

## Prescription pattern of antimicrobial agents by dental practitioners: a questionnaire based study

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### ABSTRACT

**Background:** The aim of this study was to know the pattern & rationality of antimicrobial prescription by dental practitioners.

**Methods:** It was questionnaire based cross sectional study. A total of 175 questionnaires were distributed to dental practitioners working in a tertiary care Dental College & Hospital and private practitioners in Jaipur (Rajasthan). The questionnaire contained questions about years of practice, diagnosis for which antimicrobial were prescribed, dosage and duration of antimicrobial drugs for prophylaxis, acute and chronic conditions, patient compliance & adverse effects. Data was expressed as counts and percentages.

**Results:** Out of 175 questionnaires distributed, 150 were included in the study. 78% dentists had practices less than 5 years duration. Most common indications for which antimicrobials were prescribed were abscess, cellulitis, irreversible pulpitis, and acute gingivitis. Most common antimicrobials used for prophylaxis were Amoxycillin and Metronidazole. For the treatment of acute and chronic conditions, Amoxycillin, Metronidazole, Ofloxacin and Ornidazole alone or in combination were used. Only 20% dentist advised culture & sensitivity tests. 74% patients completed the recommended course of antimicrobials. 56% patients reported adverse drug reactions (ADRs) with the most common being nausea and vomiting, but only 13% dentists reported them to proper authorities.

**Conclusions:** In this study, Amoxycillin and Metronidazole were the most common drugs used for the management of oral diseases, but were prescribed without culture & sensitivity in most cases. 56% patients reported ADRs, but only 13% dentists reported them to proper authorities. Appropriate measures need to be taken to promote rational prescribing and ADR reporting.

**Keywords:** Dental, Antimicrobials, Rational prescribing

### INTRODUCTION

Dentists prescribe medications for the management of a number of oral conditions; mainly orofacial infections.<sup>1</sup> The prescribing of antimicrobials by dental practitioners has become an important aspect of dental practice. For this reason, antimicrobials account for the vast majority of medicines prescribed by dentists.<sup>2</sup> More common dental infections present in the form of pulpitis and periapical periodontitis, which require only operative measures like fillings, root canal therapy, or extraction if the tooth is not restorable.<sup>3</sup>

Clinical situations that require antibiotic therapy on empirical basis are limited, and they include oral infection accompanied by elevated body temperature and evidence of systemic spread like lymphadenopathy and trismus.<sup>4</sup>

There are also a limited number of localized oral lesions that are indicated for antibiotic use and these include periodontal abscess, acute necrotizing ulcerative gingivitis, and pericoronitis.<sup>5</sup> Frequency of prescribing is usually mentioned in the known resources for antibiotic prescribing whereas duration of treatment recommended in therapeutic guidelines is most commonly based on expert opinion.<sup>6,7</sup>

Inappropriate prescribing of antimicrobials may be associated with unfavorable side effects ranging from gastrointestinal disturbances to fatal anaphylactic shock and especially development of resistance.<sup>8</sup> Consequently, surveillance of antimicrobial resistance, monitoring of antibiotic usage and attempts to improve prescribing attitudes have become crucial.<sup>9</sup>

**METHODS**

This study was an anonymous, questionnaire-based survey undertaken in a tertiary care Dental College & Hospital, Jaipur and private dental practitioners in Jaipur, to assess the prescribing patterns of various antimicrobial drugs. All the dental practitioners who were willing to participate in the study were enrolled. A self-developed, pre-validated questionnaire consisting of questions related to most common diagnosis for which antimicrobials were prescribed, pattern of antimicrobial use for prophylaxis & treatment of acute & chronic conditions, patient compliance and adverse effects seen with antimicrobials use, was distributed. A briefing was given about the nature of the study, and the procedure of completing the questionnaire was explained. A total of 175 questionnaires were distributed out of which 150 were completely filled & were included in the study. After completion of the questionnaire, data was collected, reviewed, organized and expressed as counts and percentages.

**RESULTS**

In this study, a total of 175 questionnaires were distributed to dental practitioners, out of which 150 were included in the study. The rest were excluded due to submission of incomplete data in the questionnaire.

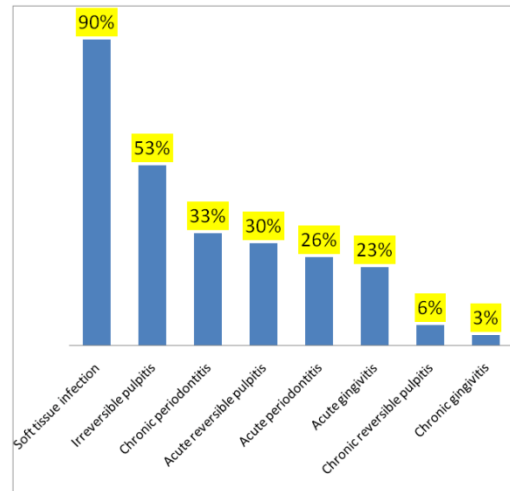
In this study, 56% of dental practitioners were males and 44% were females. Maximum practitioners (78%) had a practice of less than 5 years (Table 1). The majority of patients visiting the dental practitioners were in age group of 30-50 years (Table 2). Most common diagnosis for which antimicrobials were prescribed were soft tissue infections (90%) followed by irreversible pulpitis (53%) and chronic periodontitis (33%) (Figure 1). 68% practitioners prescribed antimicrobials for prophylaxis with Beta lactam group (penicillin & cephalosporins, with or without a Beta lactamase inhibitor) being most commonly prescribed (Figure 2). Most common antibiotics prescribed for acute as well as chronic conditions were again Beta lactam group (Figures 3 & 4). Only 20% dental practitioners advised culture & sensitivity tests. Adverse drug reactions were reported by 56% of patients, with nausea & vomiting being most commonly reported. Only 13% dentists reported adverse drug reactions to proper authorities. Patient compliance was good, with 74% patients completing the recommended course of antimicrobials.

**Table 1: Professional characteristics of participating dental practitioners.**

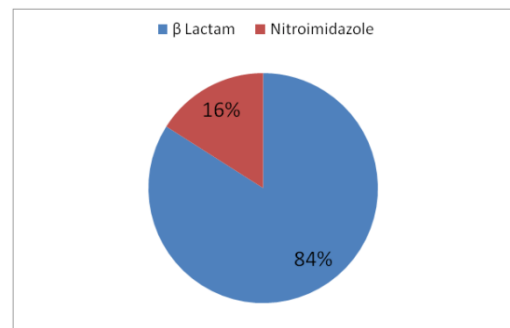
Years of practice	Percentage value
<5 years	78%
5-10 years	16%
>10 years	6%

**Table 2: Age group of patients- percentage distribution.**

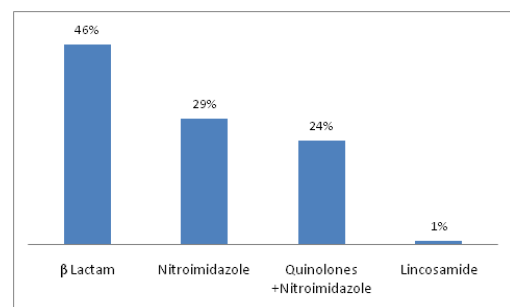
Age group of patients	Percentage value
0-15 years	3%
15-30 years	40%
30-50 years	83%
50-70 years	16%



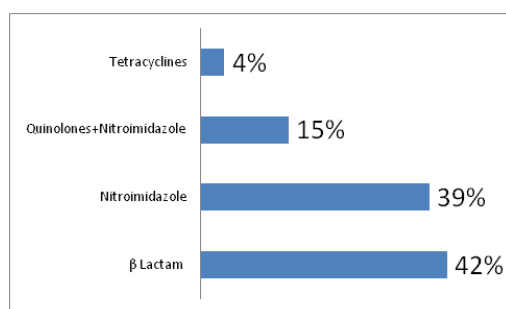
**Figure 1: Diagnosis for which antimicrobials were usually prescribed.**



**Figure 2: Antimicrobials used in prophylaxis of dental conditions.**



**Figure 3: Antimicrobials used in acute conditions.**



**Figure 4: Antimicrobials used in chronic conditions.**

## DISCUSSION

Indications for the use of systemic antibiotics in dentistry are limited, since most dental and periodontal diseases are best managed by operative intervention and oral hygiene measures. However, the literature provides evidence of inadequate prescribing practices by dentists, due to a number of factors ranging from inadequate knowledge to social factors.<sup>10</sup> A study in 2010 done in Jordan investigated the pattern of antibiotic use by dentists worldwide, concluded that the prescribing practices of dentists are inadequate and this is manifested by over-prescribing.<sup>8</sup> Recommendations to improve antibiotic prescribing practices have been presented here in brief in an attempt to curb the increasing incidence of antibiotic resistance and other side effects of antibiotic abuse. Various guidelines recommend that the first step in the treatment of dental and periodontal infections is the use of local measures. Antibiotics are appropriate for oral infections where there is evidence of spreading infection or systemic involvement. In addition, other indications for antibiotics are acute necrotising ulcerative gingivitis and sinusitis, and pericoronitis where there is systemic involvement or persistent swelling despite local treatment. Antibiotics should be used in conjunction with, and not as an alternative to, local measures. There is no evidence to support the prescription of antibiotics for the treatment of pulpitis or the prevention of dry socket in non immunocompromised patients undergoing non-surgical dental extractions.<sup>11,12</sup>

Regarding prophylaxis in dental procedures, National Institute for Health and Clinical Excellence (NICE) has recently produced guidance recommending that in infective endocarditis antibiotic prophylaxis not be used in patients undergoing dental procedures. In addition, there is no evidence that prophylaxis is of any benefit in patients with prosthetic joints and it is unacceptable to expose patients to the potential adverse effects of antibiotics in these circumstances.<sup>13</sup> For most dentoalveolar surgical procedures in fit, non-medically compromised patients, antibiotic prophylaxis is not required or recommended.<sup>14</sup> Antibiotic Prescribing Guidelines for dentists usually recommend that in most of acute conditions 1<sup>st</sup> choice is amoxycillin or metronidazole with alternatives including macrolides like erythromycin & clarithromycin. In chronic

periodontal disease conditions 1<sup>st</sup> choice is metronidazole and 2<sup>nd</sup> choice is doxycycline. Regarding cephalosporins, their widespread use is unnecessary & they have not been routinely recommended. Clindamycin should also not be used routinely, but only after culture & sensitivity. No guidelines recommend the routine use of fluoroquinolones in the treatment of the common dental infections encountered in this study.<sup>11,12</sup> In our study, 68% dental practitioners prescribed antibiotics for prophylaxis. Studies done in developing countries reported that abuse of prophylactic antibiotics was to prevent postoperative infection following surgical dental manipulations or to cover either a defect in aseptic clinical technique or improperly sterilized equipment; thus, a 'just in case' principle is practiced.<sup>15,16</sup>

For the treatment of acute conditions,  $\beta$  lactam antibiotics were most commonly prescribed (46%) with amoxycillin alone or in combination with clavulanic acid being prescribed in most cases; followed by nitroimidazoles (29%) & quinolones in combination with nitroimidazole (24%). Similar studies have also shown that amoxycillin is the preferred drug for most acute conditions with 70.5% prescribing it in England; & 74.5% in Iran.<sup>16,17</sup>

For chronic conditions  $\beta$  lactam antimicrobials (42%), nitroimidazoles (39%), quinolones+nitroimidazole (15%) & tetracyclines (4%) were prescribed in our study. A study in England found amoxycillin use to be 67% for chronic apical infection, & metronidazole use to be 48% for chronic marginal gingivitis & 44% for chronic periodontitis.<sup>16</sup> Culture & sensitivity was advised by only 20% practitioners. Adverse drug reactions were reported by 56% patients, but only 13% dental practitioners reported them to the proper authorities, showing a gross under-reporting & lack of knowledge about the pharmacovigilance aspect of reporting these adverse drug reactions.

## CONCLUSION

Our findings indicate that the scientific basis for prescribing antimicrobial agents was neglected by the majority of the practitioners. Most of those dental practitioners surveyed used antibiotics routinely for conditions where local treatment would be sufficient. Measures like audit of clinical antibiotic prescribing in dentistry has been reported to improve general dental practitioners attitudes to prescribing antimicrobials, reducing the number of prescriptions following the introduction of guidelines.<sup>18-20</sup> Other measures like proper sensitization of dental practitioners to the risks of irrational prescribing, formulating proper guidelines & promoting reporting of adverse drug reactions can all help to promote the rational use of antimicrobial agents.

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