

ORIGINAL RESEARCH ARTICLE

**Status of Antimicrobial Use in Dental Outpatient Department of a Tertiary Care Hospital in Central Nepal**

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**ABSTRACT**

Inappropriate prescribing of antibiotics by health care professionals is a worldwide concern. This study evaluated the antimicrobial drugs prescribing pattern for patients attending the dental OPD of Chitwan Medical College Teaching Hospital, Bharatpur, Nepal. 1173 prescriptions of patients attending the dental OPD were collected randomly during 15<sup>th</sup> July 2011 to 14<sup>th</sup> January 2012. The data was analyzed using WHO guidelines. The average number of drugs prescribed was 2.3 per prescription. The most commonly prescribed antimicrobials were amoxicillin (30.9%) followed by metronidazole (20.9%). Only 30.6% of antimicrobials were prescribed by generic name and 78.6% of antimicrobials belong to essential drug list (EDL) of Nepal. In this study, amoxicillin was the most commonly prescribed antimicrobials among dental outpatients.

**Key words:** antimicrobials, patients, prescription, rational use, dentistry

**INTRODUCTION**

Antimicrobials are commonly prescribed drugs and the problem of their overuse is a global phenomenon. The administration of antimicrobial agents for the management or prevention of infections in risk patients is a commonly accepted procedure. However, the systematic use of antimicrobial prophylaxis in patients with no individual risk factor is a controversial issue lacking a scientific literature. Prolonged use of antimicrobial prescription can encourage the development of drug resistance which is an emerging and significant problem in oral microorganisms [1-3] and therefore antimicrobial prescription must be kept to a minimum and use only when there is a clear indication [4]. Otherwise their use may present more of a risk to the patient than the infection being treated or prevented. Antimicrobial can be responsible for various adverse effects, drug interactions, selection and overgrowth of resistant microorganisms, potentially fatal allergic reactions and antibiotic associated colitis [4-6].

A study in eastern Nepal had shown that antimicrobials were present in 84 percent of prescriptions and constituted 42.8 percent of the total number of drugs [7]. In Nepal, studies have shown that prescriptions of large number of drugs,

excessive use of antibiotics and injections are common drug use problems [8]. In India some of the literature have suggested that the use of antimicrobial agents varies from 24% to 67% [9,10].

Antimicrobial prescriptions made by dentists are for the treatment of odontogenic infections, but mostly for prophylactic reasons in surgeries and other dental procedures [11]. There is no evidence to support the prescription of antimicrobials for the patients of pulpitis or the prevention of dry socket in non-immunocomprised patients undergoing non-surgical dental extractions where these are commonly prescribed. Although a medical prescription is required by law in order to purchase antimicrobials in most of the countries, most of the antimicrobial consumption is made without a prescription [12]. Some of the drug retailers in Kathmandu were found dispensing antimicrobials without a prescription and were also engaged in diagnostic and therapeutic behavior beyond their training [13].

As health professionals, dental surgeons may be contributing to this antimicrobial abuse by prescribing antimicrobial prophylaxis and treatment that are not always scientifically warranted. There is clear evidence that

antimicrobials are being used inappropriately by dental surgeons for a variety of conditions [6,14-16]. The rational use of antimicrobials is based upon three variables: a defined indication, the appropriateness of the antimicrobial and the adverse effects associated with the drug.<sup>[5]</sup> The first factor is the most contentious because there is a paucity of scientific evidence to support the use of antimicrobials in clinical practice<sup>[5,15]</sup>.

The purpose of the study was to identify the problem and provide information that can be used to improve the appropriate use of antimicrobials in dental out-patients.

## MATERIALS AND METHODS

The prospective cross sectional (descriptive) study was carried out in dental OPD of Chitwan Medical College Teaching Hospital, Bharatpur-10, Chitwan, Nepal. A data collection form was prepared which includes patient as well as medication related informations. The study was approved by the Institutional Ethical Committee. Written consent was obtained from the patients before their participation in the study. The subjects who had willingly participated were enrolled on the basis of inclusion and exclusion criteria. 1173 prescriptions were collected during 15<sup>th</sup> July 2011 to 14<sup>th</sup> January 2012. All relevant and necessary information for the study was collected from the outpatient department card. Patient related parameters includes age, sex, address, diagnosis etc. and drug related data such as name of the drug, dosage form, dosing frequency, duration etc. also noted. The Antimicrobial containing prescriptions (n = 837) were separated from the total prescriptions collected. These informations were analyzed by using WHO guidelines as described in accordance with "How to investigate drug use in health facilities?"<sup>[17]</sup>

## RESULTS

**Fig 1 & 2** provide the age and sex distribution of the patients in dental OPD. The number of males was 564 (48.1%) while the number of females was 609 (51.9%). The maximum number of patients was in the age group of 12 to 64 years and minimum number of patients was in the age group of  $\geq 65$  years. **Table 1** illustrates the pattern of the dental disorders. The most frequently reported dental disorders in our study were acute apical periodontitis, chronic generalized periodontitis, chronic gingivitis and dental caries etc.

**Fig 3 & Table 2** describe the pattern of antimicrobials prescribing in dental OPD. In total, 837 (71.3%) prescriptions contained antimicrobials which are the most commonly

prescribed drugs in the dental OPD. The most commonly prescribed antimicrobials were amoxicillin (30.9%) followed by metronidazole (20.9%).

The average number of drugs prescribed for each out-patient was 2.3 per prescription. In total, 21.4% antimicrobials were prescribed in fixed-dose combinations (FDCs) of the two drugs. Only 30.6% of antimicrobials were prescribed by generic name and 78.6% of antimicrobials belong to essential drug list (EDL) of Nepal.

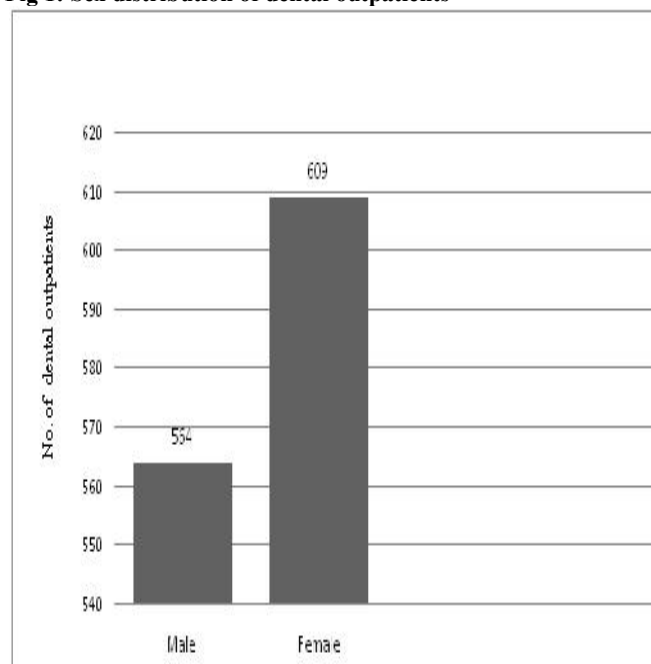
**Table 1: Diagnosis of dental conditions**

Diseases	Numbers of patients (%)
Acute apical periodontitis	249 (21.3%)
Acute gingivitis	87 (7.4%)
Aphthous stomatitis	24(2%)
Chronic generalized periodontitis	159(13.5%)
Chronic gingivitis	126(10.7%)
Dental caries	144(12.3%)
Dentoalveolar abscess	3(0.3%)
Glossitis	12(1%)
Leukoplakia	9(0.8%)
Lichenplanus	6(0.5%)
OSMF	3(0.3%)
Periapical abscess	162(13.8%)
Periodontal abscess	54(4.6%)
Diagnosis not mentioned	135(11.5%)

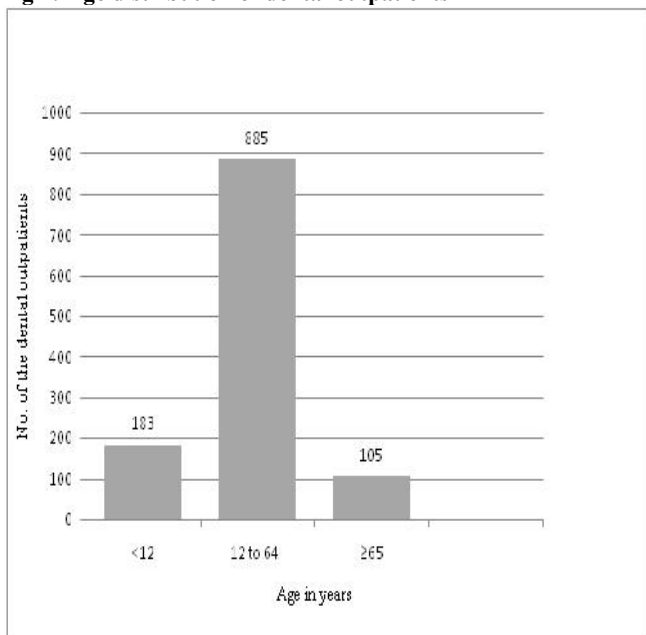
**Table 2: Analysis of dental OPD prescriptions**

Details	Total (%)
Total number of prescriptions Analyzed	1173
Total number of drugs prescribed	2709
Total number of Antimicrobials	837 (71.3%)
Antimicrobials prescribed in generic	390 (30.6%)
Antimicrobials prescribed as FDCs	273 (21.4%)
Antimicrobials prescribed from Essential Drug List of DDA (Department of Drug Administration) Nepal	1002 (78.6%)

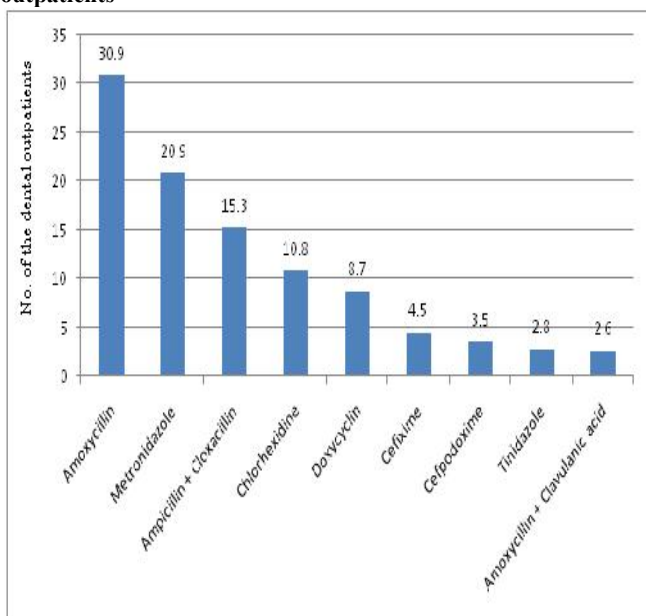
**Fig 1: Sex distribution of dental outpatients**



**Fig 2: Age distribution of dental outpatients**



**Fig 3: Pattern of Antimicrobials prescribed in dental outpatients**



**DISCUSSION**

Drug utilization studies are important for obtaining data about the patterns and quality of use, the determinants of drug use and the outcomes of use. The main aim is to facilitate the rational use of medicines in populations [18]. Antimicrobials are invaluable adjuncts in the management of oro-facial infections. Although they are not a substitute for definitive treatment, their judicious use can shorten infection periods and minimize associated risks, such as the spread of infection to adjacent anatomical spaces or systemic involvement [19].

There is much discrepancy regarding the prescription of antimicrobials in the past few decades especially with the advent of higher generation antibiotics. Within the last few decades antimicrobial resistance has become a worldwide

problem and constitutes a major threat to public health. The unsystematic prescribing of antimicrobials by dental surgeon is a major factor to be considered. Evidence of the inappropriate use of antibiotics in dentistry has increased and this could lead to the problem of antimicrobial resistance [20-23]. This fact and the increase in the number of antibiotic prescriptions written by dentists each year [21] show the importance of antimicrobials prescribing pattern in dental OPD. This study showed that the entire patients attending dental OPD received 2.3 drugs per prescription which is similar to the studies [24,25]. The WHO recommends that the average number of drugs per prescription should be less than two [17]. The observed value in our study therefore may be taken as an evidence of existing polypharmacy. This index should be kept as low as possible to avoid the unfavorable outcomes of polypharmacy such as increased risk of drug interactions, increased cost of therapy, non-compliance and emergence of resistance in case of use of antimicrobials.

Based on this study, antimicrobials (47.3%) were the most commonly prescribed drugs. This was a similar finding to studies performed in a western Nepal, [26] central Nepal [24] and eastern Nepal [27] where 44.9%, 31.5 % and 40.3% of the prescription contained antimicrobials respectively. Most often, therapeutic antimicrobial selection is done on empirical basis and such practice of selection without culture and sensitivity may increase antimicrobial resistance and adverse drug reactions. However orofacial pain due to infections are common presentations in dental OPD and the need to prescribe more of antimicrobials cannot be overemphasized. This has further revealed that current pharmacological interventions are directed primarily to the elimination of infection. [28] In this study, amoxicillin (30.9%) was most commonly prescribed antimicrobials followed by metronidazole (20.9%), which is similar to the studies [24,29,30]. These finding suggest that the infection control is the important factor in outpatient dentistry and, as the most common pathogens are gram positive bacteria, use of extended spectrum penicillins is justifiable though culture and sensitivity test was not carried out routinely in dentistry. Among the antimicrobials amoxicillin and metronidazole were the most commonly prescribed combinations. The choice of amoxicillin and metronidazole is justified as they reach effective concentration in gingival

crevicular fluid and they have the ability to cover gram positive and gram negative organisms<sup>[31]</sup>.

Drugs prescribed by generic name in our study were observed to be 30.6%, which is similar to the study observed in the study of eastern Nepal (29.3%),<sup>[7]</sup> however, our finding is a remarkably low figure in comparison to those reported in the studies of western Nepal (63.5%),<sup>[26]</sup> India (96.5%),<sup>[32]</sup> Iran (97.2%)<sup>[33]</sup> and Sudan (43.6%).<sup>[34]</sup> Cost of the treatment and prescribing errors can be minimized by prescribing the drugs in generic name and this need to be promoted among dental surgeons. Drugs prescribed from essential drugs list of Nepal were 78.6% in the present study. In a study from western Nepal 75.6 % of drugs were prescribed from the Essential Drug list of Nepal which is similar to our study.<sup>[26]</sup> Prescribing from such list is beneficial in terms of cost effectiveness and safety as drugs are selected with due regard to local disease prevalence, evidence of efficacy and safety and the cost. Prescribing from such list should be encouraged to ensure rational use of medicines.

### CONCLUSION

The present work is the only drug utilization study conducted in the dental OPD at CMCTH. In this study, amoxicillin was the most commonly prescribed antimicrobials among dental outpatients. The data presented here will be useful in future for long term and extensive drug utilization studies and in the promotion of rational prescribing in the hospital. We recommend regular CMEs for the dental surgeons at different levels to encourage prescribing by generic name. Moreover framing strategies and its implication, to make the prescription cost effective is a crucial issue, yet to be considered.

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