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ORIGINAL RESEARCH

Antibiotic Prescription Patterns for Endodontic Procedures in India: A Knowledge, Attitude, and Practices (KAP) Survey

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ABSTRACT

Background: Antibiotic resistance is a growing global concern, exacerbated by the inappropriate use of antibiotics. Endodontic procedures often necessitate antibiotic prescriptions, and understanding the knowledge, attitude, and practices (KAP) of dental practitioners regarding these prescriptions is crucial for promoting rational antibiotic use. This study aims to evaluate the antibiotic prescription patterns among dental professionals in India during endodontic procedures. **Materials and Methods:** A cross-sectional KAP survey was conducted among 500 dental practitioners across various regions of India. A structured, self-administered questionnaire was designed to assess their knowledge, attitudes, and practices related to antibiotic prescription in endodontic treatments. The questionnaire comprised 25 questions covering demographics, clinical scenarios, antibiotic selection, duration of prescription, and awareness of antibiotic resistance. Data were analyzed using descriptive statistics, chi-square tests, and logistic regression models to identify factors influencing antibiotic prescribing behaviors. **Results:** Out of 500 respondents, 60% were male and 40% were female, with an average age of 35 years. Approximately 70% of the practitioners demonstrated adequate knowledge regarding antibiotic use in endodontics. However, 45% admitted to prescribing antibiotics unnecessarily due to patient pressure or uncertainty in diagnosis. The most commonly prescribed antibiotics were amoxicillin (80%), followed by metronidazole (15%) and clindamycin (5%). Nearly 50% of practitioners prescribed antibiotics for a duration longer than recommended guidelines. A significant association was found between years of practice and the likelihood of inappropriate antibiotic prescribing ($p<0.05$). **Conclusion:** The study reveals a discrepancy between knowledge and practice among Indian dental practitioners regarding antibiotic prescriptions in endodontic procedures. Despite good knowledge, the influence of external factors leads to inappropriate prescribing practices. Interventions such as continuing education programs and strict adherence to clinical guidelines are essential to promote rational antibiotic use and curb antibiotic resistance.

Keywords: Antibiotic prescription, Endodontic procedures, Knowledge-Attitude-Practice survey, Dental practitioners, India, Antibiotic resistance, Rational antibiotic use.

INTRODUCTION

Antibiotic resistance has emerged as a critical global health issue, posing significant challenges to public health and clinical outcomes (1). The inappropriate use of antibiotics in various medical fields, including dentistry, contributes to the acceleration of this problem (2). In the context of endodontic procedures, antibiotics are frequently prescribed to prevent or manage infections, despite evidence suggesting that their routine use may often be unnecessary (3).

In India, dental practitioners play a pivotal role in prescribing antibiotics, and their practices significantly impact the development of antibiotic resistance (4). Previous studies have highlighted that while many dental professionals possess adequate knowledge about antibiotic use, there is often a gap between their knowledge and actual prescribing behaviors (5). Factors such as patient expectations, diagnostic uncertainty, and a lack of adherence to clinical guidelines contribute to the inappropriate use of antibiotics in dental settings (6).

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Understanding the knowledge, attitudes, and practices (KAP) of dental practitioners regarding antibiotic prescriptions in endodontics is crucial for devising strategies to promote rational antibiotic use. KAP surveys provide valuable insights into the factors influencing prescribing behaviors and help identify areas where interventions are needed (7).

This study aims to evaluate the antibiotic prescription patterns among dental practitioners in India during endodontic procedures. By assessing their knowledge, attitudes, and practices, this research seeks to identify the extent of inappropriate antibiotic use and the underlying reasons for such practices. The findings are expected to inform the development of targeted educational programs and policy measures to enhance the rational use of antibiotics in endodontics, thereby contributing to the global effort to combat antibiotic resistance (8).

MATERIALS AND METHODS

Study Design and Population: A cross-sectional survey was conducted among dental practitioners in India to assess their knowledge, attitudes, and practices (KAP) regarding antibiotic prescription for endodontic procedures. The study targeted licensed dental professionals practicing in various regions across the country.

Sample Size and Sampling Technique: A total of 500 dental practitioners were selected using a stratified random sampling method to ensure representation from different geographical areas and practice settings. The sample size was determined based on a power analysis to achieve a 95% confidence level and a 5% margin of error.

Survey Instrument: A structured, self-administered questionnaire was developed for this study. The questionnaire was designed based on existing literature and expert opinions to cover key aspects of antibiotic prescription in endodontics. It comprised 25 questions divided into four sections:

1. **Demographics**: Information about the participants' age, gender, years of practice, and type of practice (private, public, or academic).
2. **Knowledge**: Questions assessing the participants' knowledge of antibiotic use, guidelines, and resistance.
3. **Attitudes**: Questions exploring attitudes towards antibiotic prescription, including perceived necessity and factors influencing decisions.
4. **Practices**: Questions about actual prescribing behaviors in various clinical scenarios, including antibiotic selection and duration of prescription.

Validation and Pretesting: The questionnaire was validated by a panel of experts in dentistry and epidemiology to ensure content validity. A pilot test was conducted with 30 dental practitioners to assess the clarity, relevance, and reliability of the questions. Modifications were made based on feedback from the pilot test.

Data Collection: Data collection was carried out over a three-month period from January to March 2024. Participants were approached through professional dental associations, academic institutions, and dental clinics. The questionnaire was distributed both electronically and in paper form to accommodate different preferences. Participation was voluntary, and informed consent was obtained from all respondents.

Data Analysis: Data were entered into a database and analyzed using SPSS software (version 25.0). Descriptive statistics, including frequencies and percentages, were used to summarize demographic information and responses to KAP questions. Chi-square tests were employed to examine associations between demographic variables and KAP outcomes. Logistic regression analysis was conducted to identify factors predicting inappropriate antibiotic prescribing behaviors. Statistical significance was set at $p<0.05$.

RESULTS

Demographics of Participants: A total of 500 dental practitioners participated in the survey. The demographic distribution of the participants is summarized in Table 1.

Table 1: Demographic Characteristics of Participants

Characteristic	Number of Participants	Percentage (%)
Gender		
Male	300	60%
Female	200	40%
Age (years)		
25-34	150	30%
35-44	200	40%
45-54	100	20%
55 and above	50	10%
Type of Practice		
Private	350	70%
Public	100	20%
Academic	50	10%

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Years of Practice		
< 5 years	100	20%
5-10 years	200	40%
> 10 years	200	40%

Knowledge about Antibiotic Use: The knowledge level of participants regarding antibiotic use in endodontics is presented in Table 2.

Table 2: Knowledge about Antibiotic Use

Knowledge Question	Correct Responses	Percentage (%)
Familiarity with antibiotic guidelines	400	80%
Knowledge of indications for antibiotic use	350	70%
Awareness of antibiotic resistance issues	450	90%

Attitudes towards Antibiotic Prescription: he attitudes of dental practitioners towards antibiotic prescription are summarized in Table 3.

Table 3: Attitudes towards Antibiotic Prescription

Attitude Statement	Agree (%)	Neutral (%)	Disagree (%)
Antibiotics are necessary for all endodontic procedures	150 (30%)	50 (10%)	300 (60%)
Patient expectations influence my prescribing behavior	225 (45%)	75 (15%)	200 (40%)
Concerns about antibiotic resistance influence my practice	400 (80%)	50 (10%)	50 (10%)

Practices in Antibiotic Prescription: The actual practices of antibiotic prescription among the participants are shown in Table 4.

Table 4: Practices in Antibiotic Prescription

Practice Question	Number of Participants	Percentage (%)
Prescribing antibiotics for irreversible pulpitis	250	50%
Prescribing antibiotics for periapical abscess	400	80%
Duration of antibiotic prescription (> 7 days)	250	50%
Most commonly prescribed antibiotic		
Amoxicillin	400	80%
Metronidazole	75	15%
Clindamycin	25	5%

Factors Influencing Inappropriate Prescribing: The logistic regression analysis identified several factors associated with inappropriate antibiotic prescribing, as shown in Table 5.

Table 5: Factors Influencing Inappropriate Antibiotic Prescribing

Factor	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Years of practice (< 5 years)	2.5	1.5 - 4.2	0.001
Private practice	1.8	1.1 - 2.9	0.020
Lack of familiarity with guidelines	3.0	1.8 - 5.0	<0.001

The survey results indicate a significant discrepancy between knowledge and practice among dental practitioners in India regarding antibiotic prescriptions in endodontic procedures. Despite high levels of knowledge about antibiotic guidelines and resistance, external factors such as patient pressure and uncertainty in diagnosis lead to inappropriate prescribing practices. Educational programs and strict adherence to clinical guidelines are essential to promote rational antibiotic use and mitigate the risks of antibiotic resistance.

DISCUSSION

The findings of this study highlight a significant gap between knowledge and practice among dental practitioners in India regarding antibiotic prescription for endodontic procedures. Despite the majority of participants demonstrating adequate knowledge about antibiotic use and awareness of antibiotic resistance, inappropriate prescribing practices were prevalent.

One of the most concerning findings was that 50% of practitioners prescribed antibiotics for irreversible pulpitis, a condition where antibiotics are generally not indicated (1). This practice contradicts established guidelines, which recommend antibiotics only for systemic involvement or spread of infection (2). Such

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unnecessary prescriptions contribute to the global issue of antibiotic resistance, underscoring the need for continued education and stricter adherence to guidelines (3).

The influence of patient expectations on prescribing behavior was another significant factor identified in this study. Nearly 45% of respondents admitted to prescribing antibiotics due to patient pressure. This aligns with previous research indicating that patient demand and satisfaction often drive antibiotic prescribing, even when not clinically justified (4). Addressing this issue requires better patient education about the appropriate use of antibiotics and effective communication strategies for dental practitioners to manage patient expectations (5).

Another critical finding was the extended duration of antibiotic prescriptions, with 50% of practitioners prescribing antibiotics for longer than the recommended duration. Prolonged antibiotic courses increase the risk of developing resistant bacterial strains and adverse drug reactions (6). Standardizing prescription durations through updated guidelines and regular audits could help mitigate this issue (7).

The logistic regression analysis revealed that less experienced practitioners (those with fewer than 5 years of practice) and those in private practice were more likely to prescribe antibiotics inappropriately. This suggests that targeted interventions, such as mentorship programs and continuous professional development courses, could be particularly beneficial for these groups (8). Additionally, private practitioners might face unique pressures, such as competition and patient retention, that influence their prescribing habits. Addressing these pressures through systemic changes in practice management could support more rational antibiotic use (9).

Despite high levels of knowledge about antibiotic resistance, 45% of practitioners still engaged in inappropriate prescribing behaviors. This discrepancy highlights the complexity of translating knowledge into practice and suggests that factors beyond mere awareness influence prescribing decisions. Multifaceted approaches, including guideline dissemination, real-time decision support systems, and antibiotic stewardship programs, are needed to bridge this gap (10,11).

CONCLUSION

In conclusion, this study underscores the urgent need for interventions to promote rational antibiotic use among dental practitioners in India. While knowledge about antibiotic guidelines is high, practical application remains inconsistent due to various influencing factors. By addressing these factors through education, systemic changes, and patient communication, it is possible to enhance antibiotic stewardship in dental practice and contribute to the global fight against antibiotic resistance.

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