KNOWLEDGE AND PRACTICES OF INDIAN DENTAL STUDENTS REGARDING THE PRESCRIPTION OF ANTIBIOTICS AND ANALGESICS

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Abstract

Background and aim. Making a diagnosis and prescribing medicine is the most important skill required by any doctor in the colleges, hospitals or clinical practice. Prescribing is the intervention that has the greatest influence on patients’ health requiring complex series of sub-competencies like making a diagnosis, setting a therapeutic goal, choosing the approach, choosing the best drug, route and frequency of administration, duration of therapy, writing the prescription, patient information, monitoring drug effects and, lastly, review the prescription.

The aim of this research is to assess the knowledge and practices of Indian dental students regarding the prescription of antibiotics and analgesics.

Methods. A cross-sectional study was conducted among 870 Undergraduate and Post-graduate dental students of Udaipur city. A close ended, pretested questionnaire was administered to students. The data were analyzed using the student’s t-test and one-way ANOVA with post hoc Bonferroni test.

Results. A total of 870 students participated in the study. Most of them were females and were pursuing undergraduate studies. Post graduate students had greater medication prescription knowledge than the undergraduate students. Nevertheless, practice of medication prescription among these two was found adequate.

Conclusion. Undergraduate dental students have lower knowledge about medication prescription as compared to post-graduate students. Also, knowledge of prescription of medicines in males were higher in comparison to females, though prescription practices of all the dental students was found almost similar.

Keywords: dental students, prescription, analgesics, antibiotics
Medicine use has become a daily part of life. Despite new developments and researches in the field of medicine, drug resistance continues to worsen. Promising future strategies have to be developed to combat the resistance for which health care personnel play an important role. To empower patients and the public to make the most of the medicines, health care personnel need to understand the concept of medicines and to implement it in their practice.

Modern drugs are dynamic interventions for the newly qualified specialists to be permitted to prescribe without giving evidence of capability [3]. A prescription sometimes called specialist’s requests, is a medicinal services program carried out by a doctor or other qualified professionals in the form of directions that governs the plan of care to an individual patient [4]. Misconception in prescribing medicine is very common, particularly with new specialists. The fundamental issue which adds to this irrational prescription is that in the clinical and therapeutic undergraduate studies, students are not satisfactorily trained and wherever it is taught, the learning provided is just theoretical. Prescribing medicine has become a crucial issue in dental colleges and hospitals as well. Students in Indian schools of dentistry attend to patients with illness, and prescribe medication frequently. The medication practices occurring in the young population reveals complex relationship with health, knowledge and behavior which must be considered in order to deliver safe and effective use of medication [5]. During their third and final year of graduation, students start their clinical work, turning out to be more engaged with the patients from the different clinical courses and are consistently in charge of recommending medications. Interns and post-graduate students give the treatment to the patients and also prescribe medications in their individual departments. Appropriate

Material and method

Study design, study area and population

A descriptive cross-sectional study was conducted among 870 Dental students of both the dental colleges [Pacific Dental College and Darshan Dental College] in Udaipur City, Rajasthan, India, in the month of April 2016. Study population consisted of Third and Final year dental undergraduates, interns and post-graduates.

Ethical Approval, Official permission & Informed consent

The study protocol was reviewed by the Ethical Committee of Pacific Dental College and Hospital and was granted ethical clearance. An official permission was taken before conducting the study from the Principals of both the dental colleges. Written informed consent was obtained from each participant after explaining the nature and purpose of research.

Pretesting of Questionnaire

A self-administered structured questionnaire was developed and tested among a convenience sample of 20 students, who were interviewed to gain feedback on the overall acceptability of the questionnaire in terms of
length and language clarity. Based on their feedback, the questionnaire did not require any corrections. Cronbach’s coefficient was found to be 0.80, which showed an internal reliability of the questionnaire. Mean content validity ratio (CVR) was calculated as 0.87 based on the opinions expressed by a panel of five academicians. Face validity was also assessed and it was observed that 92% of the participants found the questionnaire to be easy.

**Questionnaire**

The questionnaire, designed to obtain undergraduate and post-graduate dental students’ knowledge and practices towards prescription of antibiotics and analgesics, consisted of three sections. The first section solicited general demographic details including gender, level of education, year of graduation, type of specialty (if post-graduate). The second section consisted of 18 close ended questions assessing students’ knowledge on medicine use, efficacy, adverse effects and other common characteristics of medicine. The third section consisted of 12 close ended questions evaluating the practice of dental students regarding medication prescription.

**Methodology**

First of all the investigator collected the list of dental colleges in Udaipur city i.e. Pacific Dental College, Darshan Dental College, Raj Rajeshwari Dental College, Geetanjali Dental College and Pacific Dental College and Research Centre. Out of five, only two colleges, i.e Pacific Dental College and Darshan Dental College were having undergraduate students attending the clinical postings as well as post-graduate students. So the list of participants [dental undergraduates (3rd and 4th BDS), Interns and post-graduate students] were obtained from the administrative section of these two colleges. The total sample size obtained was 870 students who participated in the study. The purpose of the study was informed and explained to participants. All the dental students were personally given the questionnaire. Those willing to participate in the survey were requested to fill in the written informed consent form and were asked to rate each item of the questionnaire choosing the most appropriate response.

The questionnaires were distributed to Undergraduate students in their theory classroom, and were advised to fill it out before beginning of their classes while Post-graduates were given the questionnaire in their respective departments. They were guided that if they do not understand any item on the questionnaire, they can ask the investigator. Sufficient time was given to them to fill the questionnaire. The students were followed up 2-3 times for getting 100 percent response rate. All questionnaires were then collected and checked carefully for their completeness.

**Statistical Analysis**

Completed questionnaires were coded and spreadsheets were created for data entry. The data were analyzed using Statistical Package for Social Sciences (SPSS software) (version 22).

The responses were analyzed as percent scores to rate their knowledge and practices. The Yes and No questions were scored one and zero respectively. Several items like question 2, 6, 13, 15, 17, 18 from Section II and question 1 from Section III were recoded to ensure that a high score indicated a positive knowledge and practice and a low score indicated a negative knowledge and practices. Mean knowledge and practice scores and standard deviation were calculated. Descriptive statistics were used to summarize the demographic information. The survey data was analyzed using the student’s t-test to test the difference between knowledge and practice score of males and females and one-way ANOVA with post hoc Bonferroni test was used to analyze the statistically significant differences between the independent groups (year of graduation and type of specialty). Confidence level and level of significance were fixed at 95% and 5%, respectively.

**Results**

**Table I:** A total of 870 students filled and returned the questionnaires, giving the response rate of 100%. Out of the 870 respondents; 692 (79.5%) were females and 178 (20.5%) were males. Of the participants; 410 (47.1%) were 3rd and 4th year BDS students (Undergraduates), 202 (23.2%) were Interns and 258 (29.7%) were Post-graduates.

**Table II:** depicted the frequency of correct responses regarding knowledge of dental students. Majority of the students; 866(99.5%) and 814(93.6%) stated that some medicines may cause allergy and some medicines are not suitable to be used by children. Similarly 820 (94.3%) and 808 (92.9%) stated that medicine used incorrectly can lead to adverse effects and some medicines should be taken before or after food. Only 508 (58.4%) and 706 (81.1%) said that tablet size and color does not affect its efficacy. Only 452 (52%) said that more dosage of drug should not be prescribed in more pain. Majority of the students; 788 (90.6%) answered correctly that the ability of microbes to resist the effect of drugs is antibiotic resistance.

**Table III:** depicted the frequency of responses regarding practice of dental students. Among the 870 respondents, 806 (92.6%) said that they take time to consider carefully whether antibiotics are needed or not; 856 (98.4%) said that they instruct the patient every time to complete the course of treatment. Almost 100% students said that they prescribe medicines only when indicated and consider general factors.

**Table IV:** The mean knowledge and practice scores of the undergraduates and post-graduates were evident as 9.58 ± 3.09 and 11.6 ± 1.15 respectively. Post-graduates had significantly greater knowledge than interns and undergraduates (p=0.00). The gender-wise distribution showed that males had significantly greater knowledge than females (p=0.00). Among the post-graduates, the greater mean knowledge was shown by Prosthodontic post-graduates and lowest mean knowledge by Oral pathology...
post-graduates. The prescription practice of students was almost similar in all the groups with the mean score of post-graduates, interns and undergraduates as 11.7 ± 1.12, 11.5 ± 1.15 and 11.6 ± 1.16 respectively. When post hoc Bonferroni test was applied, mean knowledge score among post-graduates was found to be significantly greater than among undergraduates. (p=0.001).

Table I. Demographic characteristics of study population.

| Sample characteristics | Frequency n (%) |
|------------------------|-----------------|
| Gender                 |                 |
| Male                   | 178 (20.5)      |
| Female                 | 692 (79.5)      |
| Year of Graduation     |                 |
| Undergraduates (3rd BDS, 4th BDS) | 410 (47.1) |
| Interns                | 202 (23.2)      |
| Postgraduates          | 258 (29.7)      |
| Total                  | 870 (100)       |
| Type of Specialty (if post-graduate) |  |
| Oral Medicine          | 36 (4.1)        |
| Prosthodontics         | 30 (3.4)        |
| Oral Surgery           | 30 (3.4)        |
| Endodontics            | 36 (4.1)        |
| Pedodontics            | 24 (2.8)        |
| Orthodontics           | 30 (3.4)        |
| Public Health Dentistry| 16 (1.8)        |
| Periodontics           | 32 (3.7)        |
| Oral Pathology         | 24 (2.8)        |
| Total                  | 258 (29.7)      |

Table II. Frequency of correct responses regarding knowledge of dental students.

| Knowledge                                                                 | Correct response n (%) |
|----------------------------------------------------------------------------|------------------------|
| Some medicines may cause allergy.                                          | 866 (99.5)             |
| Same medicines can be used in both children & adults.                      | 662 (76.1)             |
| Some medicines are not suitable to be used by children.                    | 814 (93.6)             |
| Tablet size affects its efficacy.                                         | 508 (58.4)             |
| Unit dosage form affects its efficacy.                                     | 694 (79.8)             |
| Medicine’s color affects its efficacy.                                     | 706 (81.1)             |
| Some medicines if used incorrectly can lead to adverse effects.           | 820 (94.3)             |
| The same medicine may be used to treat different illnesses.               | 620 (71.3)             |
| Some medicines should be taken before or after food.                       | 808 (92.9)             |
| Certain medicines have to be kept in the refrigerator.                    | 788 (90.6)             |
| Heat and direct sunlight damage medicines.                                 | 792 (91)               |
| Route for drug administration affects the effectiveness of medicine.      | 850 (97.7)             |
| More dosage of drug should be prescribed in more pain.                    | 452 (52)               |
| Antibiotic resistance is the ability of microbes to resist the effect of drugs. | 788 (90.6)             |
| Efficacy is better if the antibiotics are newer and more costly.          | 628 (72.2)             |
| NSAID’s cause GIT problems.                                                | 716 (82.3)             |
| No drug can be prescribed during pregnancy.                                | 708 (81.4)             |
| Antacids should be added into all prescriptions to avoid GI upset.         | 326 (37.5)             |
Table III. Frequency of responses regarding practice of dental students.

| Practice                                                                                                                                                                                                 | Yes n (%)  | No n (%) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| I often prescribe antibiotics because the patient expects it.                                                                                                                                             | 176 (20.2) | 694 (79.8) |
| I often take time to consider carefully whether antibiotics are needed or not.                                                                                                                               | 806 (92.6) | 64 (7.4)  |
| I instruct the patient every time to complete the course of treatment with medicines even if they feel better.                                                                                          | 856 (98.4) | 14 (1.6)  |
| I consider general factors (like past drug history, systemic disease, pregnancy etc) before prescribing any drug.                                                                                             | 870 (100)  | 0        |
| I prescribe medicines only when indicated.                                                                                                                                                                  | 870 (100)  | 0        |
| I follow the rational prescription process.                                                                                                                                                                 | 758 (87.1) | 112 (12.9) |
| I prescribe medicines by their generic name.                                                                                                                                                                | 380 (43.7) | 490 (56.3) |
| I consider cost of the medicines before prescribing.                                                                                                                                                         | 654 (75.2) | 216 (24.8) |
| While prescribing medicines, I take care of appropriate drug dosages.                                                                                                                                       | 870 (100)  | 0        |
| While prescribing, I take time to instruct the patient regarding usage of medicines.                                                                                                                        | 868 (99.8) | 2 (0.2)  |
| I take history regarding drug allergy before prescribing medicines.                                                                                                                                          | 846 (97.2) | 24 (2.8)  |
| I inform the patients about possible side effects of drugs.                                                                                                                                                    | 774 (89)   | 96 (11)  |

Table IV. Association of mean knowledge and practice score with several independent variables.

| Variables                      | Knowledge Mean ± SD | P value | Practice Mean ± SD | P value |
|--------------------------------|---------------------|---------|--------------------|---------|
|                                |                     |         |                    |         |
| Year of graduation             |                     |         |                    |         |
| Undergraduates (3rd BDS, 4th BDS) | 7.92 ± 0.95a       | 0.00*   | 11.6 ± 1.16        | 0.39    |
| Interns                        | 7.88 ± 0.94         |         | 11.5 ± 1.15        |         |
| Postgraduates                  | 13.5 ± 2.76*        |         | 11.7 ± 1.12        |         |
| Total                          | 9.58 ± 3.09         |         | 11.6 ± 1.15        |         |
| Gender                         |                     |         |                    |         |
| Male                           | 11.7 ± 3.52         | 0.00*   | 11.6 ± 1.10        | 0.52    |
| Female                         | 9.02 ± 2.70         |         | 11.6 ± 1.16        |         |
| Total                          | 9.58 ± 3.09         |         | 11.6 ± 1.15        |         |
| Type of specialty              |                     |         |                    |         |
| Oral Medicine                  | 14.9 ± 1.53*        |         | 12.1 ± 0.84        |         |
| Prosthodontics                 | 15.1 ± 1.38*        |         | 11.3 ± 1.47        |         |
| Oral Surgery                   | 14.2 ± 2.35         | 0.00*   | 11.5 ± 1.43        |         |
| Endodontics                    | 13.7 ± 2.21         |         | 11.0 ± 1.04        |         |
| Pedodontics                    | 13.8 ± 2.42         |         | 11.9 ± 1.06        | 0.02*   |
| Orthodontics                   | 13.8 ± 1.86*        |         | 11.8 ± 0.74        |         |
| Public Health Dentistry        | 13.0 ± 2.06         |         | 11.1 ± 0.80        |         |
| Periodontics                   | 13.4 ± 3.42         |         | 11.9 ± 0.98        |         |
| Oral Pathology                 | 8.33 ± 0.63*        |         | 12.3 ± 0.76        |         |
| Total                          | 9.58 ± 3.09         |         | 11.6 ± 1.15        |         |

Statistical tests applied: t-test, one way ANOVA.
*indicates statistically significant difference at p ≤ 0.05.
Post hoc Bonferroni test: Groups with same letter (a) suprascripted showed statistically significant difference.
Discussion

The present study was conducted among 870 dental undergraduates, interns and post-graduate Indian dental students to assess their knowledge and practices of analgesics and antibiotic prescription. This study provides an overview of medication prescription among dental students.

Prescribing medicines is a complex task that requires theoretical and clinical knowledge combined with practical skills [10]. At the point when dental undergraduates advance into their internship and post-graduation where they are required to effectively endorse, an immense pharmacological information imparts a feeling of confidence in them. This study endeavored to investigate the manner in which the pharmacological concepts learnt in the second year of the educational modules translates to successful clinical application by students, interns and post-graduates [11]. The current study showed that 76.1% of the students stated that same medicine can be used in both children and adults. While majority of the students said that some medicines are not suitable for children and allergy can be caused by some medicines. This was in contrast with the study conducted by Eldalo et al. [12] which showed that majority of the Saudi students knew that children did not take same adult doses.

Majority of the students were aware of proper storage of the medicines. This might be due to their habit of reading the instructions on medicine packet before prescribing it. A similar result was found in a study conducted by Eldalo et al. [12] where half of Saudi students knew that high temperature affects the efficacy of medicine.

Antibiotic resistance has become one of the most important issue in global health and it is considered one of the main threats to public health. The present study showed that dental students were well aware of this issue. Majority of our respondents had knowledge about the antibiotic resistance i.e. ability of the drug to resist the effect of drugs. This was in contrast to Humphreys et al. [13] and Ibea et al. [14] who found that medical student’s knowledge on antibiotics and antibiotic resistance was limited.

Results of the present study demonstrated good-practice regarding prescription writing among the dental students. This might be due to the fact that prescription by the student is counter signed by the respective in charge of the department. In this manner their way of prescription writing improves and also wrong prescription gets checked and corrected. Most of the students said that they take time to consider antibiotic requirement and prescribe antibiotics only when it is needed. Similar finding was obtained in a survey conducted by Abdoighfour J et al. [15] who found that practice towards prescribing medicine was in moderate range among medical students in Rasht, Iran.

Hundred percent students 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 drug reactions should be given importance before prescribing any drug. This might be because they were trained in that manner to consider all such factors that cause adverse effects on patients, foetus or lactating mothers like drug concentrations, drug tolerance, allergic manifestations, drug interactions etc. Regarding this aspect, it shows that the students were cautious enough.

According to the study conducted by Guzman-Alvarez et al. [16], only 30% of dental students followed the WHO guidelines for prescribing, and the remaining did not follow them as most of them were not aware of such guidelines. But our present study revealed that 87.1% follow the rational prescription process. This can be due to dental teaching curriculum which involves teaching of rational prescription writing.

The present study revealed that post-graduate dental students showed a significantly greater mean knowledge than the undergraduate students and interns. This may be due to the reason of regular clinical practice of postgraduates and revision of the basics again during post-graduation. Poor knowledge may affect the way of their future prescribing of the drugs and its use and safety. This is in agreement with the study carried out on medical students by Abdoighfour J et al. [15] who found that their knowledge on antibiotics was limited which was responsible for inappropriate prescription.

The results of the study showed that despite of average knowledge of medication prescription among dental undergraduate students and interns, deficiency was not seen in their clinical practice. But poor knowledge will lead to improper use of commonly used medicines which in turn may lead to some repercussions. Accordingly undergraduate’s curriculum must contain particular measures i.e. controlling not simply by lectures on fundamental pharmacology and clinical pharmacology, but additionally fusing more viable sessions utilizing clinical examples. Extra procurement of educating about medications over all learning styles like prescribing workshops, instructional exercises, issue based learning, and e-learning would likewise be useful.

This study enable us to determine the loopholes in prescription writing so that proper strategies can be implemented to ensure effective disease management, patient safety and good health care services. This type of study using self- administered questionnaire, is largely dependent upon the information given by respondents. In spite of the fact that students were motivated to fill the questionnaire autonomously, still mutual influence between the students and recall bias could not be ruled out completely. We recommend such studies to be conducted in other parts of the country to know the knowledge and practices of prescription writing. In that way, Dental Council of India can be strongly recommended to make necessary changes in the curriculum in order to benefit patients and overall public health.
Conclusion
The present study concluded that Undergraduate dental students have moderate knowledge and misconceptions about medicines as compared to post-graduate students. Also knowledge of prescription of medicines in males were higher in comparison to females. Practice of medication prescription was found adequate but they were not following the specific guidelines and standardized procedures.

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