

Oral Health Awareness among International Dental and Medical Students at Lithuanian University of Health Sciences: a Cross-Sectional Study

Sandra Petrauskiene¹, Hava Mushayev¹, Gintare Zemgulyte², Julija Narbutaite¹

¹Department of Preventive and Pediatric Dentistry, Faculty of Odontology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania.

²Department of Neurology, Faculty of Medicine, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania.

Corresponding Author:

Sandra Petrauskiene

Department of Preventive and Pediatric Dentistry

Faculty of Odontology, Medical Academy

Lithuanian University of Health Sciences

Lukšos-Daumanto 6, LT-50106, Kaunas

Lithuania

Phone: +370 37 388192

E-mail: sandra.zemgulyte@lsmuni.lt

ABSTRACT

Objectives: To evaluate the self-reported oral health awareness, knowledge and attitude among international dental and medical students at the Lithuanian University of Health Sciences (Kaunas, Lithuania).

Material and Methods: A cross-sectional study was conducted among international medical and dental students at the Lithuanian University of Health Sciences in 2016 - 2017. The students were invited to participate in the survey before the beginning of a lecture, and they were informed that participation was voluntary and anonymous. In total, 282 students participated in the study, with a response rate of 92.1%. A self-administered English questionnaire consisting of 25 items with options on a Likert scale (agree, neither agree nor disagree and disagree) about oral health problems and their relation to general health status was used to assess a student's oral health awareness, attitude and knowledge. The level of significance was set at $P < 0.05$.

Results: Overall good, fair and poor oral health awareness was reported by 71.3%, 24.1% and 4.6%, respectively, of the international dental and medical students ($P < 0.05$). The mean score of oral health awareness was 18.2 (standard deviation [SD 3.27]), showing overall good oral health awareness. Moreover, the international dental students reported higher oral health awareness than medical students (19.14 [SD 3.25] vs 17.44 [SD 3.1]) ($P < 0.001$). Comparing this mean score by gender, no statistically significant difference was found (18.33 [SD 3.39] vs 18.05 [SD 3.16]) ($P = 0.371$).

Conclusions: Overall oral health awareness among international dental and medical students was high. Meanwhile, international dental students reported higher oral health awareness than international medical students.

Keywords: attitude; awareness; dental students; medical students; oral health.

Accepted for publication: 10 December 2019

To cite this article:

Petrauskiene S, Mushayev H, Zemgulyte G, Narbutaite J.

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J Oral Maxillofac Res 2019;10(4):e3

URL: <http://www.ejomr.org/JOMR/archives/2019/4/e3/v10n4e3.pdf>

doi: [10.5037/jomr.2019.10403](https://doi.org/10.5037/jomr.2019.10403)

INTRODUCTION

Oral health status is equally important in relation to general health and it can affect a person's income and quality of life as well because poor oral health can cause pain, affect speech, reduce the ability to eat and sleep, and affect self-esteem and confidence [1,2]. Good oral health and functioning teeth are integral to good general health, ensuring the necessity of a varied and nutritionally balanced diet [3,4]. Integration of oral health promotion into general health care has been highly recommended by the World Health Organization [5], to teach people that a good oral health status is an essential element throughout an individual's life-course which is often neglected [5,6]. Furthermore, it may reduce not only health care costs but also improve general health status, especially for patients with chronic diseases [7].

Some systemic diseases such as ischaemic heart disease, viral hepatitis or HIV disease, have oral manifestations, and some oral diseases, for instance, periodontal diseases, are related to multiple systemic conditions. Consequently, some systemic drugs can be associated with oral adverse drug reactions, and thus poor oral health can have a negative effect on general health outcomes. Thus, a good general health status requires the efforts of both medical and dental health professionals [8-12].

Today's medical and dental students are tomorrow's doctors. Undergraduate dental and medical students bear a social responsibility and have an exemplary function for their environment, such as members of their family, friends and, in particular, patients [13]. The knowledge that is learned at present will be applied in the future during their practice [8]. Not only dentists, but also medical practitioners should play an active role in oral health to provide the most proper comprehensive health care for patients [14,15]. Therefore, it is crucial to assess the awareness, knowledge and attitudes about the maintenance of oral health among dental and medical students [16].

Dental students study the subjects of prevention and oral health promotion, and it is essential that their own oral health awareness, knowledge, and attitudes be adequate [10]. Medical students should have an optimal level of knowledge regarding oral health so that they can guide or refer the patients to the dentist when it is required [6,9]. Moreover, oral health disparities can be reduced if other health care providers are engaged in inter-professional care with dental care providers [17].

The aim of this study was to evaluate the self-reported oral health awareness, knowledge and attitudes among

international dental and medical students at the Lithuanian University of Health Sciences.

MATERIAL AND METHODS

A cross-sectional survey of oral health awareness among dental and medical international students was carried out at the Lithuanian University of Health Sciences (LSMU), Medical Academy, during the autumn semester of the 2016/2017 study year. The study was approved by the Bioethics Center of the LSMU (No. BEC-OF-34). The Lithuanian University of Health Sciences has a five-year curriculum in dentistry and a six-year curriculum in medicine, which lead to a master's degree. Since 1990, the LSMU has been providing dental and medical education in English for international students using parallel and identical curriculums in Lithuanian.

Subjects

The subjects were international students of the both Dentistry and Medicine faculties at LSMU. A total of 153 international dental students and 505 international medical students studied at LSMU during the 2016/2017 study year. All international dental and randomly selected international medical students were invited to take part in the survey. An equal number of both faculties' international students (153 dental international students and 153 medical international students) were enrolled in this study as a representative sample.

The principal investigator (HM) asked all the international students ($n = 306$) (both dental and medical) in each academic year to complete an anonymous self-administered written questionnaire before the beginning of a lecture or a compulsory practical class. Participation was voluntary and, anonymous; thus, the return of the completed questionnaire was considered as acceptance to participate.

A total of 282 international students participated in this study (125 international dental students and 157 international medical students). The response rate was 92.1%.

The questionnaire

An anonymous self-administered questionnaire covered background information (gender, faculty, academic year of study) and assessed participants' awareness of oral health problems and their relation to general health. The questionnaire consisted of

25 items with options on a Likert scale (agree, neither agree nor disagree and disagree) in English.

The mean scores of the following domains about the aetiology and prevention of caries development, the attitudes towards tooth loss, the importance of health education in increasing oral health awareness among the public and the influence of oral health on overall quality of life were calculated, where correct answers of “agree” were recorded as “2”, answers of “neither agree nor disagree” as “1” and answers of “disagree” as “0”. Correct answers of “disagree” were recorded as “2”, answers of “neither agree nor disagree” as “1” and answers of “agree” as “0” for the questions related to the risk factors of oral cancer. The mean scores in the different domains varied from “0” to “2”: it was defined that the higher the score was in each domain, the better the awareness that was found among the students.

The oral health awareness score was calculated after recording the answers: a correct answer was recorded as “1”, whereas the two other incorrect options were recorded as “0”. Consequently, the sum score was counted: scores < 12 were considered poor oral health awareness, 12 to 16 - fair oral health awareness, and > 17 - good oral health awareness.

Statistical analysis

The statistical data analysis was carried out by using SPSS (Statistical Package for the Social Sciences) for Windows, 19 version. The normality of the data distribution was confirmed using the Kolmogorov-Smirnov test.

Table 1. Characteristics of the participants by gender and academic year

	Faculty		Total
	International dental students	International medical students	
	N (%)	N (%)	N (%)
Gender			
Male	63 (22.3)	74 (26.2)	137 (48.6)
Female	62 (22.1)	83 (29.4)	145 (51.4)
Total	125 (44.4)	157 (55.6)	282 (100)
Academic year			
1st year	29 (23.2)	32 (20.4)	61 (21.6)
2nd year	20 (16)	30 (19.1)	50 (17.7)
3rd year	21 (16.8)	30 (19.1)	51 (18.1)
4th year	20 (16)	27 (17.2)	47 (16.7)
5th year	35 (28)	38 (24.2)	73 (25.9)
Total	125 (44.4)	157 (55.6)	282 (100)

Chi-square test; $P > 0.05$.

Cronbach's alpha served as a measure of the internal consistency of the questionnaire, and it was found to be 0.713 (an acceptable value).

Considering the curriculum of dentistry, the international dental students were dichotomized according to the year of study into ‘pre-clinical’ (the 1st and 2nd year) vs ‘clinical’ (the 3rd, 4th and 5th year) phases, whereas international medical students were not divided into two groups.

To establish relationships between categorical variables, the Pearson chi-squared test (χ^2) was used. The significance level was set at $P < 0.05$. The Mann-Whitney U test was used to compare the mean scores between groups. The confidence interval (CI) was 95%.

Parametric data were expressed as mean and standard deviation (M [SD]).

RESULTS

Overall, the participants in the survey were 48.6% males and 51.4% females. The highest proportion (29.4%) of participants was women studying the medicine specialty, whereas international dental students' number by gender was approximately equal. Consequently a statistically significant difference between gender was not found in both faculties ($P = 0.335$) (Table 1).

The biggest group of participants in this study was the 5th year undergraduates of both faculties (28% dental students, vs 24.2% medical ones), whereas 4th year international medical students (17.2%) and the 2nd and 4th year international dental students equally (16%) were the most inactive. Statistically significant differences were not found in students' distribution by academic year ($P > 0.05$) (Table 1).

A majority of the participants (71.3%) had good oral health awareness, whereas merely 4.6% of the students in both faculties had poor oral health awareness ($P < 0.05$).

In this survey, a slightly higher number of female participants had good and fair oral health awareness than males. Therefore, no significant difference in oral health awareness score was noticed by gender ($P = 0.926$) (Table 2).

The comparison of oral health awareness scores between dental and medical international students' showed that significantly more dental students (79.2%) had good oral health awareness than medical students (65%) ($P < 0.05$), whereas more medical students (29.3%) had fair oral health awareness than dental students ($P = 0.032$) (not presented in the tables).

Table 2. Oral health awareness by gender among international dental and medical students at LSMU

Variable	Oral health awareness							Mean (SD) ^d	P-value
	N (%)								
	Poor	Fair	Good	χ^2	df	P-value			
Gender (N = 282)									
Male	7 (2.5)	33 (11.7)	97 (34.4)	0.153	2	0.926	18.05 (3.16)	0.371	
Female	6 (2.1)	35 (12.4)	104 (36.9)				18.33 (3.39)		
Total	13 (4.6)	68 (24.1)	201 (71.3)				18.2 (3.27)		
International students (N = 282)									
Dental	4 (1.4)	22 (7.8) ^a	99 (35.1) ^b	6.896	2	0.032 ^a < 0.05 ^b	19.14 (3.25)	< 0.001	
Medical	9 (3.2)	46 (16.3) ^a	102 (36.2) ^b				17.44 (3.1)		
Total	13 (4.6)	68 (24.1)	201 (71.3)				18.20 (3.27)		
International dental students (N = 125)									
Preclinical year	3 (2.4)	18 (14.4) ^c	28 (22.4) ^c	23.867	2	< 0.001 ^c	16.9 (2.92)	< 0.001	
Clinical year	1 (0.8)	4 (3.2) ^c	71 (56.8) ^c				20.59 (2.56)		
Total	4 (3.2)	22 (17.6)	99 (79.2)				19.14 (3.25)		

^aComparing results by a fair oral health awareness between international dental and medical students (Chi-square test).

^bComparing results by a good oral health awareness between international dental and medical students (Chi-square test).

^cComparing results by oral health awareness (fair and good) between preclinical and clinical international dental students (Chi-square test).

^dMann-Whitney U test.

N = number of students; SD = standard deviation.

The comparison of oral health awareness score between pre-clinical and clinical year dental students revealed that a majority of dental students (79.2%) had a good oral health awareness, and significantly more students in the clinical year group (56.8%) reported a good oral health awareness than in the pre-clinical year group ($P < 0.001$). While the prevalence of fair oral health awareness was low among dental undergraduates, significantly more pre-clinical year dental students (14.4%) had a fair oral health awareness than did clinical year students ($P < 0.001$) (Table 2).

Overall, the mean score of oral health awareness was 18.2 (3.27) among the participants. Thus, the international students reported good oral health awareness in this survey. Comparing this mean score by gender, it was higher among females (18.33 [3.39]), although no statistically significant difference was noticed between mean scores by gender ($P = 0.371$) (Table 2).

Considering the faculty, this score was higher among dental students than among medical ones (19.14 [3.25] vs 17.44 [3.1]) ($P < 0.001$) (Table 2). Furthermore, as it was expected, the clinical year dental international students had the highest mean score of awareness among all the participants (20.59 [2.56]) ($P < 0.001$) (Table 2).

Table 3 presents the mean scores of domains in different sections among international medical and dental students at LSMU. Meanwhile, the mean

values showed that a majority of both medical and dental students agreed with the following statements “oral health has an impact on quality of life” (1.92 [0.35]) and “health education is important in oral health awareness among the public” (1.9 [0.39]). Consequently, there was no statistically significant difference among preclinical, clinical and medical students.

The clinical dental international students had the highest mean value scores of awareness about caries aetiology and prevention (1.64 [0.28]), and there was a statistically significant difference in preclinical dental students ($P = 0.003$). Furthermore, in this study dental students had statistically higher awareness of caries domain than medical students (1.58 [0.27] vs 1.4 [0.28]) ($P < 0.001$), respectively (Table 3).

Assessment of the oral cancer domain revealed that preclinical dental students had the lowest awareness about risk factors and prevention of oral cancer (1.18 [0.53]) compared with the mean scores of clinical dental and medical students (1.52 [0.56] vs 1.46 [0.59]), respectively. Although clinical international dental students showed a statistically significantly better awareness of this domain than preclinical ones ($P < 0.001$), no statistically significant difference was found between dental and medical international students ($P = 0.198$) (Table 3).

The overall awareness about attitudes towards tooth loss was low (1.13 [0.67]). Hence, the preclinical dental students had statistically significantly lower

Table 3. Mean scores of the different oral health aspects among study participants at LSMU

Domain	International dental students			International medical students N = 157	Overall N = 282	P-value
	Preclinical N = 49	Clinical N = 76	Total N = 125			
Caries aetiology and prevention-related domain	1.48 (0.28) ^a	1.64 (0.28) ^a	1.58 (0.27) ^b	1.4 (0.28) ^b	1.48 (0.29)	0.003 ^a < 0.001 ^b
Oral cancer prevention-related domain	1.18 (0.53) ^a	1.52 (0.56) ^a	1.39 (0.57) ^b	1.46 (0.59) ^b	1.43 (0.58)	< 0.001 ^a 0.198 ^b
Attitudes towards tooth loss	0.96 (0.55) ^a	1.3 (0.73) ^a	1.17 (0.68) ^b	1.09 (0.66) ^b	1.13 (0.67)	0.002 ^a 0.341 ^b
Health education importance in oral health awareness among the public	1.86 (0.5) ^a	1.92 (0.27) ^a	1.9 (0.36)	1.91 (0.37)	1.9 (0.39)	0.504 ^a 0.121 ^b
Oral health influence on quality of life	1.92 (0.4) ^a	1.92 (0.3) ^a	1.92 (0.39)	1.92 (0.32)	1.92 (0.35)	0.97 ^a 0.117 ^b

^aComparison between preclinical and clinical international dental students (Mann-Whitney U test).

^bComparison between international dental and medical students (Mann-Whitney U test).

N = number of students; SD = standard deviation.

attitudes towards tooth loss than clinical dental students (0.96 [0.55] vs 1.3 [0.73]) ($P = 0.002$), whereas no significant difference was noticed between dental and medical students (1.17 [0.68] vs 1.09 [0.66]) ($P = 0.341$), respectively (Table 3).

DISCUSSION

The level of knowledge, attitude and awareness about oral health importance among international dental and medical students might be different due to differences between curriculums of the dentistry and medicine specialties in this study. At LSMU, the curriculum of dentistry is divided into preclinical and clinical stages. The preclinical stage consists of basic and biomedical studies and lasts for the first two years. During the three-year clinical stage, students study not only the specialty subjects such as prevention of oral diseases, paediatric dentistry, orthodontics, oral and maxillofacial surgery, prosthodontics, cariology, endodontics, periodontology and diseases of oral mucosa and receive practical training, both in the phantom-head laboratory and in the clinics, but also internal diseases, ear nose and throat pathology and skin diseases [18]. Considering the gained dental education from preventive subjects and practical training, in line with the study carried out in Egypt showing better oral health knowledge, attitude and behaviour among dental students in the clinical year group than in the pre-clinical year group, our study revealed the same pattern of oral health awareness among senior dental students [19].

Meanwhile, the curriculum of medicine is comprised of basic sciences during the first year; from the second

year, the studies are problem-based, integrating basic and clinical subjects and the analysis of real clinical situations. Subsequently, knowledge is applied and skills are developed during the fourth to sixth years in solving clinical problems. In addition, only the sixth-year medical undergraduates study the subject related to oral health in clinic of oral and maxillofacial surgery [18].

The number of international students at LSMU is increasing. Students from 53 countries (mainly from Sweden, Israel, Germany, Spain, the United Kingdom, Lebanon, India, and South Korea) are currently enrolled; therefore a multicultural approach is prevalent among international students about awareness of and, attitude towards oral health importance at LSMU [18].

Worldwide, the oral health awareness among dental and medical students can differ due to gaps in knowledge about the importance of oral health in general health outcomes which is related to the separation of medical and dental education [20]. Dental students are inclined to rate the importance of medical problems in dentistry higher than medical students due to their inadequate education about oral diseases [15]. The finding of other study revealed that even though a majority of respondents (medical doctors, medical students and nurses) were aware of dentistry, only 36.4% of participants strongly agreed that delayed referral of dental treatment can lead to life-threatening conditions [21].

Often collaboration among students of different health professions is minimized. Therefore, worldwide, numerous authors encourage collaborating to develop more interdisciplinary programmes, inter-professional education and training in the specialties' curricula to

improve inter-professional relationships and enhance general health outcomes [7,18,20,22-24]. The study conducted by Hein et al. [20] revealed, that there are no or limited requirements including oral-systemic health into the curriculum of non-dental health care (medicine, nursing and pharmacy) professions in English-speaking universities in four geographic areas (United States, Canada, Great Britain, Australia and New Zealand). Consequently, there might be inadequate inclusion of content related to oral health in the curricula [20].

An active inter-professional interaction enables the development of a better patient-centered care model according to the patient's needs, minimizing potentially unnecessary harmful treatment and reducing quality of life [25]. In addition, inclusion of oral health education into the medical curriculum increases awareness and understanding of the importance of oral health to systemic health [23]. Moreover, inter-professional clinical stimulations and case study experiences focused on how oral-systemic health causes a significant positive change in self-reported inter-professional competencies among nurse practitioners, dental students and medical students after exposure to the training [26].

Some studies showed inadequate knowledge and attitude among medical students towards oral health due to insufficient medical training related to oral health or not incorporating basic studies of dentistry into the medical curricula. For instance, merely 2.8% of medical students had a good level of knowledge, whereas 47% of respondents had a poor level of knowledge in Nigeria [24,27].

Increased awareness and sufficient knowledge about oral cancer among both medical and dental students can improve oral cancer surveillance because the incidence of oral cancer tends to rise and is amongst the most prevalent cancers worldwide [28,29]. Furthermore, more than half of oral cancer cases are diagnosed at an advanced stage of the disease, and an optimal detection of early-stage disease is essential [30,31]. Moreover, study carried out in Jordan revealed that less than a half of dental students recognized the early signs of oral cancer [32]. Some studies showed different attitudes towards smoking as the main risk factor for oral cancer. Consequently, 85.4% of undergraduate medical students singled out smoking as major risk factors in Saudi Arabia [29]. Findings of other studies conducted in Brazil showed a higher prevalence of awareness by dental students about tobacco as a risk factor (92.48%), whereas only 61.3% of undergraduate dental students identified smoking as a risk factor in Malaysia [31,33]. This and another [32] studies found better knowledge toward

oral cancer prevention among clinical dental students than preclinical dental students. On the contrary, medical students tended to have a better attitude towards oral cancer than dental students in our study, but not in Malaysia [34].

Analysing the caries aetiology and prevention-related domain, the international clinical dental students had significantly deeper knowledge than the international preclinical dental and medical students in this study. Another study revealed the lower level of oral health knowledge, especially toward caries aetiology and prevention among medical students than dental ones as in this study [35]. In addition, dental students' awareness about preventive dentistry in Iran did not differ from our study [36].

This study showed that international dental and medical student at LSMU had a low awareness towards tooth loss, which needs to be raised for several reasons. Population ageing is a global phenomenon [37]. Thus a life-course approach to oral health and maintenance of natural teeth throughout life should be a goal for the medical community [25]. Chronic conditions such as dental caries and periodontal diseases, which may lead to tooth loss, are highly prevalent among older people [25]. Furthermore, oral health problems such as deterioration in taste and smell and a decline in masticatory efficiency and reduced quality of life are inclined to increase with age [38]. It is essential, that medical and dental students should have a good knowledge about elders' complex medical, psychological and social traits [39]. Awareness of the contribution of oral health to systemic health and quality of life needs to be increased by inter-professional collaboration [40].

In this study, dental clinical year students had better knowledge about the possibility to replant than preclinical year dental and medical ones, although another study showed that medical students had a deeper knowledge regarding replantation in Serbia [41].

In this study, two-thirds of international medical students reported a good awareness, whereas another study showed that merely a quarter of medical students had good oral health awareness in Davangere [8].

Strengths and limitations

The study assessing and evaluating the self-reported oral health awareness, knowledge and attitudes among international dental and medical students at the Lithuanian University of Health Sciences was carried out for the first time. This study enrolled all

the international dental and medical students at LSMU and covered all study years with a response rate of 92.1%, which can be considered high. However, this study has certain limitations. In Lithuania, not only the LSMU, but also Vilnius University provides Medicine and Dentistry studies for international students, although the number of international students is significantly lower at Vilnius University (139 and 22 international medical and dental students). The students at Vilnius University were not enrolled in this study, limiting the generalizability of our findings. The data were collected with a self-reported questionnaire, and the possibility of both intentional and unintentional misreporting can compromise the validity and reliability of the findings.

CONCLUSIONS

Overall, oral health awareness was high among international dental and medical students at the Lithuanian University of Health Sciences.

The dental students were found to have higher oral health awareness than the medical students. The oral health awareness of dental students was enhanced with an increasing level of education. Furthermore, a majority of both medical and dental students reported about a high oral health impact on quality of life and health education importance in oral health awareness among the public.

ACKNOWLEDGMENTS AND DISCLOSURE STATEMENTS

The authors have contributed equally to this work by making substantial contributions to the conception and design, acquisition of data, and analysis and interpretation of data as well as being involved in drafting of the manuscript or revising it critically for important intellectual content. All authors read and approved the final manuscript.

The authors of this manuscript declare that they do not have conflicts of interest regarding this study.

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To cite this article:

Petrauskiene S, Mushayev H, Zemgulyte G, Narbutaite J.

Oral Health Awareness among International Dental and Medical Students at Lithuanian University of Health Sciences: a Cross-Sectional Study

J Oral Maxillofac Res 2019;10(4):e3

URL: <http://www.ejomr.org/JOMR/archives/2019/4/e3/v10n4e3.pdf>

doi: [10.5037/jomr.2019.10403](#)

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