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Original Article

Evaluation of Antibiotic Prescription by Dentists for Oral Diseases

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ABSTRACT

Background: The use of antibiotics in dentistry is a crucial aspect of managing oro-facial infections, often originating from odontogenic sources. However, the increasing prevalence of antibiotic resistance highlights the need for a careful examination of prescription practices among dental professionals.

Objective: This study aims to analyze the patterns of antibiotic prescriptions among dental practitioners, with a focus on adherence to current guidelines and awareness of antibiotic resistance.

Methods: A cross-sectional study was conducted at the Institute of Dentistry, Liaquat University of Medical & Health Sciences, and Dental Out Patient Department in Hyderabad. The study employed a non-probability convenience sampling method, encompassing consultants, postgraduates, and general dental practitioners, while excluding undergraduate dentists and those involved in malpractice. A preformed and validated questionnaire was used to collect data. The sample size was calculated based on the prevalence of antibiotic prescription among dentists, leading to a required sample size of 379. Data analysis was conducted using SPSS version 25, focusing on frequencies for categorical variables and employing the Chi-square test for associations, with a p-value of ≤ 0.05 deemed significant.

Results: The majority of dentists (60.42%) reported always obtaining a patient's medicinal history before prescribing antibiotics, with 62% adhering to the 2-3 day prescription guideline. However, 17% prescribed antibiotics for more than three days. Approximately 70.44% of dentists were aware of antibiotic resistance. In terms of antibiotic choice, Amoxicillin was most frequently prescribed (26.91%), followed by Penicillin (21.62%) and Amoxicillin with Clavulanic Acid (21.37%).

Conclusion: The study reveals a significant adherence to recommended antibiotic prescription practices among dental practitioners, with a notable level of awareness regarding antibiotic resistance. However, the persistence of overprescription and extended courses by some practitioners underscores the need for enhanced education and stricter adherence to guidelines. The findings emphasize the importance of balanced antibiotic use in dentistry to combat antimicrobial resistance.

Keywords: Antibiotic Prescription, Dentistry, Antibiotic Resistance, Oro-facial Infections, Dental Practice, Antimicrobial Stewardship.

INTRODUCTION

Antibiotic use in dentistry has become increasingly prevalent as a means to prevent and manage infections. Studies have highlighted concerns regarding the prescription of antibiotics by dentists, particularly in relation to the growing problem of antibiotic resistance (1). Health organizations globally have intensified their focus on the judicious use of antibiotics (2-4). In the realm of dental practice, antibiotics are essential for treating various infections. However, the widespread use of these medications, especially in developing countries, raises significant concerns about their overuse and the potential contribution to antibiotic resistance (5-7).

Antibiotics, while lifesaving, are associated with adverse side effects such as gastrointestinal upset and anaphylactic shock (8-10). In dental practices, they are often prescribed as adjunctive therapy for conditions like periodontal abscess, pericoronitis, necrotizing

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ulcerative gingivitis, or for patients at risk of developing infective endocarditis (11-13). Acknowledging these risks, the World Health Organization (WHO) and the US Centers for Disease Control and Prevention (CDC) have developed strategies and initiatives, respectively, to combat antimicrobial resistance and promote appropriate antibiotic use (14-15). For instance, prophylactic antibiotics are commonly prescribed for bacterial infections caused by organisms such as staphylococci, streptococci, and anaerobic rods, which are frequent sources of infection in oral surgery.

The objective of this study was to conduct an extensive analysis of the patterns of antibiotic prescriptions among dental practitioners, aligning with the current guidelines for antibiotic usage in dental practice. This involves evaluating the knowledge and practices of dentists regarding antibiotic prescription, an essential aspect for ensuring effective and safe dental care. This analysis is crucial in understanding how dental professionals adhere to guidelines and their role in combating the global challenge of antibiotic resistance.

MATERIAL AND METHODS

This cross-sectional study was conducted at the Institute of Dentistry, Liaquat University of Medical & Health Sciences (LUMHS) Jamshoro, and the Dental Out Patient Department in Hyderabad, along with private dental practitioners within Hyderabad city. The methodology involved a non-probability convenience sampling technique, carried out over a period of one month. This study received ethical approval from the Institutional Ethical Review Committee of LUMHS Jamshoro (Reference No. LUMHS/REC/-105).

A questionnaire was meticulously developed and disseminated among participants, who provided their responses after signing a written consent form. The participant pool included consultants, postgraduates, and general dental practitioners. In contrast, undergraduate dentists, house officers, and dentists involved in malpractice were excluded from the study. The prevalence of antibiotic prescription among dentists from prior studies is reported as 44.2% (3). To calculate the sample size for this research, the following equation was utilized: $n = Z^2 \times p \times q / e^2$, where Z = 1.96, p = 0.442, and e = 0.05, resulting in a required sample size of 379. For data collection, following authorization from the Research Ethics Committee, a preformed and validated questionnaire was employed. This instrument was designed to gather comprehensive data from dental professionals. Prior to their inclusion in the study, written consent was obtained from all respondents. The data analysis was performed using SPSS version 25 for Windows. This involved calculating frequencies for categorical variables such as gender and age. Additionally, the Chi-square test was applied to explore associations between variables. A P-value of ≤ 0.05 was considered statistically significant, adhering to conventional criteria for determining the importance of the findings. This thorough approach ensured a comprehensive assessment of antibiotic prescription practices among dental professionals.

RESULTS

The demographic characteristics of the study participants revealed a diverse age distribution among the dental practitioners. The majority fell within the age range of 27-29 years, accounting for 49.34% of the sample, followed by those aged 30-35 years (30.60%). Participants aged 24-26 years comprised 10.30%, while those aged 36-40 years and above 40 years represented smaller proportions at 5.80% and 3.96%, respectively (Table 1). Regarding gender, the distribution was relatively balanced, with females slightly outnumbering males, 51.98% to 48.02%. In terms of specialty fields, the study included a range of disciplines: 31.40% of the participants practiced maxillofacial surgery, followed by general dentistry (27.70%), endodontics (17.68%), prosthodontics (9.50%), periodontology (2.90%), and others (10.82%). The qualifications of the respondents were predominantly postgraduate (72.30%), with the remaining 27.70% holding a graduation degree (Table 1).

Table 1 Demographic Characteristics

Variable	Response	Frequency (%)
Age (years)		
	24-26	39 (10.30)
	27-29	187 (49.34)
	30-35	116 (30.60)
	36-40	22 (5.80)
	>40	15 (3.96)
Gender		
	Male	182 (48.02)
	Female	197 (51.98)
Specialty Field		

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Variable	Response	Frequency (%)
	General Dentistry	105 (27.70)
	Maxillofacial Surgery	119 (31.40)
	Endodontics	67 (17.68)
	Prosthodontics	36 (9.50)
	Periodontology	11 (2.90)
	Others	41 (10.82)
Qualification		
	Graduation	105 (27.70)
	Post Graduation	274 (72.30)

In assessing the practice and knowledge of dentists regarding antibiotic recommendations, several key findings emerged (Table 2). A majority (60.42%) reported always obtaining a patient's medicinal history before prescribing antibiotics, with 24.28% doing so sometimes and only 15.30% never. The reasons for suggesting antibiotics varied, with surgery being the most common at 32.19%, followed by abscess treatment (22.70%), swelling (17.15%), infection (14.24%), pain (8.44%), and other reasons (5.28%). Most dentists (70.44%) were aware of antibiotic resistance, while 29.56% were not. The duration for which antibiotics were prescribed varied; most dentists prescribed them for 3-5 days (62.00%), followed by 1-2 days (20.05%) and more than 5 days (17.95%). The majority of dentists (56.46%) informed their patients about the consequences of improper antibiotic use, whereas 32.46% did so sometimes, and 11.08% never. When it came to adhering to antibiotic prescription guidelines, 55.93% always followed them, 37.47% sometimes, and 6.60% never. The basis for recommending antibiotics was mostly in line with guidelines (46.43%), but other factors like symptoms (19.52%), cost of the drug (11.88%), patient preference (8.18%), and other reasons (13.99%) also played a role. Awareness of patients self-prescribing antibiotics was reported by 19.00% of the dentists, while 45.38% had not encountered this, and 35.62% sometimes had (Table 2).

Table 2 Practice & Knowledge of Dentists About Recommendations of Antibiotics

Variable	Response	Frequency	Percentage	p-value
Medicinal history before antibiotic prescription	Yes	229	60.42	≤ 0.02
	No	58	15.30	
	Sometimes	92	24.28	
Reasons to suggest antibiotics	Pain	32	8.44	≤ 0.06
	Swelling	65	17.15	
	Abscess	86	22.70	
	Surgery	122	32.19	
	Infection	54	14.24	
	Other	20	5.28	
Acquainted with antibiotic resistance	Yes	267	70.44	≤ 0.00
	No	112	29.56	
Duration of prescription	1-2 days	76	20.05	≤ 0.03
	3-5 days	235	62.00	
	>5 days	68	17.95	
Informing patients about misuse of antibiotics	Yes	214	56.46	≤ 0.01
	No	42	11.08	
	Sometimes	123	32.46	
Following antibiotic prescription guidelines	Yes	212	55.93	≤ 0.01
	No	25	6.60	
	Sometimes	142	37.47	
Basis for recommending antibiotics	Symptoms	74	19.52	≤ 0.01
	Guidelines	176	46.43	
	Cost of drug	45	11.88	
	Patient preference	31	8.18	

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Variable	Response	Frequency	Percentage	p-value
	Other	53	13.99	
Awareness of self-prescribed antibiotics by patients	Yes	72	19.00	≤ 0.06
	No	172	45.38	
	Sometimes	135	35.62	

Table 3 Drug of Choice Prescribed by the Respondents

Antibiotic	Number of Responders	Percentage
Penicillin	82	21.62
Amoxicillin	102	26.91
Clindamycin	38	10.02
Cephalexin	76	20.05
Amoxicillin and Clavulanic Acid	81	21.37

Regarding the drug of choice prescribed by the respondents (Table 3), Amoxicillin was the most frequently chosen antibiotic, prescribed by 26.91% of dentists. This was followed by Penicillin (21.62%), Amoxicillin and Clavulanic Acid (21.37%), Cephalexin (20.05%), and Clindamycin (10.02%). This diversity in antibiotic preference underscores the varied approaches to treatment amongst dental practitioners.

DISCUSSION

The study's findings contribute to the ongoing discourse on antibiotic prescription practices in dentistry, particularly concerning oro-facial infections originating from odontogenic sources, often presenting with fever and lymphadenopathy. The role of antibiotics in dental practice has become increasingly pivotal. The British National Formulary (BNF) advocates for a two to three-day antibiotic regimen for acute dento-alveolar infections (16). This recommendation aligns with several studies indicating that patients show significant improvement after a 2-3 day course of antibiotic therapy, suggesting that prolonged treatment may not offer additional benefits (17). In this study, 62% of dentists adhered to the 2-3 day prescription guideline, echoing findings from other research where 69% of subjects prescribed antibiotics for a similar duration. However, a notable 17% of practitioners opted for a longer course, exceeding three days.

The indiscriminate use of antibiotics is a primary contributor to the escalating issue of antibiotic resistance. This problem is largely attributed to global overprescription, especially for minor infections, misuse due to lack of access to appropriate treatments, and failure to complete prescribed therapy courses due to financial constraints or lack of awareness (18). The current study was conducted in light of previous research highlighting the significant role of dentistry in the development of antibiotic resistance. Factors influencing antibiotic prescription in dental practice included clinical data, Continuing Dental Education (CDE) programs, and drug cost, while patient preference and drug availability at pharmacies had a lesser impact.

CDE programs serve as a vital source of knowledge for dental health-care professionals, enhancing their capability to appropriately use antibiotics, which subsequently influences their prescribing practices. The ideal antibiotic for dental infections should have characteristics like rapid onset of action, bactericidal activity, low propensity to induce resistance, effective tissue penetration, efficacy against nondividing bacteria, and stability in infection sites. Moreover, these antibiotics should be administered at optimal dosages and treatment durations (19). In comparison to another study where 77% of dentists were aware of antibiotic resistance, this study found a slightly lower awareness rate of 72% (20). Dental practitioners need to recognize the growing challenge of antibiotic resistance, primarily driven by overprescription and misuse. Efforts to reduce unnecessary antibiotic prescriptions and educate the public about the adverse effects of antibiotics are imperative.

The responsibility extends to healthcare workers, who must promote hygiene practices and prescribe antibiotics judiciously, considering the correct drug, dose, and duration, and resorting to diagnostic tests when necessary. Policymakers should focus on developing national strategies, enhancing surveillance systems, regulating and promoting guidelines, and assessing the impact of educational interventions. Dental practitioners, in the absence of clinical signs of infection, should avoid prescribing antibiotics solely for pain relief. A comprehensive evaluation of the patient's condition is essential before initiating antibiotic therapy.

This study, while informative, is not without limitations. The convenience sampling method and the specific demographic and geographic scope may affect the generalizability of the findings. Future research could expand the sample size and include a more diverse range of practitioners to enhance the applicability of the results. Additionally, incorporating a longitudinal approach could provide insights into changes in prescription practices over time.

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CONCLUSION

In conclusion, this study underscores the critical need for judicious antibiotic prescribing practices among dental practitioners, highlighting an adherence rate to the recommended 2-3 day antibiotic course for acute dento-alveolar infections. The findings reveal a considerable awareness of antibiotic resistance among dental professionals, yet also indicate a persistence of overprescription and extended treatment courses by a significant minority. These insights carry substantial implications for both clinical practice and policy-making, emphasizing the importance of continuous education in antibiotic stewardship and the implementation of stringent guidelines to mitigate the rising challenge of antibiotic resistance. The study advocates for a balanced approach to antibiotic use, ensuring effective treatment while preventing unnecessary overuse, thereby contributing to global efforts in combating antimicrobial resistance.

REFERENCES

1. El-Kholey KE, Wali O, Elkomy A, Almozayen A. Pattern of antibiotic prescription for oral implant treatment among dentists in Saudi Arabia. Implant dentistry. 2018 Jun 1;27(3):317-23.
2. Parekh AN, Balasubramanian K, Bhate P, Kalra DD. Antibiotics usage, how well we know it? KAP survey among the dentist population in Mumbai. International Journal of Basic & Clinical Pharmacology. 2020 Nov;9(11):1713.
3. Ahsan S, Hydrie MZ, Hyder Naqvi SM, Shaikh MA, Shah MZ, Jafry SI. Antibiotic prescription patterns for treating dental infections in children among general and pediatric dentists in teaching institutions of Karachi, Pakistan. Plos one. 2020 Jul 10;15(7):e0235671.
4. Vardhan TH, Lakhshmi NV, Haritha B. Exploring the pattern of antibiotic prescription by dentists: A questionnaire-based study. Journal of Dr. NTR University of Health Sciences. 2017 Jul 1;6(3):149.
5. Angarita-Díaz MD, Bernal-Cepeda L, Rodriguez-Paz M, Vergara-Mercado M, Herrera-Herrera A, Forero-Escobar D, Mora-Reina J, Ochoa-Acosta EM, Maya-Giraldo M, Caceres-Matta S, Tamayo J. Prescribing antibiotics by dentists in Colombia: Toward a conscientious prescription. Journal of Public Health Dentistry. 2021 Jun;81(2):100-12.
6. Sarmiento MA, Maglutac Jr MT, Yanga-Mabunga MS. Antibiotic prescribing practices of Filipino dentists. International Journal of Public Health Science. 2019;8(3):332-40.
7. Singh Gill A, Morrissey H, Rahman A. A systematic review and meta-analysis evaluating antibiotic prophylaxis in dental implants and extraction procedures. Medicina. 2018 Dec;54(6):95.
8. Deniz-Sungur D, Aksel H, Karaismailoglu E, Sayin TC. The prescribing of antibiotics for endodontic infections by dentists in Turkey: A comprehensive survey. International Endodontic Journal. 2020 Dec;53(12):1715-27.
9. Mende A, Venskutonis T, Mackeviciute M. Trends in systemic antibiotic therapy of endodontic infections: a survey among dental practitioners in Lithuania. Journal of oral & maxillofacial research. 2020 Jan;11(1).
10. Aragoneses JM, Aragoneses J, Brugal VA, Algar J, Suarez A. Antimicrobial prescription habits of dentists performing dental implant treatments in Santo Domingo, Dominican Republic. Antibiotics. 2020 Jul;9(7):376.
11. Sakeena MH, Bennett AA, McLachlan AJ. Investigating knowledge regarding antibiotics and antimicrobial resistance among pharmacy students in Australian universities. Journal of Pharmacy Practice and Research. 2021 Feb;51(1):54-61.
12. Gross AE, Hanna D, Rowan SA, Bleasdale SC, Suda KJ. Successful implementation of an antibiotic stewardship program in an academic dental practice. InOpen forum infectious diseases 2019 Mar (Vol. 6, No. 3, p. ofz067). US: Oxford University Press.
13. AboAlSamh A, Alhussain A, Alanazi N, Alahmari R, Shaheen N, Adlan A. Dental students' knowledge and attitudes towards antibiotic prescribing guidelines in Riyadh, Saudi Arabia. Pharmacy. 2018 Jun;6(2):42.
14. Puranik MP, Sabbarwal B, Bose S. Dental practitioner's knowledge and practices regarding antibiotic prescription and development of resistance: A cross-sectional study. Journal of Indian Association of Public Health Dentistry. 2018 Apr 1;16(2):144.
15. Baskaradoss JK, Alrumaih A, Alshebel A, Alfaqih A, Aleesa M, Alkhashan S, Altuwaijri M. Pattern of antibiotic prescription among dentists in Riyadh, Saudi Arabia. Journal of investigative and clinical dentistry. 2018 Aug;9(3):e12339.
16. Zakri NI, Alshehri NM, Shebli AN. Antibiotic practicing habits, knowledge and attitude toward education about antibiotics among dentists in Jazan City. The Egyptian Journal of Hospital Medicine. 2018 Jul 1;72(3):4207-17.
17. Ramadan AM, Rikaby OA, Abu-Hammad OA, Dar-Odeh NS. Knowledge and attitudes towards antibiotic prescribing among dentists in Sudan. Pesquisa Brasileira em Odontopediatria e Clínica Integrada. 2019 Sep 2;19.
18. Baş MK, Betul Basturk F, SAZAK ÖVECOGLU H. Awareness of Antibiotics and Analgesics Use In Marmara University Hospital. International Journal of Scientific Research in Dental and Medical Sciences. 2019 Dec 1;1(4):57-61.

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19. Memon I, Alrashid AA, Alshammari HS, Rehman DE, Feroz Z, Nagro A, Alotaibi R, Alsalmi M, Khan MA, Alkushi A, Zaidi SF. Assessing the Effects of Basic Medical Science Courses on the Knowledge and Attitude towards Antibiotic Usage among Pre-Professional Students in Saudi Arabia. Pharmacy. 2021 Jun;9(2):108.

20. Paudel G, Shah AK, Palikhey A, Khanal N, Karki S, Chaurasia L, Chaulagain R. Knowledge, attitude and practice of prescribing antibiotics among dental practitioners in Chitwan. Europasian Journal of Medical Sciences. 2021 Apr 24;3(1):66-72.

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