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Survey On Antibiotic Prophylaxis Practices in Dentistry Among Dentists

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Abstract

Introduction: The management of oral infections is a significant percentage of the responsibilities undertaken by oral health care providers. General dentistry practitioners frequently prescribe antibiotics to address oral and dental infections, either therapeutically or prophylactically. The objective of this study was to evaluate the self-reported practices for administering antibiotic prophylaxis among dental practitioners.

Methodology: The study spanned one month, from March 2024 to July 2024. A self-constructed, organized, and pretested questionnaire was distributed to all registered dental practitioners and dental faculty members. The questionnaire contained inquiries about commonly administered antibiotics and their respective indications.

Results: A total of 200 dentists responded to the surveys, achieving a response rate of 100%. Amoxicillin (89.00%) was identified as the most widely recommended antibiotic, followed by cephalosporins (18.00%). Endodontic operations (65.00%) and surgical procedures (42.00%) are the most frequently indicated instances for antibiotic prophylaxis. Cephalosporin (35.00%) was the primary medication of choice for patients with a penicillin allergy. 74.8% of respondents have not participated in any training about antibiotic prescription.

Conclusion: Amoxicillin was the most frequently recommended antibiotic following various dental treatments. It is essential to prioritize accurate diagnosis methods and formulate tailored prescription guidelines and training programs to ensure the optimal efficacy of antibiotics while safeguarding patient health.

Keywords: Antibiotics, Amoxicillin, Dentists, Postgraduate

Introduction

Antibiotics are drugs that eradicate or suppress bacterial development. They address infections induced by microorganisms. Anti signifies "against" and bios denotes "life".[1] Oral infection management constitutes a significant aspect of dental practice, necessitating the prescription of antibiotics to avert infections. Approximately one-third of all antibiotics utilized in medicine are administered for prophylactic purposes.[2] Dental practitioners regularly prescribe antibiotics to address oral and dental infections, either therapeutically or prophylactically.

Antibiotic prophylaxis for dental procedures was initially suggested when a correlation was established between infective endocarditis and bacteremias resulting from dental therapy. [3,4] Antimicrobial prophylaxis is intended to prevent distant site infections (DSI) resulting from procedure-induced bacteremia. In the dental community, the overprescription of drugs has become a tendency. The indiscriminate and widespread application of antibiotic prophylaxis is no longer permissible, however specifics of safe prescribing continue to pose challenges. Narrow-spectrum antibiotics should be prioritized due to their reduced adverse effects and the rising prevalence of bacterial resistance; hence, prudent antibiotic usage in dental surgical operations is essential.[5,6]

Ongoing research about the necessity and efficacy of antibiotics in dentistry has sparked a debate concerning their use in prophylaxis. The medical and dental professions must remain informed of the current protocols and prescribe accordingly.[7] A survey revealed that merely 39% of dentists and 27% of physicians adhered to the standards correctly. Numerous practitioners depend on the endorsements of their peers—who frequently reference anecdotal evidence—or conclude that, in uncertain situations, the prudent and cautious approach is to prescribe.[8] Prior research in general dental practice has focused on the preventative prescribing habits of practitioners to avert endocarditis. There is, however, some evidence that prophylactic antibiotics are prescribed in dentistry despite minimal proof of their positive effects.[9] Consequently, antibiotic prescriptions are prone to misuse, making it imperative to consistently evaluate understanding and prescribing patterns. The primary obligation of the practitioner is to adhere to established protocols when prescribing antibiotics, taking into account the progression of the illness and the susceptibility patterns prevalent in the specific geographical region.[10] There is a deficiency of literature regarding antibiotic prescribing by general dental practitioners in India. The objective of this study is to evaluate the self-reported practices for administering antibiotic prophylaxis among dental practitioners.

Methodology

This descriptive cross-sectional study aimed to evaluate the self-reported practices for administering antibiotic prophylaxis among dental practitioners over a five-month period, specifically from Maech to July 2024. Ethical approval was acquired from the Ethical Committee of the college. All registered clinicians from the Indian Dental Association, city branch as well as teaching faculty and postgraduate students from dental colleges, were invited to participate in the study. Informed consent was obtained in writing from each study participant after elucidating the investigation's nature. A self-designed, self-administered, pretested, and validated questionnaire was developed following a study of the literature about antibiotic prescribing patterns among dentists. The questionnaire encompassed the general characteristics of the study participants,

including age and gender. The questionnaire consists of both closed and open-ended questions pertaining to the prescription of antibiotic prophylaxis for various dental illnesses and conditions. The poll also concentrated on the specific antibiotics that dentists preferred to administer for various dental operations, including extractions, abscess care, endodontic procedures, and periodontal procedures. It also includes inquiries on antibiotic prophylaxis in diverse systemic disorders, pregnant individuals, and people with penicillin allergies. The questionnaire also included a question addressing training on antibiotic use. The questionnaire was developed in English to guarantee understanding among all dental practitioners and was pretested in a pilot research involving 10 dental practitioners, with subsequent revisions implemented. The validation was conducted using a panel of 10 subject matter experts. The test-retest analysis demonstrated strong reliability, with a Cronbach's alpha (α=0.80) for the questionnaire. All dentists present on the designated days of the study, as previously authorized by the authorities, were invited to participate, and those who consented were included in the study. A questionnaire was administered to dentists, and the study's goal was communicated. Ample time was allotted to the dentists to respond to the inquiry. The investigator provided the essential information and addressed any uncertainties as needed. The acquired data was input into MS Office Excel 2007 and analyzed statistically using SPSS version 19.0. Descriptive statistics were employed to encapsulate the findings.

Results

Two hundred dentists completed the questionnaire comprehensively and sent it to the investigator, achieving a response rate of 100%. Of the dentists surveyed, 104(52.00%) were male and 96 (48.00%) were female. The participants' ages vary from 25 to 60, with a mean ± standard deviation of 34.53 ± 4.21. Amoxicillin was utilized by 89.00% of dentists, followed by cephalosporins (18.00%), fluoroquinolones (14.00%), metronidazole (2.00%), and aminoglycosides (2.00%). The routine prescription of antibiotics is presented in Table 1. Endodontic procedures rank highest among dental procedures for which antibiotics are prescribed, with 65.00% of dentists administering them. This is followed by surgical procedures at 42.00%, abscess management at 48.00%, and periodontal procedures at 23.00%.

The selection of antibiotics for routine dental treatments, pregnant women, and immunocompromised patients is detailed in Table 2. Among periodontal operations, scaling and root planning received the greatest response, with 68.00% of dentists indicating they would prescribe antibiotics for this treatment, followed by periodontitis at 7.00%. Among dentists, 35.00% reported using cephalosporins, followed by clindamycin at 19.00%, fluoroquinolones at 15.00%, and erythromycin at 5.00%, as the most favoured antibiotics for patients with penicillin allergies.

Remarkably, the findings indicated that 65.00% of the surveyed dentists had not received any formal training in antibiotic prophylaxis over the past seven years, while only 8.00% reported receiving instruction in the previous year, as illustrated in Fig 2.

Discussion

This decade, the World Health Organization highlighted antimicrobial resistance on April 7, 2011. The year theme was "Antibiotic Resistance." The increasing apprehension regarding the prudent application of antibiotics, particularly antibiotic prophylaxis, poses a significant threat to public health. Exclusive reliance on antibiotics, particularly broad-spectrum varieties, may lead to ineffective infection management and the

emergence of resistant bacterial strains. While preventing infection is crucial, it is essential to balance this with the issues of antibiotic resistance and the adverse effects associated with excessive antibiotic use. The research on antibiotic prophylaxis prescription offers insights into quality and identifies drivers of drug prescription and utilization. [5]

Considering this fact, a question regarding the usual prescription of antibiotic prophylaxis in dental practice was posed to dental practitioners, with over 86% responding affirmatively, indicating a potential concern regarding antibiotic overuse. Despite the American Heart Association's advice for antibiotic prophylaxis in patients with diabetes and hypertension, fewer than 50% of dentists adhered to this guideline. Amoxicillin, due to its capacity to achieve elevated serum concentrations and its efficacy against facultative and some anaerobic flora in post-operative infections, is a rational selection as an addition to proficient surgical technique. The assessment revealed that 91.3% of participants in the current study administer amoxicillin as their preferred medication. Identical results are documented by Kamulegaya et al[3], Palmar et al[4], Garg et al[11], Rachmaveti et al[12], Maniyar et al[2] and Saadat et al[13].

This study indicates that penicillin-based antibiotics are the preferred treatment for dental infections; nonetheless, other investigations suggest that certain patients exhibit allergies to penicillin derivatives. It was essential to evaluate the alternative medication provided for patients allergic to penicillin, revealing that cephalosporin was predominantly utilized by the participating dentists. Cephalosporins serve as an alternative to amoxicillin due to their lower allergenic potential, reduced toxicity concerns, and broad spectrum of activity; nonetheless, it is commonly observed that patients sensitive to penicillin may also exhibit allergies to cephalosporins. In comparison to previous research, the findings were inconsistent with those that identified erythromycin and clindamycin as the preferred medications for patients with penicillin allergies.

Palmar et al. and Saadat et al. identified clindamycin as the primary therapeutic agent, whereas erythromycin was designated as the first-line treatment in investigations conducted by Garg et al., Januay et al[14]., and Koekoi et al[15]. The use of antibiotics in pregnant women presents a significant challenge about their prescription. The research on antibiotic prophylaxis prescription offers insights into quality and identifies drivers of drug prescription and utilization.

The efficacy of prophylactic antibiotics in immunocompromised patients for the prevention of postoperative complications is dubious or unsubstantiated; experts have asserted that antibiotic prophylaxis is unnecessary for dental procedures. Immunocompromised patients without bacterial infection typically do not necessitate antibiotic prophylaxis. Nonetheless, a clinical assessment should be conducted in situations where bacteremia is probable, such as during dental extractions.

Approximately 56% would unjustly administer antibiotics for acute pulpitis, chronic periapical lesions, chronic marginal gingivitis, dry socket, pre- and post-root canal therapy, pre- and post-extraction, and prior to third molar surgery in healthy individuals.

Dentists typically prescribe antibiotic prophylaxis to avert local infections at surgical sites and prevent post-operative problems such as discomfort, wound dehiscence, poor healing, necrotic bone exposure, and soft tissue edema. It remains a prevalent and erroneous practice among dentists to extend antibiotic prescriptions throughout the post-surgery period (from 6-8 hours to 5 days following surgical procedures).[8]

The dental profession must commit to a comprehensive understanding of the global impact of unwarranted antibiotic prescriptions. Antibiotics, when utilized judiciously, are effective life-saving medications; but, indiscriminate use can lead to considerable short-term and especially long-term harmful consequences.

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Legend Table and Figures

Table 1: Prescription of antibiotic prophylaxis by dentists in their routine practices

Questions	Frequency	Percentage
Routine prescription for antibiotics in dental practice	170	85.00%
Antibiotics as prophylactic measures in every case	48	24.00%

Table 2: Characteristics of antibiotic prescription after various dental procedure among participating dentists

Dental Treatment	Amoxicillin	Amoxicillin + Clavulanic Acid	Metronidazole	Cephalo-Sporins	Fluoro-Quinilones	Others	Not Required
Extraction of grossly decayed tooth	122(61.00%)	24(12.00%)	0(0%)	12(6.00%)	8(4.00%)	2(1.0%)	32(16.00%)
Orthodontic extractions	42(21.00%)	0(0%)	0(0%)	4(2.00%)	4(2.00%)	0(0%)	150(75.0%)
Abscess management	80(40.00%)	36(18.00%)	30(15.00%)	6(2.00%)	21(10.50%)	6(3.0%)	23(11.5%)
Traumatic injuries	99(49.5%)	23(11.5%)	0(0%)	17(8.5%)	2(1.0%)	2(1.0%)	57(28.50%)
Periodontal therapies	65(32.5%)	14(7.00%)	30(15.00%)	3(1.5%)	12(6.0%)	30(15%)	46(23.0%)
Endodontic therapies	57(44.9%)	8(6.3%)	6(4.7%)	2(1.6%)	6(4.7%)	0(0%)	48(37.8%)
Pediatric procedures	113(56.5%)	9(4.5%)	2(1.0%)	5(2.5%)	4(2.0%)	3(1.5%)	64(32.00%)
Pregnant women	110(55.0%)	3(1.5%)	0(0%)	33(16.5%)	6(3.0%)	14(7%)	34(17.0%)
Immuno-compromised	56(28.0%)	30(15%)	0(0%)	52(26%)	11(5.5%)	26(13%)	25(12.5%)

Figure 1: Time lapse since any form of training on antibiotic use by dentist