

Antibiotics: Judicious and Injudicious Use among Dentists: A Questionnaire Based Study

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ABSTRACT

Introduction: Dentists prescribe antibiotics for treatment as well as prevention of infection. Antibiotics are indicated for the treatment of odontogenic infections, oral non-odontogenic infections, as prophylaxis against focal infection and as prophylaxis against local infection and spread to neighbouring tissues and organs. Treatment of odontogenic infections includes diagnosis and management of the causative factor and usually, prescription of appropriate antibiotics. Placing a patient on antibiotics and rescheduling to have the source dealt with at a later time is not sound practice, as most often the infection will worsen. The use and abuse of antibiotics have been of concern to the medical and the dental profession for some time now, due mainly to the emergence of antibiotic-resistant bacteria.

Aim and objectives: The aim of this short study is to determine the rationale and the pattern of antibiotic prescription for dental management in Shimla, Himachal Pradesh in terms of the level of improvement in knowledge and feedbacks of the participants with the help of a questionnaire.

Materials and methods: A 56 BDS practitioners and 49 MDS dentists from Himachal Pradesh government dental college, Shimla (H.P) included in this study are given a questionnaire containing both open ended and closed ended questions. The questionnaires sought answers to the clinical and non-clinical factors; signs, clinical conditions and dental treatment modalities for which the practitioners would prescribe antibiotics.

Results/Conclusion: Odontogenic infections are polymicrobial in nature. Prompt diagnosis and treatment, including elimination of the causative factor, are crucial to their successful management. Antibiotics are a useful adjunct in the treatment of odontogenic infections, but should not replace removal of the causative factor. All dentists should know when referral to a specialist is warranted.

Keywords: Antibiotics; Antibiotic resistance; Antibiotic prophylaxis; Pediatric antibiotics

INTRODUCTION

Antibiotics are mostly prescribed in dental practice for two major reasons: For controlling oral odontogenic and non odontogenic infection and for the prevention of bacteremia caused by dental procedures resulting severe systemic conditions.

Antibiotics are prophylactically prescribed for prevention of oral flora related diseases introduced to distant sites in a host at risk or introduced to a compromised host. Dentists commonly prescribe antibiotics; hence they should have the proper knowledge of the judicious and injudicious use of these drugs.

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Antibiotic resistance infections are associated with 23,000 deaths and 2 million illnesses in the US every year. A March 2016 paper on 'Antibiotic resistance in India: Drivers and opportunities for action' in PLOS Medicine makes a convincing case for action against resistance: "Antibiotic resistance is a global public health threat, but nowhere is it as stark in India. The crude infectious disease mortality rate in India today is 416.75% 100,000 persons, twice the rate in U.S. (200) when antibiotics were introduced.

The professional organizations of health care practitioners after recognizing this increasing problem of antibiotic resistance have developed guidelines related to the adequate use of antibiotics. According to a study it has been observed that 7% to 11% of dentists prescribe all common antibiotics. Hence the American Academy of Pediatric Dentistry (AAPD) published guidelines for appropriate use of antibiotics which enlightens the adequate and judicious use of antibiotic therapy for treatment of various oral conditions in children and prevention of antibiotic resistant microorganisms [1-3].

MATERIALS AND METHODS

A cross sectional survey was done for this study. A vindicated, self-designed questionnaire was made for collection of demographic data and information related to the prescription pattern of antibiotics. 56 BDS practitioners and 49 MDS dentists from Himachal Pradesh government dental college, Shimla (H.P) were included in this study. The questionnaire sought answers to the clinical and non-clinical factors; signs, clinical conditions and dental treatment modalities for which the practitioners would prescribe antibiotics. The *chi-square* test was used for comparing the prescription pattern and knowledge between BDS and MDS practitioners.

RESULTS AND DISCUSSION

When comparison was done among BDS and MDS practitioners regarding awareness of prescription guidelines and antibiotic

resistance no significant difference was seen. Awareness of guidelines for prescribing antibiotic prophylaxis was 91% among postgraduates while it was 94% among graduates. While 98% BDS and 100% MDS practitioners had the knowledge about guidelines for antibiotic resistance and guidelines for antibiotic prescription knowledge was among 72% BDS and 87% MDS practitioners. When prescription of most often prescribed antibiotic was assessed it was found that 67.86% BDS and 65.31% MDS practitioners preferred amoxicillin while 16.07% BDS and 22.45% MDS practitioners preferred combination of amoxicillin and clavulanic acid and 14.29% BDS and 10.20% MDS practitioners prescribed other antibiotics. 47.22% BDS and 52.78% MDS practitioners prescribed antibiotics for 3 days while 60.71% BDS and 39.29% MDS practitioners preferred 5 days prescription and 8.93% BDS and 6.12% MDS practitioners prescribed antibiotics for more than 5 days. On comparing choice of antibiotic in case of penicillin allergy 17.86 % BDS and 35.71% MDS practitioners preferred clindamycin while 42.86% BDS and 26.53% MDS prescribed azithromycin and 33.93% BDS and 28.57% MDS prescribed erythromycin. Prescription pattern of dental practitioners according to clinical symptoms and general consideration was compared among BDS and MDS practitioners; antibiotic prescription was significantly higher for localized fluctuant swelling (0.001) while it was not significant for elevated temperature and evidence of systemic spread (0.44) and gross or diffuse swelling (0.43). When prescription pattern for some of the clinical diagnoses was compared it was found that there was significant increase of antibiotic prescription in case of acute pulpitis ($p=0.041$), acute periapical ($p=0.041$), chronic apical infection ($p=0.002$) and not significant ($p=0.22$) (Table 1).

Table 1: Awareness of prescription guidelines and antibiotic resistance.

Awareness of guidelines for	Graduates (%)	Post graduates (%)	p value
Antibiotic prophylaxis	94	91	0.565
Antibiotic resistance	98	100	0.347
Antibiotic prescription	72	87	0.059

Mostly inflammatory conditions are reported to dentists. Maximum percentage of dental pain originates from acute and chronic infections of pulpal origin, which necessitates operative intervention rather than antibiotics. In studies conducted in England, Kuwait and Turkey, it was found that many of the dentists prescribed antibiotics for dry socket. Antibiotics were also prescribed for localized intraoral swelling in many studies

conducted in Kuwait, Norway, England and South Australia which is not warranted. Both these conditions are not indicated for antibiotic prescription as per the AAPD guidelines (Tables 2-4) [4-7].

Table 2: Most often antibiotic prescribed.

Antibiotic	Graduates (%)	Postgraduates (%)
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Amoxicillin	67.86	65.31
Amoxicillin and clavulanic acid	16.07	22.45
Others	14.29	10.2

Table 3: Duration of antibiotic course.

Duration	Graduates (%)	Post graduates (%)
3	47.22	52.78
5	60.71	39.29
Others	8.93	6.12

Table 4: Choice of antibiotic in case of penicillin allergy.

Antibiotic	Graduates (%)	Post graduates (%)
Clindamycin	17.86	35.71
Azithromycin	42.86	26.53
Erythromycin	33.93	28.57

The most common dental infections present in the form of pulpitis and periapical periodontitis require only operative measures as per the AAPD guidelines on antibiotic therapy. In our study, 67% of the BDS practitioners and 32% of the MDS practitioners prescribed antibiotics for acute pulpitis showing statistical significant value (Table 5) [8-14].

Table 5: Prescribing patterns of dental practitioners according to clinical symptoms and general considerations.

Should antibiotics be used in the following case?	Yes (%)		p value
	graduates	postgraduates	
Elevated temperature+evidence of systemic spread	73.21%	79.59%	0.44
Localized fluctuant swelling	71.43%	40.82%	0.001*
Gross or diffuse swelling	64.29%	71.43%	0.43

Note: *Statistically significant

The most popular antibiotic is amoxicillin followed by penicillin V, metronidazole, amoxicillin and clavulanate. In our study, it was found that 67% of the BDS practitioners and 65% of the MDS practitioners relied on amoxicillin as the first choice, which was similar to studies conducted by Karibasappa, Montgomery, Gonul and Gregoire. The awareness of guidelines

for prescription of antibiotics was found to be low among the BDS practitioners (72%) in contrast to the MDS practitioners (87%). The difference was statistically significant (Table 6) [15-18].

Table 6: Prescription of antibiotics for selected dental diagnoses.

Should antibiotics be prescribed for the following clinical diagnoses?	Yes (%)		p value
	Graduates	Postgraduates	
Acute pulpitis	67.65%	32.35%	0.041*
Acute periapical infection	65.22%	34.78%	0.0007**
Chronic apical infection	65.15%	34.85%	0.002**
Periodontal abscess	58.21%	41.79%	0.22

Note: *Statistically significant

CONCLUSION

In our study the results suggests indiscriminate, injudicious and inappropriate use of antibiotics for treatment of various oral conditions. Over prescription was observed among graduates when compared with postgraduates. Discrepancies between observed and recommended practice support the need for educational initiatives to promote rational use of antibiotics in dentistry.

SOURCES OF FUNDING

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CONFLICT OF INTEREST

No conflict of interest.

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