Evaluating the knowledge of interns in prescribing basic drugs used in dentistry- A cross-sectional study

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Abstract

Background: Interns would be treating patients on their own once they graduate, so it is important that they be aware of correct prescribing.

Aim: To assess the knowledge of interns in prescribing basic drugs which are used in dentistry.

Methods: A cross-sectional study involving a sample of 227 interns in various dental colleges in and around Hyderabad city, Andhra Pradesh, India. A pretested questionnaire was used as a tool. Descriptive statistics were performed using SPSS version 17.0.

Results: Amoxicillin (46.3%) and Diclofenac sodium (37.8%) were the most commonly prescribed antibiotic and analgesic, respectively. 57.3% had a habit of referring to the drug index book. Only 9.7% and 12.3% were confident in prescribing antibiotics and analgesics respectively. Majority (77.5%) prescribed to pregnant patients only during their second trimesters. Eighty percent had difficulty memorizing drug dosages and 88% felt that training courses in clinical Pharmacology were needed. Conclusion: Majority of the interns had moderate knowledge and female interns demonstrated better knowledge in prescribing basic drugs used in dentistry than their male counterparts.

Introduction

Prescribing medicines is a complex skill that depends on a sound knowledge of drugs, an understanding of the principles of clinical pharmacology as well as the ability to make judgements concerning benefits and adverse effects of drugs. Prescribing is the act of indicating one or more drugs to be administered to or taken by the patient, its dosage, and the duration of the treatment. The rational prescription process given by World Health Organization (WHO) recommends the following steps such as 1) defining the patient’s problem (diagnosis), 2) specifying the therapeutic objective, considering the different alternatives, 3) choosing a treatment with proven efficacy and safety, 4) initiating the treatment, 5) providing the clear information, instructions and warnings, 6) stopping treatment, if the problem has been resolved or reexamining each step, if the problem persists.

Antibiotics are commonly prescribed for dental, oral and maxillofacial infections and as prophylaxis against focal infections in patients at risk (endocarditis and joint prostheses). Practically, antibiotic prescribing in dentistry is generally empiric: i.e., the clinician does not know the responsible organism since the culture tests are not commonly made. As a result, broad-spectrum antibiotics are commonly used. One of the major causes of this emerging resistance is inappropriate use of antibiotics. However, this can be solved if the health care providers are adhering to available antibiotic prescription guidelines. In addition to resistance development, adverse reactions and drug to drug interactions are other problems of antibiotics use. Rational antibiotic use is, thus, important for decreasing the resistance development in oral pathogens and the risk of adverse effects while increasing the effectiveness. Pain management has always been an important part of dental care. Non-opioid analgesics such as Paracetamol, Ibuprofen and Diclofenac sodium, as non-steroidal anti-inflammatory drugs (NSAIDs) are very effective in the initial pain with inflammation as they provide excellent analgesia for mild to moderate pain. Because of their analgesic and anti-inflammatory effects, these drugs are commonly used in dental pain. Rarely, opioid analgesics are also used in the management of moderate to severe dental pain. Due to widespread use of analgesics, there are concerns about drug-induced toxicity which can be significant health hazard. A dental graduate is expected to learn clinical skills, perform some clinical procedures and demonstrate a good clinical judgment to arrive at patient management decisions. The ability to prescribe commonly used drugs safely and effectively is a core competency of a newly qualified doctor. A study conducted on dental students in 2006 showed that the appreciation of what was learned in pharmacology is very subjective and only 44.1% of them believed they had acquired enough knowledge in pharmacology to pursue a career.
Interns would be treating patients on their own once they graduate, so it is important that they be aware of correct prescribing. Effective treatment depends on effective prescribing. The purpose of conducting this study was to know how far their undergraduate pharmacological teaching of interns of various dental colleges in and around Hyderabad city in the state of Andhra Pradesh, India, is helpful in application of this knowledge in clinical prescribing and whether they are adequately trained for this.

### Material and Methods

A descriptive, cross-sectional study was conducted for a period of about two months from 3rd December 2012 to 2nd February 2013, in various dental colleges situated in and around Hyderabad city and the study population comprised of interns. To obtain prior permission, seven dental colleges were approached. Six colleges granted permission to conduct this study constituting a sample of 227 interns. Ethical clearance to conduct the study was obtained from the institutional review board of a private dental college in Andhra Pradesh.

For the data collection, a specially designed, pre-tested questionnaire was used. The self-administered questionnaire consisted of demographic data and 26 questions regarding prescription of basic drugs in dentistry explained to the interns and only those who were willing to participate (verbal consent) were given the questionnaires. Interns not present on the day of study or not willing to participate were excluded. Sufficient time was given to them to fill the questionnaires anonymously and it was collected back on the same day.

A pilot study was conducted on a sample of 19 interns posted in the departments of Oral medicine and Radiology and Public health dentistry at a private dental college in Andhra Pradesh, to test the feasibility of conducting the study and understanding of the questionnaire.

Descriptive statistics were performed using Statistical Package for Social Science® (SPSS) version 17.0. The responses were analyzed as percent scores to rate their knowledge. From the 26 questions, ten questions which tested the knowledge of prescribing basic drugs in dentistry were selected. Those interns who correctly answered eight out of these ten questions were graded as having good knowledge (>80%), six correct responses were graded as moderate (75-80%) and those below six were graded as poor(<75%).

### Results

In this study, 227 interns participated, of which 25.1% were males and 74.9% females. 52.4% followed the six steps involved in rational prescription process, whenever they prescribed medicines.

Table 1 shows that majority (63.9%) considered that all general factors like the past drug history of the patient; presence of any systemic disease; pregnancy or lactation in women; histories of allergies or transplantations should be given importance before prescribing any drug.

Amoxicillin (46.3%) was the most frequently prescribed antibiotic followed by Metronidazole, Ornidazole, Cephalosporins and others. Diclofenac sodium (37.8%) was the most commonly prescribed non-steroidal anti-inflammatory drug followed by Paracetamol (19.8%) and Ibuprofen (11%). 11.5% of the interns avoided prescribing drugs to pregnant patients. Table 2 shows that 41% of the interns were confident in prescribing steroids without any supervision.

Majority (88.1%) of the interns considered that there was a need for development of training courses in Clinical Pharmacology and Therapeutics. The gender-wise distribution of the interns showed that 27.6% of the males had poor knowledge, 53.4% had average knowledge whereas only 19% showed good knowledge in prescribing basic drugs used in dentistry. Among the females, 24.7% had poor knowledge, 51.8% had average knowledge whereas only 23.5% showed good knowledge in prescribing basic drugs used in dentistry.

Female interns (75.3%) demonstrated better knowledge in prescribing basic drugs used in dentistry than their male counterparts (72.4%). The overall distribution of the interns showed that 25.4% of study subjects had poor knowledge, 52.2% had average knowledge whereas only 22.4% showed good knowledge in prescribing basic drugs which are routinely used in dentistry.

### Discussion

Prescribing medicines is a complex task that requires theoretical and clinical knowledge combined with practical skill. Even though graduates have little experience of undertaking prescribing tasks prior to graduating, they have to prescribe shortly after graduation. In the
undergraduate dental curriculum, pharmacology is taught as a basic science in the second year. In most pharmacological textbooks, pharmacology is dealt with as a basic science not as a discipline that forms part of a medical curriculum and the clinical perspective of pharmacological knowledge is lost in the vastness of basic pharmacological information.\[^{[16]}\] The teaching method often leaves the students to memorize drug information, it poorly prepares them to prescribe rationally and thus there is a sense of doubt and uncertainty when it comes to clinical prescribing.

When students advance into their internship where they are required to actively prescribe, a good pharmacological knowledge instills a sense of confidence in them. This study attempted to explore the manner in which the pharmacological principles learnt in the second year of the curriculum translates to effective clinical practice of the interns.

In the recent years, there certainly has been a change in outlook of Indian women as they have broken the traditional norms and taken up various careers in health care professions, which were mostly opted by males.\[^{[11]}\] Due to this advancement of women, there is an increase in the enrollment of females into dental colleges, which explains the high percent of female participation seen in our study.

Majority (63.9\%) considered that general factors like the past drug history of the patient, the presence of any systemic diseases, pregnancy or lactation in women, histories of allergies or transplantations should be given importance before prescribing any drug. This might be because they were trained in that manner to consider all such factors in order to know whether the patient is tolerant to any particular drug or not; any allergic manifestations or drug interactions that may occur in people using medications for systemic diseases and also, that some drugs will cause adverse effects on the fetus and concentrations of some drugs can be excreted in lactating milk. Regarding this aspect, it shows that the interns were cautious enough.

Rational drug usage policy is one of the most important subjects in the education of dental profession. It is best that dental students develop knowledge about pharmacokinetics and pharma-codynamics.\[^{[12]}\] There is a lack of scientific information regarding what constitutes an efficient prescription. However, World Health Organization (WHO) declares that the six points summarize the minimum information that should be given to the patients. Our present study revealed that 47.6\% reportedly did not follow such steps as they were not aware of it. According to the study conducted by Guzman- Alvarez et al (2012), only 30\% followed these WHO guidelines for prescribing, and the remaining did not follow them as most of them were not aware of such guidelines. These guidelines should, thus, be emphasized in the pharmacological curriculum to ensure rational prescribing.

The most prescribed drugs in dentistry are antibiotics, and non-steroidal anti-inflammatory drugs. In the present study, only 9.7\% and 12.3\% of the interns were confident in prescribing antibiotics and analgesics respectively. This is alarming as these are the basic drugs used in dentistry and interns should show a high level of confidence in prescribing them. In contrast, a study conducted by Kazeem et al, 87.6\% and 81.4\% of the interns were confident in prescribing antibiotics and analgesics respectively, without supervision, because these interns had completed many number of clinical postings. In India, internship is a one year program involving compulsory rotatory postings of clinical and non-clinical departments. Our study might have showed poor results, partly because, at the time of this study, only 10.6\% had completed clinical postings in more than five departments and majority (89.4\%) had completed their postings only in two to three departments. Confidence in prescribing unsupervised may not necessarily indicate good prescribing because the intern will have exhibited competent professional practice only when he/she recognizes the circumstances where antibiotics may be indicated and where they are not, and this confidence comes with practice, more exposure to clinical environment, familiarity with frequently used drugs and adequate supervision by their senior colleagues.

Our study showed that most of the interns (46.3\%) chose Amoxicillin as their first choice of antibiotics in dentistry and a similar study conducted by Guzman-Alvarez et al (2012) showed the same result. Amoxicillin is recommended as the first choice antibiotic for dental infections. Amoxicillin is a broad-spectrum penicillin derivative, used in the treatment of a number of infections and it is better absorbed, following oral administration. This trend is also based on the established efficacy of penicillin-based drugs on bacteria involved in odontogenic infections.\[^{[12]}\]

In our study, diclofenac sodium was the most commonly prescribed Non-steroidal anti-inflammatory drug followed by paracetamol and ibuprofen. Diclofenac sodium is an effective analgesic, and anti-inflammatory drug. It has better anti-inflammatory action compared to paracetamol and ibuprofen.\[^{[18]}\] This was also due to fact that diclofenac sodium was the chief painkiller sold in the dispensaries of the dental
colleges where the study was carried out. In a similar study conducted by Guzman-Alvarez et al (2012), ibuprofen and paracetamol were the properties of drugs as well as deficiencies in taking a good drug history are responsible for a significant number of adverse drug reactions. 85.9% of interns reportedly considered that a sound knowledge of undergraduate pharmacology helps in preventing adverse drug reactions. So, if the basics in pharmacology are strong, many adverse drug reactions can be avoided, where prescribing is concerned. Though our study is not related to ADRs (Adverse Drug Reactions), the knowledge on ADR is of prime necessity by the interns and young doctors before prescribing. Thus, the drug interactions of the prescribed medicines with the medicines taken by the patients for their existing ailments should be considered.

A self-assessment of the participated interns who rated themselves based on their prescribing skills revealed that majority (64.3%) rated themselves as average, 27.3% rated themselves as good followed by 5.7% who rated themselves as poor. Only 1.8% rated themselves as excellent at prescribing drugs. This study relies on self-rated confidence rather than objective demonstration of knowledge and skills. This self-rated assessment expressed in this study may not reflect the true capabilities of those individuals in clinical practice. Interns should also improve by observing where they are making mistakes. Human beings are reflexive in nature – they do something, observe the consequences and consider how they can do it better next time.\[14\]

A high percent (88.1%) of interns considered that there is a need for development of training courses in Clinical Pharmacology and therapeutics. The results of this study showed that even though these students were not yet fully responsible for prescribing, many deficiencies were noted in their practices.

As the study was conducted only in dental colleges situated in and around Hyderabad city, it cannot be generalized to the prescribing knowledge of all the dental colleges. Also, those interns who were present at the time of the study only were included. The interns who participated in this study had not completed their major clinical postings, which might have resulted in average knowledge.

In order to generalize the results, more number of studies should be carried out in a wider area covering many a dental colleges and larger samples. Introduction of workshops and group discussions emphasizing on practical implementation of knowledge rather than theoretical learning. Theoretical and practical teaching coupled with frequent assessment of the knowledge and skills acquired by the students, would likely improve their rational drug prescribing as interns. Internship training appears to increase the prescribing confidence of interns and it needs to be assessed objectively during and after internship. Most recommended textbooks of pharmacology are voluminous, containing a large body of information and details far exceeding the core of knowledge needed for undergraduate dental students. It must also be considered that pharmacology courses are taught before students have learned about diseases for which the various drugs are used. Pharmacological information overload and proliferation of new drugs have also been recognized as two of the major factors contributing to insufficient pharmacological education.

**Conclusion**

Most of the Interns had moderate knowledge in prescribing basic drugs which are used in dentistry. Undergraduate training, therefore, must equip graduates to be able to prescribe safely not just by lectures on basic pharmacology and clinical pharmacology, but also incorporating more practical sessions using clinical examples. Additional provision of teaching about drugs across all learning styles like prescribing workshops, tutorials, problem-based learning, and e-learning would also be beneficial.

**References**

## Illustrations

### Illustration 1

Factors considered before prescribing drugs

<table>
<thead>
<tr>
<th>Factors Considered</th>
<th>Frequency (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug history</td>
<td>6</td>
<td>2.6%</td>
</tr>
<tr>
<td>Allergies</td>
<td>13</td>
<td>5.7%</td>
</tr>
<tr>
<td>Transplantations</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Drug history, allergies, any systemic diseases, history of past surgeries, pregnancy, malignant diseases, transplantations, lactating mothers</td>
<td>145</td>
<td>63.9%</td>
</tr>
<tr>
<td>More than any two factors</td>
<td>62</td>
<td>27.3%</td>
</tr>
</tbody>
</table>
Illustration 2

Drugs prescribed without any supervision

<table>
<thead>
<tr>
<th>Prescribe unsupervised</th>
<th>Frequency (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics</td>
<td>22</td>
<td>9.7%</td>
</tr>
<tr>
<td>Non-steroidal anti-inflammatory drugs</td>
<td>28</td>
<td>12.3%</td>
</tr>
<tr>
<td>Antacids</td>
<td>4</td>
<td>2.1%</td>
</tr>
<tr>
<td>Multivitamins</td>
<td>79</td>
<td>34.8%</td>
</tr>
<tr>
<td>Steroids</td>
<td>93</td>
<td>41%</td>
</tr>
</tbody>
</table>
Illustration 3

Prescriptions for various dental problems

<table>
<thead>
<tr>
<th>Prescriptions</th>
<th>Frequently n(%)</th>
<th>Sometimes n(%)</th>
<th>Rarely n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abscesses</td>
<td>191 (84.1%)</td>
<td>31 (13.7%)</td>
<td>5 (2.2%)</td>
</tr>
<tr>
<td>Minor oral surgical</td>
<td>160 (70.5%)</td>
<td>53 (23.3%)</td>
<td>14 (6.2%)</td>
</tr>
<tr>
<td>procedures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periodontal diseases</td>
<td>67 (29.5%)</td>
<td>124 (54.6%)</td>
<td>36 (15.9%)</td>
</tr>
<tr>
<td>Endodontic problems</td>
<td>93 (41.0%)</td>
<td>96 (42.3%)</td>
<td>38 (16.7%)</td>
</tr>
<tr>
<td>Mouthwashes</td>
<td>54 (23.8%)</td>
<td>157 (69.2%)</td>
<td>16 (7%)</td>
</tr>
</tbody>
</table>
Illustration 4

Prescriptions-related problems encountered during internship

<table>
<thead>
<tr>
<th>Problems encountered</th>
<th>Yes n(%)</th>
<th>No n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing of prescriptions</td>
<td>50 (22%)</td>
<td>177 (78%)</td>
</tr>
<tr>
<td>Witnessing Adverse drug reactions</td>
<td>12 (5.3%)</td>
<td>215 (94.7%)</td>
</tr>
<tr>
<td>Difficulty in memorizing drug doses</td>
<td>182 (80.2%)</td>
<td>45 (19.8%)</td>
</tr>
<tr>
<td>Preparedness to prescribe safely</td>
<td>112 (49.3%)</td>
<td>115 (50.7%)</td>
</tr>
</tbody>
</table>