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Dental Faculty Experiences of Drug Prescription Patterns: A Qualitative Study

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Abstract

Background: Dental prescribing is considered a basis for short-term treatment of clinical problems. Therefore, dentists should be familiar with the patterns of rational drug prescription. Neglecting this important issue can lead to misprescription and side effects. Accordingly, the present study aimed to investigate the experiences of a group of dental specialists about prescribing drugs.

Methods: This qualitative study was conducted using a conventional content analysis approach. A total of 19 specialists from 5 different fields (oral diseases, pediatric dentistry, oral and maxillofacial surgery, endodontics, and periodontics) participated in this study. Purposive and theoretical sampling was used to collect data and semi-structured in-depth interviews were conducted in the form of focus group discussions from each department at Kerman dental school. Data collection and content analysis were performed simultaneously.

Results: The analysis of the data revealed five categories including more frequently prescribed drugs, common concerns about prescribing drugs, recommendations for reducing potential side effects, experience of clinical pharmacology training, and criteria for prescribing new drugs.

Conclusion: Since the knowledge of dental students affects the quality and effectiveness of treatment and patient safety, this study emphasized the need to improve clinical pharmacology training provided to dentistry students, residents, and dentists.

Keywords: Drug prescription, Dentistry, Clinical problems, Qualitative research

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Introduction

Medication has a direct relationship with people's health hence it is essential to pay attention to how it is prescribed. All drugs may cause side effects (1). A prescription is, in fact, a legal document, and writing a prescription helps to strengthen the professional relationship between doctors and patients. Therefore, all prescriptions should be standard and justifiable (2). In addition to financial loss, misprescription can lead to physical complications for the patients. Given that Iran is a developing country and many pharmaceutical raw materials must be imported, irrational prescription of drugs causes great financial losses to society (3). Various studies show that in many countries, the average number of drug items in a prescription is higher than the standard of the World Health Organization (WHO), and in fact, irrational prescription of drugs seems to be a global problem (3). Ignoring the details while prescribing medications may lead to non-ideal treatment. These kinds of prescribing errors cause trouble for the patients and may even put them at risk of death. Moreover, the occurrence of such errors can destroy the professional relationship between the doctor/ dentist and the patient and even lead to litigation (4). Prescribing medication is one of the important treatment actions in dentistry and dentists should have sufficient information about when to prescribe drugs as well as drug interactions and side effects (5). Drugs are prescribed according to the clinical symptoms and paraclinical findings and the experience and competence of the doctor/dentist play an important role (6). Therefore, to improve the health system of the community, it is useful to conduct a qualitative study that examines specialists' attitudes toward the medical system and describe their experiences. Several studies have been conducted on dentists' attitudes to prescribing drugs in Iran and other countries. (7). However, based on the literature review, no qualitative study has yet been conducted in Iran to evaluate the opinions and experiences of dentists. Besides, most Iranian studies targeted general dentists, not specialists in the field. Since Kerman Dental Faculty hosts many clients from the southeast of the country for dental treatment and considering the great number of patients and their diversity, it can be regarded as an effective center for promoting oral health

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in this area. Accordingly, this study aimed to qualitatively evaluate the opinions and experiences of the dental faculty members at Kerman University of Medical Sciences who were specialist dentists in five specialized fields with the highest number of prescriptions.

Methods

This qualitative study was conducted using a conventional content analysis approach through interviews with 19 dental faculty members of Kerman University of Medical Sciences. The reason for selecting dentists working in the academic field to participate in the present study was the sensitivity of the questions related to updating prescriptions and reviewing prescription training, and the fact that their up-to-date information made the evaluation of their experiences more reliable. The participants were selected from clinical departments of Kerman Dental Faculty including oral diseases, oral and maxillofacial surgery, periodontics, endodontics, and pediatric dentistry departments (all somehow related to prescription). The target group consisted of all faculty members of these departments who met the criteria to participate in the study. The inclusion criteria were having at least one year of experience as a faculty member, interest in participating in the study, and knowledge of the study objectives (8). Concerning ethical considerations, written informed consent was obtained from the participants and they were assured that their information would be kept confidential. The interviews were conducted in the form of focus group discussions by a final-year dental student who had received the necessary training. Before the interviews, arrangements were made with the specialists, and the necessary explanations were provided to them. The interviewer and the participants agreed on the proper time to conduct the interviews and in some cases, rearrangements were done. The interviews were conducted in a completely quiet place and each interview began with four general questions on the subject of the study. The interviews continued until data saturation i.e., to the point where no new information was obtained. The four general questions posed based on the literature review and study objectives were as follows:

Q1: Which drug groups do you mostly prescribe? If there is a reason, please explain.

Q2: In your opinion, what are the significant problems of prescribing drugs? If you have encountered these problems, what have you done to solve them and prevent their recurrence?

Q3: What problems do you see in training dental students and residents to prescribe drugs? Do you have any suggestions to increase the efficiency of training students and assistants?

Q4: Do you prescribe new drugs according to your clinical experience or the content of reference books? Which approach do you think is more logical for prescribing drugs which are new to the market?

Based on the participants' answers, additional questions were asked to provide more in-depth explanations. Each structured in-depth interview lasted from 30 to 60 minutes and all interviews were recorded. All the recordings were transcribed at the end of each interview (9). After obtaining informed consent, the personal details of the interviewees, including age, gender, specialty, work experience as a faculty member, and academic degree were written in a separate form by the researcher. All the details and the recorded conversations were kept confidential (10).

Data were collected through semi-structured face-to-face interviews and five focus group discussions. Interviews and group discussions continued until data saturation. First, interviews and group discussions were recorded on cassettes, and the researcher listened to all recordings in one session to get a general idea of the interviews, and then all conversations were transcribed verbatim. To ensure the accuracy of the data, transcripts were given to each interviewee to review and then, the important relevant sentences were highlighted. Considering the highlighted sentences, the original transcripts were summarized and modified into a second draft, and conventional content analysis was performed (11).

Data analysis in qualitative research involves organizing data into codes and categories. Therefore, main themes and subthemes emerge from the data. Accordingly, after carefully reviewing the summarized text, a specific concept was assigned to each sentence, and each sentence was coded i.e., given a title to describe it. After repeated review of the sentences, their codes were categorized thematically so that the researcher could refer to the original answers of the participants to validate the content. Meanwhile, the differences between the categories were taken into account and the summarized concepts were classified into their respective categories. Then, clusters (themes) were obtained from the main concepts. The criteria proposed by Lincoln and Guba were used to ensure the accuracy and robustness of the study. Thus, member checking and peer review with colleagues were used to enhance the accuracy of the data.

Results

This study investigated the experiences of 19 dental faculty members at Kerman University of Medical Sciences of drug prescription patterns. Table 1 shows the demographic characteristics of the participants. About 53% of the interviewees were female and 57.89% of the total interviewees were assistant professors. The average work experience of the participants was 8.9 years (minimum 1 year and maximum 20 years). The analysis of the data revealed five categories. Table 2 shows the categories and the number of answers. The statements of the interviewees are provided as well.

Table 1. Demographic characteristics of the participants

Group	Code	Gender	Academic Rank	Work experience as a faculty member (year)
Oral diseases	1	Female	Associate Professor	15
	2	Female	Assistant Professor	4
	3	Male	Associate Professor	20
	4	Female	Associate Professor	18
	5	Female	Assistant Professor	2
Pediatric dentistry	6	Male	Professor	19
	7	Female	Associate Professor	11
	8	Female	Assistant Professor	2
	9	Female	Assistant Professor	3
Endodontics	10	Male	Professor	15
	11	Female	Associate Professor	14
	12	Male	Assistant Professor	3
Oral surgery	13	Male	Assistant Professor	3
	14	Male	Assistant Professor	3
	15	Female	Assistant Professor	4
Periodontics	16	Male	Assistant Professor	1
	17	Female	Assistant Professor	3
	18	Male	Associate Professor	20
	19	Male	Assistant Professor	10

More frequently prescribed drugs

In this category, the analysis of the answers to the first interview question (Which drug groups do you mostly prescribe?) revealed two important codes including drug dosage and drug selection based on relevant reference books and clinical experience.

According to a pediatrician, "In pediatric dentistry, it is very important to pay attention to the correct dose of medication as each milligram of the drug must be carefully prescribed considering the child's weight" (Participant 8). According to the faculty members, choosing what drug to prescribe was based on the relevant reference books and clinical work experiences.

Common concerns about prescribing drugs

A total of 12 codes were identified as a result of analyzing the answers to the question on common concerns about prescribing drugs. The most important codes were common and uncommon side effects of drugs, drug resistance, unavailability of certain drug forms, decreased patient trust and cooperation, and problems with intravenous injection. The high price of drugs and drug reactions were pointed to by a smaller number of participants.

Recommendations for reducing potential side effects

In this category, 9 codes were identified based on the recommendations given by the professors concerning reducing possible side effects. For example, considering that in prescribing drugs, the most important point was the side effects of the drugs, oral disease specialists proposed the correct dosage of drugs to reduce the potential side effects. The most important codes were advising assistants and students to visit websites, prescribing antacids or reducing the dose of metronidazole to prevent nausea, and close follow-up of patients.

Experience of clinical pharmacology training

This category involves the extracted codes related to the analysis of the answers given to the third general question for different groups. The analysis of the interview texts led to the identification of 10 codes for this question. The need to teach the principles of prescription by dentists who have enough expertise in this field was expressed more frequently. The need to hold workshops and continuing education programs for dentists and the need to increase the number of pharmacology and prescribing courses were also pointed out. In this regard, a periodontist said, "One of the reasons for the problems in prescribing medicine is the graduates not being involved in education; we think that holding well-organized training workshops in this field can be effective" (Participant 17).

Criteria for prescribing new drugs

This category represents the extracted codes of the answers to the fourth question. A total of 6 codes were obtained from participants' responses, most of which pointed to the need for evidence-based protocols and drug prescription based on the guidelines. After that, most respondents pointed to drug prescribing based on scientific reference books for cases such as antibiotic prophylaxis treatment and relying on clinical experience for different clinical cases. One of the participants expressed, "Sometimes it is better to prescribe medication based on the specific conditions of each patient and not merely focus on the reference books since there may be drug resistance to a particular medicine in a geographical area" (Participant 2).

Discussion

The results of the present study showed that as reference books and authoritative articles are the main source of information for dental professionals, their drug prescription patterns are reasonable and reliable. As Hamian et al indicated in their study, academic specialists' patterns of prescribing medication are more acceptable compared to other specialists (12). Carrying out qualitative studies is particularly sensitive in terms of selecting a practical topic and following the correct research methodology. As Bozorgmehr et al claimed in their study, the topics selected for qualitative studies conducted in the field of dentistry in Iran have not been acceptable in terms of applicability, and Iranian qualitative research published in medical journals are assessed at a moderate level (13). A review of the literature shows

Table 2. Codes and categories related to different aspects of drug prescription in order of importance

Categories	Codes	Number of answers (%)
More frequently prescribed drugs	Relevant reference books and clinical work experience	15 (79.0)
	Drug dosage	4 (21.0)
Common concerns about prescribing drugs	Common and uncommon side effects of some drugs (Nausea after swallowing fluoride)	12 (63.0)
	Decreased trust and cooperation of the patient when there is a need to change the prescribed drug group	12 (63.0)
	Unavailability of some drug forms (e.g., acyclovir suspension)	12 (63.0)
	Drug resistance due to arbitrary use of drugs	12 (63.0)
	Specific problems with intravenous injections	12 (63.0)
	The way drugs are taken by patients, especially in the form of local usage, proper timing due to forgetting or not waking up at night, under three-year-old children due to lack of cooperation	9 (47.4)
	Unwillingness of some patients to take some forms of medicine such as syrup	9 (47.4)
	High costs of some drugs (e.g., dry mouth drugs)	6 (31.6)
	Uncertainty about the maximum daily dose of some drugs (adults or children) for compounds such as B1 or B6	6 (31.6)
	In some clinical cases, the first choice of drug is unclear and there is no evidence-based response to it.	5 (26.3)
	Not taking some drugs due to side effects (e.g., chlorhexidine)	5 (26.3)
	Drug Interactions (especially in treatment), children who are under treatment with multiple drugs, families due to convulsion	4 (21.0)
Recommendations for reducing potential side effects	Designing research to add evidence	12 (63.0)
	Advising students and specialist assistants to visit websites	12 (63.0)
	Prescribing antacids or reducing the dose of metronidazole to control nausea	12 (63.0)
	The follow-up appointment should be as close as possible to ensure the correct use	9 (47.4)
	Writing the time to take medicines on a separate sheet as a reminder for the patients.	6 (31.6)
	Drinking milk in case of nausea due to swallowing fluoride (because of its calcium content)	4 (21.0)
	Recording medications taken by the patient on a chart for a better control	4 (21.0)
	Cleaning children's mouth and teeth after drinking syrup to reduce the risk of caries	4 (21.0)
	Prescribing medications at long intervals such as 12 hours to children so that they are not needed to wake up at night or prescribing drugs such as azithromycin to be taken once a day	4 (21.0)
Experience of clinical pharmacology training	The section related to prescribing drugs should be included in the curriculum and a separate prescription training course should be considered for each specialized field.	12 (63.0)
	Individuals' role in updating drug information	12 (63.0)
	A long gap between teaching pharmacology basics and training drug prescription	6 (31.6)
	Encouraging the use of specialized software and websites such as e-Pocrate to learn about new drugs	6 (31.6)
	The need to hold training workshops for graduates on drug prescription, prescribing without scientific support, overprescription should be modified among dentists through the ongoing training programs.	4 (21.0)
	Drug prescription training should be accompanied by disease education courses; for each disease, relevant prescriptions should be taught at the same time.	3 (15.8)
	Theoretical and practical drug prescription training (using medicine boxes for clinical students)	3 (15.8)
	Increasing the number of courses in pharmacology for general doctorate; teaching pharmacology step by step from basics to applied levels	3 (15.8)
	Teaching basic pharmacology by the Department of Pharmacology and dentists who have received the necessary training, such as oral specialists	3 (15.8)
	Teaching prescribing outpatient medications to general doctoral students and injectable drugs to specialist assistants in maxillofacial surgery	3 (15.8)
Criteria for prescribing new drugs	Prescribing drugs according to textbooks	13 (68.4)
	The need for evidence-based protocols and prescribing based on the guidelines	12 (63.0)
	Clinical experience including experience in traditional medicine	9 (47.4)
	Considering geographical patterns while prescribing antibiotics (as bacterial strains of one country are different from another, it is necessary to provide documentation for each country).	9 (47.4)
	Pharmacogenetics as a global trending topic	9 (47.4)
	Drug orders are inevitably varied and when a treatment does not work, we have to try other options.	6 (31.6)

that the only qualitative study on prescribing drugs in dentistry was conducted by Palmer et al. who evaluated the experiences of dentists regarding the process of legal supervision on antibiotics prescription whose objective is obviously different from the objectives of the present study and is therefore not comparable (14). The results of the study by Hildebran et al. indicated the need to check online for possible side effects of drugs prescribed by physicians (15). Moreover, the results of the present study indicated the need for additional courses in the field of drug administration. In the present study, drug groups prescribed by oral disease specialists were more diverse compared to other specialists, which seems to be due to the need for different drug prescriptions to treat various diseases of the oral mucosa. Furthermore, as noted in the results, drug classes such as antifungal and antiviral drugs are practically only prescribed by this group of specialists. Of course, the nature of other specialties also causes some specific drug groups to be prescribed only by the specialists in those fields. For example, based on the results of the present study, drugs such as chloroform are prescribed for deep sedation in pediatric dentistry and also intravenous injection of antibiotics is prescribed by oral and maxillofacial surgeons for hospitalized patients.

Antibiotics are the most commonly prescribed drugs by all groups and amoxicillin is the most commonly prescribed drug by the majority of the groups. This can be explained by the prevalence of dental and periodontal infections and amoxicillin is the first choice of treatment for these infections. However, Sancho-Puchades et al noticed the possibility of using amoxicillin in the prophylaxis of local infections following oral procedures (16). Abukaraky et al also stated that there is a great variety in the type and method of prescription as well as the dose and duration of antibiotics in implant surgeries and standard protocols need to be followed to prevent misprescription of them (17). It seems that the only standard and generally accepted antibiotic therapy protocol in this field is related to the prophylactic diet of the American Heart Association for infective endocarditis.

The results of the present study showed it is very important to pay attention to the side effects of taking drugs and most of the interviewees expressed concerns about the occurrence of common and uncommon side effects of prescribed drugs, improper use of drugs by the patients, and drug interactions. Awad et al pointed to irrational drug use and its influencing factors in Sudan and asserted that the high rate of arbitrary use of antimicrobial drugs and herbal products is worrying. Therefore, educational interventions seem necessary to reduce this problem (18).

Improving the training provided to dental students and residents on medication prescription as well as the training of general dentists in continuing educational programs were mentioned by most of the participants in this study. In a systematic review, Ross et al studied educational interventions to improve prescription patterns of medical students and young physicians. They showed there are methodological flaws in these patterns and concluded that determining the effectiveness of the interventions in reducing the subsequent errors in prescribing drugs is confusing (19). Löffler and Böhmer conducted a similar systematic review to evaluate the effect of therapeutic interventions on improving the process of antibiotic prescription in dentistry. They also asserted that few studies have been conducted in this field and the quality of related scientific reports has been low; thus, there is a need for higher-quality studies and longer follow-up courses (20).

Issues related to the rational prescription of medicine have always been one of the priorities of the ongoing training of dentists in Iran. However, the results of a qualitative study conducted by Navabi et al. showed that general dentists are more likely to participate in retraining programs covering clinical subjects (10).

In their qualitative study, Ross et al. found that young physicians' errors in prescribing medication to hospitalized patients are complex issues to consider. They also believed that more future studies are needed to determine the interventions through which the occurrence of such errors can be reduced (19).

In the present study, the assistants and students were advised to visit websites to follow up at short intervals. The participants believed that dental students learn pharmacology in the preclinical years and due to forgetting things like drug interactions or dosing, they face problems during the clinical work. Thus, dental pharmacology should be re-taught in the third and fourth academic years with an emphasis on its clinical applications. The current curriculum of general dentistry includes teaching clinical pharmacology in a course entitled "Pain and Pharmacology in Dentistry", but the contents of this course do not seem to be efficient to achieve the goals mentioned. Eachempati et al proposed a new educational model called "blended learning" and it seems that a new educational approach is required in this area (21).

Horowitz argued that concerning the use of fluoride supplements, there is a need for educational interventions, not only for dentists, but also for pharmacists, physicians, nurses, oral health professionals, and the public (22). However, the need for pharmacotherapy training in the field of dentistry was not mentioned by the participants of such groups in the present study. Another concern that was not mentioned in the interviews of the present study was for dentists to pay attention to the legal aspects and outcomes of prescribing medication. In a qualitative study, Cannell evaluated the experiences of general dentists about the system designed for such matters (23) while in Iran there is no such system for the legal evaluation of prescriptions. Some of the participants in

the present study emphasized the need to improve the decision-making processes related to prescribing drugs based on evidence-based principles. The study by Löffler et al and other studies also pointed out the concern about the potential of microbial resistance following the overuse of antibiotics in dentistry and the need to solve this problem based on principles such as decision-making (24-26). In contrast, those participants in the present study who agreed with the need to make some changes to what international protocols refer to for prescribing drugs stated that the definite effect of some drugs is not yet known and some other drugs are not available in the pharmaceutical market of Iran, stressing the need to modify the recommendations. Therefore, it seems that both professors in favor of prescribing drugs based on evidence-based principles and those who agreed with relying on clinical experiences and specific conditions of each patient had their justifications.

Conclusion

The present study investigated the experience of a group of dental specialists regarding the prescription of drugs in dental treatment and identified the most common concerns and types of drugs. Drug interactions, prescribing the right drug in the right dose, avoiding unnecessary prescribing, and drug accessibility were among the concerns of the participants in this study. According to the statements of the participants in the present study and comparing the conclusions drawn from those statements with the results of recent relevant studies, the following solutions are suggested:

1. Since it was found that oral disease specialists mostly deal with drugs from various categories, involving them in training medicine prescription and using their experiences can be effective.
2. Students and residents should be familiar with the applications and websites related to drug side effects and interactions to be able to routinely use such resources when they need to prescribe new drugs.
3. In teaching principles of prescribing to dental students, while increasing the number of courses in the curriculum, basic and clinical topics should be integrated in a way that improves learning efficiency and students feel informed at the end of the course.
4. To improve pharmacology training provided to postgraduate students in various fields of dentistry, it is necessary for several interested faculty members to take additional courses in this field.
5. In ongoing educational programs, at least one retraining program related to the topics of rational drug prescription should be designed annually for general dentists, and in academic congresses, at least one panel should include the presentation of new scientific materials in this field.
6. Researchers should identify knowledge gaps and prioritize research projects by the needs of the country using evidence-based approaches, to develop prescription guidelines for dentists.

Authors' Contribution

Conceptualization: Nader Navabi.
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Validation: Fatemeh Najminouri.
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Writing–original draft: Nader Navabi, Fatemeh Najminouri.
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Competing Interests

The authors declare no conflict of interest.

Ethical Approval

This study was approved by the Ethics Committee of Kerman University of Medical Sciences under the code IR.KMU.REC.1395.397. The research ID number is 95000162.

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