

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

ASTHA DOSHI¹, KAILASH ASAWA¹, NAGESH BHAT¹, MRIDULA TAK²,
PRIYANJALI DUTTA³, TAJINDER KUMAR BANSAL⁴, RUCHIKA GUPTA⁵

¹Department of Public Health Dentistry, Pacific Dental College and Hospital, Udaipur, India

²Department of Public Health Dentistry and Research Centre, Pacific Dental College and Hospital, Udaipur, India

³Department of Oral and Maxillofacial Pathology, RR Dental college and Hospital, India

⁴Department of Oral Medicine, RR Dental College and Hospital, Udaipur, India

⁵Department of Endodontics, RR Dental College and Hospital, Udaipur, India

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

Background and aim

The primary decade of the 21st Century brought many interventions, misconceptions, and therapeutic advances that have affected medicine from the patient's

bedside to the pharmaceutical cabinet. In some cases these advances changed deep-embedded convictions regarding prescription; in others, they opened up potential outcomes beyond what specialists believed was conceivable years ago. Medical technology is an extensive field where advancement plays a critical role in managing well-being. Zones like biotechnology, pharmaceuticals, information

Manuscript received: 19.01.2017

Received in revised form: 28.02.2017

Accepted: 07.03.2017

Address for correspondence: asthadoshi1989@gmail.com

technology, the improvement of medical devices and machines etc. have made critical contributions in improving the well-being of individuals all around the globe. From “little” advancements like glue wraps and hand-leg supports, to bigger, more mind boggling innovations like X-ray machines, simulated organs, and mechanical prosthetic appendages, innovation has undoubtedly an incredible effect on medicine [1].

In spite of new advancements and improvements in drugs, disease burden is ceaselessly increasing. With rapid financial advancement and expanding westernization of lifestyle in the past couple of decades pervasiveness of sicknesses has reached alarming extents in the recent years [2]. Medicines play an essential part in maintaining well-being, averting ailment, managing chronic conditions and curing ailment. In a time of significant financial, demographic and mechanical difficulties it is crucial that patients get the best quality results from drugs. Nonetheless, there is a developing assemblage of evidence that demonstrates that there is an urgent need to get the basics of medicines use suitable.

Medicine use has become a daily part of life. Despite of 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

medication prescription can upgrade treatment achievements and forestall unfavorable events. Inappropriate prescribing practices containing unusual dosages give rise to ineffectual and unsafe treatment, aggravation or development of disease, anxiety, and damage to the patient at a higher cost [6].

Dental prescriptions give transient treatment or treatment particularly for surgical methods; nevertheless, dental practitioners require learning about medications and must look after the guidelines for prescribing. There is confirmation that, in Mexico and in different nations, dental practitioners frequently don't have the best possible pharmacological learning, and in this manner, often make prescription mistakes [7]. Hence it is important to evaluate the medical knowledge of the dental students. The medicine learning evaluation can serve as the premise to focused information improvement arrangements [8]. Lacking information of medicine use may specifically prompt abuse by group and/or patients' resistance with a medication regimen and results in serious results like antagonistic medication response and reduction of the nature of treatment [9].

Various studies have been conducted among medical students regarding prescription knowledge, though there is a scarcity of literature among dental students. Despite the fact that in the starting years, prescription of medication is taught to the dental students in their educational modules, the use of recommending prescriptions in the clinical departments by them should be refurbished, understood and to be evaluated.

The aim of the present cross-sectional study is to assess the knowledge and practices of Indian dental students regarding the prescription of antibiotics and analgesics.

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

Statistical tests applied: t-test, one way ANOVA.

*indicates statistically significant difference at $p \leq 0.05$.

Post hoc Bonferroni test: Groups with same letter (a) superscripted 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.

References

1. Lauren Cox, ABC Medical News Unit, Peggy Peck. The top 10 Medical advances of the decade. Medpage Today: Infectious disease. Available from: <https://www.medpagetoday.com/infectiousdisease/publichealth/17594>
2. Pappachan MJ. Increasing prevalence of lifestyle diseases: high time for action. *Indian J Med Res.* 2011;134:143–145.
3. Aronson JK, Henderson G, Webb DJ, Rawlins MD. A prescription for better prescribing. *BMJ.* 2006;333:459–460.
4. W.H.O. Guide to Good Prescribing – A Practical Manual: Part 3: Treating your patients: Chapter 9. Step 4: Write a prescription. Available from: <http://apps.who.int/medicinedocs/en/d/Jwhozip23e/5.4.html#Jwhozip23e.5.4>
5. Hsiao F, Lee J, Huang W-S, Chen S-M, Chen H-Y. Survey of medication knowledge and behaviors among college students in Taiwan. *Am J Pharm Educ.* 2006 Apr 15;70(2):30.
6. Gopalakrishnan S, Ganeshkumar P, Katta A. Assessment of prescribing practices among urban and rural general practitioners in Tamil Nadu. *Indian J Pharmacol.* 2013;45:252–257.
7. Espinosa-Melendez MT. An evaluation of the pharmacological knowledge of undergraduate and graduate students at UNAM's School of Dentistry. *Proc West Pharmacol Soc.* 2006;49:173–176.
8. Atsbeha BW, Suleyman SA. Medication knowledge, attitude and practice (KAP) among university of Gondar freshman students, North Western Ethiopia. *Pharmacologyonline.* 2008;1:4–12. Available from: <http://pharmacologyonline.silae.it/files/newsletter/2008/vol1/2.Atsbeba.pdf>
9. Oshikoya KA, Bello JA, Ayorinde EO. Prescribing knowledge and skills of final year medical students in Nigeria. *Indian J Pharmacol.* 2008;40(6):251–255.
10. Sandilands EA, Reid K, Shaw L, Bateman DN, Webb DJ, Dhaun N, et al. Impact of a focussed teaching programme on practical prescribing skills among final year medical students. *Br J Clin Pharmacol.* 2011;71(1):29–33.
11. Jayadev M, Karunakar P, Vishwanath B, Chinmayi SS, Siddhartha P, Chaitanya B. Knowledge and Pattern of Antibiotic and Non Narcotic Analgesic Prescription for Pulpal and Periapical Pathologies- A Survey among Dentists. *J Clin Diagn Res.* 2014 Jul;8(7):ZC10–ZC14. doi: 10.7860/JCDR/2014/9645.4536.
12. Eldalo AS, Yousif MA, Abdallah MA. Saudi school students' knowledge, attitude and practice toward medicines. *Saudi Pharm J.* 2014;22(3):213–218.
13. Humphreys, H, Dillane T, O'Connell B, Luke LC. Survey of recent medical graduates' knowledge and understanding of the treatment and prevention of infection. *Ir Med J.* 2006;99(2):58–59.
14. Ibia E, Sheridan M, Schwartz R. Knowledge of the principles of judicious antibiotic use for upper respiratory infections: a survey of senior medical students. *South Med J.* 2005;98(9):889–895.
15. Abdolghafour Jorak, Faeze Keihanian, Amin Saeidinia, Abtin Heidarzadeh, Fatemeh Saeidinia. A Cross Sectional Study on Knowledge, Attitude and Practice of Medical Students Toward Antibiotic Resistance and its Prescription, Iran. *Adv. Environ. Biol.* 2012;8(17):675–681.
16. Guzmán-Álvarez R, Medeiros M, Lagunes LR, Campos-Sepúlveda A. Knowledge of drug prescription in dentistry students. *Drug Healthc Patient Saf.* 2012;4:55–59.