REVISTA DA ABENO
Associação Brasileira de Ensino Odontológico
https://revabeno.emnuvens.com.br ISSN 2595 0274

Knowledge of Dentistry students about prescription and use of drugs

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Received: Jan 17, 2022
Approved: Sep 09, 2023
Last revision Dec: 05, 2023

Abstract This study aimed to analyze the knowledge of 335 dentistry students about prescription and use of drugs. The participants were divided into two groups: Group I - composed of 136 students in the last period/semester of the Dentistry course and Group II - composed of 199 students who had recently completed the discipline of Pharmacology/Therapeutics Applied to Dentistry (second semester of graduation). Students answered a questionnaire with 19 closed questions divided into three blocks of interest, Block A (5 questions about their academic background); Block B (4 questions about legislation and drug prescription) and Block C (10 questions about common prescription in cases of increased risk due to comorbidities in Dentistry). The instrument was validated after the application of three pilot studies in 60 volunteer students who had recently completed the Pharmacology/Therapeutics Applied to Dentistry discipline. The results allowed classifying the level of knowledge as bad, moderate, good or excellent according to the stratification adopted by the authors. Most of the students interviewed were female, 22 years old. According to the results, 70% of the participants stated that the duration of the Pharmacology/Therapeutics Applied to Dentistry course was insufficient for them to feel safe when prescribing medications. The data presented showed that in block "B" only 19% of the students knew who was responsible for the prescription document. Additionally, 57% identified the mandatory items on an antimicrobial prescription. The successful rate of block "C" showed that the participants presented reasonable knowledge of most of the questions related to indication and prescription of medication both in regular and risky situations in Dentistry. The student's average knowledge regarding the indication and prescription of drugs reveals a problem in academic qualification related to drug therapy. It also highlights the need for continuing education of dental surgeons.
Descriptors: Therapeutics. Drug Prescriptions. Dentistry. Pharmacology.

Conocimientos de los estudiantes de Odontología sobre prescripción y uso de medicamentos

Resumen Este estudio tuvo como objetivo analizar los conocimientos de 335 estudiantes de odontología sobre la prescripción y uso de medicamentos. Los participantes fueron divididos en dos grupos: Grupo I - compuesto por 136 estudiantes del último período/semestre de la carrera de Odontología y Grupo II - compuesto por 199 estudiantes que habían finalizado recientemente la disciplina de Farmacología/Terapéutica Aplicada a la Odontología (segundo semestre de pregrado). Los estudiantes respondieron un cuestionario con 19 preguntas cerradas divididas en tres bloques de interés, Bloque A (5 preguntas sobre su formación académica); Bloque B (4 preguntas sobre legislación y prescripción de medicamentos) y Bloque C (10 preguntas sobre prescripción común en casos de mayor riesgo por comorbilidades en Odontología). El instrumento fue validado luego de la aplicación de tres estudios piloto en 60 estudiantes voluntarios que habían finalizado recientemente la disciplina Farmacología/Terapéutica Aplicada a la Odontología. Los resultados permitieron clasificar el nivel de conocimientos como malo, moderado, bueno o excelente según la estratificación adoptada por los autores. La mayoría de los estudiantes entrevistados eran mujeres, de 22 años. Según los resultados, el 70% de los participantes afirmó que la duración del curso de Farmacología/Terapéutica Aplicada a la Odontología fue insuficiente para sentirse seguros al prescribir medicamentos. Los datos presentados mostraron que en el bloque "B" sólo el 19% de los estudiantes sabían quién era el responsable del

documento de prescripción. Además, el 57% identificó los artículos obligatorios en la prescripción de antimicrobianos. La tasa de éxito del bloque "C" demostró que los participantes presentaron conocimientos razonables en la mayoría de las cuestiones relacionadas con la indicación y prescripción de medicamentos tanto en situaciones habituales como de riesgo en Odontología. El conocimiento medio del estudiante sobre la indicación y prescripción de medicamentos revela un problema en la calificación académica relacionada con la farmacoterapia. También destaca la necesidad de una educación continua de los cirujanos dentistas.
Descriptores: Terapéutica. Prescripciones de Medicamentos. Odontología. Farmacología.

Conhecimento de estudantes de Odontologia sobre prescrição e o uso de medicamentos

Resumo Este estudo teve como objetivo analisar o conhecimento de 335 estudantes de Odontologia sobre prescrição e uso de medicamentos. Os participantes foram divididos em dois grupos: Grupo I - composto por 136 alunos do último período/semestre do curso de Odontologia e o Grupo II - composto por 199 alunos que haviam concluído recentemente a disciplina de Terapêutica Medicamentosa/Farmacologia (segundo semestre da graduação). Os estudantes responderam a um questionário com 19 perguntas fechadas dividido em três blocos de interesse, Bloco A (5 perguntas sobre sua formação acadêmica); Bloco B (4 perguntas sobre legislação e prescrição de medicamentos) e Bloco C (10 perguntas sobre prescrição comum em casos de risco aumentado por comorbidade em Odontologia). O instrumento foi validado após a aplicação de três estudos piloto em 60 alunos voluntários que recentemente haviam concluído a disciplina de Terapêutica Medicamentosa/Farmacologia. Os resultados permitiram classificar o nível de conhecimento como ruim, moderado, bom ou excelente de acordo com a estratificação adotada pelos autores. A maioria dos alunos entrevistados era do sexo feminino, com 22 anos de idade. De acordo com os resultados, 70% dos participantes afirmaram que a duração da disciplina Farmacologia/Terapêutica Aplicada à Odontologia foi insuficiente para que se sentissem seguros ao prescrever medicamentos. Os dados apresentados mostraram que no bloco "B" apenas 19% dos alunos sabiam quem é o responsável pelo documento de prescrição. Além disso, 57% identificaram os itens obrigatórios em uma prescrição antimicrobiana. O índice de sucesso do bloco "C" mostrou que os participantes apresentaram conhecimento razoável envolvendo as questões sobre indicação e prescrição de medicamentos tanto em situações regulares quanto em situações de risco na Odontologia. O conhecimento médio dos alunos quanto à indicação e prescrição de medicamentos revela um problema na formação acadêmica relacionada à terapia medicamentosa.
Descritores: Terapêutica. Prescrições de Medicamentos. Odontologia. Farmacologia.

INTRODUCTION

The selection and prescription of a drug implies previous knowledge about it. The professional must evaluate the desired and possible adverse pharmacological effects, the contraindications and the risks of interaction with other substances[1]. Information regarding concentration, dosage, frequency of medication, and appropriate additional guidance are essential for an adequate prescription. The dental practitioner's attention to these items while preparing a prescription avoids risks and must be thorough, as the prescription constitutes a legal instrument to the professional in situations of misuse or lack of treatment adherence[2-5].

The Brazilian legislation in force determines that only physicians, dentists, and veterinarians can prescribe controlled drugs, the latter being prevented from prescribing pharmacological substances for human beings. Dental surgeons are only allowed to prescribe drugs for exclusive use in Dentistry[6]. Irrational use of drugs is a worldwide problem and one of

its possible causes is the multiplicity of available pharmaceutical products[7,8]. In this context, Brazil is among the ten largest pharmaceutical markets in the world and the largest in Latin America, with an increasing number of new drugs approved annually[8].

The difficulties and errors observed in dental prescriptions are a consequence of poor academic training[9,10]. There is a consensus that dental surgeons prescribe poorly and that the number of drugs that can be selected by them is restricted since it includes only antibiotics (antimicrobials), analgesics, and anti-inflammatories[9]. These professionals have difficulties in selecting more efficient drugs with fewer adverse effects[1]. Particularly common in dentistry, Brazilian dental surgeons maintain a distressing habit of making verbal prescriptions, which does not proceed as a regulated practice and encourages self-medication[2,4,7,11]. Given this reality, the objective of this study was to evaluate the knowledge of dental students about drug prescription in their area of expertise, leading to a reflection on their responsibilities as health promoters.

METHOD

This study was approved by the Research Ethics Committee of the Health Sciences Center of the Universidade Federal do Paraná (Number: 937527). The model of study was classified as an analytical, observational, and cross-sectional based survey. The sample was chosen by convenience and consisted of adult individuals (N = 335), mostly Brazilian, of both sexes. It was divided into two groups: Group 1: dental students who recently had finished the Dentistry course's subject of Drug Pharmacology/ Therapeutics Applied to Dentistry (n= 136), in the second semester/period of the course; Group 2: dental students in their final year/period of the Dentistry courses at the participating institutions (n = 199).

Incomplete surveys with no response in any block of interest or that were misplaced were excluded. For validation of the research instrument, an initial convenience sample with twenty dental students was established. In addition, the questions were improved by applying three pilot studies addressing the topics of interest. In order to reduce interpretation error, questions with possible duplicate answers or unclear ones were eliminated. The definitive instrument was validated only after these steps' conclusion.

The methodology employed applied 3 blocks (A, B, and C) with closed questions, similar to the study developed by Godoy et.al. [12]. The 19 questions constituting the survey were divided as follows: Block A: 5 questions on the academic background regarding Drug Pharmacology/Therapy; Block B: 4 questions on the current legislation regarding the practice of dental prescription; Block C: 10 questions on the indication and prescription of medicine in regular and risk cases in Dentistry.

The final validated instrument was applied to the undergraduate dental students who had already completed the subject of Therapeutics Applied to Dentistry. Students who were attending the final year of the course were also invited to participate. For this purpose, all the objectives of this study were explained to the students, who participated voluntarily and answered the questions after signing the Free Informed Consent Form. After the survey application at the [hidden text], the interviews were also proposed to be carried out in other institutions.

The questionnaires were coded for later descriptive data analysis with no nominal identification of the participants. After completing the questionnaire, those interested in receiving the answers referring to blocks B and C were able to send us an email requesting a template with theoretical reference clarifying which would be the most appropriate options to be marked.

The percentage of correct answers obtained by the participants in the questions related to blocks B and C were coded in qualitative indicators and are shown below: Poor: 0% - 50% (the qualitative indicator on the question was considered poor when up to 50% of the participants correctly marked an alternative); Moderate: 51% - 70% (the qualitative indicator on the question was considered moderate when the percentage of participants who correctly marked an alternative was between 51% and 70%); Good: 71% - 89% (the qualitative indicator on the question was considered good when the percentage of participants who correctly marked an alternative was between 71% and 89%); Excellent: 90% - 100% (the qualitative indicator on the question was considered excellent when the percentage of participants who correctly marked an alternative was between 90% and 100%).

After digitizing the obtained information in an EXCEL® spreadsheet (Microsoft® Office® 2013) and analyzing them using the Statistical Package for the Social Sciences (SPSS) software (IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp.), a descriptive analysis was performed using absolute frequencies (n) and relative frequencies (%).

Pearson's correlation was used to analyze the associations between two quantitative variables; the Chi-square to test the hypothesis of independence between two qualitative variables; and the Student's t-test to compare the means between the groups. The significance level adopted was 5%.

RESULTS

We applied a total of 359 surveys, but only 335 met the inclusion criteria and were submitted for analysis. The students' ages ranged from 17 to 39 years for females and from 18 to 37 years for males. The majority of respondents was female in both groups. No statistical difference was observed between the mean age and gender of the students within each group.

Most respondents (92.4%) stated that they studied the subject of Therapeutics applied to Dentistry during their undergraduate course in Dentistry in the second semester/period. According to some of the interviewees, instruction on the correct use of medicines and how to prescribe them was addressed in Basic Pharmacology or in other subjects. The students were asked if the duration of Drug Pharmacology or Therapeutics applied to Dentistry subjects had been sufficient to enable them to prescribe a medication. The majority of them (65.7%) did not feel qualified to prescribe a medication when needed, which occurred even among students concluding the Dentistry course (n = 125, 62.5%). In addition, 52.9% of the students in group 2 and 47.2% of the students in group 1 considered it to be inadequate the moment when the contents regarding drug prescription were taught.

In the questionnaire, we asked about the frequency with which respondents performed prescriptions and 66% of the students in group 2 answered they prescribed medications on a weekly basis. In contrast, 40.2% of the students in group 1 reported never to have made a prescription. The first question of the questionnaire assessed the students' knowledge regarding the legality of drug prescription. The results revealed that most of them had little knowledge about the subject, as only 19.9% of group 1 and 21.6% of group 2 knew the responsibility of any drug prescription lies within the dental surgeon and pharmacist's duty. According to the qualitative indicators of evaluation adopted in this study, the success rate of this question, expressed as a percentage, was considered "bad".

The second question evaluated the respondents' knowledge regarding the drug classes that can be prescribed in Dentistry. A low number of participants (4.2%) recognized among the options presented that only oral hypoglycemic agents cannot be prescribed by dental surgeons. However, some respondents singly pointed out anticonvulsants (5%), antidepressants (16.4%), and parasympathomimetics (4.8%). Other respondents marked more than one alternative as drugs that cannot be prescribed by dental surgeons. Among these, the most marked associations of responses were: antidepressants and anticonvulsants (7%); antidepressants, oral hypoglycemic agents, anticonvulsants, and parasympathomimetics (6.4%); antidepressants, anticonvulsants, and parasympathomimetics (6%). According to the qualitative evaluation criteria adopted in this study, the success rate of this question, expressed as a percentage, was considered "poor" for the knowledge on drugs that can be prescribed in Dentistry.

Regarding drug switching, 86.8% of respondents were able to identify that brand-name drugs can be replaced by generic drugs. However, only 6.4% recognized that brand-name drugs can also be replaced by similar drugs as long as there is no indication of switch restriction in the prescription.

Regarding the mandatory data that must be included in an antimicrobial prescription, 57% of the respondents answered that it must be made in a simple prescription, in three counterparts, and containing the following items: full name, age and sex of the patient, and the prescriber's personal data, including address, telephone number, registration number in the Brazilian Regional Council of Dentistry (CRO, in Portuguese), stamp and signature (alternative represented by the letter "A" in the survey). Pearson's Chi-square test showed that there was an association between the group and the mandatory data that must be included in the prescription of an antimicrobial (Table 1).

The knowledge regarding the recommended prophylactic dosage of antimicrobial to prevent the occurrence of infective

endocarditis (according to the American Heart Association protocol) was considered moderate. Only 67.0% and 61.8% of students in groups 1 and 2, respectively, answered the question correctly (Table 1).

Question 11 investigated the knowledge regarding the relationship between oral candidiasis and chronic use of medications. Once again, the students' knowledge was considered moderate since only 49.3% and 50.8% of the students in groups 1 and 2, respectively, associated the chronic use of antimicrobials with the occurrence of oral candidiasis (Table 1). Question 12 evaluated the students' knowledge regarding the antimicrobial association to treat cases of aggressive periodontitis. For this question, the knowledge of the students in groups 1 and 2 was considered moderate and poor, respectively. The percentage of correct answers was 55.1% for group 1 and 46.2% for group 2 (Table 1). The students' knowledge regarding drug interactions of nonsteroidal anti-inflammatory drugs when used together with antihypertensive agents was investigated in question 13. The knowledge of the respondents was considered moderate, as only 56.6% and 54.8% of the students in groups 1 and 2, respectively, answered it correctly (Table 1).

Students' knowledge regarding the recommended concentrations of fluoride for daily and weekly usage was investigated in question 14. For this question, the knowledge of the students in groups 1 and 2 was considered moderate and poor since the percentage of correct answers was 60.3% and 44.7%, respectively (Table 1). Knowledge on dosage forms recommended for the drug treatment of children was assessed in question 15. It was considered excellent for groups 1 and 2, as 92.6% and 91% of the students, respectively, answered it correctly (Table 1).

Question 16 created a hypothetical clinical situation to assess the interviewee's knowledge on contraindication for the use of peripheral analgesic paracetamol. The knowledge of most students in groups 1 and 2 was considered poor and moderate, as the percentage of correct answers was 46.3% and 60.8%, respectively (Table 1).

The students' knowledge regarding the main active ingredient contained in the Periogard® antiseptic solution for mouthwash was considered excellent and good. Approximately 93.4% and 72.9% of groups 1 and 2, respectively, answered with "chlorhexidine gluconate" (Table 1).

The second to last question investigated if the students knew how to identify the signs and symptoms resulting from an overdose of local anesthetic. It had the worst performance, as only 47.8% and 36.7% of the respondents in groups 1 and 2, respectively, knew the correct answer, a level of knowledge considered poor (Table 1).

The last question asked which vasopressin is not recommended for local anesthesia in pregnant patients. The knowledge of groups 1 and 2 was considered moderate and poor, as only 58.1% and 47.2% of the respondents, respectively, answered it correctly (Table 1).

DISCUSSION

This study evaluated the knowledge of dental students regarding the indication and prescription of medication and the basic pharmacological aspects related to their area of expertise. The dental surgeons are the ones who treat diseases that affect the teeth and its supporting tissues. In some situations, they need to prescribe drugs as a therapeutic aid[9]. The greatest difficulty encountered by these professionals in drug prescription stems from poor academic training, which is aggravated by little experience in everyday clinical procedures that require the prescription of analgesics, anti-inflammatory, or antimicrobial drugs[9,10].

The average age of the students and professionals interviewed in this research showed the sample consisted of young individuals, despite the age extremes identified in the groups. Since the respondents were selected through congresses, dental events, and specialization courses, it may have influenced their mean age.

When questioned, 70% of the interviewees stated the duration of the Therapeutics subject was not enough for them to feel confident when prescribing a medication. This result is similar to the one found by Carneiro-Lúcio et al.[13] who evaluated dental students in Paraiba, Brazil. According to them, the insecurity reported by students when prescribing medications can lead to an inappropriate prescription, thus leading to ineffective treatments, exacerbation or prolongation of the disease, discomfort and harm to the patient, as well as high cost to the individual and to the health system.

Table 1. Percentage of correct answers regarding to the questions about legislation knowledge on drug prescription in Brazil.

Questions	Group 1 n (%)	Group 2 n (%)	Total n (%)	p-value
Legal liability for prescription				
Correct answer	27 (19.9)	43 (21.6)	70 (20.9)	0.931
Incorrect answer	109 (80.1)	156 (78.4)	265 (79.1)	
Drug Switching				
Correct answer	122 (89.7)	168 (84.4)	290 (86.6)	0.977
Incorrect answer	14 (10.3)	31 (15.6)	45 (13.4)	
Mandatory data in antimicrobial prescriptions				
Correct answer	81 (59.6)	86 (43.2)	167 (49.8)	0.986
Incorrect answer	55 (40.4)	113 (56.8)	168 (50.2)	
Antibiotic prophylaxis in risk situations for infective endocarditis				
Correct answer	88 (64.7)	123 (61.8)	211 (20.9)	0,000*
Incorrect answer	48 (35.3)	76 (38.2)	124 (79.1)	
Oral candidiasis caused by chronic use of antimicrobials				
Correct answer	67 (49.3)	101 (50.7)	168 (50.2)	0,000*
Incorrect answer	69 (50.7)	98 (49.3)	167 (49.8)	
Metronidazole + antimicrobial association for the treatment of aggressive periodontitis				
Correct answer	75 (55.1)	92 (46.2)	167 (49.8)	0,000*
Incorrect answer	61 (44.9)	107 (53.8)	168 (50.2)	
Drug Interaction Non-Steroidal Anti-Inflammatory Drugs + Antihypertensive				
Correct answer	77 (56.6)	109 (54.8)	186 (55.5)	0.000*
Incorrect answer	59 (43.4)	90 (45.2)	149 (44.5)	
Daily and weekly concentration of sodium fluoride				
Correct answer	82 (60.3)	89 (44.7)	171 (51.0)	0,000*
Incorrect answer	54 (39.7)	110 (55.2)	164 (49.0)	
Pharmaceutical dosage forms used for children				
Correct answer	126 (92.6)	181 (91.0)	307 (91.5)	0.000*
Incorrect answer	10 (7.4)	19 (9.0)	29 (8.5)	
Contraindications on use of Paracetamol				
Correct answer	63 (46.3)	121 (60.8)	184 (54.9)	0.000*
Incorrect answer	73 (53.7)	78 (39.2)	151 (45.1)	
Periogard active ingredient				
Correct answer	127 (93.3)	145 (72.9)	272 (81.2)	0.000*
Incorrect answer	9 (6.7)	54 (27.1)	63 (18.8)	
Local anesthetic overdose				
Correct answer	65 (47.8)	73 (36.7)	138 (41.2)	0.000*
Incorrect answer	71 (52.2)	126 (63.3)	197 (58.8)	
Vasopressin contraindicated in pregnancy				
Correct answer	79 (58.0)	94 (47.2)	173 (51.6)	0.000*
Incorrect answer	57 (42.0)	105 (52.8)	162 (48.4)	

In addition to the dissatisfaction of the participants regarding the duration of the subject, more than half of the interviewees (52.6%) said that the moment when it was taught during the undergraduate course was not the most appropriate for them to feel able to prescribe a drug. The group formed by students who had recently completed the Drug Pharmacology/Therapeutics applied to Dentistry subject was the one that considered its duration and the semester in which it was taught the most appropriate.

An inefficient training of dental surgeons in Pharmacology results in a public health problem and is a challenge to professional awareness programs[10]. For a correct drug prescription, dental surgeons need to receive both basic and applied prescribing training. They also have to be familiar with the pharmacological properties of the drug. Moreover, they must frequently seek professional development and have access to technical and scientific knowledge in their field of work[11]. There is a need for improvement of the academic contents and approaches, as well as for changes in teaching methodologies in order to simultaneously apply theory and practice[13].

The drug prescription is a written order directed to the pharmacist defining how the drug should be provided to the patient and the conditions under which it should be used[8,11]. Among other purposes, its guidelines aim to prevent self-medication and to guide postoperative care. In addition, it is a document that can prove the misuse of medications by the patient in possible legal challenges[9,11]. Therefore, the prescription is a legal document for which both the prescriber (the dental surgeon) and the dispenser (the pharmacist) are responsible. It is also subject to sanitary surveillance laws[8,11].

The quantitative indicator of correct answers regarding the prescription responsibility was poor among all the groups evaluated. Garbin et al.[9] presented similar results and considered the legal knowledge about prescription presented by the final-year dental students to be insufficient.

Dental surgeons may prescribe the medication they find most appropriate to cure, diminish, or stabilize the diagnosed disease in accordance with the current legislation. Therefore, there is no drug restriction in the daily therapeutic routine of the dental surgeon, provided that the use and indication are authorized to use in Dentistry[11].

The second set of questions (block B) of the instrument had options to be marked and asked the interviewee to indicate which drug class(es) cannot be prescribed by dental surgeons. It presented a very low rate of correct answers (4%), showing the lack of knowledge on the theme by the evaluated public.

Garbin et al.[9] detected the same lack of knowledge when they asked final-year dental students which medications are part of the dental surgeon's prescription list. On the other hand, Araújo et al.[11] considered the results of their study as average.

This study completed the stages of preparation of the knowledge assessment questionnaire before the new Collegiate Board Resolution (RDC, in Portuguese) 58/2014, which is regulated by the Brazilian Health Regulatory Agency, was in force[14]. For this reason, the question on medication interchangeability considered as a correct answer only the substitution between a brand-name drug and a generic one and its qualitative indicator was considered as "good". However, when considering as correct the option that described the substitution of a brand-name drug by a similar one, the indicator was "bad". Possibly due to the recent change in legislation, none of the interviewees marked both options as correct, which demonstrates the need for greater dissemination of information among the work classes that perform medicine prescriptions.

Antimicrobial drug prescription preparation is established by the RDC No. 20/2011, which guides the mandatory data that must be included in the prescription and the need for two copies of the document[15]. Furthermore, by recommendation of the Brazilian Federal Council of Dentistry, a copy of the prescription should be stored in the patients' medical records for a minimum period of 5 years. For this reason, the correct answer in the instrument included three counterparts for the prescription of an antimicrobial[21].

The importance of the correct antimicrobial prescription can be proven as the data presented by Brazil and other countries (such as the United Kingdom, Iran, and India) shows that dental surgeons incorrectly prescribe these drugs, disregarding both the legal and pharmacological aspects. The consequences of this practice are seen directly in the impact on the population's health and in the high costs of treatment[16].

Among the groups evaluated, the final-year dental students presented a "moderate" rate regarding this issue, and the students who had recently completed the therapeutics' subject presented a "poor" one. This result suggests that the greater the prescribing experience of the interviewees, the easier it is to identify the mandatory items of an antimicrobial prescription.

A study conducted by Lisboa et al.[16] that evaluated 366 drug prescriptions from dental surgeons in the city of Belo Horizonte (Minas Gerais State - Brazil) found that Brazilian regulations were not followed. The prescription errors showed ignorance and lack of instruction regarding the prescription rules for these drugs. The authors also point out that dental surgeons, as well as physicians, prescribe antimicrobials in an exaggerated and inadequate way in situations in which they are not indicated[16].

The control of antimicrobial prescription tends to favor the rational use of drugs for the benefit of the patient by reducing adverse reactions and treatment cost. This also benefits the public health sector and decreases the risk of bacterial resistance. Therefore, further health measures should be developed aiming at the improvement of antimicrobial drugs recommendation by dental surgeons[16].

The question that opened the block of pharmacological indications both in regular and risky situations in Dentistry addressed the indication of a prophylactic dose of amoxicillin one hour before a procedure at risk of Infective Endocarditis (IE). According to Wilson et al.[17], two grams of amoxicillin should be administered for adults and 50 mg/kg for children thirty minutes to one hour before dental care. Overall, the interviewees obtained a "moderate" indicator on this issue. Some controversies are found in the literature on the real need for antimicrobial prophylaxis in situations at risk of IE due to the lack of scientific evidence confirming that its benefits outweigh the health risks and financial costs. However, the protocols established by the American Heart Association (AHA) serve as a basis for prophylactic prescription[16,18].

Questions related to the prescription of antimicrobials, antihypertensives, use of anesthetics in pregnant women and contraindication of paracetamol in the elderly and alcoholics presented a moderate result of correct answers. And despite the last year dentistry students having a higher average of correct answers than the other groups, however, this does not represent more knowledge about the topics. The recognition of signs and symptoms of overdose caused by local anesthetics was evaluated in question 8, which presented a "poor" rate of correct answers (45%). This shows an alarming result when considering that local anesthetics are widely used in daily dental practice, as well as the emergency risks since an overdose can lead to lethal consequences.

Among the questions with the highest success rate, we highlight questions 6 and 10 (which refer, respectively, to the most recommended oral pharmaceutical treatment for a pediatric patient and the active ingredient of Periogard®) since both presented an "excellent" qualitative analysis. Knowledge on the active principle of Periogard® solution was lower among students who had recently completed the Therapeutics applied to Dentistry subject (72.9%). It may be related to the fact that the students learn about this drug indication during the periodontics subject, which is taught after therapeutics applied to Dentistry subject.

It is the dental surgeon's duty to have a wide knowledge about drugs, whether in the prevention process or for the treatment of diseases. The correct drug selection and indication as well as the knowledge of its interactions and adverse effects are fundamental aspects for an adequate and ethical professional practice[10,11].

According to Foucault and Brouqui[19], educational interventions are more effective when the main objective is to change the behavior of health professionals rather than just to provide information. However, the undergraduate courses place little emphasis on drug prescription and on the association of basic pharmacology to dental practice, which may result in dental surgeons unprepared for both a correct and safe prescription[13]. In this way, urgent educational changes are needed to improve knowledge about the correct prescription and rational use of medicines[22].

There are several studies that have evaluated the knowledge and practice of dental students regarding drug prescription in different countries[23-30]. The development of research on drug prescription is essential to identify possible errors that could harm the health of patients[23]. A study developed by Mexican researchers revealed the main mistakes made by dental students: lack of knowledge about drug posology, improperly filled prescriptions, not knowing the brand names and uncertainty about the correct drug indicated for each case, not knowing the duration of treatment, not asking the patient about possible allergies, and not giving prescriptions[24].

In 2011, Carneiro-Lúcio et al.[13] suggested an improvement of the academic contents and approaches, with changes in teaching methodologies that address theory and practice simultaneously. For dental students to become aware of their actions and reflect both on their professional role in society and on the use of medication in an expanded perspective,

it is necessary for them to receive adequate training on the indication and prescription of drugs. The need to reassess the current curriculum and what would be the best period of graduation in Dentistry for the discipline of Pharmacology/Therapeutics Applied to Dentistry to be offered, justifies the relevance of this study and shows that there is still much to be discussed on this subject.

The Dentistry courses in Brazil should be aware of the need for better preparation regarding the medication prescription. In addition, dental surgeons need to adapt and maintain a proactive attitude, as well as to update themselves through professional development courses, and seek technical and scientific renewal through articles, publications, and journals addressing information from the Councils and professional associations[16].

CONCLUSION

Although therapeutics and pharmacology applied to dentistry are part of the training of dental surgeons, many students do not feel able to prescribe medications. The student's average knowledge regarding the indication and prescription of drugs reveals a problem in academic qualification related to drug therapy. It also highlights the need for continuing education of dental surgeons.

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Conflict of Interest: The authors declare that there is no conflict of interest.

Funding: No funding to declare.

Acknowledgements: The authors would like to thank the Academic Publishing Advisory Center (Centro de Assessoria de Publicação Acadêmica, CAPA – UFPR) in partnership with UNESPAR for assistance with English language translation and developmental editing.

Authors' Contribution: Study conception and planning: JK, NSFOM, AASL. Data collection, analysis and interpretation: JK, NSFOM, AASL. Manuscript preparation or review: JK, AASL. Final version approval: JK, NSFOM, AASL. Public responsibility for article content: JK, NSFOM, AASL.