# Oral health knowledge and behaviour in the field of oral health among freshman medical students

## Wiedza i zachowania prozdrowotne w zakresie zdrowia jamy ustnej u studentów pierwszego roku medycyny

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#### ABSTRACT

**Introduction**: Students of medical faculties are the backbone of a well-educated medical team. First-year medicine students in the field of oral health have knowledge and pro-health behaviors acquired before the beginning of academic education. The level however does not always match scientific views. It is important that during studies they should systematically deepen and model. It is expected that appropriate, reliable and professional knowledge about oral health obtained during the academic training has modulated their own pro-health behaviors concerning the oral health of future doctors and their patients.

The aim of the study was to assess the level of knowledge and pro-health behaviors concerning the oral cavity of first-year students of medicine.

**Materials and methods**: The study covered 60 first-year medical students of the Faculty of Medicine and Health Sciences at the University of Zielona Góra. Students anonymously filled out a questionnaire containing questions about health knowledge and behaviors as well as a self-assessment of oral health.

**Results**: Only 13.3% of the medical students knew that tooth decay is an infectious disease. At the same time, 95% indicated acid bacteria and carbohydrates as a cause of caries. When assessing the level of their own health-oriented knowledge in the field of dentistry, the vast majority considered it sufficient (over 61%) or too low (14%). It is worrying to submit responsibility for the oral health of the unit to the dentist – 96.7% of respondents considered it. As many as 33.3% of respondents believed that the responsibility for removing plaque is borne by the dentist. The vast majority determined their oral hygiene as good, and only 3.4% as bad. Among students 65% recognized the

need to change the toothbrush every month, and 90% when needed. Most students, 93.3%, knew that toothpaste with fluoride prevents the development of caries and that one of the hygienic procedures is cleansing the tongue. In the assessment of oral health, the vast majority indicated the range of 1–3 teeth treated for dental caries. At the same time, almost 70% admitted that they never had an endodontically treated tooth, with almost 80% stating that they had not had any tooth removed. Almost 18% of respondents did not report any signs of periodontal inflammation. The largest number of respondents after the analysis of their teeth would change the color - 64%, slightly less the teeth position 21.5%, and for a change in the shape of the teeth indicated 6.1%. The most common source of pro-health knowledge was a dentist for the students and then mass media. **Conclusions**: The level of knowledge regarding oral health and healthy behaviors of first-year medical students requires raising thorough academic training. Attention should be paid to building systematic and cause-and-effect knowledge based on tooth and periodontal anatomy, bacterial etiology of caries, formation of odontogenic inflammatory foci and their impact on the development of focal diseases. Research has shown no causal relationship between the level of knowledge and pro-health behavior. The undergraduate education of future doctors should include shaping the correct dietetic and hygienic regimes. Developed attitudes based on professional knowledge will allow future physicians to promote proper health behaviors in the oral cavity of their friends and patients.

**Keywords**: oral health knowledge and behaviours; mouth; medical students.

#### ABSTRAKT

**Wstęp**: Studenci kierunków medycznych stanowią wsparcie wszechstronnie wykształconej kadry lekarskiej. Studenci pierwszego roku medycyny w dziedzinie zdrowia jamy ustnej posiadają wiedzę i zachowania prozdrowotne nabyte przed rozpoczęciem edukacji akademickiej. Wiedza ta nie zawsze jest jednak zgodna z dowodami naukowymi. Ważne jest, aby podczas studiów ulegała ona systematycznemu pogłębianiu i modelowaniu. Oczekuje się modulowania zachowań prozdrowotnych przyszłych lekarzy i ich pacjentów przez odpowiednią, rzetelną i profesjonalną wiedzę na temat zdrowia jamy ustnej, uzyskaną podczas szkolenia akademickiego. Celem pracy była ocena poziomu wiedzy i zachowań prozdrowotnych dotyczących jamy ustnej studentów pierwszego roku medycyny.

**Materiały i metody**: Badaniem objęto 60 studentów pierwszego roku kierunku lekarskiego na Wydziale Lekarskim i Nauk o Zdrowiu Uniwersytetu Zielonogórskiego. Studenci anonimowo wypełnili kwestionariusz zawierający pytania dotyczące wiedzy i zachowań prozdrowotnych oraz samooceny stanu jamy ustnej. **Wyniki**: Jedynie 13,3% studentów medycyny wie, że próchnica zębów jest chorobą zakaźną. Jednocześnie 95% wskazało bakterie kwasotwórcze i węglowodany jako przyczynę choroby próchnicowej. Oceniając poziom własnej wiedzy prozdrowotnej w dziedzinie stomatologii, zdecydowana większość uznała ją za wystarczającą (ponad 61%), zaś 14% – za zbyt niską. Niepokojące jest obciążanie odpowiedzialnością lekarza stomatologa za stan zdrowia jamy ustnej jednostki – dotyczy to 96,7% respondentów. Aż 33,3% badanych uważa, że odpowiedzialność za usuwanie płytki nazębnej ponosi lekarz stomatolog. Zdecydowana większość respondentów określiła stan higieny swojej jamy ustnej za dobry, a jedynie 3,4% za zły. Konieczność wymiany szczoteczki co miesiąc uznało 65% studentów, a 90% wymienia ją w miarę zużycia. Z kolei 93,3% wie, że pasta do zębów z fluorem zapobiega rozwojowi próchnicy i że jednym z zabiegów higienicznych jest oczyszczanie języka. W ocenie stanu zdrowia jamy ustnej zdecydowana większość badanych wskazała zakres 1-3 zębów leczonych z powodu próchnicy, przy czym prawie 70% przyznaje, że nigdy nie mieli zęba leczonego endodontycznie, a prawie 80% zaznaczyło, że nie ma usuniętego żadnego zęba. Niemal 18% nie stwierdziło u siebie żadnych oznak stanu zapalnego przyzębia. Najwięcej respondentów, po analizie swojego uzębienia, zmieniłoby jego kolor - 64%, nieco mniej -21,5% – ustawienie zębów, a zmianę kształtu zębów wskazało

6,1%. Głównym źródłem wiedzy prozdrowotnej był dla studentów lekarz stomatolog, a następnie środki masowego przekazu. Wnioski: Poziom wiedzy dotyczącej zdrowia jamy ustnej i zachowań prozdrowotnych studentów pierwszego roku medycy wymaga pogłębiania w trakcie gruntownego szkolenia akademickiego. Należy zwrócić uwagę na poszerzanie systematycznej i przyczynowo-skutkowej wiedzy dotyczącej anatomii zębów i przyzębia, etiologii bakteryjnej choroby próchnicowej, powstawaniu zębopochodnych ognisk zapalnych i ich wpływu na rozwój chorób odogniskowych. Wyniki badań wskazały brak związku przyczynowo-skutkowego pomiędzy poziomem wiedzy a zachowaniem prozdrowotnym. Kształcenie przeddyplomowe przyszłych lekarzy powinno obejmować kształtowanie prawidłowych reżimów dietetyczno-higienicznych. Postawy przyjęte dzięki profesjonalnej wiedzy pozwolą przyszłym lekarzom mieć wpływ na właściwe zachowania prozdrowotne dotyczące jamy ustnej ich znajomych i pacjentów.

**Słowa kluczowe**: wiedza i zachowania prozdrowotne; jama ustna; studenci medycyny.

#### INTRODOCTION

Oral health as a state of complete, physical, mental and social well-being [1, 2] is an integral part of an individual's health and contributes to the general well-being of every human being. Many diseases developing in the mouth may consequently lead to local pain, disturbances in the function of the masticatory system, the occurrence of numerous focal diseases, as well as having significance in the social life of the individual [2, 3]. The health condition of this area is closely related to the state of health of the whole organism and as such should be perceived by medical students as well as doctors of all specialties.

A higher level of knowledge directly affects the improvement of pro-health behaviours. The result of a correct modulation is an improvement in oral health [4, 5], which affects the general health of the patient. The effectiveness of dental prophylaxis depends to a large extent on adherence to the principles of prohealth behaviour [2] by patients as one of the determinants of models conditioning health [1, 2, 6].

Students starting their academic education have a certain level of knowledge, and based on this, pro-health behaviours shaped by the family environment and mass media. Their level does not always correspond to scientific views on the etiology, etiopathogenesis, prophylaxis and methods of treatment of oral diseases.

During the undergraduate education of medical students, we should strive to transmit thorough knowledge of oral diseases which will condition modulations in the behaviour of medical practitioners towards their own health. The acquired knowledge and experience will allow them to be aware of the impact in the public space (for public health) on improving the health of patients, family members and acquaintances [4].

The aim of the work was to assess the knowledge and prohealth behaviour of first-year students of medicine at the University of Zielona Góra.

#### MATERIALS AND METHODS

The study covered 60 students (24 men and 36 women) of the first year of medical direction, Faculty of Medicine and Health Sciences at the University of Zielona Góra. The study used a modified anonymous survey of "health knowledge" developed by Kaczmarek et al. [4], which was carried out as part of the World Health Day at the University and shared by the Polish Dental Society "Poland speaks AAA" in 2018. Students completed the survey on April 20, 2018. Knowledge was assessed on the basis of a sheet containing 28 questions. The respondents had 3 choices to choose from: true, false, I do not know. Subsequent points of the questionnaire contained questions about pro-health behaviours. These included the frequency of follow-up dental appointments, the reasons for reporting to a dentist during the last visit, assessing their oral health and identifying the treatment needed for dentition and periodontium. Subsequent items concerned self-assessment and sources of knowledge in the field of dental prophylaxis.

#### RESULTS

Table 1 presents the answers by the medical students to questions related to the level of knowledge about dental caries, pro-health behaviours, prophylactic intervention, and responsibility for their own oral health. Fifty people answered 28 questions, 9 answered 27 questions, and 1 person answered 26. Caries as an infectious disease was identified by 8 people (13.3%), 48 people considered it a non-infectious disease. At the same time, 95% of respondents said that the cause of caries are acid-forming microorganisms and sugars.

All subjects considered the necessity of changes in their own teeth. In  $1^{st}$  place in the assessment of the needs of changes was a change in the colour of the teeth – 42 people (70%). In  $2^{nd}$ 

		Answers		
Question number	Question	true	false	l do not know
		n/%	n/%	n/%
1	Tooth decay is an infectious disease.	8/13.3	48/80	4/6.7
2	The cause of caries is acid-forming bacteria and sugars.	57/95	0/0	3/5
3	Reduction of salivation promotes the development of caries.	44/73.3	11/18.3	5/8.33
4	If parents have tooth decay, their children always have teeth with tooth decay.	1/1.67	58/96.7	1/1.67
5	If a person under the age of 18 has no caries, then throughout their life they will have healthy teeth (without caries).	0/0	59/98.33	1/1.67
6	Lack of thorough cleansing of teeth results in tooth decay.	58/96.7	2/3.3	0/0
7	Lack of thorough cleansing of teeth causes gum disease.	58/96.7	1/1.67	1/1.67
8	The patient is responsible for the condition of the teeth and gums.	58/96.7	2/3.3	0/0
9	The dentist is responsible for the condition of the teeth and gums of the patient.	31/51.7	26/43.3	3/5
10	The 1 <sup>st</sup> visit of a child to the dentist should take place before the 12th month of the child's life.	9/15	26/43.3	25/41.7
11	The $1^{st}$ visit of a child to the dentist should take place in the $3^{rd}$ year of the child's life.	35/58.3	10/16.	15/25
12	The 1 <sup>st</sup> visit of a child to the dentist should occur at the occurrence of symptoms of dental caries (e.g. tooth loss).	5/8.3	52/86.7	3/5
13	Adults should monitor the condition of the mouth every 6 months.	45/75	12/20	3/5
14	Adults should monitor the condition of the mouth every 12 months.	13/21.7	43/71.7	4/6.6
15	Adults should check the condition of the mouth when necessary (e.g. toothache, loss of filling).	35/58.3	23/38.3	2/3.4
16	Plaque is removed by a dentist.	20/33.3	36/60	3/5
17	Tartar is removed by the dentist.	47/78.3	10/16.7	4/6.7
18	Teeth should be cleaned before breakfast.	16/26.7	37/61.7	3/5
19	The toothbrush should be replaced:			
	every month,	39/65	16/26.7	8/13.3
	every 3 months,	2/3.4	55/91.7	3/5
	every 6 months,	23/38.3	36/60	1/1.7
	when worn out.	54/90	2/3.4	4/6.7
20	The use of a toothpaste with fluoride prevents tooth decay.	56/93.3	3/5	1/1.7
21	Standard oral cleansing procedures include the tongue.	56/93.3	2/3.4	2/3.4
22	Eating an apple before bedtime replaces brushing the teeth.	2/3.4	56/93.3	2/3.4

#### TABLE 1. Knowledge and pro-health behaviour of medical students in the field of oral health

place was a change in tooth position – 14 people (23.3%). Third place was a change in the shape of the teeth – 9 (15%) (Fig. 1).

In the study group, 35 of the students (58.3%) recognized their own dental condition as good, with 10 (16.7%) respectively as very good, 13 (21.7%) as satisfactory and only 2 (3%) as unsatisfactory (Fig. 2).

The most common source of knowledge about oral health was a dentist – 40 (58.3%), followed by mass media – 24 (40%) and other sources – 14 (16.7%). A relatively low impact on raising the level of pro-health knowledge came from materials and advertising campaigns – 8 (13.3%) – Figure 3.

As many as 53 (88.3%) students did not notice problems with periodontium (Fig. 4). However, in response to questions related to the symptomatology of periodontal disease, 44 (73.2%) students reported particular symptoms of periodontal disease, including 23 (38.3%) noticing the presence of plaque on their teeth, 16 (26.7%) noticing dental tartar, and 13 (21.7%) noticing bleeding from the gums. Gingival recession was noticed by 2 (3%) students (Fig. 5). Only 11 (18%) of the students did not notice the symptoms of periodontal disease.

Students declared systematic dental visits every 2 months – 8 (12.3%), every 6 months – 24 (36.9%), every 12 months – 16 (24.6%), when necessary – 17 (26.2%) – Figure 6. Over 44 (74%) of the students had been in a dental office in the last 6 months, including up to 3 months for a follow-up visit – 22 (37%). Only 15 (25.9%) students took follow-up visits later than 12 months (Fig. 7).

At the same time 33 (54.5%) students described an asymptomatic reason for reporting to a dentist. Twenty-seven (45.6%) students referred to a subjective feeling of discomfort or pain not defined in the etiology study (Fig. 8).

Only 14 (24.2%) students rated their level of knowledge of dental needs as high and very high. The vast majority – 37 (61.3%), considered that they had sufficient knowledge of oral health needs, and 9 (14.5%) admitted that they had a low level of knowledge about their own dental needs (Fig. 9).



FIGURE 1. Perception of the need for changes in your own teeth



FIGURE 2. Self-assessment on the condition of their own teeth







FIGURE 4. Assessment of health needs related to periodontal disease



FIGURE 5. Subjective assessment of periodontal inflammation



FIGURE 6. Frequency of reporting to the dentist



FIGURE 7. The date of the last visit to the dentist



FIGURE 8. Reason for reporting to the dentist



FIGURE 9. Assessment of their own level of knowledge of dental needs



FIGURE 10. Number of students on their knowledge of the number of teeth treated



FIGURE 11. Number of students on their knowledge of the number of teeth treated endodontically



FIGURE 12. Number of students on their knowledge of the number of teeth removed

FIGURE 13. Frequency of experiencing toothache







FIGURE 15. Evaluation of the motivation for dental visits

While assessing the level of knowledge on the number of treated teeth, 10 (25%) students said they did not have any treated teeth, 25 (41.7%) said that they had 1–3 treated teeth, 16 (26.7%) had 4–6 treated teeth, and 4 (6.6%) had more than 6 treated teeth. Three (1.8%) students did not answer the question (Fig. 10).

In assessing the level of their own knowledge about the number of teeth treated endodontically, 43 (71.7%) students stated that they did not have any endodontically treated teeth, 11 (18.3%) said that they had 1 tooth treated endodontically, and 3 (5%) said that they had 2 or more teeth treated endodontically (Fig. 11).

The majority of the students – 49 (81.7%), stated that they had not had any teeth removed or 1 tooth was removed, 5 (8.3%) said they had 2 teeth removed, and 4 (6.7%) said that 3 teeth had been removed (Fig. 12).

Sixteen (26.3%) of the students had never had toothache, 24 (40%) stated that tooth pain was infrequent, 18 (30%) stated rarely, and 2 (3.7%) often experienced toothache (Fig. 13).

A good state of oral hygiene was stated by 32 (52.5%) of the students, very good by 12 (20.4%), satisfactory by 14 (23.7%), and only 2 (3.4%) considered their oral hygiene bad (Fig. 14).

About half of the students – 32 (52.2%), considered their motivation for frequent dental visits to be prophylactic in nature, 18 considered their smile to be important (30%), 6 (11.1%) considered a regular shape was important and only 4 (6.7%) wanted to change the colour of their teeth (Fig. 15).

#### DISCUSSION

Health education of medical students aiming at acquiring and broadening their knowledge and skills in the field of dental health behaviours, influences them making informed decisions regarding their own health [7, 8]. It is recognized that medical students, being the backbone of well-educated medical staff, play an important role in social life [4]. It can therefore be expected that their awareness in the field of oral health, the significant and wide impact of oral diseases on the whole of human health, and creating a healthy lifestyle by medical students, will influence the practical motivation of patients to implement dental prophylaxis and change inadequate hygienic and dietary habits [4, 9]. In many publications, the level of knowledge and pro-health behavior of students in numerous faculties, including students of medical faculties [2, 3, 4, 5, 8, 9, 10], has been evaluated. In published studies, anonymous questionnaires were used to assess student knowledge and pro-health behaviours. This paper uses the questionnaire presented by Kaczmarek et al., from which we can fully compare the answers of medical students from 2 separate academic cities [4].

Comparing the answers to questions related to the etiology of tooth decay, it was noted that only 13.3% of medical students in Zielona Góra (UZ) and 15.2% in Wrocław (UM) consider it an infectious disease, yet respectively 95% and 83.3% indicated acid bacteria and carbohydrates as the reason for its formation. Significantly, respectively 73.3% and 74.2% of the medical students were found to be significantly more knowledgeable in the etiology of caries. In a similar way, the medical students of both universities assessed a lack of thorough cleansing of teeth results in tooth decay (respectively 96.7% UZ and 91% UM), and in a different way that the lack of good tooth cleaning causes periodontal diseases (96.7% UZ and 62.1% UM respectively).

A similar number of students from both universities recognized their own responsibility in the health condition of their teeth and gums (96.7% UZ and 98.5% UM respectively), and similarly, that the dental officer bears the responsibility for the health of the teeth and gums of an individual (as much as 51.7% UZ, 50% of UM).

The highest percentage of respondents admitted that the 1<sup>st</sup> visit of a child to a dental office should take place before 12 months of age (40.9% of UM) and also in the 3<sup>rd</sup> year of life (58.3% of UZ). However, the students of both universities mistakenly assessed that the 1<sup>st</sup> visit of a child to a dental office should take place only at the occurrence of pain symptoms (8.3% of UZ and as many as 25.7% of UM).

What is worrying is the lack of knowledge about the person responsible for removing plaque. As many as 33.3% of UZ students and 59.1% of UM believe that plaque should be removed by a dentist. Students are better educated in the field of dental tartar removal – 78.3% of UZ and 91% of UM students think tartar is removed by a dentist.

The majority of 75% of UZ and 69.7% of students are of the opinion that the mouth should be checked every 6 months, while 21.7% of UZ and 30.3% of UM, respectively, think every 12 months, and 58.3% of UZ and 45.5% of UM students when necessary.

With regard to the need to change the toothbrush, the level of knowledge of students is satisfactory. The need to change the brush during use is recognized by 90% of UZ and only 33.4% of UM, while the highest number of 65% of UZ respondents considers it necessary to change the brush every month, and 38.3% every 6 months. Wrocław students consider it necessary to change the brush only because of the degree of wear, without specifying the time attribute.

Zielona Góra students (93.3%) stated that toothpaste with fluoride prevents the development of tooth decay and also (93.3%) that one of the hygienic procedures in the mouth is brushing the tongue. The UM students responded to both questions (respectively 80.3% and 6.1%), but considered that cleansing the tongue was not required (74.2%). Such a large discrepancy between the students of both universities may be related to an age difference between in both groups (UZ first-year students, UM students, first and second year) and due to the fact that the compared studies were carried out several years apart.

Much less often, UZ students (21.7%) observed problems with bleeding gums in comparison with UM students (100%). Such a significant discrepancy could be caused by insufficient understanding of the question by some respondents and the choice of only one symptom with the possibility of multiple choice of answers to the question asked about the subjective assessment of periodontal inflammation. At the same time, as many as 88.3% of UZ students stated that they did not notice any problems relating to the functioning of the periodontium.

The occurrence of pain as the 1<sup>st</sup> reason for reporting to a dentist was recognized by 45.6% of UZ students, 50% of UM students, and as many as 81.5% of students in Turkey [4].

In the analysis of medical needs related to the change of shape, tooth color and tooth position, UZ students considered it relevant for them (respectively 15%, 70%, 23.3%), whereas UM students indicated 6.1%, 47% and 7%. Lack of satisfaction with the color of teeth was declared (70% of UZ, 47% of UM),

and in Peker's and Alkurta's studies [11] for British (35%) and Turkish (79.6%) students.

The most common source of knowledge about the oral health of students was a dentist (58.3% of UZ, 47% of UM), followed by mass media (40% of UZ, 40.9% of UM) and other sources (16.7% of UZ, 12, 1% of UM). Advertising materials and campaigns (13.3% of UZ) had a relatively low impact on raising the level of pro-health knowledge.

#### SUMMARY

The data obtained indicates that health knowledge and prohealth behaviours of medical students are based mainly on information obtained directly from the dentist. The frequent disparities, however, indicate the need for a detailed education of medical students, who will then communicate the knowledge to their friends, family and patients in a similar way. It requires professional and thorough preparation of physicians in the field of knowledge about hygiene and diet regimes, methods of proper oral hygiene, minimizing a cariogenic diet, and reducing the frequency of carbohydrate intake. Medical students should be introduced to the issues of health education during post-graduate education. This will create the opportunity to develop and reinforce appropriate attitudes and pro-health behaviours, to exert a proper influence on shaping the behaviours and attitudes of their patients. Attention should be paid to building the systematic and cause-and-effect knowledge of medical students in the field of dental prophylaxis based on tooth and periodontal anatomy, infectious etiology of caries and periodontal diseases, inflammatory foci and obstructive diseases originating from a primary focus in the oral cavity.

### CONCLUSIONS

Medical students should be further educated in the field of oral education and health promotion, so that by their own example (based on knowledge and practice), they can directly promote the behaviour and attitudes of their patients.

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