ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25sep079

Current Practices in Antibiotic Prophylaxis for Dental Professionals: A Cross-Sectional Study

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Publication Date: 2025/09/09

Abstract:

- ***Background***

Antibiotics are frequently used in oral surgery to prevent or manage infections. However, inappropriate or excessive prescription contributes to the global issue of antimicrobial resistance. Despite the availability of evidence-based guidelines, real-world prescribing behaviors among dental professionals often vary significantly.

- ***Aim:***

To evaluate current antibiotic prescribing practices among dental practitioners involved in oral surgical procedures and assess adherence to established clinical guidelines.

- ***Materials and Methods***

A descriptive cross-sectional survey was conducted among 400 licensed dental professionals, including general dentists and oral surgeons, from private practices, academic institutions, and government settings. Participants completed a validated questionnaire assessing demographic details, types of procedures performed, antibiotic choices, duration of therapy, awareness of prescribing guidelines, and adherence. Data were analyzed using SPSS version 25. Chi-square tests were applied to identify significant associations ($p < 0.05$).

- ***Results***

Most participants were aged 20–30 years (62.5%) and predominantly female (62.5%). Amoxicillin was the most prescribed antibiotic, especially in academic settings (22.25%). The oral route was preferred by a vast majority (40% academic, 31% private, 8.5% government). Antibiotis were commonly used prophylactically, even for routine extractions. Although 269 participants reported awareness of prescribing guidelines, only 204 reported adhering to them. Statistically significant differences were found in drug choice ($p = 0.032$), procedure-specific prescribing ($p = 0.048$), and guideline awareness ($p = 0.02$).

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➢ *Conclusion*

The study highlights considerable variability in antibiotic prescribing habits among oral healthcare providers, with a noticeable gap between awareness and adherence to guidelines. Emphasis on continuing education, evidence-based protocols, and institutional antibiotic stewardship is necessary to promote rational prescribing and combat antimicrobial resistance.

Keywords: *Antibiotic Prescription, Oral Surgery, Antimicrobial Resistance, Prophylactic Antibiotics, Prescribing Behavior, Dental Practitioners, Guideline Adherence.*

How to Cite: Lubna Fathima; Puja Harie Priya M. S.; Vasumathi Deenadayalan; Viji Vinnarasi A.; Kamal Deepa S.; Ramba M. R. (2025) Current Practices in Antibiotic Prophylaxis for Dental Professionals: A Cross-Sectional Study. *International Journal of Innovative Science and Research Technology*, 10(9), 83-89. https://doi.org/10.38124/ijisrt/25sep079

I. INTRODUCTION

Antibiotics play a pivotal role in the prevention and management of infections associated with oral surgical procedures. In oral and maxillofacial surgery, these agents are commonly prescribed to minimize the risk of postoperative infections, especially in procedures involving soft tissue manipulation, bone exposure, or when treating immunocompromised patients[1,2]. However, the inappropriate or excessive use of antibiotics remains a significant global concern, contributing to the rise of antimicrobial resistance (AMR), which threatens the effectiveness of standard treatments and increases the risk of treatment failure, prolonged hospital stays, and higher medical costs. In recent decades, antibiotic resistance has emerged as a critical global health issue[3,4]. The indiscriminate and empirical use of antibiotics, including in dentistry, has been directly linked to the development of resistant bacterial strains. Dental professionals contribute to a considerable percentage of antibiotic prescriptions in outpatient settings, yet studies have shown wide variability in prescribing habits. These inconsistencies often stem from a lack of adherence to clinical guidelines or from non-clinical influences such as patient pressure or fear of legal repercussions[5,6]. Dental professionals, particularly oral surgeons, are key prescribers of antibiotics in outpatient care. Their prescribing decisions are often influenced by clinical judgment, patient expectations, institutional protocols, and evolving guidelines[7]. Despite the availability of evidence-based recommendations, discrepancies persist in real-world practices, leading to variations in the type, dosage, and duration of antibiotic therapy. Overprescribing, empirical use without culture sensitivity testing, and extended postoperative courses are commonly reported issues in dental settings[8].

Oral surgeons, in particular, are frequently faced with decisions about antibiotic use, especially in complex or high-risk cases. Although several guidelines from professional bodies recommend the judicious use of antibiotics only when clinically indicated, many practitioners still prescribe them routinely, even in simple extractions or non-infective cases. This habit not only increases the risk of antibiotic resistance but also contributes to unnecessary patient exposure to potential adverse drug reactions[9,10]. Several factors influence the prescribing behavior of oral surgeons. These include individual clinical judgment, perceived risk of infection, institutional practices, patient history, and accessibility to updated guidelines. Additionally, some clinicians tend to prescribe broad-spectrum antibiotics pre-emptively, believing it ensures better infection control. However, this approach may not always align with evidence-based practices and can result in suboptimal therapeutic outcomes[11]. Cross-sectional studies serve as valuable tools for assessing current trends and behaviours in antibiotic prescribing[12]. By collecting data from a diverse group of practitioners over a specific period, such studies can provide insights into common practices, frequency of prescription, choice of antibiotic, and duration of treatment. This information is essential in identifying gaps in knowledge, areas of overuse, and the need for continuing education among dental professionals[13]. Preliminary investigations across various countries have indicated that antibiotics are frequently prescribed without definitive indications in oral surgery settings. For example, antibiotics are often prescribed for healthy patients undergoing minor oral procedures, where evidence shows that the risk of infection is minimal. Such trends highlight the importance of evaluating prescription patterns to ensure alignment with internationally accepted clinical protocols and antibiotic stewardship principles. Understanding the current trends in antibiotic prescribing among oral surgeons is essential to identify areas of concern and to promote rational use[14,15,16]. A thorough evaluation of these patterns can help inform targeted educational interventions, policy changes, and the development of clinical guidelines aimed at optimizing antibiotic stewardship[16,17]. This cross-sectional study seeks to analyze the prescribing behaviours of dental practitioners in oral surgery settings, highlighting the prevalent practices, underlying justifications, and adherence to established protocols.

II. MATERIALS AND METHODS

This study was designed as a descriptive cross-sectional survey aimed at evaluating antibiotic prescribing habits among dental professionals involved in oral surgical procedures. The research was conducted over a period of three months across various private clinics, dental colleges, and hospital-based dental departments. Ethical approval was obtained from the institutional review board prior to the commencement of the study. Participants included licensed dental practitioners, including general dentists and oral surgeons, who regularly perform oral surgery procedures such as tooth extractions, minor oral surgeries, implant

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25sep079

placements, or management of oral infections. Inclusion criteria required participants to have at least one year of clinical experience and be actively engaged in patient care. A convenience sampling method was employed to recruit a diverse range of practitioners from different geographic regions. A structured, pre-validated questionnaire was used as the primary tool for data collection. The questionnaire was developed based on previous studies and international guidelines on antibiotic use in dentistry. It consisted of both closed- and open-ended questions, divided into four main sections: demographic details, types of procedures performed, antibiotic prescribing patterns (including drug choice, dosage, duration, and timing), and awareness of antibiotic stewardship principles. To ensure clarity and content validity, the questionnaire was reviewed by a panel of experts in oral surgery and pharmacology. A pilot study was conducted with a small group of 15 practitioners, and necessary revisions were made based on feedback. The reliability of the questionnaire was confirmed using Cronbach's alpha, with a value of 0.82 indicating acceptable internal consistency. The finalized questionnaire was distributed both in print and digital formats. Participants were informed about the purpose of the study and provided informed consent prior to participation. Anonymity and confidentiality of responses were maintained throughout the study. Data collection was carried out over a defined period, and incomplete or duplicate responses were excluded from analysis.

Collected data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics such as frequencies, percentages, and means were calculated to summarize the demographic data and prescribing trends. Chi-square tests were used to evaluate associations between demographic variables and prescribing behavior, with a p-value of less than 0.05 considered statistically significant. The study adhered to the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants. The research protocol was approved by the Institutional Ethics Committee (approval number to be inserted), and participation was voluntary, with no financial incentives offered.

III. RESULTS

A. Demographic Characteristics of Participants

A total of 400 dental professionals participated in the study. The majority of respondents were in the age group of 20–30 years (62.5%), followed by 25% in the 31–40 age group, and 23.5% in the 41–50 range. Only 1.5% were aged above 50. Female participants comprised a larger portion of the sample (62.5%) compared to males (37.5%). Regarding educational background, the cohort was evenly split between undergraduate and postgraduate dental students, each representing 50% of the total participants. In terms of workplace setting, 50% of respondents were engaged in private practice, 40% were from academic institutions, and the remaining 10% were affiliated with government healthcare facilities.

B. Antibiotic Prescribing Patterns

- *Indications for Antibiotic Prescription*

Antibiotics were most commonly prescribed following third molar extractions, reported by 12.5% of private practitioners, 5.5% of government-affiliated respondents, and 16.5% of those in academic institutions. Prescriptions following cyst enucleation were also frequent, particularly among academic respondents (13%), followed by private (9.5%) and government (2%) practitioners. Other indications included periapical surgeries (10% in private, 1.5% in government, 11.25% in academic) and implant placement (8%, 1%, and 8.75% respectively). A statistically significant difference was observed in prescription patterns for third molar extractions ($p = 0.048$).

- *Duration of Antibiotic Course*

Most respondents prescribed antibiotics for 3 days, with this being the preference among 22% of private, 5% of government, and 20% of academic participants. Five-day courses were the second most common (11%, 2%, and 15% respectively), while seven-day regimens were prescribed by 7% (private), 3% (government), and 15% (academic). No significant association was found between duration of prescription and practice type ($p = 0.27$).

- *Choice of Antibiotic*

Amoxicillin was the most frequently prescribed antibiotic across all groups—16.5% in private, 5.5% in government, and 22.25% in academic settings—showing a statistically significant difference in preference ($p = 0.032$). Amoxicillin-clavulanic acid followed in popularity, particularly among private practitioners (9%), government (2%), and academic (10.75%). Metronidazole was prescribed by 8.5% in private, 1.5% in government, and 9% in academic sectors. Azithromycin was the least commonly used among the four options (6% private, 1% government, 8% academic).

- *Route of Administration*

The oral route was overwhelmingly preferred across all groups, with 31% of private, 8.5% of government, and 40% of academic practitioners administering antibiotics orally. The intravenous (IV) route was far less common (9% private, 1.5% government, 10% academic). The difference between groups was not statistically significant ($p = 0.093$).

- *Purpose of Antibiotic Use: Prophylactic vs Therapeutic*

Prophylactic antibiotic use was more common than therapeutic use in all groups. Specifically, 30% of private, 6.25% of government, and 35% of academic practitioners reported using antibiotics prophylactically. Therapeutic antibiotic use was noted among 10% (private), 6.25% (government), and 15% (academic). The variation was not statistically significant ($p = 0.091$).

- *Awareness and Adherence to Guidelines*

A significant proportion of participants reported being aware of antibiotic prescribing guidelines: 96 private, 31 government, and 142 academic professionals answered "Yes" to this question, with a statistically significant difference observed across groups ($p = 0.02$). However, guideline

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25sep079

adherence was lower. Only 54 private, 11 government, and 139 academic respondents indicated that they follow specific prescribing protocols, again showing a significant difference ($p = 0.041$). Interestingly, when asked if they believed antibiotics were overprescribed in dentistry, the majority answered affirmatively—99 in private, 34 in government, and 154 in academic institutions—highlighting widespread recognition of the issue. This difference was also statistically significant ($p = 0.032$).

Table 1: Demographic Characteristics of Participants

QUESTIONAIRRE	OPTIONS	FREQUENCY (N)	PERCENTAGE (%)
Age distribution	20-30	250	62.5
	31-40	100	25
	41-50	94	23.5
	Above 50	6	1.5
Gender distribution	Male	150	37.5
	Female	250	62.5
What is your current level of education	Undergraduate Student	200	50
	Postgraduate Student	200	50
Type of practice	Private	200	50
	Government	40	10
	Academics	160	40

Table 2: Antibiotic Prescribing Patterns

QUESTIONAIRRE	OPTIONS	Private		Government		Academics		P-value
		FREQUENCY (N)	PERCENTAGE (%)	FREQUENCY (N)	PERCENTAGE (%)	FREQUENCY (N)	PERCENTAGE (%)	
Type of Oral Surgeries for Which Antibiotics Were Prescribed:	Third molar extraction	50	12.5	22	5.5	66	16.5	0.048*
	Cyst enucleation	38	9.5	8	2	54	13	
	Periapical surgeries	40	10	6	1.5	45	11.25	
	Implant placement	32	8	4	1	35	8.75	
Duration of Prescription	3 Days	88	22	20	5	80	20	0.27*
	5 Days	44	11	8	2	60	15	
	7 Days	28	7	12	3	60	15	
Most Commonly Prescribed Antibiotics:	Amoxicillin	66	16.5	22	5.5	89	22.25	0.032*
	Amoxicillin + Clavulanic acid	36	9	8	2	43	10.75	
	Metronidazole	34	8.5	6	1.5	36	9	
	Azithromycin	24	6	4	1	32	8	

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25sep079

Table 3: Oral of administration

oral of administration	Options	Private		Government		Academics		P-value
		FREQUENCY (N)	PERCENTAGE (%)	FREQUENCY (N)	PERCENTAGE (%)	FREQUENCY (N)	PERCENTAGE (%)	
	Oral	124	31	34	8.5	160	40	0.093
	I.V	36	9	6	1.5	40	10	

Table 4: Use of Prophylactic vs Therapeutic Antibiotics

Use of Prophylactic vs Therapeutic Antibiotics Use of Prophylactic vs Therapeutic Antibiotics	Options	Private		Government		Academics		P-value
		FREQUENCY (N)	PERCENTAGE (%)	FREQUENCY (N)	PERCENTAGE (%)	FREQUENCY (N)	PERCENTAGE (%)	
	Prophylactic	120	30	25	6.25	140	35	0.091
	Therapeutics	40	10	25	6.25	60	15	

Table 5: Guideline Awareness and Practice Alignment

Questions	Private		Government		Academics		P-value
	Yes	No	Yes	No	Yes	No	
Are you aware of any antibiotic prescribing guidelines?	96	64	31	9	142	58	0.02*
Do you follow any specific guideline?	54	106	11	29	139	61	0.041*
Do you believe antibiotics are overprescribed in dentistry?	99	61	34	6	154	46	0.032*

IV. DISCUSSION

This study sheds light on prevailing antibiotic prescribing patterns among dental professionals engaged in oral surgery, highlighting notable inconsistencies and areas requiring improvement. A key observation was the widespread use of antibiotics following third molar extractions and minor oral surgeries, despite existing guidelines suggesting limited benefit in many routine cases.[18,19] This may be attributed to practitioners' efforts to prevent postoperative infections or patient expectations, particularly in private practice settings where clinical outcomes are closely monitored by patients[20,21].

Amoxicillin, both alone and in combination with clavulanic acid, was the most preferred antibiotic, consistent with earlier research that highlights its broad-spectrum efficacy and cost-effectiveness[22]. However, the frequent use of this class without proper culture sensitivity testing may promote antimicrobial resistance, an issue globally recognized by healthcare authorities[23]. Despite a high level of awareness regarding guidelines, actual adherence was notably lower, especially in private and government sectors. This gap between knowledge and practice indicates the influence of factors such as habitual prescribing, institutional norms, time constraints, or fear of medico-legal repercussions[24]. The predominance of prophylactic use over therapeutic prescription, even in simple procedures, reflects a tendency toward defensive medicine[25]. While prophylaxis is justified in certain high-risk patients, routine administration without evidence-based indication may contribute to drug resistance and unnecessary patient exposure[26].

The preference for the oral route over intravenous administration aligns with the outpatient nature of most dental procedures[27,28]. However, the variation in drug choice and treatment duration underlines the absence of standardized protocols and the need for greater uniformity. Lastly, the significant acknowledgment of antibiotic overuse among respondents points to growing awareness of the issue, though it has yet to fully translate into practice. Enhancing continuing education, encouraging adherence to protocols, and promoting antimicrobial stewardship at all institutional levels could help address this gap[29,30].

V. CONCLUSION

The findings of this study reveal significant variability in antibiotic prescribing practices among dental professionals performing oral surgical procedures. Despite high levels of awareness regarding antibiotic stewardship principles and clinical guidelines, adherence remains inconsistent,

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25sep079

particularly in private and government practice settings. Amoxicillin, either alone or in combination with clavulanic acid, was the most frequently prescribed antibiotic, with a general preference for short-term prophylactic use via oral administration. These trends, while reflective of common clinical behaviors, raise concerns about the potential for overuse and the escalation of antimicrobial resistance. There is a pressing need for targeted interventions, including regular continuing education programs, clear institutional prescribing policies, and stronger emphasis on evidence-based protocols. Enhancing antibiotic stewardship in oral healthcare will not only optimize patient outcomes but also contribute to the global effort to combat antimicrobial resistance.

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