

# KNOWLEDGE, ATTITUDE AND AWARENESS ABOUT EFFECTIVENESS OF VARIOUS ANTIBIOTICS IN DENTISTRY AMONG DENTAL STUDENTS

Running title: Knowledge, attitude and awareness about effectiveness of various antibiotics in dentistry among dental students.

## **KARTHIKEYAN.S**

Graduate student,  
Saveetha Dental College  
Saveetha Institute of Medical and Technical science.

## **DR. BALA KRISHNA**

Senior Lecturer  
Department of Oral & maxillofacial Surgery  
Saveetha Dental College  
Saveetha Institute of Medical and Technical science.  
Chennai 600077; Tamilnadu

## **ABSTRACT**

### **AIM:**

To assess the knowledge, attitude and awareness about effectiveness of antibiotics in dentistry among dental students.

### **INTRODUCTION:**

Dentists and dental students attend patient with illness and often prescribe medicines. About 12% of their prescription are antibiotics. Hence this study was conducted to assess their knowledge, attitude and awareness about antibiotics.

### **MATERIALS AND METHODS:**

This study was conducted among dental students who were doing their graduation in a dental college in Chennai. A self administered questionnaire consisting of 10 questions was prepared to know the knowledge of various antibiotics used in dental practice. 100 students were selected, the questionnaire were distributed through an online link. Their results were collected and tabulated.

**RESULTS:** Among the respondents around 40% lacked adequate knowledge about antibiotics and 46% lacked knowledge about developing antibiotics resistance and around 60% of the respondents lack interest in updating themselves with the new developments and tests that are used to detect bacterial infection.

### **CONCLUSION:**

The knowledge about antibiotics is less than adequate among the dental students. Extra classes, conferences, seminars and workshops should be conducted, that will change their thought about this and also insist a positive attitude in them.

**KEYWORDS:** antibiotic, antibiotic resistance, odontogenic infections, operative intervention

### **INTRODUCTION:**

Antibiotics are widely used, and they form an indispensable part as both prophylactic and treatment modalities in documented as well as suspected infections. In dental practice, antibiotics are used mainly after oral surgical and periodontal procedures.[1] However, resistance to antibiotics has been a rising global problem and modalities for preventing resistance are being undertaken.[2] It is the duty of every dentist to arrive at the correct diagnosis in order to avoid the indispensable use of antibiotics. Since most human orofacial infections originate from odontogenic infections, the prescribing of antibiotics by dental practitioners has become an important aspect of dental practice. For this reason, antibiotics account for the vast majority of medicines prescribed by dentists. Dentists prescribe between 7% and 11% of all common antibiotics. Various studies have been conducted on the injudicious use of antibiotics in dental practice.[3,4] The relatively relaxed regulation on antibiotics without prescription (over-the-counter) worsens the scenario. Knowledge, attitude, and practice (KAP) among dental students towards various antibiotics prescribed in dental practice. This study aimed to identify the KAP of antibiotic use among dental students in Saveetha Dental College. The purpose of the present study was to survey the extent of and indications of antibiotic use among dental students.

Antibiotics are prescribed by dentists for treatment as well as prevention of infection. Indications for the use of systemic antibiotics in dentistry are limited, since most dental and periodontal disease are best managed by operative intervention and oral hygiene measure[5,6]. However, the literature provides evidence of inadequate prescribing by dentists, due to number of factors ranging from inadequate knowledge to social factors. The main defects in the knowledge of antibiotics prescribing are outlined.

The use of broad spectrum antibiotics for short periods of time and the application of very narrow range of antibiotics.[8,9]. The simultaneous prescription of non-steroidal anti inflammatory drugs can modify the bioavailability of antibiotics[7]. In turn an increased number of bacterial strains resistant to conventional antibiotics are found in the oral cavity.

**MATERIALS AND METHODS:**

The study was designed as a prospective, questionnaire based survey. A questionnaire enquiring about the knowledge and awareness regarding various antibiotic prescribed in practice was administered to students of 3rd years, final years and interns (those who undergo clinical practices) in Saveetha Dental College. A total of 100 students were selected and an online link was given and their responses were obtained online. The questions had a set of options and the participants have to choose one among the options. The questions were simple and easy to answer. The results obtained were collected and tabulated.

**QUESTIONNAIRE:**

Knowledge regarding antibiotics

Yes

No

Do you feel overdose of antibiotics can lead to resistance

Yes

No

Alternative antibiotics choice in patient allergic to penicillin

Metronidazole

Azithromycin

Clindamycin

Cephalosporin

Does your antibiotic prescription depend on patients preference

Yes

No

Do you prescribe antibiotics depending on its cost

Yes

No

Do you take past dental/ medical history of consumption of antibiotics before prescribing antibiotics?

Yes

No

Consideration of antibiotic resistance in prescribing

Yes

No

Which antibiotic do you prescribe most often for an adult patient with no medical allergies

Amoxicillin

Metronidazole

Azithromycin

Amoxicillin + clavulanic acid

Clindamycin

Do you keep yourself updated by reading any latest scientific material prior to use of antibiotics in dentistry?

Yes

No

Do you prescribe antibiotics preoperatively prior to dental implant placement?

Yes

No

**RESULTS:**

Though antibiotics are the commonly prescribed medications by dentists, only 80% of the respondents agreed that they have complete knowledge about the antibiotics they use (figure1). The respondents in our survey within the age group of 20-24 years and the number of Male and female respondents were almost equal with 52% of female respondents and 48% were male respondents. While coming to history taking of the patient, only 85% of them consider their past medical and dental history before prescription of the antibiotics (figure2). Considering the group of drugs that are prescribed, more than 50% of the students prescribes amoxicillin ( penicillin group of drug) for their patients, the rest fall under the category of metronidazole which scores about 10%, Augmentin ( amoxicillin +clavulanic acid) which is the second commonly prescribes scoring a range of 35%. Other drugs like Azithromycin and clindamycin are prescribes 2% and 3% respectively (figure3). These drugs are prescribes when the patient does not have any known history of allergy towards any of these drugs.

When the patient has an history of allergy towards penicillin, the most commonly prescribes drug by the respondents are Metronidazole. About 25% prescribe azithromycin, 10% prescribe cephalosporin and other 10% prescribe clindamycin (figure 4). Dentist also prescribe antibiotics according to patient's compliance and cost (figure 5 and 6). 85% of the respondents think that over dose of antibiotics can lead to resistance but when asked if they would consider about antibiotic resistance before prescribing them only 75% agreed (figure 7). 75% of the students said that they would prescribe antibiotics prior to invasive procedures like implant placement (figure 8). Besides all these 55% of them were interested in keeping themselves updates about the latest scientific materials that are used prior to antibiotics.

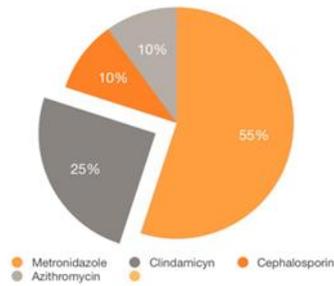


Figure 1 represents the respondents who answered about their knowledge about antibiotics

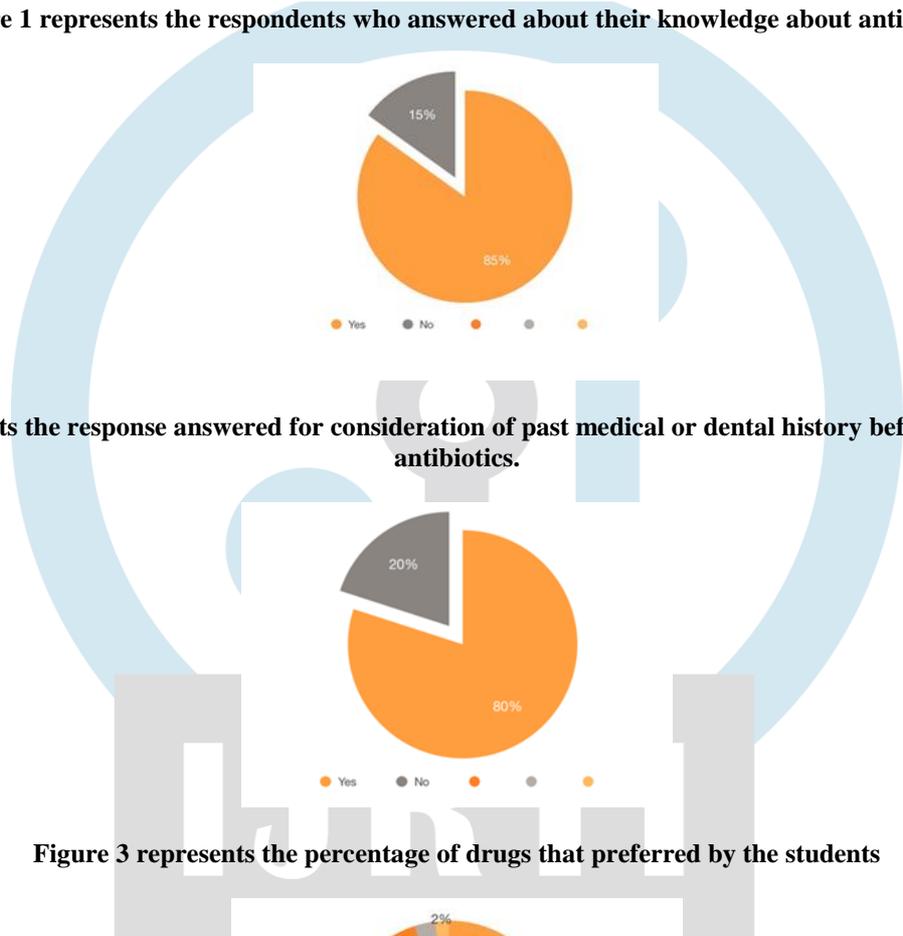


Figure 2 represents the response answered for consideration of past medical or dental history before prescription of antibiotics.

Figure 3 represents the percentage of drugs that preferred by the students

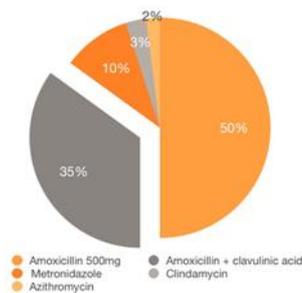


Figure 4 represents the percentage of drugs that are preferred by the dentist in patients with penicillin allergy

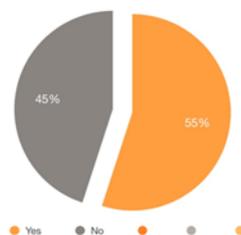


Figure 5 represents the percentage of respondents who would prescribe drugs based on patient's preference

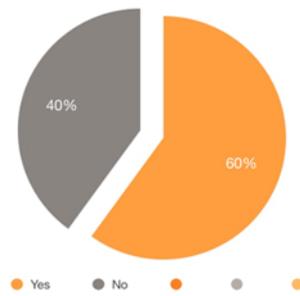


Figure 6 represents the percentage of respondents who would prescribe drugs based on the cost.

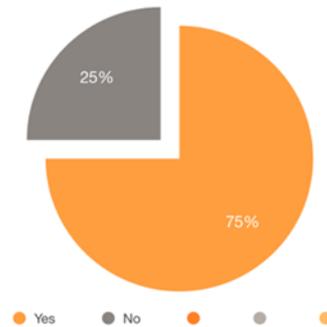


Figure 7 represents the percentage of respondents who would consider antibiotic resistance before prescription

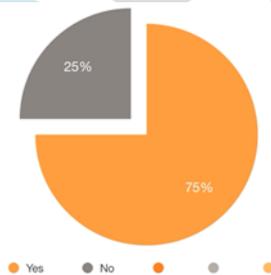


Figure 8 represents the percentage of respondents who would prescribe antibiotics prior to implant placement

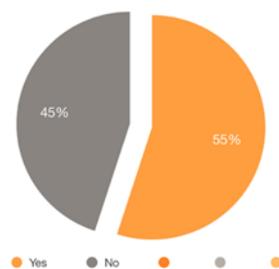


Figure 9 represents the percentage of respondents who would update themselves with the latest scientific materials used before antibiotics

**DISCUSSION:**

The most common dental indication of antibiotics among dentists was post dental extraction attributing to 30.8% , followed by dental abscess which was 21.6% ,periapical discharge and infection 15%, cellulitis, ludwig’s angina and other space infection 12.5% , periodontitis 7.5% , pericoronitis 4.1% , periodontal surgery 3.3% , gingivitis 5%, pulpitis 2.5% , implant surgery 2.5% , dry socket 1.6% . 0.8% mentioned alveoloplasty, operculectomy, oro antral fistula. 8.3% prescribed antibiotics after root canal treatment and 1.6% after orthognathic surgery. The development of resistance to various antibiotics is in rise due to irrational use of antibiotics.[10,11]. Various guidelines have been laid down which intended to provide guidance over judicious antibiotic use. Contrary to those guidelines, in the present study, antibiotics were prescribed for dental abscesses, post root canal treatment, post

dental extraction and after most minor surgical procedures with no mention on the systemic counterpart.[12,13,14]. In our study around 85% of the individuals donor consider the patient's medical or dental history before prescribing any antibiotics.

Antibiotics which are effective against odontogenic infections caused by the above-mentioned organisms include penicillin, clindamycin, erythromycin, cefadroxil, metronidazole, and tetracyclines. In a study conducted by Sivaramakrishnan et al, amoxicillin was the most commonly prescribed antibiotic followed by metronidazole and combination of amoxicillin and clavulanic acid[15,16,17]. WHO has recommended guidelines on drug prescription which should include the identity of the clinician and patient, method of administrations and its dosage.[19]. This explains that the majority of dentist used particular antibiotics to treat specific infections. This is almost similar to our study. The respondents in our study prefer amoxicillin as the most common antibiotic for almost all the odontogenic procedures followed by Augmentin ( amoxicillin + clavulanic acid) followed by metronidazole.

Antibiotic resistance was reported to occur when a drug loses its ability to inhibit bacterial growth effectively. Bacteria become 'resistant' and continue to multiply in the presence of therapeutic levels of the antibiotics. The level of antibiotic-resistant infections was found to be strongly correlated with the degree of antibiotic consumption [20]. But few of the dental students are not aware of the antibiotic resistance offered by these pathogenic microorganisms. An organism can also acquire resistance to an antimicrobial to which it was previously sensitive. This can be due to chance mutation in the genetic material of the cell, or the acquisition of resistance genes from other drug-resistant cells. This is usually because over use of particular antibiotics, that the organism is initially sensitive and later develops resistance. [21,22]. There are various techniques used to detect bacterial infections that include test bacterium, application of conditioning film, serial plate transfer test. The respondents are not aware of these test and they lack interest in learning more about antibiotic resistance and its threat to the society.

#### CONCLUSION:

The students lack adequate knowledge about antibiotics and antibiotic resistance. Hence they should be taught about antibiotic resistance and the threat it offers to the society. This will reduce over use and misuse of antibiotics. To emphasis these thoughts extra classes, conferences, seminars and workshops should be conducted, that will change their thought about this and also insist a positive attitude in them.

#### REFERENCES:

- 1.Lambrecht JT. Antibiotic prophylaxis and therapy in dental surgery. Schweiz Monatsschr Zahnmed 2004;114:601-13.
2. World Health Day -Antibiotic Resistance: No Action Today, no Cure Tomorrow; 2011.
3. Jaunay T, Sambrook P, Goss A. Antibiotic prescribing practices by South Australian general dental practitioners. Aust Dent J 2000;45:179-86.
4. Cope AL, Wood F, Francis NA, Chestnutt IG. General dental practitioners' perceptions of antimicrobial use and resistance: A qualitative interview study. Br Dent J 2014;217:E9.
5. Demirbas F, Gjermo PE, Preus HR. Antibiotic prescribing practices among Norwegian dentists. Acta Odontol Scand. 2006;64(6):355–359
6. Al-Haroni M, Skaug N. Incidence of antibiotic prescribing in dental practice in Norway and its contribution to national consumption. J Antimicrob Chemother. 2007;59:1161–1166.
7. Epstein JB, Chong S, Le ND. A survey of antibiotic use in dentistry. J Am Dent Assoc. 2000;131(11):1600–1609.
8. Wise R, Hart T, Carrs O, et al. Antimicrobial resistance is a major threat to public health. BMJ. 1998;317:609–610.
9. Palmer NO, Martin MV, Pealing R, Ireland RS. An analysis of antibiotic prescriptions from general dental practitioners in England. J Antimicrob Chemother. 2000;46:1033–1035.
10. Ocek Z, Sahin H, Baksi G, Apaydin S. Development of a rational antibiotic usage course for dentists. Eur J Dent Educ. 2008;12:41–47.
11. Ogunbodede EO, Fatusi OA, Folayan MO, Olayiwola G. Retrospective survey of antibiotic prescriptions in dentistry. J Contemp Dent Pract. 2005;6(2):64–71.
12. Sarkar C, Das B, Baral P. An audit of drug prescribing practices of dentists. Indian J Dent Res. 2004;15(2):58–61.
13. Murti A, Morse Z. Dental antibiotic prescription in Fijian adults. Int Dent J. 2007;57(2):65–70.
14. Yingling NM, Byrne BE, Hartwell GR. Antibiotic use by members of the American Association of Endodontists in the year 2000: report of a national survey. J Endod. 2002;28(5):396–404.
15. Longman LP, Preston AJ, Martin MV, Wilson NHF. Endodontics in the adult patient: the role of antibiotics. J Dent. 2000;28:539–548.
16. Palmer NO, Martin MV, Pealing R, et al. Antibiotic prescribing knowledge of National Health Service general dental practitioners in England and Scotland. J Antimicrob Chemother. 2001;47(2):233–237
17. Prescription Cost Analysis System. Dental practitioner prescribing – Antimicrobials. Department of Health, Statistics Division 1E, 1998.

18. Thomas D W, Satterthwaite J, Absi E G, Lewis M A O, Shepherd J P. Antibiotic prescription for acute dental conditions in the primary care setting. *Br Dent J* 1996; 181: 401–404.
19. Knowledge of drug prescription among dental and medical students in India – an online survey. Nor Syakirah Binti Shahroom, T. Lakshmi, Anitha Roy
20. Outpatient antibiotic use in Europe and association with resistance: A cross-national database study. Goossens H, Ferech M, Vander Stichele R, et al.
21. Lewis M A O, Parkhurst C L, Douglas C W, Martin M V, Absi E G, Bishop P A, et al. Prevalence of penicillin resistant bacteria in acute suppurative oral infection. *J Antimicrob Chemother* 1995; 35: 785–791.
22. Standing Committee of Science and Technology House of Lords. *Resistance to antibiotics and other antimicrobial agents*.

