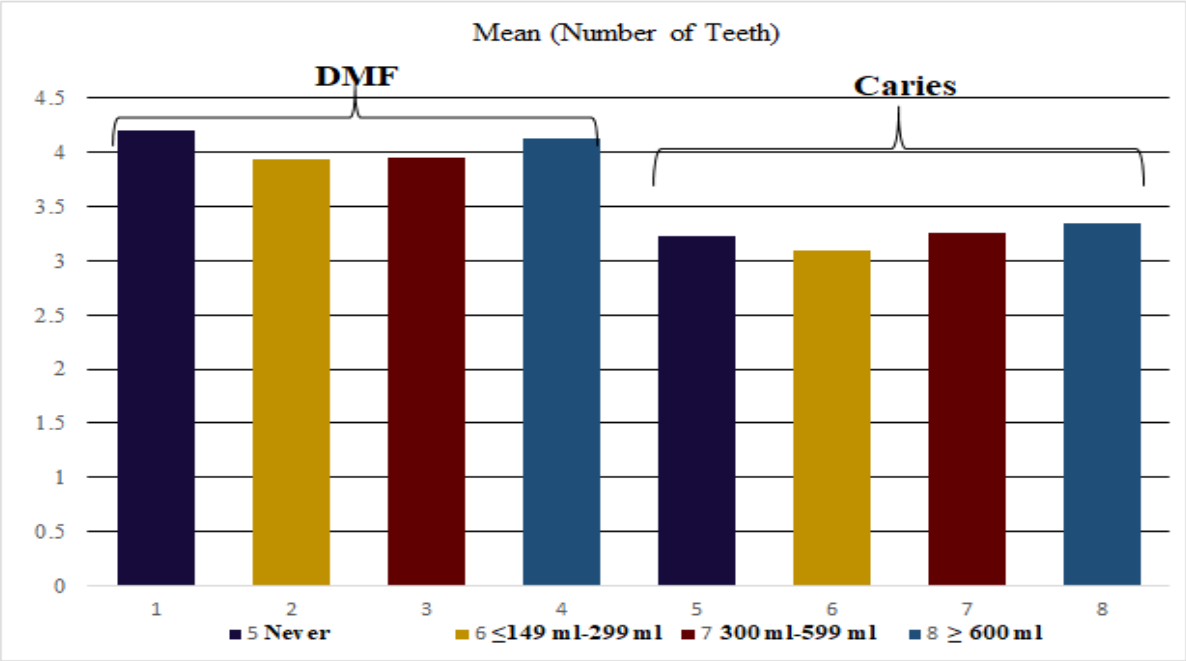

Figure 2: shows the relationship between the quantity of coffee and tea consumption and caries.

Discussion

There was a significant association between the frequency of coffee and tea consumption and caries. The more the frequency of coffee and tea consumption, the higher the caries. However, recent studies, found out that coffee is beneficial for our teeth. Furthermore, coffee made up from roasted beans has anti-cariogenic activity [7]. Coffee is active against Streptococcus Mutans. Also, roasted coffee has antiadhesive properties7. Consequently, it prevents adhesion of S. mutans. In the same line, researchers found that consuming decocted black and green tea stimulates the inhibitory effect of caries formation by preventing salivary amylase [8,9]. This contrary can be justified by knowing the fact that the combination of caffeine with sugar may cause initial caries and rapid progression of dental caries [10]. In rare case, salivary secretion is dramatically decreased leading to plaque formation and eventually gingivitis [10]. Furthermore, one study found that DMFS scores of those who consumed coffee varied from 2.9, where coffee was consumed without sugar and milk and 5.5 when it was taken with milk and sugar indicating that coffee has anti-caries action [3]. In addition, another study concluded that sucrose intake in coffee or tea (SCT) increases the potential of coronal and root caries in elderly [11]. The incidence of caries is more related to the frequency of the consumption of coffee and tea than to the frequency [11].

Consequently, further studies are needed to assess the effect of the co-founders as brushing habits and coffee and tea additives' which have not been studied in the present study. Some limitations of this study should be considered while interpreting the results. First, the causal relationship was unable to be assessed due to the cross-sectional nature of the study. Second, in result of the self-administered questionnaire that was used during the data collection, the re-call bias could be expected in this study. Third, the effect of the confounders such as the brushing technique, the additive (sugar, caramel, milk) and the effect of the coffee and tea separately can be improved on the future study. Our findings call for a close attention of coffee and tea consumption frequency in young adults. Increased awareness of the effect of coffee and tea consumption on caries would result in decreased caries rate among adolescents. Intensive oral health education is needed to be provided by dentists and dental hygienists in the dental clinics and by running dental campaigns to aware the parents and the society. Furthermore, the relationship between the frequency and caries is more important than the quantity and caries [12]. As a result, further studies are needed to focus on the effect of frequency of coffee and tea and caries taking in consideration the possible co-founders.

Conclusion

There was a significant association between the frequency of coffee and tea consumption and D-component of DMF. The more the frequency of coffee and tea consumption, the higher the caries. However, there was no association between the quantity of coffee and tea consumption and D nor with the overall DMF score. Further studies are needed to assess the effect of the co-founders as brushing habits and coffee and tea additives' which have not been studied in the present study.

Ethics approval

Institutional research ethics board approval was acquired before conducting any study-related procedures. A statement was included at the beginning of the questionnaire clarifying that the participation in this study is voluntary and that collected data will be anonymous and will only be used for this study.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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