Original Article

Study of nutritional pattern and degree of dental caries in patients referred to the dental department of Tasu'a clinic during 2017-2018 in Babol

Seyed Amin Alavi Enderajemi*, Afagh Hovakhti

Student Research Committee, Babol University of Medival Sciences, Babol, Iran.

Correspondence: Seyed Amin Alavi Enderajemi, Student Research Committee, Babol University of Medival Sciences, Babol, Iran.

ABSTRACT

Background: Tooth caries is the most common chronic disease in the world. Different factors contribute to caries and plaque growth. One of the research priorities is to know about the causes of dental caries and one of them is nutritional pattern. Therefore, in this study, we examined the nutrition pattern and degree of caries in the visitors of the dental clinic of Babol- Tasu'a clinic during 2017-2018. Materials and Methods: A descriptive study was carried out. At first, 100 patients, 20 -55 years, which referred to the Tasua Clinic were randomly asked about the nutritional pattern and the results were recorded. The patients were examined for determining DMFT and the results were analyzed by regression analysis. Results: DMF based on food groups showed that the highest DMF reduction was associated with increased protein intake and the lowest reduction in DMF associated with increased consumption of oily seeds. The highest increase in DMF per every time change of food intake was associated with an increase in the consumption of Gaz, biscuits, Sohan, chocolate, sugar, and the lowest increase in DMF for increasing carbohydrate intake. The correlation between DMF and Oily seeds was 0.65 and DMF decreasing 0.59 per each consumption, while the correlation between DMF and chips is 0.7 and DMF changes are increased by 0.39 per each consuming. Conclusion: There is a relationship between dental caries and nutritional pattern. Therefore, proper nutrition can prevent caries and its complications.

Keywords: Nutritional pattern, caries.

Introduction

One of the concerns in the human societies is dental caries. Dental caries is the most common chronic disease in the world. The state of caries in Third World countries poses the greatest challenge to dental science [1]. Fauchard, in the sixteenth century, founded the caries on the basis of the presence of macroscopic symptoms. The dental caries resulting from the interaction of specific bacteria with food in a biofilm called dental plaque. Different factors contribute to caries and growth of plaque: fluoride absorption, hygiene, saliva quality, socioeconomic status, diet, and etc. A diet containing fermented carbohydrates (regular ingestion of sugar) considered as a very strong dental caries factor in poorly hygienic populations.

In terms of nutrition, sucrose is thought to have the highest caries in the diet [2]. If dental caries are not controlled, it can cause loss of teeth and loss of teeth leads to a reduction in the function of teeth, which can cause digestive and systemic disorders. In addition, caries lead to other significant costs, such as pain, discomfort, beauty defects, and quality of life, which can't be estimated financially [3].

One of the research priorities is to know the causes of dental caries and one of them is nutritional pattern. In some studies, reported that the increase in caries in the new age has been strongly influenced by dietary changes [1, 2], but in some studies other factors, such as oral health and fluoride intake, play a more important role in caries control than diet [4]. Regarding the contradiction and shortcomings in this study, we examined the nutritional pattern and the prevalence of caries in patients

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referred to the dental department of Tasua clinic in Babol, Iran during 2017-2018.

Research Methodology:

The research was descriptive and interviews, observation, clinical examination and information forms were used to collect data.

100 referred patients to the dental department of Tasua Clinic in Babol were randomly selected and evaluated. At first, information form No. 1 was completed with asking the patients by the researcher. Then, the information form 2, which examined the nutritional pattern, was completed by asking the patient, and the form number 3 that is the examination form based on the DMF system, was completed as follows:

Number D: Recorded by counting tooth caries.

D1: White Spot

D2: Caries limited to tooth enamel

D3: Caries in Dentin

D4: Caries that Dental pulp also has been involved

The number of M: was recorded by counting the missing teeth.

The number of F: that was recorded by counting the teeth with any type of patient's restoration.

Finally, the sum of the three above numbers indicates the patient's D1MF, D2MF, D3MF, and D4MF [2, 5].

After analyzing the obtained data, statistical analysis was performed by regression analysis.

Results:

The research was conducted on 100 patients referred to the Department of Dentistry of Tasua Clinic in Babol, the age of which was 20 -55 years and 52% male and 48% female. The DMF value based on food groups in the consumption pattern is presented in Table 1 and shows that the highest reduction in DMF is related to increased protein intake and the lowest reduction in DMF associated with increased consumption of oily seeds. The highest increase in DMF per every time change of food intake was associated with an increase in the consumption of Gaz, biscuits, Sohan, chocolate, sugar, and the lowest increase in DMF for increasing carbohydrate intake. The correlation between DMF and Oily seeds was 0.65 and DMF decreasing 0.59 per each consumption, while the correlation between DMF and chips is 0.7 and DMF changes are increased 0.39 per each consuming. The D1MF value based on food groups in the consumption pattern is presented in table 2 and shows that the highest reduction in D1MF is related to increased protein intake and the lowest reduction in D1MF associated with increasing dairy consumption. The highest increase in D1MF per every time change of food intake was associated with an increase in the consumption of Gaz, biscuits, Sohan, chocolate, sugar, and the lowest increase in D1MF was for increasing chips and cheese puffs.

The D2MF based on food groups in the consumption pattern is presented in Table 3, which shows that the highest reduction in D2MF is related to the increase in dairy consumption and the lowest reduction of D2MF associated with increased beans consumption. The highest increase in D2MF per every time change of food intake was associated with an increase in the consumption of Gaz, biscuits, Sohan, chocolate, sugar, and the lowest increase in D2MF was for increasing consuming of chips and cheese puffs.

The D3MF value based on food groups in the consumption pattern is presented in Table 4, suggesting that the highest D3MF reductions associated with increased fruit and vegetable consumption and the lowest reduction of D3MF associated with increased protein intake.

The highest increase in D3MF per every time change of food intake was associated with an increase in the consumption of Gaz, biscuits, Sohan, chocolate, sugar, and the lowest increase in D3MF was for increasing consuming of chips and cheese puffs.

D4MF based on food groups in the consumption pattern is presented in table 5 and shows that the highest reduction in D4MF is related to increased consumption of oily seeds and the lowest reduction of D4MF related to the increase in dairy consumption.

The highest increase in D4MF per every time change of food intake was associated with an increase in the consumption of Gaz, biscuits, Sohan, chocolate, sugar, and the lowest increase in D3MF was for increasing consuming of chips and cheese puffs.

Discussion:

The purpose of this study was to investigate the nutritional pattern and caries rate on 100 patients, 20 -55 years of age that 52 subjects were men and 48 were women, referred to the dental unit of Tasua clinic in Babol.

Nutrition can affect the anatomy and function of the salivary glands and the amount of calcification of the tooth during the lifetime [6]. All of these factors are directly and indirectly effective on the risk of caries. However, what was studied in this study was the assessment of the nutrition pattern of patients and their relationship with the degree of dental caries. In the prepared questionnaire the number of consumption of different diets during the recent week were asked from patients to provide a common pattern of nutrition [7].

Beverages, carbohydrate type, sugar type, consistency and adhesion, starch content and coexistence of starch with sucrose, vegetables, lipids and cheese are all factors that can affect the caries [2]. Caries assay in people with more precisely and with the division of D4, D3, D2, D1 is in fact paying more attention to non-cavity caries (D1), and the correlation of these caries with the nutritional pattern, such as beverages. Attention and awareness of caries as a white lesion without cavity is helpful in the prevention of caries and, if necessary, changing the nutrition pattern of the patient [2]. In a similar study done by BrianA and colleagues in 2006, special attention has been paid to the D1MF [8] and this is a positive part of our research. In the present

study, there was a significant relationship between the frequency of consumption of Gaz, biscuit, souhan, chocolate, sugar, and the DMF value (P = 0.0001). These foods had the highest additive effect on D3MF, while had the least additive effect on D2MF.

In a study conducted by Teresa A and Marshall (2009) in the United States to investigate the risk factors and factors affecting caries, it was concluded that the use of sticky foods such as chocolate and the consumption of sugars more than 4 times per day increased the incidence of tooth caries [9]. Marshall also showed in her 2007 study that caries ability of sugar-rich foods, when used frequently as snacks, are higher than consuming along with food [10]. A study by Hashim (2009) in Ajman demonstrated that people who use sugar three times or more per day, DMF is more than those who only use sugar and snacks once a day [11].

In the present study, there was a significant relationship between the frequency of dairy consumption and DMF value (P = 0.04). Dairy products have the most reducing effect on D2MF and have the lowest reducing effect on D3MF. In vitro researches showed that dairy products play a role in decreasing caries by remineralizing the teeth and limiting their demineralization and having buffering properties [2]. In a study by Keiko Tanaka and colleagues (2010), it was concluded that dairy consumption is effective in reducing dental caries, since casein phospho peptidase in yogurt plays an important anti-caries role. In this study, the group that consumed dairy products caries was the least, and among the dairy groups who that used yoghurt more than milk and cheese caries was the least. These results showed that the combination of casein with saliva pellicle reduces the adhesion properties of corrosive bacteria such as S. Sobrinus and S. Mutans [12]. Ohlund also showed in 2007 that the risk of caries with the alternation of cheese consumption has inverse relationship and cheese consumption can have a protective effect against caries [13].

In the present study, there was a significant relationship between the frequency of carbohydrate intake and DMF (P = 0.04). Carbohydrate has the most additive effect on D4MF, but has the least effect on D1MF.

Sundin, in a study on Swedish children, concluded that there is a significant correlation between increased caries and carbohydrate intake, and this relationship is more significant in children with poor oral hygiene than in those with better oral hygiene [14].

In the present study, there was a significant relationship between the frequency of beverage drinking and the DMF value (P = 0.03). Beverage has the most additive effect on D1MF and the least additive effect on D2MF. Juice Citric acid and phosphoric acid have a great influence on oral measurable acid and Calcium-Chelation, and Citric Acid has a great potential for dental erosion [2]. Since the caries progression to the cavitation stage depends on many other factors, but given that in this research D1 has been studied separately, the effect of the beverage acidity on the non-cavity caries (D1) is evident. Brian A et al. (2006) in a study Concluded that the relationship between D1MF and beverage drinking was significant, and the frequency of drinking had a significant relationship with the prevalence of dental caries [8]. In a study by Lin and colleagues in 2008, it was concluded that people who increased drinking in two years showed 75.1 times higher caries than those who used low-alcohol beverages during these two years [15]. In 2006, Dr. Sohn and his colleagues conducted a study to identify consumption patterns of various drinks on dental caries. The result showed that children who use high amounts of beverage are 1.8 times more likely to have dental caries than children using Milk and water in their diet than [16]. But in a study conducted by Heller et al. (2001), there was no significant relationship between the consumption of sweet drinks and teeth caries, which could be due to differences in the methods of analyzing the findings [17].

In the present study, there was a significant correlation between the amount of protein intake and the DMF value (P = 0.001). Protein had the most reductive effect on D4MF and had the lowest reductive effect on D3MF and for each legumes consumption 0.3% of DMF was reduced.

A research conducted by Arifkhan and his colleagues (2008) in India concluded that in a group that does not consume animal protein due to religious issues, caries is more than normal people. They concluded that when fermentable carbohydrates are not added to the saliva, the alkalinity is superseded to acidity and dental decalcification is not observed. Individuals who use a lot of protein in comparison to sugar reduce their acidity and protect themselves from dental caries [18].

In the present study, there was a significant relationship between the consumption number of fruits and vegetables and the DMF value (P = 0.04). Fruit and vegetables have the most reductive effect on D3MF and have the least effect on D2MF. Since fruits contain fiber and polyphenols, it is possible to interfere with oral bacteria to form dental plaque and acid production [2]. On the other hand, when meals include enough protein, fresh fruit and vegetables, appetite for snacks is reduced [19].

Rugg-gunn concluded in his study that the increase in the consumption of fresh fruit in the diet, instead of sugar, reduced the chance of caries [20]. Moynihan also reported in 2004 that the consumption of fresh fruits reduces tooth caries rates and also empirically observed that if the fruit is a major component of the diet, it may be involved in the process of caries, but if used as part of a diet there will be less effective on the process of caries [21]. In the Touger-decker study, it is recommended to eat vegetables with food to increase the flow of saliva [6].

In the present study, there was no significant relationship between the frequency of chips and puff consumption and the DMF value (P = 0.72). Although these substances are sticky and starchy, both of these factors are additive in the process of caries, but in this study there was no direct effect on caries growth, which can be attributed to the presence of fat, corn and cheese.

In a study conducted by Teresa A and Marshall in 2009, it was found that snack ingestion for 4 times a day is effective on dental caries [9].

Conclusion:

There is a relationship between dental caries and nutritional pattern among patients. Therefore, proper nutrition can prevent caries and its complications.

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Table 1: DMF value based on the food groups

Variable	R	RS	B	SE	B(SC)	P value
Gaz, biscuits, Sohan, chocolate, sugar	0.7	0.48	0.25	0.069	0.387	0.0001
Dairy	0.657	0.432	-0.097	0.048	-0.27	0.042
Beverage	0.665	0.442	0.652	0.295	0.196	0.029
Carbohydrate	0.677	0.458	0.218	0.078	0.18	0.04
proteins	0.496	0.484	-0.257	0.072	-0.292	0.001
beans	0.650	0.423	-0.178	0.073	-0.293	0.04
Oily seeds	0.646	0.418	-0.058	0.051	-0.585	0.33
Fruit and vegetable	0.660	0.435	-0.160	0.083	-0.286	0.045
Fruit juice	0.651	0.423	-0.228	0.168	-0.112	0.01
Chips and puffs	0.7	0.48	0.25	0.069	0.387	0.725

Table 2: Based on food groups

Variable	R	RS	B	SE	B(SC)	P value
Gaz, biscuits, Sohan, chocolate, sugar	0.747	0.558	+0.198	0.048	+0.404	<0.0001
Dairy	0.711	0.506	-0.097	0.04	-0.214	0.016
Beverage	0.715	0.512	0.543	0.204	0.268	0.009
Carbohydrate	0.71	0.51	0.14	0.055	0.274	0.008
proteins	0.723	0.484	-0.257	0.072	-0.292	0.001
beans	0.705	0.497	-0.192	0.092	-0.189	0.039
Oily seeds	0.7	0.49	-0.073	0.041	-0.144	0.04
Fruit and vegetable	0.708	0.501	-0.13	0.057	-0.204	0.026
Fruit juice	0.693	0.481	-0.138	0.117	-0.192	0.043
Chips and puffs	0.688	0.473	+0.028	0.348	0.006	0.937

Table 3: Based on food groups

Variable	R	RS	B	SE	B(SC)	P value
Gaz, biscuits, Sohan, chocolate, sugar	0.733	0.538	0.160	0.045	0.352	0.001
Dairy	0.705	0.497	-0.076	0.037	-0.180	0.044
Beverage	0.695	0.483	0.250	0.194	0.110	0.201
Carbohydrate	0.721	0.519	0.148	0.050	0.293	0.004
proteins	0.718	0.516	-0.134	0.048	-0.222	0.006
beans	0.719	0.517	-0.238	0.083	-0.253	0.005
Oily seeds	0.716	0.513	-0.101	0.037	-0.216	0.008
Fruit and vegetable	0.721	0.519	-0.154	0.052	-0.260	0.004
Fruit juice	0.702	0.492	-0.197	0.107	-0.242	0.030
Chips and puffs	0.693	0.480	+0.349	0.320	0.087	0.278

Table 4: Based on food patterns

Variable	R	RS	B	SE	B(SC)	P value
Gaz, biscuits, Sohan, chocolate, sugar	0.710	0.505	0.179	0.045	0.406	<0.0001
Dairy	0.681	0.464	-0.103	0.037	-0.251	0.007
Beverage	0.690	0.476	0.594	0.190	0.221	0.002
Carbohydrate	0.693	0.481	0.167	0.051	0.341	0.001
proteins	0.689	0.475	-0.150	0.048	-0.256	0.003
Oily seeds	0.649	0.422	-0.026	0.040	-0.057	0.514
Fruit and vegetable	0.661	0.437	-0.095	0.055	-0.0165	0.008
Fruit juice	0.668	0.447	-0.233	0.109	-0.172	0.036
Chips and puffs	0.649	0.421	0.183	0.329	0.047	0.588

Table 5: Based on food groups

Variable	R	RS	B	SE	B(SC)	P value
Gaz, biscuits, Sohan, chocolate, sugar	0.643	0.414	0.170	0.048	0.400	0.001
Dairy	0.602	0.362	-0.083	0.039	-0.210	0.037
Beverage	0.606	0.367	0.461	0.202	0.216	0.025
Carbohydrate	0.641	0.410	0.183	0.052	0.386	0.001
proteins	0.603	0.364	-0.112	0.051	-0.198	0.032
beans	0.585	0.342	-0.114	0.091	-0.130	0.212
Oily seeds	0.577	0.332	-0.022	0.041	-0.051	0.584
Fruit and vegetable	0.592	0.350	-0.094	0.056	-0.171	0.030
Fruit juice	0.584	0.341	-0.137	0.115	-0.105	0.034
Chips and puffs	0.575	0.331	0.031	0.341	0.008	0.728