

Current Trends in Prescription of Antibiotics among Dentists: A questionnaire-based study

Mayank Parmar¹ Pushti Purohit² Sapan Patel³ Mayur Parmar^{4*} Foram Shah⁵ Bhavin Patel⁶

¹Professor and Head, Department of Periodontology and Implantology, Goenka Research Institute of Dental Science, Piplaj, Gujarat, India.

²PG Student, Department of Periodontology and Implantology, Goenka Research Institute of Dental Science, Piplaj, Gujarat, India.

³Professor, Department of Periodontology and Implantology, Goenka Research Institute of Dental Science, Piplaj, Gujarat, India.

⁴Reader, Department of Periodontology and Implantology, Goenka Research Institute of Dental Science, Piplaj, Gujarat, India.

⁵Senior Lecturer, Department of Periodontology and Implantology, Goenka Research Institute of Dental Science, Piplaj, Gujarat, India.

⁶Senior Lecturer, Department of Periodontology and Implantology, Goenka Research Institute of Dental Science, Piplaj, Gujarat, India.

ABSTRACT

Background: The misuse of antibiotics in dentistry mainly involves prescription in unnecessary situations where a healthy patient is given antibiotics to prevent infections which are less likely to occur. present study aims to chart current trends in antibiotics prescription among dentists working in dental college of Gujarat, India.

Material and Methods: The present cross-sectional survey was conducted to determine the antibiotic prescribing practices among dentists in Gujarat. A total of 150 dentists, actively engaged in treatment of dental patients in different public and private hospitals were invited to participate in this study. A self-administered questionnaire to explore general information and questions related to antibiotics use in certain dental clinical procedures was provided to the dentists. The questionnaire included questions about the knowledge and attitudes of dentists toward prescribing antibiotics to dental patients.

Results: A total of 85 undergraduate dental practitioners and 65 postgraduate specialists volunteered to contribute to this survey. In the specialists' group, 12 males and 10 females with less than 10 years of experience and 18 males and 25 females with more than 10 years of experience completed the survey. Amoxicillin was the most popular antibiotics. More than 50% of the sample prescribed antibiotics daily.

Conclusion: Most of the dentists participating in the survey prescribed antibiotics daily. It should also be kept in mind that the most common encountered problem in a dental clinic is pain. Appropriate guidelines for antibiotic use and misuse should be stipulated to combat drug resistance.

Keywords: Amoxicillin, Antibiotics, Dentistry, Knowledge.

INTRODUCTION

Antibiotics are chemical substances that are capable of destroying and inhibiting the growth of specific microorganisms, such as infectious bacteria and fungi. There are different antibiotics, which are broadly classified based on their mechanism of action, chemical structure, spectrum of activity, or

by mode of administration.¹ In the field of health care, antibiotics have emerged as a boon to mankind and this advancement has led to a better quality of life, reduction of morbidity and mortality. Dental infections are poly-microbial in nature.

Received: Dec. 10, 2020; Accepted: Jan. 13, 2021

*Correspondence Dr. Mayur Parmar.

Department of Periodontology and Implantology, Goenka Research Institute of Dental Science, Piplaj, Gujarat, India.

Email: drmayur.perio@gmail.com

Hence, antibiotics and analgesics account for the majority of drugs prescribed by dentists.²

Acute and chronic infections of the pulp and periarticular tissues are the main causes of tooth pain that can be cured by appropriate restorative care rather than administration of antibiotics. Antibiotics are contraindicated in clinical cases such as acute periapical infections, dry socket, pulpitis and chronic inflammatory periodontal conditions.^{3,4} Systemic antimicrobials should only be used in acute periodontal conditions where drainage or debridement is impossible and where there is a local spread of the infection or where the systemic upset has occurred.⁵ Prophylactic antibiotics taken prior to a number of dental procedures have shown to reduce the likelihood of postoperative complications like infection, dry socket, or any serious complications like infective endocarditis. Evidence on the action of antibiotics in preventing infection in surgical wounds of the oral cavity is almost non-existent.

The misuse of antibiotics in dentistry mainly involves prescription in unnecessary situations where a healthy patient is given antibiotics to prevent infections which are less likely to occur. Also the desire to make their patients well and prevent unpleasant complications can stimulate the prescription of antibiotics.⁷ With increasing prescription of antibiotics & increasing bacterial resistance, newer drug combinations are being introduced which are included in the prescription.^{8,9} Dentists are opting for other antibiotics apart from the standard ones due to increased resistance to older antibiotics and better action with fewer side effects of the newer antibiotics. Keeping in mind, the recent advances in antimicrobial therapy & the increased prescription of drugs, present study aims to chart current trends in antibiotics prescription among dentists working in dental college of Gujarat, India.

MATERIAL AND METHODS

The present cross-sectional survey was conducted to determine the antibiotic prescribing practices among dentists in Gujarat. A total of 150 dentists, actively engaged in treatment of dental patients in different public and private hospitals were invited to participate in this study. A self-administered questionnaire to explore general information and

questions related to antibiotics use in certain dental clinical procedures was provided to the dentists. The questions were mainly close ended, with few open questions to allow free response. The questionnaires were mailed to the dentists. Dentists were given 3 reminders at a week's gap and the completed questionnaire was retrieved. Apart from the demographic details, a questionnaire with multiple choices in pertinence to antibiotic regimen was formulated:

A self-structured both open ended and close ended questionnaire was used for recording all required demographic data like name, age, gender, year of graduation, etc. The questionnaire was designed to collect information related to the antibiotic prescribing pattern for different oral pathologies like the periapical abscess, cellulitis, etc. The questionnaire was pretested by the dental faculty of various dental specialties to assess the validity, reliability and internal consistency of the questionnaire. Kappa statistics were done for the questions which revealed a value of 0.83.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

RESULTS

A total of 10 pretested closed ended questions were compiled and were mailed to 150 dental clinics. A total of 85 undergraduate dental practitioners and 65 postgraduate specialists volunteered to contribute to this survey. In the specialists' group, 12 males and 10 females with less than 10 years of experience and 18 males and 25 females with more than 10 years of experience completed the survey (Table 1). In terms of the age of the dentists, the study population was categorized into three age groups of 25–30, 31–45 and over 46 years of age (Table 2). The breakdown of the 65 postgraduate dental specialists is given in (Table 3) Response to questions are mentioned in table 4 Within the limitations of the present study the descriptive statistics was used for representing each category of response and kappa statistics was used to assess the

reliability of the initial cohort. Kappa statistic was found to be 0.82 and the same questionnaire was used in the main study. Chi square test which was used to assess the significance in the difference in the proportion of responses revealed that with $p \leq 0.05$ being statistically significant, statistically

significant differences were observed in questions 1,2,3,,6,7,8 and 9 among UG and PG practitioners which means there is need of awareness and knowledge deficits regarding proper and standardized use of antibiotic regimen

Table 1: Information of the participants/dental professionals.

	Undergraduate n=85		Post-graduate n=65		P value
	Male	Female	Male	Female	
> 10 years experience	32	7	18	25	0.25
< 10 years experience	35	11	12	10	
Total =150					

* indicates statistically significant at $p \leq 0.05$: Test applied chi-square test

Table 2: Age of the participants.

Sr No	Age (Years)	N (150)	P value
1	25-30	57	0.10
2	31-45	74	
3	≥ 46	19	

* indicates statistically significant at $p \leq 0.05$: Test applied chi-square test

Table 3: Specialties of the postgraduate dentists.

Sr no	Specialty	n
1	Oral Medicine	2
2	Prosthodontics	9
3	Periodontics	14
4	Oral Surgery	9
5	Orthodontics	11
6	Endodontics	12
7	Pedodontics	4
8	Oral Paathology	2
9	Public Health Dentistry	2

Table 4: Reponeses to questions 1-10.

Sr no	Questions	Choices	Ug response	%	PG Responses	%	P value
1	Question no 1	a)	44	51.76%	21	32.30%	0.05*
		b)	21	24.70%	37	57%	
		c)	14	16.47%	5	7.69%	
		d)	6	7.05%	2	3.07%	
2	Question no 2	a)	3	3.52%	2	3.07%	0.02*
		b)	33	38.82%	17	26.15%	
		c)	0	0.00%	3	4.61%	

		d)	1	1.17%	4	6.10%	
3	Question no 3	a)	48	56.47%	39	60.00%	0.001*
		b)	85	100%	65	100%	
4	Question no 4	a)	0	0%	0	0.00%	0.06
		b)	7	8.23%	2	3.07%	
5	Question no 5	a)	35	41.17%	40	61.53%	0.1
		b)	34	40%	21	32.30%	
6	Question no 6	a)	9	10.58%	2	3.07%	0.05*
		b)	85	100%	65	100%	
7	Question no 7	a)	0	0%	0	0%	0.03*
		b)	79	92.94%	56	86.15%	
8	Question no 8	a)	6	7.05%	9	13.84%	0.01*
		b)	23	27.05%	18	27.69%	
		c)	62	72.94%	47	72.30%	
		d)	46	54.11%	58	89.23%	
9	Question no 9	a)	39	44.88%	7	10.76%	0.004*
		b)	69	81.17%	41	63.07%	
10	Question no 10	a)	16	18.82%	24	36.92%	0.09
		b)	67	78.82%	41	63.07%	

* indicates statistically significant at $p \leq 0.05$: Test applied chi-square test

DISCUSSION

The present cross-sectional survey was conducted to determine the antibiotic prescribing practices among dentists in Gujarat. A total of 150 dentists, actively engaged in treatment of dental patients in different public and private hospitals were invited to participate in this study. A self-administered questionnaire to explore general information and questions related to antibiotics use in certain dental clinical procedures was provided to the dentists.

Dental Prescriptions account for approximately 7-11% of all antibiotic prescriptions in the world. Although, the percentage is less when compared to medical practitioners, antibiotics are one among frequently prescribed drugs which significantly contributes to national and or global patient consumption of antibiotics. Continuing Dental Education program (CDE) offers an important resource for dental healthcare professionals, looking to refresh or upgrade their clinical skills and knowledge, attending these dental education programmes helps in updating the knowledge on the use and misuse of antibiotics which in turn will have effect on the prescribing practices.

Under the limitations of the present study it was observed that most of the dentists prescribed antibiotics daily. Amoxycillin was the antibiotic of

choice for majority of doctors. Paterson SA⁹ and Palmer NO¹⁰ observed that amoxicillin was effective in the treatment of pediatric infections. Combined drug prescription in dental practice is becoming more important as now days the doctor encounters resistant or mixed infections.¹¹ Gowri S et al¹² observed that the most commonly prescribed antibiotic in Uttar Pradesh, India is amoxicillin which is in agreement with our findings. Dar-Odeh NS et al¹³ did a survey in Jordan and concluded that dentists prescribe unnecessary antibiotics in irrelevant clinical conditions as an alternative to sterilization or to delay treatment which might be one of the reason for prolonged usage of antibiotics in our study as well.

In the current study, most of the participants prescribe antibiotics following extractions. This is because of the fact that antibiotics are helpful in preventing further infection.¹⁴ But antibiotics should be prescribed only if there are signs of systemic spread of infection.¹⁵ Studies have also suggested that antibiotic prescription by postgraduate dentists is much lesser when compared to that of undergraduate doctors due to better understanding of the disease conditions and superior diagnostic and treatment skills. Duration of antibiotic course showed the difference in various studies. A short course of antibiotic usage for 2-3 days is advisable in children. Usage of sub

therapeutic dosage for long duration can lead to the development of mutant strains.¹⁴ In addition, this can result in the destruction of normal flora in the gut and oral cavity.¹⁶ More than 50% of the respondents prescribed antibiotics for endodontic pain in our study. Baumgartner JC²¹ stated that a majority of infections of endodontic origin could be managed without antibiotics.¹⁷⁻¹⁹ similar results were obtained by Pavan kumar et al²⁰(92.1%), Yingling et al¹⁵, Rodriguez et al¹⁶ (87-92%). However endodontic conditions like irreversible pulpitis, irreversible pulpitis with acute apical periodontitis could be managed by intervention methods such as root canal therapy. Conflicting results from other studies might be attributed to differences in demography and the lack of understanding of the rationale of usage of antibiotics and anti-inflammatory.

The American Academy of Pediatric Dentistry (AAPD) recognizes that numerous medical conditions predispose patients to bacteremia-induced infections. Because it is not possible to predict when a susceptible patient will develop an infection, prophylactic antibiotics are recommended when these patients undergo procedures that are at risk for producing bacteremia. This guideline is intended to help practitioners make decisions regarding antibiotic prophylaxis for dental patients at risk. Antibiotic prescription is a complex multifactorial issue. Dentist should consider all the factors before prescribing an antibiotic. Overall, antibiotic prescribing patterns among our study participants were quite high with certain misuse of antibiotics for few conditions. Creating awareness among dentists is of utmost importance and educational initiatives to promote rational use of antibiotics in dentistry can be organised at the local, national and at international level.

CONCLUSION

Most of the dentists participating in the survey prescribed antibiotics daily. Although the low number of participants is a limitation of the study but the results of this study provide a vista about the attitude and knowledge of dentists on antibiotic prescribing. It was also observed that there was no consensus among participants regarding the important aspects of antibiotic prescribing like dose, frequency and duration. It should also be kept in mind that the most common encountered

problem in a dental clinic is pain. Appropriate guidelines for antibiotic use and misuse should be stipulated to combat drug resistance. Regular Continuing Dental Education programmes should be conducted to update the use of antibiotics and on newer generations of anti microbials.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

REFERENCES

1. K.D Tripathi. Text book of Essentials of Pharmacology for Dentistry. IST edition Jaypee Brothers Medical Publishers (p) ltd 2005 pg. 354-368.
2. J. F. Siqueria, I.N. Rocas and M.G. Silva. "Prevalence and clonal analysis of *Porphyromonas gingivalis* in primary endodontic infections." *Journal of Endodontic*, 2008; 34(11):1332-1336.
3. Longman LP, Preston AJ, Martin MV, Wilson NHF. Endodontics in the adult patient: the role of antibiotics. *J Dent*. 2000;28:539-548.
4. Salako N, Rotimi VO, Adib SM, Al-Mutawa S. Pattern of antibiotic prescription in the management of oral diseases among dentists in Kuwait. *J Dent*. 2004; 32:503-509.
5. Addy M, Martin MV. Systemic antimicrobials in the treatment of chronic periodontal diseases: a dilemma. *Oral Dis*. 2003; 9 Suppl 1:38-44.
6. K. Pavan Kumar, Mamta Kaushik, P. Udaya Kumar, M. Shilpa Reddy and Neha Prashar. Antibiotic prescribing habits of Dental Surgeons in Hyderabad city, India, for pulpal and Periapical Pathologies: A survey. *Advances in pharmacological sciences*. Volume 2013.
7. Lewis MA. Why we must reduce dental prescription of antibiotics: European Union Antibiotic Awareness Day. *Br Dental J* 2008;205:537-8.
8. Segura-Egea JJ, Velasco-Ortega E, Torres-Lagares D, Velasco-Ponferrada MC, Monsalve-Guil L, LlamasCarreras JM, Pattern of antibiotic prescription in the management of endodontic

infections amongst Spanish oral surgeons. *Int Endod J* 2010;43:342-50.

9. Paterson SA, Curzon ME. The effect of amoxycillin versus penicillin V in the treatment of acutely abscessed primary teeth. *Br Dent J* 1993; 174:443-9.

10. Palmer NO. Pharmaceutical prescribing for children. Part 3. Antibiotic prescribing for children with odontogenic infections. *Prim Dent Care* 2006;13:31-5.

11. Sayegh A, Dini EL, Holt RD, Bedi R. Oral health, sociodemographic factors, dietary and oral hygiene practices in Jordanian children. *J Dent* 2005;33:379-88.

12. Gowri S, Mehta D, Kannan S. Antibiotic use in dentistry: A cross-sectional survey from a developing country. *J Orofacial Sci* 2015;7:90-4.

13. Dar-Odeh NS, Al-Abdalla M, Al-Shayyab MH, Obeida H, Obeidat L, Abu-Hammad OA. Prescribing antibiotics for pediatric dental patients in Jordan; Knowledge and attitudes of dentists. *Int Arabic J Antimicrob Agents* 2013;3:1-8.

14. SR Goud, L Nagesh, S Fernandes Are We eliminating cures with antibiotic abuse? A study among Dentists *Nigerian Journal of Clinical Practice* 2012, 15(2), 151-155.

15. N. M. Yingling, B. E. Byrne, and G. R. Hartwell, "Antibiotic use by members of the American

Association of Endodontists in the year 2000: report of a national survey," *Journal of Endodontics*, 2002;28(5):396-404.

16. Rodriguez-Núñez, R. Cisneros-Cabello, E. VelascoOrtega, J. M. Llamas-Carreras, D. Tórres-Lagares, and J. J. Segura-Egea, "Antibiotic use by members of the Spanish Endodontic Society," *Journal of Endodontics*, 2009;vol. 35, no. 9, pp. 1198-1203.

17. Vessal G, Khabiri A, Mirkhani H, Cookson BD, Askarian M. Study of antibiotic prescribing among dental practitioners in Shiraz, Islamic Republic of Iran. *East Mediterr Health J* 2011;17: 763-769.

18. WHO How to investigate drug use in health facilities: Selective drug use indicators, Geneva, World Health Organization WHO/DAP/ 93; 1:1-87.

19. T. Kuriyama, D.W.Williams, M. Yanagisawa et al., "Antimicrobial susceptibility of 800 anaerobic isolates from patients with dentoalveolar infection to 13 oral antibiotics," *Oral Microbiology and Immunology*, 2007 vol. 22, no. 4, pp. 285-288.

20. K. Pavan Kumar, Mamta Kaushik, P. Udaya Kumar, M. Shilpa Reddy and Neha Prashar. Antibiotic prescribing habits of Dental Surgeons in Hyderabad city, India, for pulpal and Periapical Pathologies: A survey. *Advances in pharmacological sciences*. Volume 2013.