



ORAL HYGIENE LEVEL MAINTENANCE OF DENTAL MEDICINE STUDENTS

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Abstract

Modern scientific literature shows that enroll in preclinical and clinical subjects at dental medicine improved oral health manners and level of oral hygiene. The aim of this study was to determinate the maintenance of oral hygiene of the dental medicine students, at "Goce Delcev" University" - Stip, Faculty of Medical Science.

Forty students from Faculty of Medical Sciences - Dental Medicine were included in the study. The examinations were made twice: before listening the subject Oral Health and after, in third and the same student in fifth semester. Evaluation was made how their attitude has been changed in maintaining oral hygiene after learning about oral health. Dental plaque index (according to Silness and L oe) and Decay, Missing, Filling Teeth index (DMFT) were used to determinate the plaque level and caries teeth.

In the first testing period were processed results with average value of 0.84 of Dental plaque index, in the mean while students were attending courses about oral health. The mean value of DMFT index among students was 9.72. In the second clinical examination, after one year were processed results with average value of 0.69. After one year, mean value of DMFT index among students was 7.8. There's a significant reduction in the unhealed caries shown by the result taken from the decayed teeth which, when first examined was 1.1, and after the second examination was 0.46.

Results showed that Oral Health subject has a major impact in improving the habits and manner of maintaining oral hygiene among students. Students have less plaque in fifth than third semester (after enrolled the subject). Also, students have smaller number of caries (decay), equal number of missing teeth, and higher number of filling teeth in fifth than third semester. Knowledge about oral health has important role in maintaining oral hygiene and reducing the level of plaque and decay teeth among students of Dental Medicine

Key words: *Plaque index, Missing tooth, Oral hygiene, DMFT index, Decay.*

1. Introduction

College life takes an important period of every persons' life and getting new experience. Association among college students allows transferring different habits and attitudes between them. Inattention to oral health is common in individuals and that may influence their colleagues.

According Khami *et al.*, [1], dental medicine students should have positive attitude towards oral health because it should be those who shall be set aside among college students and take steps for greater promotion of oral hygiene among their colleagues from other academic years, and also between their friends and family. In order to reduce the oral diseases, we must increase the prevention of oral diseases.

Oral and general health depends of the dynamic interaction of several factors including the personality of the individual, behavior and perception. One of the aims to teaching the dental medicine students is to motivate them to maintain good oral hygiene, and further their experience to confer on society. This research shows that attitudes and knowledge about oral hygiene are changing in terms of what students are studying on clinical or preclinical courses [2].

According Vangipuram *et al.*, [3], as they progress in their studies students of dental medicine, progress in knowledge about oral hygiene, so their attitude for that is more serious. According Sharda *et al.*, [4], students who are not medical sciences despite their higher education nevertheless have scanty knowledge about oral health; there is a need to increase the promotion of oral health in other higher educational institutions by teachers, assistants and students of dental medicine.

Oral hygiene is the main factor for prevention and promotion of oral health. With proper oral hygiene we prevent the accumulation of dental plaque, which if it is not removed, allows the accumulation of tartar and that opens the way for the development of dental caries and parodontopathy. World Health Organization (WHO) is responsible for programs and strategies for Health Improvement and therefore oral health [5]. Health care and prevention will be improved only by higher diffusion and the exchange of knowledge in the international level.

Dental caries and periodontal disease are the most common diseases with chronic character and deteriorate by entering food rich with carbohydrates, inefficient removal of dental plaque and small input of fluoride and calcium [6].

These diseases are not directly life threatening, but they influence life quality in affecting: nutrition, aesthetics, and self-esteem, causing pain, discomfort and loss of the tooth. Proper and adequate use of products with fluoride can help initial lesion to be reduced and they are recommended in the treatment of hypersensitive teeth.

Dental plaque is an organized microbial system, association of microorganisms with protein and extracellular matrix polysaccharides and has a major role in the incidence of caries and parodontopathy. According Armitage [7], dental plaque has been classified as supra gingival and subgingival. Also, the process of formation of dental plaque were classified into three phases: formation of dental pellicle, initial bacterial colonization, secondary bacterial colonization and plaque maturation [8].

Epidemiological studies for assessing the current situation provide an important basis and the further health-care of the population. They also provide reliable data for the development of national or regional health program [9]. The main index for epidemiological investigations of oral health is Decay, Missing, Filling Teeth index (DMFT).

DMFT index is most often elected and it is considered as the most relevant index for determination of the dental status [10]. DMFT index is correlated with oral hygiene because not removing dental plaque results to progression of dental caries and parodontopathy.

The first aim of this study was to determine the level of the maintenance and the technique of maintaining oral hygiene among the students from the Faculty of Medical Sciences - Dental Medicine at the University "Goce Delcev" in Stip. Students from second year were included for this study to compare how their attitudes have changed in maintaining oral hygiene before enrolled of certain courses related to oral health and oral hygiene and after.

The second aim was to evaluate the condition of the teeth and plaque index in the students.

2. Materials and Methods

Forty students from the Dental Medicine at the Faculty of Medical Sciences at the University "Goce Delcev" in Shtip were included in this study. The investigation was made twice: before enrolling the subject Oral Health and after, in third and the same student in fifth semester. Students were between 20 - 22 years.

For the realization of this study were made questionnaire with four questions for students and clinical investigation for dental status. Students answered questions related to maintaining oral hygiene such as: how often you brush your teeth, which technique you use when you brush your teeth, are you using some additional things to maintain oral hygiene and which of them, how often you visit your dentist.

Clinical investigation was made to determinate the condition of the teeth and plaque index. The examinations were made twice: before enrolling the subject Oral Health and after, in third and the same student in fifth semester. Evaluation was made to improve how their attitude has been changed in maintaining oral hygiene after learning about oral health.

Dental plaque was determined by probing and values were obtained with Silness and Löe plaque index. The presence of dental plaque was estimated at the level of the marginal third and it is scored on a scale of 0 - 3, or more precisely: 0 - 1 is an excellent oral hygiene, 1 - 2 is a good oral hygiene and 2 - 3 is an unsatisfactory oral hygiene.

For determining this index, was used a selected group of teeth (16, 12, 24, 36, 32, and 44), and all four surfaces. Plaque index was determined for each of the teeth. The quantity of dental plaque is determined by sliding the probe in the cervical surface of the teeth, where the presence of dental plaque is seen at the top of the probe. The values of plaque index for each surface is collected and divided by the number of surfaces - 4. Obtained values of dental plaque were collected and divided by the number of examined teeth. It is not compensating in the case of deficiency of a tooth.

Plaque accumulation is assessed for each surface, such as:

- 0 - no plaque, by inspection or by probing.
- 1 - adherent, very thin layer of dental plaque, cannot be noted by inspection, only with probing.
- 2 - the presence of dental plaque with moderate thickness which is observed with the eye.
- 3 - large deposits of dental plaque that are on the marginal gingiva.

We used only dental mirror and probe for the existence of dental plaque and dental caries during the clinical examinations. Additional or supplementary instruments and methods were not used.

For determining the level of caries among students was elected DMF Teeth index. DMFT - index (originally: D - "Decayed" - carious, M - "Missing" - extracted due to caries, F - "Filling" - tooth with definitive filling).

The data obtained from the clinical examination after the collection was statistically processed. For statistical processing was used special software for statistical processing of data (Statistical software SPSS for Windows version 23).

3. Results and Discussion

Inappropriate oral hygiene influences the appearance of oral diseases. High prevalence of caries and periodontitis was due to improper oral hygiene. Oral health among dental medicine students should be on the highest level, because as future dental medicine doctors, dental medicine students had a large social responsibility and should serve as an example, not only to their peers but also in the wider socially community.

The average age of subjects was 21 (± 2) years. Students answered four questions from two questionnaires.

The results from first questionnaire before learning the subject Oral Health were as following. Regarding brushing teeth frequency question, large percentage (29 students) - 72.5% of the students brushed their teeth twice a day, usually in the morning and then at

night before bed time which is enough for optimal oral hygiene, while only (25%) 10 students was brush their teeth after every meal, and which is a sign of good oral hygiene (Table 1). Summarized results from the study showed that all students (100%) were maintaining a basic oral hygiene with the main thing of oral hygiene, toothbrush and toothpaste.

The results from this study were similar with results of Ganss *et al.*, [11], who processed more studies and indicate the fact that 74% of students brushed their teeth twice a day. In the studies of Gharib *et al.*, [12], and Al-Omari *et al.*, [13], for the frequency of brushing teeth showed lower results, than were represented of this study.

From the responses received from the second question - about the technique that is used when they are brushing their teeth, we found out that more than a half of respondents 24 students (60%) used circular movements while brushed teeth. Vertical movements were used by 3 students or 7.5%. Horizontal movements were used by only 1 student (2%) and 12 students (30%) of dental medicine in Stip were used combination of all these movements (Table 1).

The next question was about use of additional things to maintain oral hygiene. Thirty-two students (80% of respondents) had answered that they use additional things to maintain oral hygiene like: dental floss used by 27 students (67.5%), and interdental brush used by 5 students (12.5%), while despite these 28 students (70%) used mouthwash solution, and only 8 respondents (20%) answered that do not used any additional things, but only brush and toothpaste (Table 1). Sixty

Table 1. Questionnaire of Oral Hygiene Habits on the Students

| Question | Response | Percentage of students (total = 40) | Number of students |
|--|-------------------------------|-------------------------------------|--------------------|
| How often you brush your teeth? | Once | 2.5% | 1 |
| | Twice | 72.5% | 29 |
| | After each meal | 25% | 10 |
| | Other (combination) | 0% | 0 |
| Which technique you use when you brush your teeth? | Horizontal movement | 2.5% | 1 |
| | Vertical movement | 7.5% | 3 |
| | Circular movement | 60% | 24 |
| | Other (combination) | 30% | 12 |
| Are you using some additional things to maintain oral hygiene and which of them? | No | 20% | 8 |
| | Dental Floss | 67.5% | 27 |
| | Interdental brush | 12.5% | 5 |
| | Mouthwash solution | 70% | 28 |
| How often you visit your dentist? | Only when they have a problem | 45% | 18 |
| | Every six months | 35% | 14 |
| | Once a year | 7.5% | 3 |
| | Other | 12.5% | 5 |

seven percentages of the students used dental floss as a additional device which is very good, apart from students in Nigeria which according to research Folayan *et al.*, [14], more than 48% of the students never had used dental floss.

Majority of the students 18 (45%) were visiting dentist only when they had a problem in the oral cavity, while 14 students (35%) had regular dental checkups every six months (Table 1). These results from data differ from other countries. In his research Halawany *et al.*, [15], showed that in Asian countries this data ranges from 26% in the United Arab Emirates (UAE), Saudi Arabia 24%, India 16% and 7% that Yemen represented a very low percentage on students who attend regular dental checkups.

The examination for dental plaque among students of dental medicine was determined with probing and the results were obtained with plaque index Silness and Loe (Table 2). First measuring, before enrolled of certain courses related to oral health, average value of dental plaque measured by plaque index was 0.84.

Table 2. Values of Silness and Loe dental plaque index before enrolling the subject

| Values of Silness and Loe Dental plaque index | Percentage of students | Number of students Total = 40 |
|---|------------------------|-------------------------------|
| 0 - 1 | 45% | 18 |
| 1 - 2 | 52.5% | 21 |
| 2 - 3 | 2.5% | 1 |

More than half 21 students (52.5%) had plaque index between 1 to 2 what means that they maintain a good oral hygiene, but to be brought to excellent, there was a still need to take actions. Eighteen students (45%) had plaque index of 0 to 1, so this was an excellent level of oral hygiene and we should strive these students to keep on in this way of maintaining oral hygiene, and therefore about oral health in general. Improper oral hygiene was detected in only one student (2.5% of students).

Average value for DMFT index from the first measuring was 9.72. In twenty-four students (60%) the DMFT index was less than 10, fourteen students (35%) had DMFT index between 10 - 20 and only two students (5%) at dental medicine in Shtip, Macedonia, had DMFT index higher than 20 (Table 3). The most represented component of the DMFT index among students of was F - component (filling teeth with definitive fillings), with average value of 8.02. Most of the respondents seventeen students (42.5%) had between six and ten filling teeth, less than five filling teeth were noted in thirteen students (32.5% of students). Ten (25%) of the students had higher than ten filled teeth (Table 3).

D - Component of DMFT index (untreated carious teeth) among dental medicine students had average value of 1.1. Twenty-six (65%) of students had untreated carious teeth according to obtained data and from the clinical checkups. Fifteen (37.5%) of students had tooth decay, caries of two teeth were noted in six (15%) students and in five (12.5%) students were found caries more than 3 teeth (Table 3). The mean value of missing

Table 3. Values of DMFT index before enrolling the subject

| Question | Number of tooth | Percentage of students | Number of students Total = 40 |
|--|-------------------------|------------------------|-------------------------------|
| DMFT Index | 0 - 10 | 60% | 24 |
| | 10 - 20 | 35% | 14 |
| | 20 - 32 | 5% | 2 |
| "Filling" - (tooth with definitive filling) | 0 - 5 | 32.5% | 13 |
| | 6 - 10 | 42.5% | 17 |
| | 10 - 32 | 25% | 10 |
| "Decayed" - (carious teeth) | Caries on a one tooth | 35% | 14 |
| | Caries on a two teeth | 37.5% | 15 |
| | Caries on a three teeth | 15% | 6 |
| | Caries on a four teeth | 5% | 2 |
| | Caries on a one tooth | 7.5% | 3 |
| "Missing" - (extracted due to caries) | No extracted tooth | 72.5% | 29 |
| | One | 12.5% | 5 |
| | Two | 7.5% | 3 |
| | Three | 2.5% | 1 |
| | Four | 5% | 2 |

teeth due to caries (M - component of DMFT-index) was 0.55. According to the results, twenty-nine (72.5%) of dental medicine students did not have missing teeth. Only eleven (27%) of the students had missing teeth out of which: one extracted tooth was noted in five (12%) students, two extracted teeth were detected in three (7.5%) students and in only three students (7.5%) was found had more than three extracted teeth (Table 3).

Second measuring, after enrolled of certain courses related to oral health, average value of dental plaque measured by plaque index was 0.69. More than sixty percentages (62%) of the students (25 students) had plaque index of 0 to 1 which means that they maintain an excellent oral hygiene. Fifteen students (38% of the students) had plaque index of 1 - 2 that they maintain a good oral hygiene. And the second measurement, after enrolled courses oral health there were not detected students with inadequate oral hygiene (Table 4).

Table 4. Values of Silness and Löe dental plaque index after enrolled the subject

| Values of Silness and Löe Dental plaque index | Percentage of students | Number of students Total = 40 |
|---|------------------------|-------------------------------|
| 0 - 1 | 62% | 25 |
| 1 - 2 | 38% | 15 |
| 2 - 3 | 0% | 0 |

DMFT index during the second measurement was with average value 10.36. In twenty-three students (57.5%) the DMFT index was less than 10, fifteen students (37.5%) had DMFT index "between" 10 - 20 and two

students (5%) of Dental medicine in Shtip had DMFT index higher than 20 (Table 5). The most significant reduction had in component D (untreated carious teeth) with average value of 0.46. Most of the students (32 students or 80%) didn't have carious teeth. Eight students (20%) had carious teeth four students (10%) had tooth decay and four 10% had carious of two teeth); (Table 5). F - component (filling teeth with definitive fillings), was with average value of 12.5. Most of the respondents, nineteen students (47.5%) had between six and ten filling teeth, less than five filling teeth were noted in ten students (24.5%). And eleven (27.5%) students had higher than ten filled teeth (Table 5). According to results of second measurement, it's determined that there were not changes in M - component (missing teeth); (Table 5).

According Reddy *et al.*, [16], academic classes' appropriate preclinical and clinical courses among the students of dental medicine contributes to acquire greater skills and knowledge of oral hygiene. In the research of Peker *et al.*, [17], dental medicine students in Turkey were changing their attitudes and behaviors towards oral hygiene better after enrolled preclinical courses. This study showed that the subject oral health has a major impact in behaviors and attitudes of the students, after enrolled of the course students improve their habits and thereby reduces plaque index and DMFT index.

The average value of the plaque index found among students was 0.76 which indicates that dental medicine students of the second year of studies had good oral hygiene and hopes that with higher education about oral health will be increased the level of maintenance of oral hygiene and with that the reduction

Table 5. Values of DMFT index after enrolled the subject

| Question | Number of tooth | Percentage of students | Number of students Total = 40 |
|---|-----------------------|------------------------|-------------------------------|
| DMFT Index | 0 - 10 | 57.5% | 23 |
| | 10 - 20 | 37.5% | 15 |
| | 20 - 32 | 5% | 2 |
| "Filling" - (tooth with definitive filling) | 0 - 5 | 25% | 10 |
| | 6 - 10 | 47.5% | 19 |
| | 10 - 32 | 27.5% | 11 |
| "Decayed" - (carious teeth) | No caries | 80% | 32 |
| | Caries on a one tooth | 10% | 4 |
| | Caries on two teeth | 10% | 4 |
| "Missing" - (extracted due to caries) | No extracted tooth | 72.5% | 29 |
| | One | 12.5% | 5 |
| | Two | 7.5% | 3 |
| | Three | 2.5% | 1 |
| | Four | 5% | 2 |

of plaque index. DMFT index was chosen as the most relevant index to indicate the condition of the teeth in the mouth of the respondents. DMFT index uses quantity of caries, filling and missing teeth in an individual and also able to find the mean value. DMFT index largely depends on individual oral hygiene.

The average value of the DMFT index showed in this study was 10.04, which is rather high. The DMFT index showed in the study is correlated with the research of Ljaljevic *et al.*, [18], Davidović *et al.*, [19], Badovinac *et al.*, [20], which confirm that DMFT index in the Balkan countries was high. According Shirazi *et al.*, [21], and Vizotto [22], in their studies performed in Asian countries had very low DMFT index that ranges between 0.5 and 3. Also low DMFT index was also found in Von der Fehr [23], who investigated the Scandinavian countries.

F - Component (filling teeth) had the highest value in DMFT index among students of dental medicine in the second year. Great value of this component was often because of irregular dental checkups among students and the fact that the definitive fillings were not permanent or their durability was reduced due to other factors.

The fact that at the first measurement the average value of carious teeth was 1.1 and missing teeth was 0.5, which means that approximately half of the students had one extracted tooth and that all students had more than one carious tooth, suggests that students was not maintaining proper oral hygiene before enrolling the studies of dental medicine.

4. Conclusions

- The results showed that classes of oral health had a major impact in improving the habits and manner of maintaining oral hygiene among students. Students had less plaque index in fifth than third semester (after enrolled the subject).

- Also, students had smaller number of caries (decay), equal number of missing teeth, and higher number of filing teeth in fifth than third semester. Knowledge about oral health had important role in maintenance of oral hygiene and reduce the level of plaque and decay teeth among students of Dental medicine.

5. References

- [1] Khami M. R., Virtanen J. I., Jafarian M., Murtomaa H. (2007). *Prevention-oriented practice of Iranian senior dental students*. Eur. J. Dent. Educ., 11, pp. 48-53.
- [2] Bono A., Brunotto M., Almerich J., Molina G. (2006). *Comparison of oral hygiene habits among university students from Argentina, Spain and Italy*. Rev. Odontol. UN-ESP, 35, pp. 41-46.
- [3] Vangipuram S., Rekha R., Radha G., Pallavi S. K. (2015). *Assessment of oral health attitudes and behavior among undergraduate dental students using Hiroshima University Dental Behavioral Inventory HU-DBI*. Journal of Indian Association Of Public, 13, pp. 52-57.
- [4] Sharda A. J., Shetty S. A. (2008). *Comparative study of oral health knowledge, attitude and behaviour of first and final year dental students of Udaipur city, Rajasthan, India*. Int. J. Dent. Hyg., 6, pp. 347-353.
- [5] Petersen P. E. (2003). *The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century the approach of the WHO Global Oral Health Programme*. Community Dent. Oral Epidemiol., 31, pp. 1-3.
- [6] Kirchhoff J., Filippi A. (2015). *Comparison of oral health behavior among dental students, students of other disciplines and fashion models in Switzerland*. Swiss Dental Journal, SSO 125 C, pp. 1337-1344.
- [7] Armitage G. (1999). *Development of a Classification System for Periodontal Diseases and Conditions*. Ann. Periodon., 4, pp. 1-6.
- [8] Jass J., Surman S., Walker J. (2003). *Medical Biofilms, Detection, Prevention and Control*. Wiley, 2, pp. 173192.
- [9] The World Health Organization. (1991). *Basic oral health epidemiological survey: Instruction manual*. WHO, Sao Paulo Santos, Brasil.
- [10] Levin L., Shenkman A. (2004). *The relationship between dental caries status and oral health attitudes and behavior in young Israeli adults*. J. Dent. Educ., 68, pp. 1185-1191.
- [11] Ganss C., Schlueter N., Preiss S., Klimek J. (2009). *Tooth brushing habits in uninstructed adult -frequency, technique, duration and force*. Clin. Oral Invest., 13, pp. 203-208.
- [12] Gharib D. S. H., Rashed H. J. H. (2015). *Oral hygiene status among Dental Students of School of Dentistry at University of Sulaimani*. J. of Dent. and Med. Science, 14, pp. 66-69.
- [13] Al-Omari Q. D., Hamasha A. A. (2005). *Gender-specific oral health attitudes and behavior among dental students in Jordan*. J. Contemp. Dent. Pract., 6, pp. 107-114.
- [14] Folayan M., Khami M., Folaranmi N., Popoola B., Sofola O., Ligali T., Esan A., Orenuga O. (2013). *Deretminants of preventive oral health behavior among senior dental students in Nigeria*. BMC Oral Health, 13, pp. 1-8.
- [15] Halawany H. S., Abraham N. B., Jacob V., Al-Maflehi N. (2015). *The perceived concepts of oral health attitudes and behaviors of dental students from four Asian countries*. The Saudi J. for Dent. Research, 6, pp. 79-85.
- [16] Reddy L., Saimadhavi N., Reddy S., Ramesh T., Reddy P., Saikiran C. (2012). *Oral hygiene practices and habits among dental students and staff in a dental college India*. Cumhuriyet Dent. J., 10, pp. 7-13.
- [17] Peker I., Alkurt M. T. (2009). *Oral Health Attitudes and Behavior among a Group of Turkish Dental Students*. European Journal of Dentistry, 3, (1), pp. 24-33.
- [18] Ljaljevic A., Matijevic S., Tarzic N., Andjelic J., Mugosha B. (2012). *Significance of proper oral hygiene for health condition of mouth and teeth*. Vojnosanitetski Pregled, 69, pp. 16-21.

- [19] Davidovic B., Jankovic S., Ivanovic D., Grujicic I. (2012). *Oral Health Assessment Among Dental Students*. Serbian Dental Journal, 59, pp. 141-147.
- [20] Badovinac A., Božić D., Vučinac I., Vešligaj J., Vražić D., Plančak D. (2013). *Oral health attitudes and behavior of dental students at the University of Zagreb, Croatia*. J. Dent. Educ., 9, pp. 1171-1178.
- [21] Shirazi U., Naz F., Yousuf M. (2013). *DMFT index among Dental Undergraduates of Lahore Medical and Dental College in different professional years of Dentistry, Pakistan*. Oral & Dental Journal, 33, pp. 156-159.
- [22] Vizzotto D., Paiano H. M. A., Rudey A. C., Lovera A. K., Hagemann P., Gazolla T. (2013). *DMFT index of 12 year-old students of public schools participating in the Project of Education for Working for Health*. RSBO, 10, (3), pp. 245-251.
- [23] Von der Fehr F. (1994). *Caries prevalence in the Nordic countries*. Int. Dent J., 44, pp. 371-378.