

PREScription WRITING IN DENTISTRY

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Abstract:

Introduction: Antibiotics play a key role in fighting bacterial infections. Dentists prescribe antibiotics for both prophylactic and therapeutic reasons. According to WHO, there has been an increasing occurrence of errors in antibiotic prescription globally. The majority of these errors occur in developing countries.

Objective: Present study was conducted to assess knowledge and pattern regarding the antibiotic prescription of dentists associated with Universities/Hospitals in Sindh, Pakistan.

Methodology: It was a cross-sectional study, including multiple dental institutes. A validated custom-made questionnaire containing questions for assessing dentist knowledge and pattern of antibiotic prescription was used. The sample size calculated using OPENEPI was 160 with validated responses of 140. For statistical analysis of correlation and frequencies, SPSS ver 21.0 was utilized. Undergraduates, dental hygienists, and technologists were excluded from the study.

Result: the reported majority of dentists prescribe combination therapy of Amoxicillin + Clavulanic acid. Antibiotic was being prescribed for conditions including dental infections, swellings, pericoronitis, irreversible pulpitis, surgical extraction, periodontal diseases, and draining sinus. The majority preferred trade names when prescribing antibiotics and were well aware of drug resistance, and bacteria but were not prescribing antibiotic sensitivity and culture tests. Respondents were following ADA and NICE antibiotic prescription guidelines and were prescribing antibiotics for 5 days course.

Conclusion: Respondents know antibiotic prescription but fail to fully comply with established guidelines and believe self-medication is a major cause of drug resistance, bacterial. Further studies on a larger scale will reveal interesting findings.

Keywords: Infections, Drug resistance, bacterial, Prescriptions

Abbreviations: ADA(American dental association),NICE(National institute for health and care excellence),WHO(World health organization),SEOM(Standard error of

mean), NSAID (Nonsteroidal anti-inflammatory drugs), OTC (Over the counter), AAPD (American academy of paediatric dentistry)

Background:

Antibiotics are key appurtenance for managing infections of the oral cavity. Even though they cannot replace definite therapy, their sensible use can greatly limit periods of infection and related risks, such as limiting the involvement of adjacent tissues and spaces¹.

Dentists prescribe antibiotics for both prophylactic and therapeutic reasons. These drugs are often abused by patients (due to ill-informed dentists) regarding their dosage and duration of use. They are often prescribed, in absence of any sign and symptoms of any underlying infection, as a precautionary measure for preventing the occurrence of infection and according to Achal Murti et al, to avoid criticism. Additionally, antibiotics are often given to rectify any errors during the procedure and reduce patient visits².

RDP (rationale drug prescription) refers to the use of the least quantity of antibiotics for acquiring the best outcome possible in the little time possible at a nominal cost. Correct diagnosis, prescription, dispensing, packing, and patient compliance are 5 essential criteria for acquiring rationale drug use. Improper prescribing of the drug has become a global problem³. This results in treatment that is not effective or safe prolongs the illness, and distress, and is costly on part of the patient⁴.

There has been an increased occurrence of errors during antibiotic prescriptions by doctors and dentists associated with universities, and hospitals and a majority of these prescriptions lack WHO guidelines⁵⁻¹⁰. Reports on irrational usage of the drug have been on the rise globally accompanied by adverse health effects¹¹. A 2010 report by WHO stated that more than 50% of prescribed drugs were not adequately dispensed and sold. This was severe in developing nations where the majority of patients' treatment lack clinical guidelines^{11,12}.

Elements underlying irrational drug usage are misinformation about the drug, patient expectations and demands, deceptive beliefs, lack of trained personnel, education and etc¹³⁻¹⁴

There is a lack of studies comparing preferences regarding prescription writing by dental graduates. Though there are some individual unrelated studies. Having sound knowledge regarding antibiotic prescription is of utmost importance for any health care professional, irrespective of qualifications¹⁵.

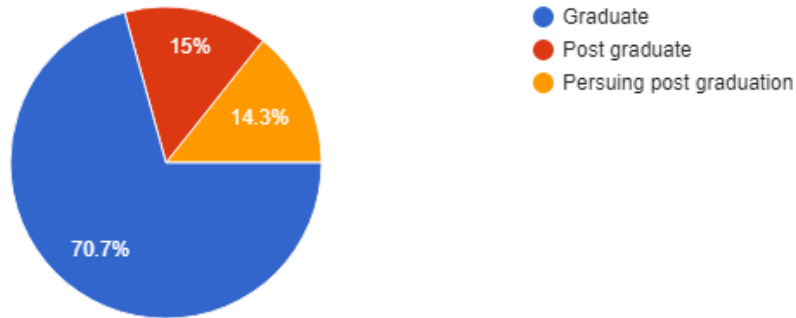
The present study aims at identifying and evaluating patterns of antibiotic prescription and knowledge among dental surgeons and identifying components that aid in the determination of prescription practices.

Methodology:

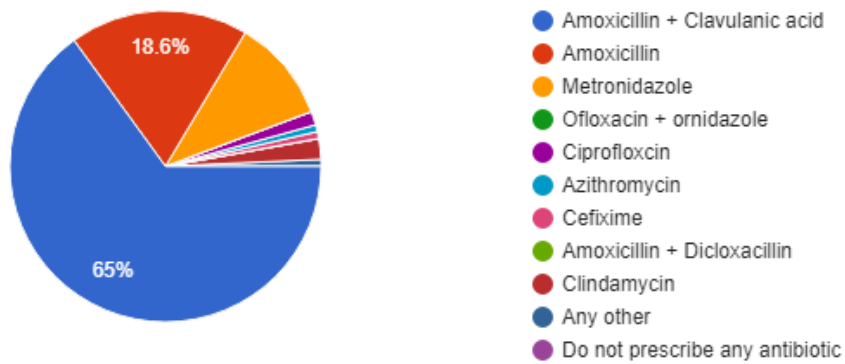
This was a cross-sectional study. Five Medical/Dental colleges in Sindh were selected based on several post-graduate programs and specialties. Variables for the questionnaire were selected after careful analysis of similar research papers that assess the knowledge and preferences of clinicians regarding prescription writing and a custom-made questionnaire was developed which was validated via a pilot study. The study period was from September 2017 to May 2018. Graduate students included dental house officers and demonstrators, "Postgraduate" included those that have completed dental postgraduate degree courses and are currently in practice, and "Pursuing postgraduate" included participants in their dental clinical training or about to complete their dental postgraduate degree course. Specialists included all subdomain specialties in dentistry. The sample size was calculated by determining the number of dentists in each college as population size and inputting the value in the online statistical software OPENEPI keeping a 5% SEOM and 95% confidence interval. The calculated sample size was 160. The total number of respondents excluding missing data was 140. SPSS version 21 was used to interpret the chi-square test of association and level of significance. A p-value of 0.05 was considered statistically significant. All undergraduate students were excluded from the study as they give prescriptions during their clinical years under supervision. Dental technologists, hygienists, nurses, and dental assistants were not part of this study. Sociodemographics included gender and age. Informed consent was taken from all participants before the start of the study.

Results:

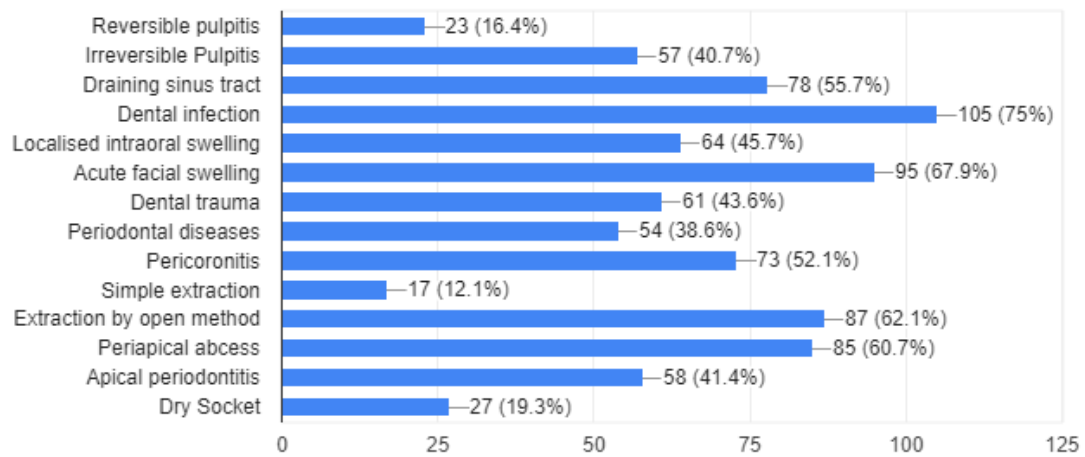
Results are tabulated in graphs 1.1 - 1.9 & Table 1.1 and 1.2.



Graph 1.1 Qualifications of participants



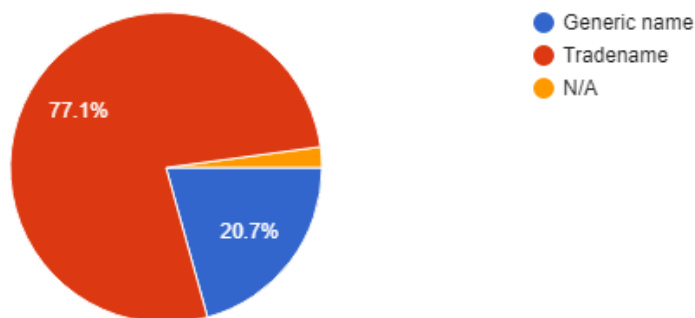
Graph 1.2 Most commonly prescribed antibiotic



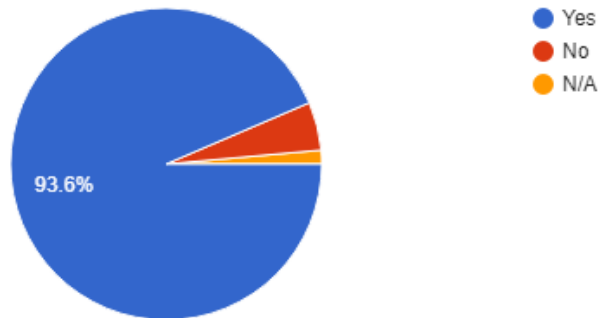
Graph 1.4 Number of dentist prescribing routine antibiotics in following situations



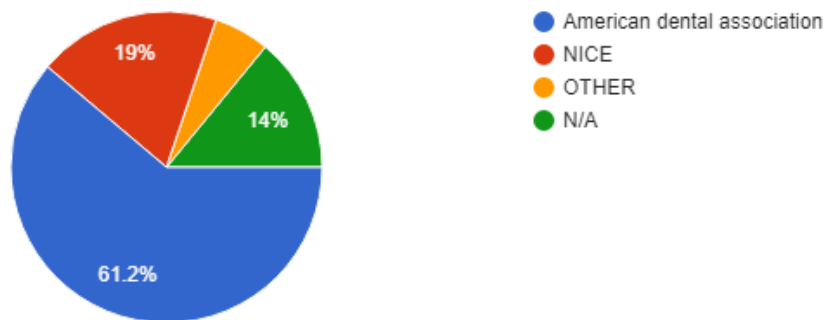
Graph 1.3 Dental Specialist present in the study



Graph 1.5 Percentage of participants prescribing antibiotics by generic, or trade name

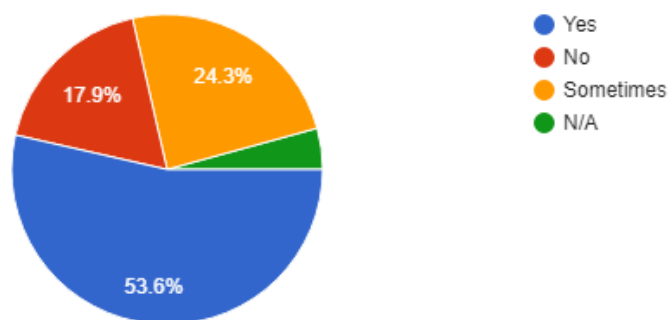


Graph 1.6 Respondents prescribing antibiotic sensitivity & culture test before prescribing antibiotics



Graph 1.7 Percentage of respondents following ADA, NICE or any other guidelines

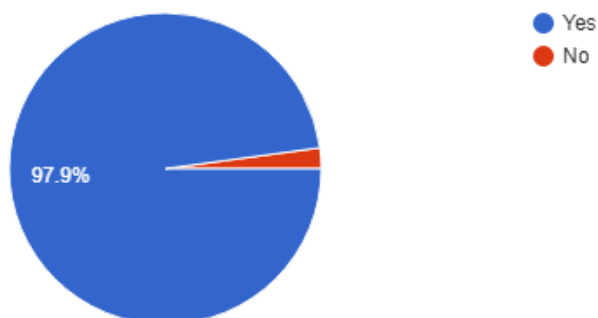
Graph 1.10 Percentage of respondents who believe self-medication by patients for pain relief is responsible for drug resistance, bacterial



Graph 1.8 Percentage of respondents who are aware of guidelines of antibiotic prophylaxis

Most Prescribed antibiotic	Qualification <i>(P-Value=0.44)</i>		
	Graduate	Pursuing Post graduation	Post Graduate
<i>Amoxicillin</i>	17	5	4
<i>Amoxicillin + Clavulanic acid</i>	68	12	11
<i>Azithromycin</i>	1	0	0
<i>Cefixime</i>	0	0	1
<i>Ciprofloxacin</i>	0	1	1
<i>Clindamycin</i>	2	0	1
<i>Metronidazole</i>	10	24	3

Table 1 Respondent's most prescribe antibiotic based on their qualification



Graph 1.9 Percentage of respondent's who are well aware of antibiotic resistance

<i>Speciality</i>	<i>3 days</i>	<i>5 days</i>	<i>7 days</i>	<i>Total</i>
<i>General practitioner</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>1</i>
<i>Community health and preventive dentistry</i>	<i>0</i>	<i>2</i>	<i>0</i>	<i>2</i>
<i>Dental Hygienist</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>1</i>
<i>Forensic odontologist</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>1</i>
<i>General practioner</i>	<i>20</i>	<i>64</i>	<i>5</i>	<i>89</i>
<i>House officer</i>	<i>1</i>	<i>1</i>	<i>0</i>	<i>2</i>
<i>Implantologist</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>1</i>
<i>Medical Consultant</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>1</i>
<i>Medical Educationist</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>1</i>
<i>Operative and conservative dentistry</i>	<i>2</i>	<i>5</i>	<i>0</i>	<i>7</i>
<i>Oral and Maxillofacial Surgeon</i>	<i>0</i>	<i>14</i>	<i>3</i>	<i>17</i>
<i>Oral pathologist</i>	<i>0</i>	<i>2</i>	<i>0</i>	<i>2</i>
<i>Orthodontist</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>1</i>
<i>Pediatric Dentist</i>	<i>0</i>	<i>2</i>	<i>0</i>	<i>2</i>
<i>Periodontist</i>	<i>1</i>	<i>4</i>	<i>1</i>	<i>6</i>
<i>Prosthodontist</i>	<i>1</i>	<i>3</i>	<i>0</i>	<i>4</i>
<i>Public health dentist</i>	<i>0</i>	<i>2</i>	<i>0</i>	<i>2</i>
Total (P-Value =0.361)	27	103	10	140

Table 2 Number of respondents prescribing antibiotics for 3,5,7 days

The majority of respondents (70%) were dental graduates (graph 1.1). Combination therapy of Amoxicillin & Clavulanic acid was the most commonly prescribed antibiotic (65%) mostly accounting graduates (Table 1), general practitioners & Maxillofacial surgeons (Table 2), followed by Amoxicillin only (18.6%), (graph 1.2). Most respondents prescribed antibiotics for

dental infections (75%), acute facial swelling (68%), Periapical abscess (60%), and extraction by open method (62%) (graph 1.4). 77% of respondents prescribed antibiotics by generic name followed by 20% using trade names (graph 1.5). 61% of respondents adhere to American Dental Association guidelines for an antibiotic prescription (graph 1.7). Almost all of the respondents 93% believed that self-medication by the patient is responsible for drug resistance and bacteria. Surprisingly only half of the respondents were aware of proper guidelines for antibiotic prophylaxis (graph 1.8)

Discussion:

The present study was conducted to assess the preferences of dental professionals regarding antibiotic prescription writing prophylaxis. A good dental/medical practice demands up-to-date knowledge and expertise in pharmacology and norms of prescription¹⁶.

The present study reported dental infection as the most frequent reason for an antibiotic prescription. This is in line with a study by Guzman-Alvarez who also reported infection as a frequent cause for antibiotic prescription among dentists, while Ankita Jian et al in a similar study reported pain as the most frequent cause for prescribing NSAID by dentists¹⁷

Bacterial resistance to antibiotics has become a global issue and now is considered one of the main threats when treating infections. The current study reported respondents being well aware of drug resistance, and bacteria. This is in line with a study by Astha Doshi et al who reported respondents having sound knowledge regarding drug resistance, and bacterial, but contrary to a study by Humphreys et al and Ibea et al who reported respondents having limited knowledge regarding drug resistance, bacterial^{18,19,20}.

Concerning dental conditions, few such as oral infections with malaise, limited mouth opening, and lymphadenopathy usually require antibiotics therapy²¹. The present study reported respondents prescribing antibiotics for conditions, that according to prescription guidelines, are not required and the condition can be treated via dental procedures alone. Respondents reported prescribing antibiotics for Periapical abscess (60%), Irreversible pulpitis (40%), and facial swelling (68%) (Graph 1.4). All of these conditions can be treated by operative procedures and do not always necessarily require antibiotics. A similar trend was observed in studies by Abdul Rehman et al, Kumar et al and JJ Segura et al. In Light of current WHO guidelines, prescribing antibiotics for all these dental conditions has no proven benefit²²⁻²⁵.

An infected operculum is termed pericoronitis, which is a microbial infection mainly resolved via dental procedures. Almost half (52%) of respondents reported prescribing antibiotics to pericoronitis-suspected patients, assuming it was an indication of antibiotic usage. Similar reports were also observed in other studies. According to Roda et al if there is systemic involvement and persistent swelling then antibiotic is recommended, but the current study excluded any systemic involvement with reported dental conditions²⁶.

Surgical/Open Method extraction is another common procedure in the dental practice where antibiotics administration was prescribed by respondents, although no effective research has reported any improvement as a result of post-surgical extraction medication²⁷.

The present study has reported a combination of amoxicillin and clavulanic acid as the preferred antibiotic prescription (65%). Al obaida et al also reported similar preferences among their participants²⁸. Although our study reported only 16% of respondents preferring amoxicillin alone as the first choice antibiotic, Abdul Rehman et al reported (88.5%) of respondents preferring amoxicillin alone¹⁸. A major difference between (Amoxicillin) and (amoxicillin + Clavulanic acid) is amoxicillin clavulanic acid has added side effects of gases, bloating and headache but the presence of Clavulanic acid fights against those bacteria also that are resistant to Amoxicillin and other antibiotics. The increased incidence of drug resistance, and bacterial can be a reason why respondents in this study prefer (Amoxicillin + Clavulanic acid) therapy over amoxicillin²⁹.

Drug resistance, bacterial is an essential issue globally. 98% of respondents in the present study were well aware of drug resistance, bacterial and 93% believe self-medication by the patient is a major factor contributing towards drug resistance, bacterial. Studies have reported self-medication to be prevalent among developing countries, especially south Asian countries^{30,31}. Joshi, Shalini, et al, Sharma et al and Phalke et al in their respective studies on people of Punjab (India) reported 73% resorting to self-medication³²⁻³⁴. Barker et al stated illiteracy, lack of knowledge regarding antibiotics, and avoiding dental visits as possible reasons for self-medication. He further stated the lack of proper health care facilities, expansive treatments, easy access to prescription drugs such as OTC medicine, and lax medical regulation as reasons for self-medication³⁵.

Less than 10% of respondents prescribe antibiotic sensitivity and culture tests, although studies have stated a positive outcome of its use. Captain Warren J et al and Adrian et al stated use of antibiotic sensitivity and culture tests must be undertaken on regular basis for

establishing drug effectiveness and to counteract any emerging bacterial resistance^{36,37}. Multiple studies reported an excellent correlation between antibiotic sensitivity and culture tests and clinical outcomes^{38,39}. Folsom and Stuteville in their studies reported having conducted a 12-hour disk susceptibility test against multiple antibiotics for specific dental infections. They reported an increased number of patients being cured in a short burst of time⁴⁰. AAPD guidelines recommend a 5-7 day antibiotic course, although the duration of the drug is dependent upon the patient's condition. The current study reported respondents preferred to prescribe a 5-day course of antibiotics. European-based studies on dental practitioners report a 5-7 day antibiotic course specified for a particular drug⁴¹.

Conclusion:

A study has reported more than half of respondents including both general dentists and specialists prescribing antibiotics which under scientific literature do not need an antibiotic course. More than 70% of respondents claim to follow ADA, NICE, or any other guidelines, and almost all are aware of drug resistance and bacteria, Majority prescribe recommended duration of antibiotic course and antibiotic. Thus, it can be concluded that respondents have knowledge regarding antibiotic subscriptions but fail to follow them concerning conditions that can be treated without them. Knowledge-based workshops and programs must be introduced in medical universities and colleges on antibiotic prescription guidelines and practices to better equip healthcare professionals regarding antibiotic prescription guidelines and practices. Further studies on the larger population at a national level will reveal more conclusive results.

Conflict of interest: All authors declare no conflict of interest

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