

SPREMNOST STUDENATA ZAVRŠNE GODINE STUDIJA DENTALNE MEDICINE NA PRUŽANJE SKRBI PACIJENTIMA NA ANTITROMBOSKOJ TERAPIJI

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SELF-CONFIDENCE OF FINAL-YEAR DENTAL STUDENTS IN MANAGING PATIENTS ON ANTITHROMBOTIC THERAPY

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Objectives: The aim of the study was to assess whether Croatian final-year dental students experience discomfort in relation to treating patients who use oral antithrombotic drugs and if it would influence their decision to provide care independently after graduation. **Methods:** Students from three universities were invited to participate by filling in an online questionnaire regarding, among other, experience in managing patients on antithrombotic therapy, self-assessed knowledge of antithrombotic drugs, and readiness to provide care to these patients independently. **Results:** All respondents had been in contact with patients taking antithrombotics. Despite lower self-assessed knowledge of latest drugs among antiplatelet agents and novel oral anticoagulants, students expressed high degree of willingness to provide care independently without fear or in spite of it. Thereby all students considered consultations with patient physician important in all or in some cases. Lower level of stress was associated with better knowledge of medical indications for antithrombotic therapy, greater self-confidence in performing specified dental procedures, and with better knowledge of other factors that can be related to the risk of prolonged bleeding after dental procedure. **Conclusion:** The participants of this study mostly feel confident to manage patients on antithrombotic therapy whether it provokes anxiety or not.

Key words: dental students, oral anticoagulants, platelet aggregation inhibitors

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INTRODUCTION

Use of oral antithrombotic drugs for the treatment and prevention of thromboembolism may be causally linked to more extensive bleeding following invasive dental procedures. Bleeding risk would be dependent upon the characteristics of the antithrombotic drug(s) used by the patient, individual characteristics of the patient (comorbidities and/or use of other drugs/supplements that interfere with hemostasis), and the nature of dental procedure.

There is general agreement that antiplatelet therapy, as well as warfarin therapy in patients who have a stable INR should not be discontinued or altered in most pa-

tients prior to performing routine dental procedures not associated with high bleeding risk (1-4). Recommendations regarding perioperative management of patients on non-vitamin K oral anticoagulants (NOACs) are not compliant (5) or clearly established (6), so the practices are expected to be variable. Similar to findings from other countries (7,8), the expenditure of NOACs has greatly increased in the past few years in Croatia. Data from the Agency for Medicinal Products and Medical Devices of Croatia show a substantial increase in their use since 2017, particularly of rivaroxaban and apixaban. According to the guidelines designed by an expert working group of Croatian emergency specialists, discontinuation of therapy with NOACs is not indicated for dental procedures carry-

ing minimal bleeding risk but the intervention should be planned for the time when the blood concentration of the specific drug is lowest (9).

Research investigating how patients on antithrombotic therapy are being managed in general dental practice in Croatia has not been conducted so far. Scientific reports from other countries suggest that both inappropriate and inconsistent management occurs in practice. Examples include preference of stopping antithrombotic therapy before performing dental procedure (10-15), relying on invalid or outdated INR values for therapeutic decisions (15), not giving sufficient consideration to the potentially relevant drug-drug interaction (15), hesitation in following existing guidelines (12), overestimating the risk of bleeding related to specified dental procedures (13,16), and unnecessary referral of patients to a specialist/hospital even for simple procedures not associated with high bleeding risk (such as simple tooth extraction) (17,18).

AIM

The aim of the study was to assess if Croatian final-year dental students experience discomfort in relation to patients on antithrombotic therapy and how this influences their decision to provide care for these patients independently once they start practising dentistry after graduation.

PARTICIPANTS AND METHODS

Target population were dental students finishing their integrated undergraduate and graduate six-year dental medicine program in the academic year 2018/2019 at three Croatian universities in Zagreb, Split and Rijeka. Students were invited to participate in the study by filling out an anonymous questionnaire that was created using Google Forms and sent to students individually by e-mail (Zagreb, Split), with explanation of the purpose of the study. Social networks were also used to invite students to take part in the survey (students from Rijeka could have been reached only by sharing invitation to participate on social networks). Total number of students we aimed to reach was about 160 (88 in Zagreb, 43 in Split, and about 30 in Rijeka). Student responses were collected from mid June till mid July 2019.

The questionnaire used in this study was not formulated in a way to assess student knowledge but rather their preparedness to manage this specific group of patients when they start practising dentistry after graduation. In the first part of the questionnaire, gen-

eral information (male/female, age, university, year of enrolment in dental school, most common grade during the study) was collected. The second part consisted of mostly single-answer multiple choice questions, as follows:

Q1 self-confidence in performing specified dental procedures independently

Q2 experience in managing patients on antithrombotic drugs during the study

Q3 if yes, which group of antithrombotics

Q4 if yes, in which dental specialties

Q5 experience in managing patients on antithrombotic drugs during the obligatory 500 hours of practice in their senior year

Q6 self-assessment of one's knowledge of antiplatelet agents

Q7 self-assessment of one's knowledge of vitamin K antagonists (warfarin)

Q8 self-assessment of one's knowledge of NOACs

Q9 the way of questioning about the use of antithrombotics during history taking

Q10 self-assessment of one's knowledge about medical indications for temporary or lifelong antithrombotic therapy

Q11 opinion about the importance of being acquainted with the indication for the patient's antithrombotic therapy

Q12 self-assessment of one's knowledge of other factors (comorbidities, concomitant medications) that can be related to the risk of prolonged bleeding following dental procedure

Q13 opinion about the importance and need for consultations with the physician of the patient using antithrombotic therapy prior to performing invasive dental procedure

Q14 self-assessment of one's general approach when dealing with a patient on antiplatelet therapy

Q15 self-assessment of one's general approach when dealing with a patient on warfarin therapy

Q16 self-assessment of one's general approach when dealing with a patient on NOAC therapy

Answers offered to the last three questions were the same, as follows:

1. I do not fear working with this group of patients, I will conduct dental procedures needed whenever I judge that I can perform them safely, and only exceptionally, in difficult cases, refer the patient to another dentist/specialist to provide treatment;
2. I am feeling anxious and stressed when working with this group of patients due to the possible complications, nevertheless, I will conduct dental procedures needed whenever I judge that I can perform them safely, and only exceptionally, in difficult cases, refer the patient to another dentist/specialist to provide treatment;
3. Working with this group of patients makes me too anxious and stressed, so I will rather refer my patient to another dentist/specialist to provide treatment than risk complications; and
4. None of the above.

At the end of the questionnaire, students were invited to give comments or remarks regarding our questions, their answers, or anything else they considered important to mention about the topic of the survey. Three students provided short comments.

The questionnaire and methodology of the study were reviewed and approved by the Ethics Committee of the School of Dental Medicine, University of Zagreb.

Statistical analysis

The answers to questions Q14-16 were used as the starting point for data analysis and interpretation. Answers to previous questions were assessed as possible predictors of student fear/behavior regarding patients on antithrombotics. For this purpose, Mann-Whitney test, Kruskal-Wallis test and Spearman's correlation were used. Several students chose answer 4 to questions Q14-16 without explaining their choice. Answers from these respondents were not included in correlation analyses. Effect size was calculated using the formula $r=Z/\sqrt{N}$. The following criteria were applied to interpret the results: $r=0.1-0.3$ = small, $0.3-0.5$ = medium, and >0.5 = large effect size. Commercial statistical software IBM SPSS 22 was used for data analysis (IBM SPSS, Vermont, USA) with the significance preset at $\alpha<0.05$ for two-sided test.

RESULTS

We received 77 filled out questionnaires (36 from Zagreb, 28 from Split, and 13 from Rijeka). Sixty-five (84.4%) respondents were female students. Participants were aged 24-30 (median 24, interquartile range 24-25) years.

All students responded that they had encountered patients on antithrombotic therapy during their study. Only two students answered that this happened only once, and all others that it happened multiple times. When asked about the group(s) of antithrombotics those patients were taking, 87% of students reported antiplatelet drugs, 93.5% warfarin, and 40.3% NOACs. When asked to declare at which department(s), 27.3% of all students marked prosthodontics, 39% periodontology, 41.6% oral medicine, 41.6% endodontics and restorative dentistry, and 100% oral surgery. The majority of students (70.1%) also reported meeting patients on antithrombotics during the obligatory 500 hours of practice in their senior year.

Women expressed a higher degree of discomfort related to working with patients using antithrombotics than men but the difference was significant only for antiplatelet therapy ($p=0.009$, $r=0.295$). Students from Rijeka expressed higher self-confidence when working with these patients than students from Zagreb and Split. The difference was significant for patients on NOACs ($p=0.013$, $r=0.351$).

Spearman's correlation did not reveal association between Q14-16 and student age, duration of the study (calculated from the year of enrolment in dental school), and most common grade during the study.

Descriptive statistics of self-confidence in performing specified procedures independently is shown in Table 1. The last three columns in Table 1 show results of Spearman's correlation assessing the relation between Q14-16 and Q1.

Table 1

Descriptive statistics on self-confidence in performing specified procedures independently (Q1) for the whole sample (N=77), and relationship between student fear and anxiety related to working with patients on antithrombotic therapy (Q14-16) and self-confidence in performing specified dental procedures independently (Q1) (last three columns, N stated in the table)

Q		Min	Max	Mean	SD	Q14 (N=76)	Q15 (N=75)	Q16 (N=71)
1A	Taking medical history	3	5	4.66	0.50	-0.161	0.024	0.008
1B	Ultrasonic scaling and teeth polishing	4	5	4.91	0.29	-0.336	-0.249	-0.218
1C	Root scaling and planing	1	5	3.39	1.24	-0.384	-0.271	-0.335
1D	Dental caries removal on posterior teeth and restoration of lost tissue	2	5	4.27	0.70	-0.431	-0.416	-0.387
1E	Endodontic therapy on posterior teeth	1	5	3.64	0.96	-0.392	-0.307	-0.262
1F	Providing mandibular anesthesia	1	5	3.71	1.07	-0.317	-0.330	-0.258
1G	Planning prosthetic therapy and implementation of the plan	1	5	2.70	1.10	-0.307	-0.189	-0.376
1H	Shaping of the abutment teeth	1	5	2.35	1.09	-0.411	-0.182	-0.377
1I	Simple (uncomplicated) extraction of anterior teeth	3	5	4.51	0.56	-0.390	-0.368	-0.255
1J	Simple (uncomplicated) extraction of posterior teeth	2	5	4.16	0.76	-0.384	-0.408	-0.363
1K	Placing stitches after tooth extraction	1	5	3.43	1.10	-0.365	-0.418	-0.457

Q = question; SD = standard deviation; 1-5 = self-confidence rated from insufficient (1) to excellent (5); Min = minimum; Max = maximum; N = sample size; correlations in bold type are significant at $p < 0.05$

Results of Spearman's correlation assessing the relation between answers to Q9, Q10, Q12 and Q13 and answers to Q14-16 are shown in Table 2.

Table 2

Relationship between student fear and anxiety related to working with patients on antithrombotic therapy (Q14-16) and the way of taking history regarding antithrombotics (Q9), knowledge of medical indications for antithrombotic therapy (Q10), knowledge of other factors related to the risk of prolonged bleeding (Q12) and opinion about the importance of consultations with the physician of patient on antithrombotic therapy prior to performing invasive dental procedure (Q13)

Q		14 (N=76)	15 (N=75)	16 (N=71)
9	The way of taking history regarding antithrombotics (more or less detailed and direct)	-0.280	-0.254	-0.245
10	Knowledge of medical indications for antithrombotic therapy	-0.292	-0.133	-0.168
12	Knowledge of other medical factors related to the risk of prolonged or more intense bleeding	-0.305	-0.290	-0.269
13	Opinion about the importance of consultations with the physician of the patient on antithrombotic therapy prior to performing invasive dental procedure	0.018	0.030	0.089

Q = question; N = sample size; correlations in bold type are significant at $p < 0.05$

Concerning student rating their own knowledge, 1.3% of students rated their knowledge of medical indications for antithrombotic therapy as excellent, 33.8% as very good, 36.4% as good, 23.4% as sufficient, and 5.2% as insufficient. Thereby, 63.6% of students absolutely agreed that it was important for the doctor of dental medicine to be acquainted with the indication for the patient antithrombotic therapy, 31.2% agreed, 2.6% disagreed, and 2.6% could not judge this.

With regard to Q13, 81.8% of students agreed on the need to consult the patient physician prior to performing invasive dental procedure but considered that seeking guidance was not necessary for every patient and that this should be decided individually, from case to case. Furthermore, 16.9% of students would consult the physician whenever treating a patient taking antithrombotics.

Ratings for self-assessed knowledge of specific antithrombotics are presented in Table 3.

Table 3
 Descriptive statistics of student self-assessment of their knowledge of specific antithrombotics used in the prevention of thromboembolism, N=77

Q		Minimum	Maximum	Mean	SD
6A	acetylsalicylic acid	2	5	3.56	1.01
6B	clopidogrel	1	5	2.12	1.16
6C	prasugrel	1	4	1.35	0.76
6D	ticagrelor	1	4	1.32	0.77
7	warfarin	1	5	3.40	1.15
8A	dabigatran	1	5	2.44	1.29
8B	rivaroxaban	1	5	2.19	1.30
8C	apixaban	1	5	1.95	1.22
8D	edoxaban	1	5	1.57	0.97

Q = question; SD = standard deviation; 1-5 = knowledge self-assessment from insufficient (1) to excellent (5)

Spearman's correlation was used to assess association between answers to Q6-8 and Q14-16. The results showed that better knowledge of warfarin was correlated to a lower degree of fear and anxiety related to all groups of antithrombotic drugs ($\rho=-.370$, $-.293$ and $-.304$ for Q14, 15 and 16, respectively; $p<0.05$). The same relation was found for the most familiar antiplatelet drug, acetylsalicylic acid ($\rho=-.410$, $-.267$ and $-.305$ for Q14, Q15 and Q16, respectively; $p<0.05$), for acetylsalicylic acid + clopidogrel ($\rho=-.384$, $-.273$ and $-.305$ for Q14, Q15 and Q16, respectively; $p<0.05$), and for the most familiar NOAC, dabigatran ($\rho=-.352$, $-.263$ and $-.379$ for Q14, Q15 and Q16, respectively; $p<0.05$). Associations between answers to Q14 and Q16 and the reported knowledge of specific type of antiplatelet drug or a NOAC and their combinations are shown in Table 4 in more detail.

Additionally, answers to Q1A were correlated with answers to Q10, Q11 and Q12. Significant association was only determined between higher self-confidence in history taking and better rating of one's knowledge of other factors related to the risk of bleeding ($\rho=0.308$, $p<0.05$, $N=77$).

Table 4
 Relationship between student fear and anxiety related to working with patients on antiplatelet therapy (Q14) and self-assessed knowledge of antiplatelet drugs (Q6) and relationship between student fear and anxiety related to working with patients on NOAC (Q16) and self-assessed knowledge of these drugs (Q8)

Q		14 (N=76)	16 (N=71)
6A	acetylsalicylic acid	-0.410	
6B	clopidogrel	-0.253	
6C	prasugrel	-0.128	
6D	ticagrelor	-0.056	
6A+B+C+D		-0.320	
6A+B		-0.384	
6C+D		-0.113	
8A	dabigatran		-0.379
8B	rivaroxaban		-0.417
8C	apixaban		-0.277
8D	edoxaban		-0.210
8A+B+C+D			-0.397
8A+B			-0.414
8C+D			-0.282

Q = question; N = sample size; correlations in bold type are significant at $p<0.05$

DISCUSSION

The findings of this survey suggest that final-year dental students who participated in the study mostly feel prepared to provide care independently to outpatients treated with antithrombotic drugs, whether it provokes anxiety or not.

All participants had encountered patients on antithrombotic therapy in the clinics, particularly at departments of oral surgery. No data are available regarding the share of anticoagulated outpatients in our oral surgery departments and the nature (complexity) of surgical interventions performed. It could be expected that oral surgeons would allow dental students to perform uncomplicated procedures. The opportunity to provide treatment to patients who use antithrombotic drugs in a safe learning environment could be expected to increase undergraduate student self-confidence and awareness that they may perform the procedures safely. Our finding that greater self-confidence in performing procedures that are routinely conducted at departments of oral surgery (e.g., providing mandibular anesthesia and simple extractions) was significantly correlated with a lower level of fear related to work-

ing with patients on antithrombotic therapy may be viewed as confirmatory for this assumption. In addition, lower stress level was also correlated with greater self-confidence in performing dental procedures that are not associated with significant bleeding risk. This finding could be interpreted in a way that the higher the students rate their overall skills, the more prepared they feel to treat patients independently, including more complex ones. The results of Al-Dajani's study are supportive of such interpretation (19).

As expected, a more detailed and direct history regarding antithrombotics, as well as better knowledge of other factors that can be related to the risk of prolonged bleeding following dental procedure were significantly correlated with a lower level of stress and anxiety for all groups of antithrombotics. Knowledge of medical indications for temporary or lifelong antithrombotic therapy was negatively correlated with the level of stress and anxiety only for antiplatelet drugs. However, 28.6% of the participants did not rate their knowledge of medical indications for antithrombotic therapy higher than sufficient, even though 94.8% absolutely agreed (63.6%) or agreed (31.2%) that it was important for the doctor of dental medicine to be acquainted with the indication for the patient antithrombotic treatment. The latter is in accordance with the report by Gill and Scully (20) who assessed attitudes and awareness of final-year predoctoral dental and medical students towards medical problems in dentistry. They report that 100% (N=70) of surveyed dental students graded medical problems in dentistry as very important (67%) or reasonably important (33%). None of their students graded the importance as little or very little. The study did not specify any of the medical conditions but assessed student knowledge, training in this topic, and perceived importance of medical problems in dentistry in general. In contrast, two of our students did not agree when explicitly asked if the doctor of dental medicine should know the reason behind the patient's use of antithrombotic drug(s). Two other students declared themselves as unable to judge. In other words, this information was considered either unimportant or the students did not know how it related to them as dental practitioners. Even though the number of these students was small, it can be considered significant as all dental students reaching the end of their undergraduate dental education should be aware that certain medical conditions for which antithrombotics are prescribed necessitate greater caution and alterations in the provision of dental treatment (21).

Students self-rated their knowledge highest for acetylsalicylic acid and warfarin, and lowest for the latest drugs among antiplatelet agents and NOACs. Despite this, our respondents expressed a high degree of will-

ingness to provide care to patients taking antithrombotics without fear or in spite of it. One of the possible explanations could be revealed in a free comment given by one of the participants. The student suggested that the questions 6-8 should have been referring only to a specific group of drugs (i.e. antiplatelets, vitamin K antagonists, NOACs). The student explained that she was not well acquainted with each of the available antithrombotic drugs but was knowledgeable of the general characteristics of the group in which particular drugs 'act alike'. Therefore, it is possible that the students rated their knowledge of the whole group based on their familiarity with the most representative drug from the group. Results of the correlation analysis assessing association between answers to Q6-8 and fear related to working with patients on antithrombotic therapy are suggestive of this possibility.

Opinion about the importance and need for consultations with the patient physician prior to performing invasive dental procedure was not correlated with the level of anxiety. This could be considered as an unexpected finding as the possibility to make decisions in consultation with another physician and/or to follow given recommendations could be expected to relieve stress. However, 81.8% of the students chose to seek guidance from the patient physician after thorough independent assessment of each patient. Therefore, by retaining a higher level of responsibility to themselves, students may have also retained the stress related to the independent decision making. This result could suggest that dental students are aware of the need to be well educated in this field and that they perceive themselves as partners in the consultations with colleagues that serve to determine optimal patient management. Their education should build this attitude along with providing the necessary knowledge as it has been shown that some inappropriate decisions regarding management of dental patients who use antithrombotic drugs, such as discontinuation of antiplatelet or oral anticoagulation therapy, may be made in consultation with the patient physician or a specialist (15).

In this survey, we did not ask the students to rate their familiarity with the guidelines and best available evidence related to periprocedural management of dental patients taking antithrombotics. Their preparedness to work with this group of patients could be suggestive of their acquaintance with them (or at least awareness of them), particularly for traditional anticoagulants and antiplatelet agents for which they rated their knowledge highest. However, two of the respondents commented on this very aspect of the topic suggesting that it would be beneficial for the students to receive clear and uniform guidelines regarding management of anticoagulated patients during and at the end of their formal undergraduate education.

Limitations of the study

The results of this study do not necessarily reflect how the students are going to behave once they start practising dentistry. For at least some of them, their current declarations reflecting a relatively high self-confidence could be altered by factors such as place of employment and working conditions (equipment, staff, distance from the hospital/emergency service, and the like). In addition, confidence level is a subjective indicator and does not necessarily translate into a true ability or skill, which should be assessed independently (19).

We aimed to include all final-year dental students from three Croatian universities to gain a representative insight into their attitudes but the total response rate was only about 48%. Unfortunately, at the time this study was conducted, it was impossible to reach the participants personally and offer printed questionnaires, which would expectedly ensure a higher response rate.

The response rate lower than desired is also the reason why comparisons among students from Zagreb, Split and Rijeka are difficult to interpret. For example, statistical analysis revealed that the students from Rijeka expressed a lower degree of stress and anxiety related to working with patients on NOACs in comparison to students from Zagreb and Split. This finding could suggest that students from Rijeka received better education regarding this group of drugs. However, an insight into differences among dental schools in the educational modalities covering this topic, as well as a response rate higher than achieved should be available for such conclusions.

This survey did not assess student acquaintance with evidence-based protocols for the periprocedural management of patients on antithrombotic therapy nor did we ask them to specify the guidelines they would follow in their independent patient assessment. These answers would provide more useful data for our analysis but questions on this matter would make the survey longer, which could possibly contribute to even lower response rate.

CONCLUSIONS

The results of this survey suggest that Croatian final-year dental students who participated in the survey mostly feel prepared to manage patients on antithrombotic therapy on their own after graduation, whether it provokes anxiety or not. Management of dental patients who use antithrombotic drugs is an important part of general dental education as the expenditure of oral anticoagulants, especially non-vitamin K oral anticoagulants, is increasing. Up-to-date

recommendations on the preferred clinical approaches in patient management, particularly for the latest oral antithrombotic drugs, would be well received by students. Student professional journals, if available, could be a convenient way of disseminating clinically relevant current knowledge among dental students. Joint courses for medical and dental students both at the undergraduate level and as part of continuous professional education on the overlapping medical issues could highlight the benefits of their close(r) cooperation for improved patient care.

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S A Ž E T A K

SPREMNOST STUDENATA ZAVRŠNE GODINE STUDIJA DENTALNE MEDICINE NA PRUŽANJE SKRBI PACIJENTIMA NA ANTITROMBOSKOJ TERAPIJI

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Cilj: Pružanje stomatološke skrbi pacijentima koji uzimaju lijekove iz skupine antitrombotika može biti izvor dodatnog stresa za liječnike, osobito mlade koji su netom završili studij i započeli samostalnim radom. Cilj ovoga istraživanja bio je ispitati izaziva li rad s ovom skupinom pacijenata nelagodu kod studenata završne godine integriranoga preddiplomskog i diplomskog studija dentalne medicine i njegov utjecaj na njihovu spremnost za samostalno obavljanje potrebnih stomatoloških zahvata. **Metode:** Studenti s triju hrvatskih sveučilišta bili su pozvani da ispune *online* upitnik o, među ostalim, dosadašnjim iskustvima sa zbrinjavanjem pacijenata na antitrombotskoj terapiji, da procijene svoje znanje o antitromboticima, te da procijene svoju spremnost na samostalno pružanje stomatološke skrbi ovoj skupini pacijenata. **Rezultati:** Svi sudionici istraživanja susreli su se s pacijentima na antitrombotskoj terapiji tijekom studija. Iako su svoje znanje o novijim antitromboticima procijenili slabim, ipak su izrazili spremnost za samostalno pružanje stomatološke skrbi pacijentima koji koriste antitrombotike bez obzira na s time povezan stres. Niži stupanj stresa bio je povezan s boljim poznavanjem indikacija za propisivanje antitrombotske terapije, većim samopouzdanjem pri izvođenju stomatoloških zahvata, te s boljim poznavanjem drugih čimbenika koji mogu povećati rizik za pojačano i/ili produljeno krvarenje nakon zahvata. Svi studenti smatraju savjetovanje s pacijentovim liječnikom važnim za osiguranje optimalne skrbi. **Zaključak:** Studenti koji su sudjelovali u istraživanju uglavnom izražavaju spremnost za samostalno pružanje stomatološke skrbi pacijentima na antitrombotskoj terapiji bez obzira na s time povezanu razinu stresa.

Ključne riječi: studenti dentalne medicine, oralni antikoagulansi, inhibitori agregacije trombocita