

An evaluate to antibiotic prescription pattern of dentists

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Abstract

Objective: It is a widespread practice among dentists all around the world to overuse prescriptions for antibiotics. The overuse of these medications increases the chance of bacterial resistance development and has a number of negative consequences.

Method: A questionnaire-based survey form was conducted in dental clinics and hospitals. The questionnaire was composed of questions seeking details about antibiotic prescriptions patterns for different oral and dental conditions as well as the duration and antibiotic course.

Results: Amoxicillin and Amoxicillin clavulanic acid were the most preferred antibiotics. The duration and antibiotic course most of the dentist prescribed are 3 days and 5 days. 98% of dentists recorded medical history before prescribing antibiotics.

Conclusions: The majority of the dentists tend to prescribe antibiotics for recommended conditions, but antibiotic prescriptions for Non recommended conditions were also common.

Keywords: Antibiotic, Clavulanic Acid, Amoxicillin, Pericoronitis, Cellulitis,

Introduction

Antibiotics have been proved as a boon in treating different bacterial infections. The oral cavity contains a variety of microbial flora. Some of the microbes prove to be beneficial to mankind and some prove to be detrimental.

Different bacteria cause different oral diseases such as periodontal disease, odontogenic infections etc. To give symptomatic relief to the patient, the dentist prescribed antibiotics to the patient on a regular basis.

The continuous use of antibiotics or over prescription of antibiotics causes multiple adverse effects and develops

a risk of formation of bacterial resistance to antibiotics. The development of antibiotic resistance due to over prescription of antibiotics may lead to a crisis if neglected. The crisis can include the threat to treat common infections and to deliver complex medical procedures.

Inappropriate antibiotic usage has dangers, including the possibility of gastrointestinal issues since antibiotics have the potential to change the usual gut flora. Allergic reactions are frequent and can range from the appearance of a rash to anaphylactic shock.

According to the studies, dentists and other health care professionals worldwide over-prescribe antibiotics. However, wealthy nations rather than underdeveloped nations were the sites of the majority of investigations examining dental prescribing practices and views.

Pulpitis and periapical periodontitis, which are more prevalent dental diseases, only call for operational treatments such fillings, root canal therapy, or extraction if the tooth cannot be saved. Sadly, dentists continue to recommend antibiotics for this illness. There are just a few clinical circumstances that, empirically, call for antibiotic therapy, such as oral infections accompanied by fever and signs of systemic dissemination such lymphadenopathy and trismus. Facial cellulitis, which may or may not be accompanied by dysphagia, is a dangerous condition that has to be treated right once with antibiotics due to the risk of infection spreading through the lymphatic and blood circulation and the subsequent development of septicemia.

Numerous treatments have been created in an effort to lessen unwarranted prescriptions and usage. Those that have been effective have had a small impact and might not be long-lasting. A typical, information-heavy approach to health education that depends on altering knowledge and implies that this new knowledge would

naturally lead to changes in behaviour underlies nearly all prior programmes, it has been claimed. With an emphasis on the reasons for antibiotic use, the kind of antibiotic provided, and the length of prescription, these references were examined to assess the therapeutic and prophylactic antibiotic prescribing habits of dentists.

As the majority of strains acquire resistance via transposable elements that are preferentially transferred when antibiotics are used in sub-therapeutic doses or for long durations, it is a myth that antibiotics should be used for a specific number of days to "kill the resistant strains." Instead, antibiotics should be used for a shorter period of time to "slow the spread of resistant strains." So that the minimal inhibitory concentration is surpassed, side effects and the development of resistant bacteria are avoided, antibiotics should be administered at the proper frequency, dose, and duration.

The commensal flora is destroyed by prolonged antibiotic treatments. Furthermore, longer periods of up to 21 days could lead to the selection of resistant strains and a decrease in the oral flora's capacity to fend off the colonisation of harmful microorganisms that are not typical residents, which could result in superimposed infections with multi-resistant bacteria and yeasts.

Method

A cross-sectional survey was conducted by using a questionnaire to assess antibiotic prescribing patterns amongst dentists. A pre-validated questionnaire was distributed among the dental practitioners with qualification of BDS and MDS. The questionnaire was distributed through google form to respective participants in the English language. The sample size was chosen as 100. Inclusion criteria included regular practitioners with qualification of BDS and MDS who are willing to participate. Exclusion criteria included all the unwilling participants.

Elements of the questionnaire

To suit the purpose of this study, the questionnaire was modified from earlier studies. The first section was dedicated to collecting general information, sex, and qualifications. The second section was designed to gather data about antibiotic prescription in different dental conditions like acute pulpitis, chronic periapical infection, pericoronitis, cellulitis, periodontal abscess, Dry socket, trismus, Reimplantation of teeth, infective endocarditis, Dental Implant, Patient satisfaction and Extraction. Participants were asked to choose whether or not they would prescribe antibiotics for each of the conditions on the list.

The questionnaire consisted four Questions with first question consist of twelve sub questions which could distributed as:

- Questions based on antibiotic prescriptions during dental conditions.
- Questions based on most commonly prescribed antibiotic
- Questions based on duration and course of antibiotic prescriptions.
- Questions based on whether medical history is recorded before prescribing antibiotics.

The survey was approved by the Institutional Ethics Committee VSPM DCRC on 19/04/22.

Statistical analysis

Software from IBM SPSS Statistics for Windows (version 23.0, IBM Corp, Chicago, USA) was used to conduct the statistical analyses. To investigate the normality of the continuous variables, the Shapiro Wilk test was performed. Categorical variables were given as frequencies and percentages for continuous data. T test was utilised to assess how the clinician's overall rating of each gender differed from one another. The Chi-Square

test was used to assess differences in prescription and qualification levels across the groups.

All tests were two-tailed, and $p < 0.05$: Not significant.

Results

The questionnaire was distributed amongst 135 randomly selected dentists. A total of 35 dentists did not return the questionnaire. A total of 100 (32 % male and 68 % female) dentists out of which 76% BDS and 24% MDS returned completed questionnaires, which were included in the final analysis.

The table for the first question shows frequency and percentage for different dental conditions whether they were prescribed antibiotic or not. the first condition i.e, acute pulpitis shows 59.4% of Yes and 40.6% of No. Chronic periapical infection shows 99% of Yes results and 1% of No. pericoronitis has 96% of Yes result and 4% of No. The anti-biotic prescription for cellulitis shows 94.9% Of Yes result and 5.1% of No. periodontal abscess shows Yes 92.9% and No 7.1%. Dry Socket shows 57.5% of Yes and 52.5% No. Trismus shows 37.1% of Yes and 62.9% No. Infective endocarditis shows 97.9% of Yes and 2.1% No. Dental Implants shows 89.8% Yes and 10.2% No. Patient satisfaction shows 24.2% Yes and 75.8% No. Extraction shows 98% Yes and 2% No.

The most commonly prescribed antibiotics are Amoxicillin and Amoxicillin clavulanic acid with the percentage of 88.9% and 91.9% respectively. Penicillin is prescribed with the percentage of 8.1. clindamycin is prescribed with the percentage of 10.1%. Cephalexin is prescribed with the percentage of 4. Cefixima is prescribed with the percentage of 8.1.

Antibiotic courses usually preferred are with the duration of 3 days and 5 days with the percentage of 45.5% and 52,5% respectively. The antibiotic course duration for 7 days is 2%.

Sex	Frequency	Percentage
Female	68	68%
Male	32	32%
Qualification		
BDS	76	76%
MDS	24	24%
Total	100	100%

Table 1:

1. In which of the following situations would you prescribe antibiotics?		
Situations	Frequency	Percentage
a) Acute pulpitis		
No	39	40.6
Yes	57	59.4
b) Chronic periapical Infection		
No	1	1
Yes	98	99

Table 2:

c) Pericoronitis		
No	4	4
Yes	95	96
d) Cellulitis		
No	5	5.1
Yes	93	94.9
e) Periodontal abscess		
No	7	7.1
Yes	92	92.9
f) Dry socket		
No	52	52.5
Yes	47	47.5
g) Trismus		
No	61	62.9
Yes	36	37.1
h) Reimplantation of teeth		
No	13	13.3
Yes	86	86.7
i) Infective endocarditis		
No	2	2.1
Yes	95	97.9

j) Dental Implant		
No	10	10.2
Yes	88	89.8
k) Patient Satisfaction		
No	75	75.8
Yes	24	24.2
l) Extraction		
No	2	2
Yes	97	98

Table 3:

2. Which antibiotic do you prescribe most commonly ?		
Antibiotics	Frequency	Percentage
Penicillin	8	8.1
Amoxicillin	88	88.9
Clindamycin	10	10.1
Cephalexin	4	4
Amoxicillin clavulanic acid	91	91.9
Cefixima	8	8.1

Table 4:

3. What is the duration and antibiotic course you prefer ?		
Duration	Frequency	Percentage
3 Days	45	45.5
5 Days	52	52.5
7 Days	2	2

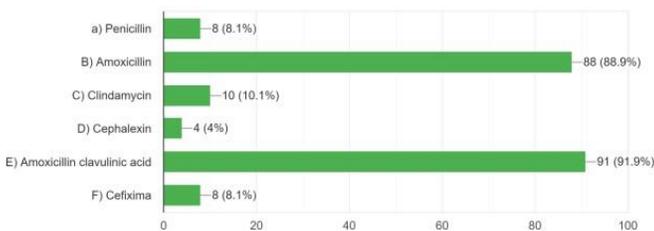
Table 5:

4. Is medical history recorded before prescribing ?		
	Frequency	Percentage
Yes	98	98
No	2	2

Table 6:

Which antibiotic do you prescribe most commonly ?

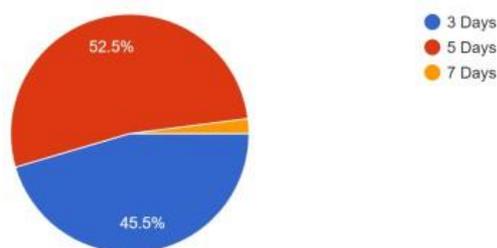
99 responses



Graph 1:

What is the duration and antibiotic course you prefer?

99 responses



Graph 2:

Is medical history recorded before prescribing?

98 responses



Graph 3:

Discussion

To the best of our knowledge, this is a survey to investigate antibiotic prescription patterns amongst dentists. The results of this research showed that dentists are likely to favor administering antibiotics for approved situations. Prescriptions were nevertheless often given in conditions that weren't advised.

The most typical antibiotics dentists prescribed were amoxicillin, amoxicillin clavulanic acid, or both. Dentists all around the globe frequently prescribe antibiotics in appropriately for illnesses that can be effectively treated with active dental care. More than

80% of prophylactic antibiotic prescriptions in dental practice were unnecessary, according to startling findings from a prior study.

This is supported by the findings of the current study, where 50% of the participating practitioners reported writing prescriptions for systemic antibiotics for ailments when they are not necessary. For instance, dentists advised antibiotics for conditions like acute pulpitis and gingivitis, or localised infections like dry socket, when the infection was limited to the gingiva or the pulpal region (alveolar osteitis).

An explanation for such an antibiotic prescription might be that it was prescribed as a preventative measure in an effort to get rid of infection while receiving endodontic treatment. Prophylactic antibiotic usage, however, is not well established, and prior research on antibiotic use in conjunction with endodontic therapy has produced mixed or inconclusive findings.

The use of antibiotics to manage the infection or lessen the discomfort brought on by a dry socket is also not supported by the available data. Results of a systematic analysis of randomised clinical trials for implant-associated operations revealed that prescribing antibiotics to healthy patients during the implantation of implants did not enhance the clinical outcome. On the other hand, it is yet unknown if preventive antibiotics are effective for individuals who are at risk for infective endocarditis because of inherited or acquired cardiac problems.

Cardiologists disagree with the new changes to guidelines that do not suggest an antibiotic treatment for these patients because they view dental operations as a possible source of infection. Additionally, mechanical debridement is the mainstay of periodontal treatment, with antibiotics only being beneficial in cases of refractory periodontitis and what was formerly termed as

aggressive periodontitis. Except for the qualification and workplace, no other practice-related or demographic characteristics showed a significant correlation with the pattern of antibiotic prescribing. Specialists often handle a small range of referred patients and have more defined treatment plans than general practitioners, who are in charge of providing primary care for many dental diseases. Additionally, as part of their primary teaching duties, dentists employed in the academic sector are expected to be knowledgeable about the most recent advancements in the dentistry industry.

This may account for the stronger correlation between accurate patterns of antibiotic prescription for recommended and non-recommended illnesses among academic dentists than among their colleagues in the healthcare industry. Dentists often advise taking antibiotics for a period of time longer than 3 days.

It is interesting to note that the length of amoxicillin use for illnesses for which antibiotics were not essential was considerably longer than the duration for illnesses for which antibiotics were required. In contrast to the results of this study, a lengthier antibiotic prescription was advised for disorders when extended antibiotic intake was not essential. Typically, a longer period of more than 10 days is prescribed for people with immunocompromised conditions and disseminated infections.

Another concerning finding was the indicated dosages for certain conditions, which were shown to be random rather than the needed dose. The lack of explicit instructions from government organizations may be to blame for this haphazard prescribing of antibiotics.

Due to the fact that this study used a questionnaire, it has limitations seen in studies with similar designs. For example, the fact that the questions had to be submitted online rather than in person may have impacted the

respondents' comprehension of the questions and subsequent interpretation of the data. Additionally, additional factors that were excluded from the current study, such as the patient's medical state or the sources of information for the antibiotic prescription, may have an impact on the antibiotics that dentists prescribe. A further drawback of this study is its reliance on dentists' replies, which could not have correctly represented the recommendations made to patients. However, the current study's strengths lie in the large sample size and use of a postal technique rather than online surveys, both of which were representative of the community under consideration.

Conclusion

The majority of the dentists tend to prescribe antibiotics for recommended conditions, but antibiotic prescriptions for Non recommended conditions were also common. Amoxicillin and Amoxicillin clavulanic acid were the most preferred antibiotics. The duration and antibiotic course most of the dentist prescribed are 3 days and 5 days. 98% of dentists recorded medical history before prescribing antibiotics.

Reference

1. Suda KJ, Hicks LA, Roberts RM, Hunkler RJ, Danziger LH. A national evaluation of antibiotic expenditures by healthcare setting in the United States, 2009. *J Antimicrob Chemother.* 2013;68(3):715–8. doi: 10.1093/jac/dks445. [DOI] [PubMed] [Google Scholar]
2. Fleming-Dutra KE, Hersh AL, Shapiro DJ, et al. Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010–2011. *JAMA.* 2016;315(17): 1864–73. doi: 10.1001/jama.2016.4151. [DOI] [PubMed] [Google Scholar]
3. Lockhart PB, Hanson NB, Ristic H, Menezes AR, Baddour L. Acceptance among and impact on dental

- practitioners and patients of American Heart Association recommendations for antibiotic prophylaxis. *Journal of the American Dental Association*. 2013;144(9):1030–35. doi: 10.14219/jada.archive.2013.0230. [DOI] [PubMed] [Google Scholar]
4. Cherry WR, Lee JY, Shugars DA, White RP, Jr, Vann WF., Jr Antibiotic use for treating dental infections in children: a survey of dentists' prescribing practices. *J Am Dent Assoc*. 2012;143(1):31–8. doi: 10.14219/jada.archive.2012.0015. [DOI] [PubMed] [Google Scholar]
 5. Roberts RM, Bartoces M, Thompson SE, Hicks LA. Antibiotic prescribing by general dentists in the United States, 2013. *J Am Dent Assoc*. 2017 doi: 10.1016/j.adaj.2016.11.020. [DOI] [PMC free article] [PubMed] [Google Scholar]
 6. Hicks LA, Bartoces MG, Roberts RM, et al. US outpatient antibiotic prescribing variation according to geography, patient population, and provider specialty in 2011. *Clin Infect Dis*. 2015;60(9):1308–16. doi: 10.1093/cid/civ076. [DOI] [PubMed] [Google Scholar]
 7. Ford PJ, Saladine C, Zhang K, Hollingworth SA. Prescribing patterns of dental practitioners in Australia from 2001 to 2012. *Antimicrobials. Aust Dent J*. 2016 doi: 10.1111/adj.12427. [DOI] [PubMed] [Google Scholar]
 8. Marra F, George D, Chong M, Sutherland S, Patrick DM. Antibiotic prescribing by dentists has increased: Why? *J Am Dent Assoc*. 2016;147(5):320–7. doi: 10.1016/j.adaj.2015.12.014. [DOI] [PubMed] [Google Scholar]
 9. Cope AL, Barnes E, Howells EP, et al. Antimicrobial prescribing by dentists in Wales, UK: findings of the first cycle of a clinical audit. *Br Dent J*. 2016;221(1):25–30. doi: 10.1038/sj.bdj.2016.496. [DOI] [PubMed] [Google Scholar]
 10. Schultz L, Lowe TJ, Srinivasan A, Neilson D, Pugliese G. Economic impact of redundant antimicrobial therapy in US hospitals. *Infect Control Hosp Epidemiol*. 2014;35(10):1229–35. doi: 10.1086/678066. [DOI] [PMC free article] [PubMed] [Google Scholar]