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ORIGINAL RESEARCH

Knowledge of drug prescription in dentistry students

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R Guzmán-Álvarez[1]
M Medeiros[2,3]
LI Reyes Lagunes[4]
AE Campos-Sepúlveda[1]

[1]Pharmacology Department, UNAM School of Medicine and Dentistry, Mexico City, [2]Pharmacology Clinical Seminar, UNAM School of Medicine, Mexico City, [3]Medical Sciences Department, Mexico Federico Gómez Children's Hospital, Mexico City, [4]Measuring and Evaluation Unit, UNAM School of Psychology, Mexico City, Mexico

Background: Students in schools of dentistry attend to patients with illnesses, and often prescribe medication. Because students are still learning, they are influenced by a variety of factors: the different teaching approaches of the professors at the clinics and in the pharmacology course, fellow students, and even the information provided by the pharmaceutical industry.

Objectives: The aim of this pilot study was to assess the prescription knowledge and common mistakes in fourth-year students at the School of Dentistry at the Universidad Nacional Autónoma de México.

Methods: In March 2010, a survey was conducted among 66 fourth-year students at the School of Dentistry, applying a previously validated questionnaire consisting of six open-ended questions The following factors were assessed: the most frequent illness requiring dental prescription; the most prescribed nonsteroidal anti-inflammatory drugs and antibiotics; the most frequent errors; sources of information used for prescribing drugs; and whether the students knew and followed the World Health Organization Guide to Good Prescribing.

Results: The most frequent response for each question was considered the most significant. The most common reason for prescribing medication was infection (n = 37, 56%), followed by pain (n = 24, 38%); the most used painkillers were ibuprofen and acetaminophen at equal levels (n = 25, 37.8%), followed by ketorolac (n = 7, 10.6%), naproxen (n = 6, 9.1%), diclofenac (n = 2, 3%), and aspirin (n = 1, 1.5%); the most widely prescribed antibiotics were amoxicillin (n = 52, 78.9%), ampicillin (n = 7, 10.6%), and penicillin V and clindamycin (n = 3, 4.5%). The most frequent errors reported by students were: lack of knowledge about drug posology (n = 49, 74.2%), improperly filled prescriptions (n = 7, 10.7%), not knowing the brand names and uncertainty about the correct drug indicated for each case (n = 3, 4.54%), not knowing the duration of treatment (n = 2, 3%), not asking the patient about possible allergies, and not giving prescriptions (n = 1, 1.5%). The sources of information used by students for prescribing drugs included the professors at the clinics (n = 49, 74.2%), the pharmacology course (n = 7, 10.7%), medical dictionary consultation (n = 15, 22.72%), classmate support (n = 3, 4.54%), and information provided by medical representatives from pharmaceutical companies (n = 1, 1.5%). Finally, only 20 students (30.3%) followed the WHO Guide to Good Prescribing, 40 students acknowledged not following it (60.6%), and six students (9.1%) had no knowledge of it.

Conclusion: The knowledge of pharmacology among fourth-year students in the School of Dentistry has gaps that could affect patient safety. More studies are needed to determine whether this issue affects the quality of patient care and the effectiveness and safety of treatments. Since prescribing accurately is extremely important, it is necessary to develop therapeutic guidelines, and to provide pharmacological therapy courses. The implementation of educational programs, including the WHO Guide to Good Prescribing and Patient Safety Curriculum Guide, would be beneficial in helping students develop prescribing skills.

Correspondence: Mara Medeiros
Dr Márquez 162 Colonia Doctores
México DF, México CP 06720
Tel (52) 55 52-28-99-17
Fax (52) 55 55-88-48-10
Email medeiro.mara@gmail.com

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Keywords: prescription, dentistry prescription, most used NSAIDs by dentists, most used antibiotics, dentist prescribing errors, sources of information for prescribing, WHO Guide to Good Prescribing

Introduction

The instruction of dental surgeons at the School of Dentistry at the Universidad Nacional Autónoma de México (UNAM) takes five years. In the third year, students take a pharmacology course, focused on general pharmacology, chemotherapy, and specialized medical pharmacology, where they learn about medical and dental issues. Also during the third year, students begin their clinical practice, becoming more involved with patients from the various clinical courses (exodontics, endodontics, dental surgery), and are regularly responsible for prescribing drugs. At this stage, professors supervise the students as they are writing prescriptions.

The most prescribed drugs in dentistry are the local anesthetics used during dental procedures, antibiotics, and NSAIDs. Because of the characteristics of these drugs, it is important to determine accurate doses and be aware of any adverse or toxic effects.

Prescribing is the act of indicating one or more drugs to be administered to or taken by the patient, its (their) dosage, and the duration of the treatment. It is an individualized and dynamic clinical process. In spite of their unique characteristics, prescription patterns may be influenced by social, cultural, economic, and/or promotional factors. The World Health Organization (WHO) recommends defining the patient's problem (diagnosis), specifying the therapeutic objective, and then, considering the different alternatives, choosing a treatment with proven efficacy and safety; prescribing is a customized process. Treatment begins by providing the patient with clear information and instructions. After an appropriate interval, results are evaluated. If the problem has been resolved, treatment may be stopped. If the problem persists, each step should be reexamined.[1]

Dental prescriptions provide short-term treatment or treatment specifically for surgical procedures; nevertheless, dentists require knowledge about drugs and must follow the international rules for prescribing. There is evidence that, in Mexico and in other countries, dentists often do not have the proper pharmacological knowledge, and therefore, sometimes make prescription errors.[2–5]

The aim of the present study was to assess the prescription knowledge and common errors made by fourth-year students in the School of Dentistry at UNAM.

Methods

A pilot study was conducted. The study was approved by the Psychology Faculty at UNAM, which is responsible for the evaluation of research projects in the postgraduate program in the area of measurement and evaluation. The study was also registered in the Medical Education Postgraduate Program of the School of Medicine, UNAM, and was evaluated by the research committee.

We developed a questionnaire with six open-ended questions; the content validation was performed by a group of 16 experts, all of whom were professors at the School of Dentistry at UNAM.

The questionnaire was distributed among 66 fourth-year students at the School of Dentistry UNAM, from three class groups out of 15, during March 2010.

Prescribing questionnaire

1. What are the most common health conditions you treat in the clinic, where you need to prescribe?
2. What is the most common NSAID (Non-Steroidal Anti-Inflammatory Drug) you prescribe?
3. What are the antibiotics most frequently prescribed in the clinic?
4. What is the most common mistake you make during prescription?
5. What is your source of information during prescription (your professor, a classmate, a medical representative, medical dictionaries, your pharmacology course)?
6. Do you follow the rational prescription process given by the WHO? (Do you know it, do you follow it, and do you follow any step separately?)
    1. Define the patient's problem.
    2. Specify the therapeutic target. What do you want to get with the treatment?
    3. Verify if the personal treatment is appropriate for such patient in terms of effectiveness and safety.
    4. Initiate the treatment.
    5. Give information, instructions and warnings.
    6. Supervise (stop?) the treatment.

Results

Of the 66 students surveyed, 48 were women (72.7%) and 18 were men (27.3%) from both shifts of the fourth year of the Dental Surgeon program at the School of Dentistry, UNAM.

Table 1 indicates the responses to the survey questions.

According to the students, the main reason for prescription was infection, 37/66 (56%); followed by pain management, 25/66 (38%); and conditions not related to dental health, 4/66 (6%), such as diabetes and high blood pressure.

The most widely used NSAIDs were ibuprofen and paracetamol, resulting in 25/66 responses (37.9%); followed by naproxen (n = 6, 9.1%), diclofenac (n = 2, 3%), and aspirin (n = 1, 1.5%).

The most commonly prescribed antibiotics were: amoxicillin (n = 52, 78.9%), ampicillin (n = 7, 10.6%), and penicillin V and clindamycin (n = 3, 4.5%).

Table 1 Knowledge of drug prescription and common errors

Question	N	(%)
Most common health conditions treated in dental practice		
Infection	37	(56)
Pain	24	(38)
Other (not related to oral health)	4	(6)
Most common NSAIDs prescribed		
Ibuprofen	25	(37.8)
Paracetamol	25	(37.8)
Ketorolac	7	(10.6)
Naproxen	6	(9.1)
Diclofenac	2	(3)
Aspirin	1	(1.5)
Most common antibiotics prescribed		
Amoxicillin	52	(78.9)
Ampicillin	7	(10.6)
Penicillin V	3	(4.5)
Clindamycin	3	(4.5)
Other*	1	(1.5)
Most common error during prescription		
Wrong posology	49	(74.2)
Prescriptions wrongly filled	7	(10.7)
Not knowing the brand names	3	(4.54)
Not knowing what to prescribe	3	(4.54)
Wrong treatment duration		(1.5)
Not asking the patient about allergies	3	(1.5)
Not giving a prescription	1	(1.5)
Sources of prescription information		
Professor	29	(43.94)
Pharmacology course	16	(24.24)
Prescription books	15	(22.72)
Classmate	3	(4.54)
Medical representative	1	(1.5)
No response	2	(3.0)
WHO Guide to Good Prescribing used		
Yes	20	(30.3)
No	40	(60.6)
Unknown	6	(9.1)

Note: *One student had a response not corresponding to antibiotics (paracetamol).
Abbreviations: WHO, World Health Organization; NSAIDs, nonsteroidal anti-inflammatory drugs.

The most frequently reported errors made by the students were: not knowing the posology of the drug (n = 49, 74.2%); errors in filling out the prescription (n = 7, 10.7%); not knowing the brand names and not being sure of the proper drug to prescribe (n = 3, 4.54%); not knowing the duration of the treatment (n = 2, 3%); not asking the patient about possible allergies; and failing to provide the patient with a prescription (n = 1, 1.5%).

Sources of information students consult when prescribing included: clinic professors (n = 49, 74.2%), information from their pharmacology course (n = 7, 10.7%), a medical dictionary (n = 15, 22.72%), classmates (n = 3, 4.54%) and medical representatives from pharmaceutical companies (n = 1, 1.5%).

Finally, when prescribing, only 20 students (30.3%) followed the WHO Guide to Good Prescribing, compared to 40 not following it (60.6%), and six students (9.1%) who were not aware of it.

Discussion and conclusion

The questionnaire was distributed among senior students in their last year at the School of Dentistry. The inherent defect of open-ended questions is that respondents can answer however they wish; this defect can become an asset, however, as the responses may provide the researcher with new categories to investigate. Another advantage is that the responses can suggest new possibilities for relationships and hypotheses.

Even though these students were not yet fully responsible for prescribing, many deficiencies were noted in their practices. It is the responsibility of the institution and the professors to solve any such deficiencies so that graduating students become highly competent in their professional practice.[1,2] In the School of Dentistry at UNAM, students take a pharmacology course in the third year that covers prescribing, but it accounts for only six hours of the curriculum, which is too little time for such an important topic that directly affects patient safety.[3,6]

The most frequent reason for prescription is infection, when, in fact, pain is the main reason that patients go to the dentist. Often, pain is the result of infection; it should always be treated. It is very important to use appropriate diagnostic methods to differentiate the type and the origin of the pain so that proper treatment can be provided.[4,7]

The most important factor for the proper use of NSAIDs is to know the pharmacokinetics and pharmacodynamics of each particular substance, as well as the small differences between drugs and the general properties that they share.[7] Regarding analgesics, students seem to have good knowledge about

ibuprofen and paracetamol; the last one can be prescribed alone but it has no anti-inflammatory properties. Nevertheless, it is the only NSAID that may be prescribed in combination with other NSAIDs, not necessarily in the same formulation. It can also be combined with narcotic analgesics.[5,7–10] Ten percent of the students mentioned ketorolac as their first analgesic choice; ketorolac is an excellent analgesic, but it is not as effective as an anti-inflammatory, it is potentially nephrotoxic, and it is extremely irritating to the stomach. When prescribing ketorolac, it is necessary to consider the patient's pre-existing conditions (he must not suffer from gastric or kidney condition), it must not be administered for more than 5 days, and the patient must drink plenty of water to protect the kidneys. One student chose aspirin, which is not a common choice in the practice of therapeutic dentistry.[8,11,12] In Mexico, NSAIDs are sold over the counter.

As for antibiotics, most students chose penicillin, mainly amoxicillin, which is appropriate since it is the first choice in dentistry; [3,13] however, one student erroneously prescribed an antibiotic instead of an NSAID. No student mentioned antibiotic combinations, especially for complicated cases of infection, which could compromise systemic health, mainly in patients with heart conditions. In such cases, the American Heart Association recommends high doses of different antibiotics, such as amoxicillin, ampicillin, clindamycin, cephalosporin, etc, 30 to 60 minutes before beginning the dental procedure.[14] For antibiotics, the professor always needs to approve and sign the prescription.

When evaluating the most common prescription errors, 74% of students acknowledge lack of awareness about drug posology. This is a critical issue, since it affects patient health and safety; too low doses, extended administration intervals, or short duration of treatment will undoubtedly lead to therapeutic failure, which could complicate the patient's condition. On the other hand, excessively high doses, short intervals, or prolonged duration of treatment may result in toxicity.[15] The drugs most used by dentists are NSAIDs, and the most frequent side effect is stomach upset and digestive tract bleeding, which compromises the patient's safety.[11] Improperly filled out prescriptions is a common issue and also compromises patient safety. Student confusion about the large number of available drugs with different brand names was also mentioned.[16] To avoid this, the WHO Guide to Good Prescribing recommends making a customized list including the essential drugs for each healthcare professional who prescribes drugs at the clinic.[10,17]

The main sources of information for prescribing were professors, which is good in this stage of the students' formation; it is extremely disturbing that almost 5% rely on their classmates or even medical representatives for advice.

Finally, only 30% report following the WHO guidelines for prescribing, 9% do not know them, and only 20% follow the indications when prescribing.

Our study had some limitations since it was a pilot study, the sample size was small, and the questionnaire had only six open-ended questions. Future studies should evaluate prescription practices among teachers and general practitioners.

In conclusion, the knowledge of pharmacology among fourth-year students at the School of Dentistry at UNAM has gaps that could affect patient safety. More studies are needed to determine whether this issue affects the quality of patient care, and the effectiveness and safety of treatment.

Summary

It is necessary for the School of Dentistry at UNAM to work with the pharmacology authorities and the academic department. The curriculum should provide more focus on prescribing, and students should be taught good prescription practices in the classroom, using hypothetical or real cases. Recently, the Patient Safety Curriculum Guide, Multi-professional Edition was published by WHO[16] in order to implement patient safety education in healthcare educational institutions worldwide and raise consciousness about unintended harm caused by the healthcare industry. The UNAM School of Dentistry actively participates in this program and will be part of a pilot study for its application with new students.[16] Medical representative visits should be supervised, and all clinics should have academic medication dictionaries, as well as implement courses on therapeutics.[13,18–22]

Disclosure

The authors report no conflicts of interest in this work.

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