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Knowledge Levels of Nutrition and Dietetics Students About the Effect of Nutrition and Biochemistry Learning on Oral and Dental Health

Beslenme ve Diyetetik Öğrencilerinin Beslenme ve Biyokimya Öğrenimlerinin Ağız ve Diş Sağlığına Etkisi Hakkında Bilgi Düzeyleri

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ABSTRACT

Aim: The aim of the study is to evaluate the practices, knowledge, and attitudes of the students of the Department of Nutrition and Dietetics at Burdur Mehmet Akif Ersoy University toward oral and dental health.

Material and Method: 140 volunteers participated in the study. In the study, a total of 22 questions were asked about their knowledge, education, and thoughts on biochemistry and oral and dental health. In the information questions, students were grouped as 3rd and 4th-grade students who completed biochemistry courses and 1st and 2nd-grade students who did not complete them.

Results: It was statistically observed that the biochemistry and other courses taken by the students in the 1st and 2nd grades increased their knowledge of oral and dental health ($p < 0.05$). While 67.85% of the students in the study stated that the education they received on oral and dental health was not sufficient, 84.24% stated that they would be sensitive about protecting oral and dental health in the diet lists they would write to their clients.

Conclusion: Relevant courses can be added to the curriculum for students to receive comprehensive education on oral and dental health. It is crucial that they transfer this knowledge to society throughout their professional life.

Keywords: Oral and dental health, Nutrition, Biochemistry, Nutrition and dietetics students

ÖZET

Amaç: Bu çalışmanın amacı Burdur Mehmet Akif Ersoy Üniversitesi Beslenme ve Diyetetik bölümü öğrencilerinin ağız ve diş sağlığına yönelik uygulama, bilgi ve tutumlarını değerlendirmektir.

Gereç ve Yöntem: Çalışmaya 140 gönüllü katıldı. Çalışmada, biyokimya ve ağız ve diş sağlığı ile ilgili sahip oldukları bilgi, eğitim ve düşünceleri ile ilgili toplam 22 soru soruldu. Öğrenciler bilgi sorularında biyokimya derslerini tamamlamış 3. ve 4. sınıf öğrencileri ve tamamlamamış 1. ve 2. sınıf öğrencileri olarak gruplandırıldı.

Bulgular: Öğrencilerin 1. ve 2. sınıfta aldıkları biyokimya ve diğer derslerin ağız ve diş sağlığı bilgisini arttırdığı istatistiksel olarak gözlenmiştir ($p < 0.05$). Çalışmadaki öğrencilerin %67.85'i ağız ve diş sağlığı konusunda aldıkları eğitimin yeterli olmadığını belirtirken, %84.24'ü danışanlarına yazacakları diyet listelerinde, ağız ve diş sağlığını koruma konusunda hassasiyet göstereceklerini belirtti.

Sonuç: Öğrencilerin ağız ve diş sağlığı konusunda kapsamlı bir eğitim almaları için müfredata ilgili dersler eklenebilir. Meslek yaşamları boyunca bu bilgileri topluma aktarmaları çok önemlidir.

Anahtar Kelimeler: Ağız ve diş sağlığı, Beslenme, Biyokimya, Beslenme ve diyetetik öğrencileri

INTRODUCTION

Oral and dental health problems are at the forefront of the health problems experienced today. These problems are among important public problems (Petersen, 2003). According to the Global Burden of Disease Study; oral and dental health problems affect half of the world's population (GDB, 2017). In addition, these problems affect all age groups and are closely related to systemic diseases (Jin et al., 2016).

Oral and dental health is an also important problem in our country. Even in children aged 12-13 years, the incidence of dental caries is 80%. The incidence of periodontal diseases increases up to 96% in advanced ages (Develioğlu, Gedik, Tufan, & Yalçın, 2001; Gökalp & Doğan, 2007a; Gökalp & Doğan, 2007b). However, simple measures to be taken, the attitude of the individual, and the necessary recommendations can prevent problems that may occur in oral and dental health. Here, the individual's lifestyle, socioeconomic status, education, and environmental factors are also very effective (Dilip, 2005; Okutan, Dönmez, & Yücel, 2017). However, the recommendations and warnings given by the experts in the field will be very effective in solving problems in oral and dental health.

Excessive consumption of refined carbohydrates, unhealthy diet, cigarette consumption, and poor oral hygiene have been shown to be among the factors of the recent increase in oral and dental health problems (WHO, 2018). There is a strong relationship between nutritional and oral health conditions. Malnutrition can affect the growth and development of orofacial components, oral mucosal and dental diseases, and oral cancer. While fermentable carbohydrates' relationship with dental caries has been known, highly consumed acidic foods and beverages also cause tooth erosion (Touger-Decker & Van Loveren, 2003; Salas et al., 2015). Therefore, identifying and managing nutritional problems are important to improve the health and quality of life of individuals affected by oral and dental health problems.

In order to prevent oral and dental health problems, it is also important to get enough oral health information and proper nutrition. The knowledge and attitude of dietitians about oral hygiene behavior and biochemistry will be effective in oral and dental health in society.

It is very important for nutrition and dietetics

students to apply the oral hygiene and biochemistry knowledge they have acquired during their education throughout their professional lives and to transfer them to other parts of society. Although there are few studies (Sharda & Shetty, 2010; Erdoğan et al., 2015; Okutan, Dönmez, & Yücel, 2017) investigating the knowledge level of students about oral and dental health, there are no studies measuring oral and dental health knowledge on dietitians who will give advice on healthy nutrition. Therefore, this study aims to evaluate the personal oral hygiene behaviors of nutrition and dietetics students, their knowledge about this subject and biochemistry, and their future thoughts on this subject.

MATERIALS AND METHODS

Type of the Study

This study is an original research study planned to evaluate the practices, knowledge, and attitudes of the students of the Department of Nutrition and Dietetics on oral and dental health.

Study Population and Sample

The survey was conducted among the Nutrition and dietetics students of Burdur Mehmet Akif Ersoy University. The sample of the research consists of students who agree to participate in the research. Of the 290 students in this section, the minimum number of samples to be taken was 140, with a population proportion of 50%, a margin of error of 5%, and a confidence level of 90%. Before the study, the purpose of the research was explained to the students and it was explained that participation was on a voluntary basis. Under these conditions, a total of 140 students agreed to participate in the survey. Students are grouped as 3rd and 4th-grade students who have completed the biochemistry course and 1st and 2nd-grade students who have not yet completed the biochemistry course.

Data Collection Tools

Survey questions were checked by dentists (3), biochemists (3), and dietitians (1) and revised in line with their feedback. The data of the research were collected in March 2022. The questionnaire consisted of 3 questions to ask about the participants' use of tooth brushing and oral care tools and their state of going to the dentist, 3 questions about their education and their thoughts about it, and 16 questions about oral and dental health, and biochemistry knowledge.

Ethics Consideration

The research had the approval of the Burdur Mehmet Akif Ersoy University's Ethics Committee (Date: 02.03.2022, No: GO 2022/545), which is in compliance with the Helsinki Declaration.

Data analysis

The responses of the survey participants to the questions were coded and analyzed using the SPSS computer program (SPSS 20.0, Inc., Chicago, IL, USA). In descriptive statistics; numbers, averages, and percentage distributions were calculated. The Chi-square test was used for statistical analysis; a value of $p < 0.05$ was considered statistically significant.

RESULTS

Seven of the students participating in the study were male and 133 were female. Seventy-eight of the students were in the group that consisted of 1st and 2nd-grade students. The other group consisted of sixty-two students and included 3rd and 4th grade students.

Questions students about oral and dental health practices were asked about the frequency of tooth brushing, flossing, and routine check-up with the dentist. The difference between 1st and 2nd-grade students and 3rd and 4th-grade students was examined, and no statistically significant difference was found ($p=0.514$; 0.175 ; 0.844). Therefore, the answers to these questions are given together in Table 1. The results showed that 23.6% of the students got into the habit of using dental floss and 25% said that they went for a routine dental check-up. However, it has been determined that most of them brush their teeth at least twice a day.

Table 1. Oral health practices of students

Oral health practices	n (%)
Tooth brushing frequency	
Once a day	31 (22.2)
Twice and more a day	99 (70.7)
Once a week	9 (6.4)
None	1 (0.7)
Using dental floss	
Yes	33 (23.6)
No	107 (76.4)
Routine check-up at the dentist	
Yes	35 (25)
No	105 (75)

In the questions asked to measure the biochemistry, oral and dental health knowledge of the students, mostly correct answers were obtained above 50%. The questions asked to the students and the answers received are summarized in Table 2. Considering the answers given to the knowledge level questions, the question of whether bleeding gingival is an indicator of unhealthy gingival was the most correctly answered. Another question that the highest number of students answered correctly was the question of which type of food carries a higher risk of caries potential. The first two questions that students gave wrong answers were the questions about the effect of increasing the number of snacks on dental caries, and whether the presence of protein and fat in meals containing carbohydrates is effective in preventing dental caries.

There is a statistically significant difference between the two groups in terms of their answers to three questions. The first of these questions is the question about the effect of having protein and fat in carbohydrate-containing meals ($p=0.001$). The other two questions are the questions asked about the substance that prevents caries in the gum and the vitamin of which deficiency causes aphthous ulcers in the mouth (respectively, $p=0.003$; 0.031).

After these, in the questions about their education and their thoughts on it part, the answer to the question "What would you recommend to consume for clients with dry mouth?" has been to consume the most fiber foods (Graphic 1). More than 50% of the students recommended the consumption of fiber foods for dry mouth. After this recommendation, mostly chewing gum and orange consumption are recommended by students. Consumption of spicy foods, coffee, and soda, was suggested by only one or two students.

After these questions, 95 students answered no to the question "Do you think that the education received by nutrition and dietetics specialists on oral and dental health is sufficient?" No statistically significant difference was observed among the answers given by the 1st and 2nd grade students and the 3rd and 4th grade students ($p=0.138$). However, the rate of nutrition and dietetics students who do not find the education they receive about oral and dental health sufficient is quite high. Then, 128 students answered yes to the question "Do you plan to give dietary advice to your clients, taking into account the protection of oral and dental health?" A statistically

significant difference was observed between the answers given by the 1st and 2nd grade students and the 3rd and 4th grade students (p=0.014). When 15 of the last two-year students answered that they

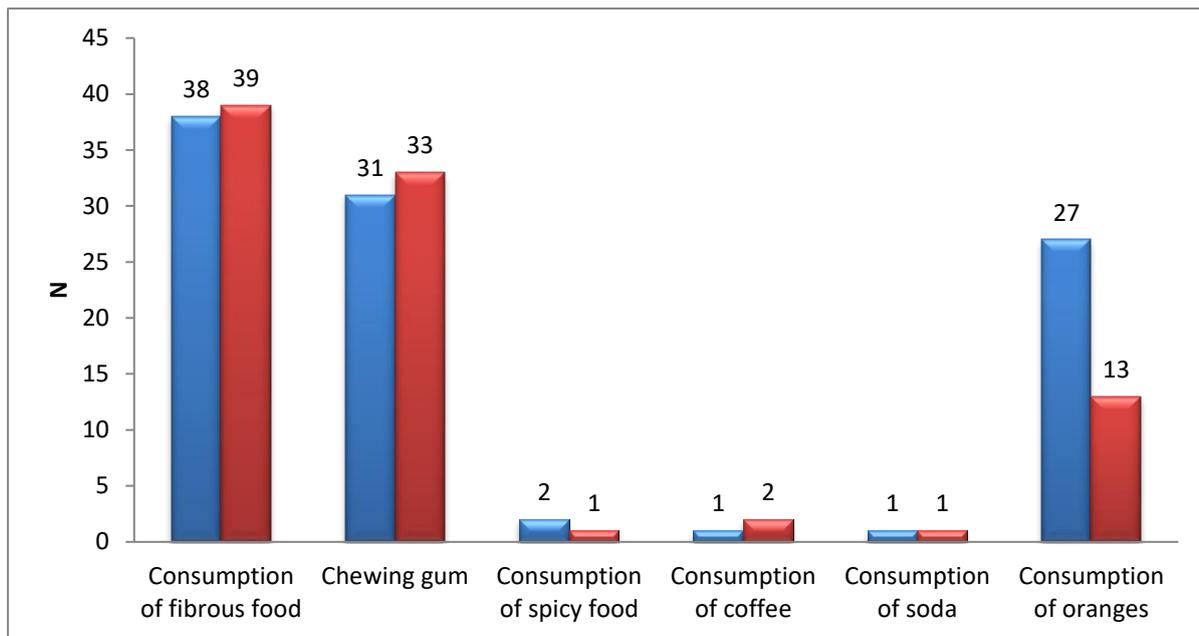
would not consider oral and dental health while creating a diet list, this number was only 7 in the first two-year students (Table 3).

Table 2. Oral and Dental Health, and Biochemistry Knowledge of Students

Oral and dental health, and biochemistry knowledge	Correct practice N (%)		p value*
	1-2 nd Grade	3-4 nd Grade	
Which of the following option is the most important time for brushing? (Morning, Noon, Before going to sleep ⁺ , I don't know)	44 (56.4%)	37 (59.7%)	0.412
What does the presence of bleeding gingiva indicate? (Healty gingiva, Unhealthy gingiva ⁺ , I don't know)	69 (88.5%)	60 (96.8%)	0.212
Which of the following types of carbohydrates plays a more active role in tooth decay? (Fructose, Maltose, Sucrose ⁺)	45 (57.7%)	41 (66.1%)	0.749
Which is the least caries-forming sugar? (Glucose, Aldose, Lactose ⁺)	55 (70.5%)	47 (75.8%)	0.484
Which type of food has a higher risk of caries potential? (Lemonade, Apple, French Fries Caramel ⁺)	69 (88.5%)	54 (87.1%)	0.806
Which food's consumption is effective in reducing the risk of caries by after consumption of sugary food? (Cheese ⁺ , Bread, Banana, Bread)	42 (53.8%)	32 (51.6%)	0.793
Which option is riskier in terms of caries formation due to fruit consumption? (Fruit Juice ⁺ , Fruit, I don't know)	60 (76.9%)	51 (82.2%)	0.439
Which saliva pH increases the risk of caries formation? (Basic, Acidic ⁺ , Neutral)	62 (79.5%)	54 (87.1%)	0.235
Which element is found in meat, fish and cereals in general and prevents the formation of dental caries and provides remineralization? (Fluor ⁺ , Iron, Magnesium, Selenium)	46 (59.0%)	41 (66.1%)	0.401
What is the effect of increasing the number of snacks on dental caries? (Does not affect, Increases ⁺ , Decreases, I do not know)	30 (38.5%)	26 (41.9%)	0.322
Do you find the statement correct "The presence of protein and fat in carbohydrate-containing meals is effective in preventing dental caries"? (Yes ⁺ , No, I don't know)	28 (35.9%)	39 (62.9%)	0.001
Which is the most commonly used anti-caries substance in gums? (Glycerol, Xylitol ⁺ , Gum Mastic)	47 (60.2%)	48 (77.4%)	0.003
Which of the following eating disorder is more common in dental erosion? (Obesity ⁺ , BlumiaNeurosa, Orthorexia Neurosa)	50 (64.1%)	37 (59.7%)	0.592
Which vitamin's lack causes the formation of aphthous ulcers and the deficiency of it which is also known as mouth sores among the people? (Vitamin B12 ⁺ , Vitamin A, Vitamin E)	31 (39.7%)	36 (58.1%)	0.031
Do you think that malnutrition can cause dental crowding? (Yes ⁺ , No, I don't know)	41 (52.6%)	40 (64.5%)	0.155
Is there a relationship between the increase in body mass index and the deterioration of oral and dental health? (Yes ⁺ , No, I don't know)	43 (55.1%)	43 (69.4%)	0.086

⁺Correct answer

*Chi-square test, p<0.05



blue: 1st and 2nd grade students; red: 3rd and 4th grade students

Graphic 1. Students' Answers to the Question for What Do You Recommend to Clients to Consume with Dry Mouth

Table 3. Students' Thoughts on Their Oral and Dental Health Education and Future Plans

	1-2 nd Grade	3-4 nd Grade	P value*
	N (%)		
Do you think that the education received by nutrition and dietetics specialists on oral and dental health is sufficient?			
Yes	21 (26.9)	24 (38.7)	0.138
No	57 (73.1)	38 (61.3)	
Do you plan to give dietary advice to your clients, taking into account the protection of oral and dental health?			
Yes	71 (91.0)	47 (75.8)	0.014
No	7 (9.0)	15 (24.2)	

DISCUSSION

In recent years, the impact of oral and dental health on general health has been a current issue and the training of health professionals on this subject has been questioned (Sharda & Shetty, 2010; Erdoğan et al., 2015). All individuals in the field of health must have accurate information about oral and dental health and biochemistry, which is closely related to this subject, during their education. In particular, the training of dietitians, who will have the authority to write a diet program for the clients, plays a key role in the good oral and dental health that the society will have. It is known that while there is a biochemistry course in the

nutrition and dietetics curriculum in Turkey, there is not enough course on oral and dental health. Nutrition and dietetics education should be structured in a way to include oral and dental health issues, and students' proficiency in this area should be increased.

Students' practices are as important as their knowledge of oral and dental health as it is known that brushing the teeth regularly twice a day reduces dental caries (Gibson & Williams, 1999). In the questions we asked the students about oral and external health practices, we found that 70.7% of the students brushed their teeth two or more times a day. While this rate is lower than some

related studies on students, it is higher than some related studies (Ulu, Doğruer, Usta, & Dörter, 2012; Hou et al., 2014; Erdoğan et al., 2015). As it is impossible to completely remove plaque from tooth surfaces with a toothbrush and toothpaste, it is important to use dental floss to improve oral hygiene, but according to answers to these questions, it was found that only 23.6% of the students in our study used dental floss. This rate is even lower than previous studies showing the use of dental floss in our society (Dilber, & Koray, 2013). From the answers, it is seen that the rate of routine visits to the dentist by the students participating in our survey is only 25%. This rate was the same as in a study measuring the frequency of visits to the dentist in children in our society (Karabekiroglu, Öncü, Kaplanoğlu, & Ünlü, 2015). Since dietitians' attitudes towards oral and dental health will be effective in society, it is important to put efforts that will increase all these rates obtained from the study.

In the questions measuring the biochemistry and oral and dental health knowledge of the students, more than 50% correct answers were obtained, except for three questions. The first of these three questions was the question asked whether snacks increase dental caries. It is a scientific fact that snacks increase dental caries (Johansson, Lif Holgerson, Kressin, Numm, & Tannere, 2010). In this context, the two groups similarly gave the correct answer as 38.5% and 41.9%.

Another question with a low rate of correct answers is the question asked if the presence of protein and fat in carbohydrate-containing meals is effective in preventing dental caries. Regarding periodontal diseases, there are many published articles reporting the associations of any of the dietary factors such as carbohydrates, lipids, proteins with the incidence of dental diseases (Ceog, 2002; Freeman, 2014; Sonarkar, Purba, & Singh, 2014; Varela-Lopez, Giampieri, Bullon, Battino, & Quiles, 2016). Lipids are hydrophobic, reducing contact between carbohydrates and bacteria, and proteins and lipids have cariostatic effects (Aksoy, 2017; Razmpoosh, Abdollahi, & Salehi, 2018). Carbohydrates, lipids, and proteins are covered in detail in biochemistry courses. In this question, we see that the classes who took the biochemistry course were able to answer the question correctly at a statistically higher rate.

The relationship between recurrent aphthous ulceration and vitamin B12 deficiency was first suggested more than 65 years ago and has been

proven by studies (Brachmann, 1954; Carrozzo, 2009). The question of whether vitamin B12 deficiency causes aphthous ulceration was answered correctly by 39.7% of the 1st and 2nd grade students who did not complete the biochemistry course, while 58.1% of the 3rd and 4th-grade students who took the biochemistry course answered correctly the question. Thus, the inclusion of vitamins in biochemistry lessons has been effective in answering this question correctly.

The question of whether xylitol in the gum prevents dental caries was answered correctly with a higher rate of 77.4% in the 3rd and 4th grades learning sugar alcohols in the biochemistry course because the percentage of correct answers to the same question in other classes is 60.2%. In the question, the list of foods recommended for dry mouth wrong answers were given. However, sugary drinks, caffeine, acidic foods such as oranges, and dry, hard foods that can irritate your mouth such as grains can increase dry mouth (Quandt et al., 2011). On the contrary, there are studies stating that fruits such as oranges and fibrous foods are good for dry mouth by increasing the amount of saliva (Moynihan, 2000; Aksoy, 2017). Therefore, it is expected students choose such answers with such information.

When all the questions are examined, it is seen that the questions are answered correctly at a higher rate in the 3rd and 4th grades. It could be said that the courses taken by the students in the 1st and 2nd grades, especially in the field of biochemistry, increase their knowledge of oral and dental health.

Although the level of knowledge increases with the education received, it is obvious that 67.85% of nutrition and dietetics students do not find oral and dental health education sufficient. The reason for this may be related to the difficulty in answering the questions about oral and dental health in the survey questions. Another reason is that they have not taken any lessons about oral and dental health. Even in this case, 84.24% of the state that they will consider protecting oral and dental health in their future diet recommendations. This result shows that the dietitians of the future are eager to improve the oral and dental health of society. However, students are aware that they are not getting enough lessons that include more nutrition and biochemistry and its relationship with oral and dental health.

CONCLUSION

In conclusion, it is necessary to increase the awareness of nutrition and dietetics students about oral and dental health, and it is necessary to add more curricula on this subject to their education programs. In this way, the application of the knowledge acquired by these students during their education to their professional lives will be of great help in improving the oral and dental health of society. At the same time, new survey studies with more participants on this subject should be conducted and the knowledge levels of oral and dental health in nutrition and dietetics students in different universities should be compared.

Ethics Committee Approval

Ethics committee approval was received for this study from the Burdur Mehmet Akif Ersoy University's Ethics Committee (Date: 02.03.2022 and No: GO 2022/545).

Author Contributions

Idea/Concept: B.İ.K., E.N.K.; Design: B.İ.K., E.N.K.; Supervision/Consulting: B.İ.K., E.N.K.; Analysis and/or Interpretation: B.İ.K., E.N.K.; Literature Search: B.İ.K., E.N.K.; Writing the Article: B.İ.K., E.N.K.; Critical Review: B.İ.K., E.N.K.

Peer-review

Externally peer-reviewed.

Conflict of Interest

The authors have no conflict of interest to declare.

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