

Drug Utilization Pattern Of Antimicrobial Agents In Dental Outpatients Of A Tertiary Care Teaching Rural Hospital

Nirav N.Patel*, Haresh Desai*, Nilay Modi**, Nehal Shah**

*Assistant Professor, ** Resident, Department, Department of Pharmacology,
S.B.K.S. Medical Institute & Research Centre, Sumandeep Vidyapeeth, Piparia, , Dist. Vadodara

Abstracts: Aim: To study drug utilization pattern of antimicrobial agents in various outpatient departments of a tertiary care teaching rural dental hospital. **Methods:** A prospective-observational study was carried out in 200 patients from January 2014 to March 2014. Relevant information was obtained from the interview as well the hospital case record. Structured and pre-tested format was used for compiling the data. **Results:** The majority of the patients (51.5%) were in age group 41 to 60 years. Common conditions for antibiotic use included periodontal diseases (46.5%), endodontic diseases (38.5%) and dental caries (21.5%). Five antimicrobial drug formulations were used leading to a total of their 253 drug uses. Amoxicillin alone (64%) was the most commonly prescribed antimicrobial formulation followed by amoxicillin plus clavulanic acid (31.5%), metronidazole (26.5%), ofloxacin plus ornidazole (3%) and doxycycline (1.5%). The average number of antimicrobials prescribed per patient was 1.61. The average duration of antimicrobial was found to be minimum 3 days to maximum 5 days. Except ofloxacin plus ornidazole, all of the prescribed antimicrobials have been included in the WHO Model List of Essential medicines. 50.59% and 49.40% of total antimicrobial drug formulations were prescribed by generic and brand names respectively. **Conclusions:** Drug utilization data can help to formulate appropriate clinical guidelines for drug use and facilitate rational use of medicines in population. [Patel N NJIRM 2014; 5(3):42-45]

Key Words: Dentistry, antimicrobials, drug utilization study

Author for correspondence: Dr. Nirav Patel; S.B.K.S Medical Institute & Research Center, Sumandeep Vidyapeeth Piparia ; Vadodara ; Gujarat; Mo: 09898557371 Email: nirav_1313@yahoo.com

Introduction: Drug utilization research was defined by the World Health Organization (WHO) in 1977 as "the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences"¹. In the present scenario, drug utilization studies have become effective tools to ascertain the role of medicines in society. Antimicrobial agents are widely prescribed in dental practice. Antibiotics are typically prescribed for treatment of orofacial infections as well as for prophylaxis against focal infections in patients at risk (endocarditis and joint prostheses), local infections and systemic spread in oral surgery^{2,3}. Dental infections are polymicrobial in nature with 2-10 major microbial species involved including anaerobes. Thus, it becomes difficult to determine the principal causative pathogen⁴. Judicious use of antibiotics in addition to dental intervention is the most appropriate method to treat odontogenic infections. Inappropriate use of antimicrobial agents is a major concern in clinical practice. Such misuse includes incorrect dose and duration of antimicrobial therapy, inappropriate choice of antimicrobial and the use of an

antimicrobial in unwarranted clinical situations⁵. The consequences of misuse of antimicrobials include ineffective treatment, development of resistance, adverse drug reactions and economic burden on patients and society. These problems have led to a need for rationalization of antimicrobial use in dental practice for the treatment of infections. Studies investigating drug utilization pattern of antibiotics amongst dentists are limited. Hence, the study was undertaken with an aim to study drug utilization pattern of antimicrobial agents in various outpatient departments of a tertiary care teaching rural dental hospital.

Material and Methods: A prospective and observational study was carried out over a period of two months from January 2014 to March 2014 in K.M. Shah Dental Hospital, attached to Sumandeep Vidyapeeth, Piparia, Vadodara, India. Before starting this study, the study protocol was approved by the Institutional Ethics Committee. Written informed consent was obtained from participants who had volunteered for the study. Two hundred patients of any age and either sex, who were prescribed one or more antimicrobials,

were included in the study. Outdoor patients were interviewed once at the time of recruitment. Relevant patient demographics and information pertaining to antimicrobials prescribed were collected from the interview as well the hospital case record and entered in a pre-structured case record form.

The data collected included name, age, sex, indications (diagnosis) and details of antimicrobials prescribed including name (brand/generic), dose, route of administration, frequency and duration of treatment. Data were analyzed for total number of antimicrobial drug formulations prescribed, average number of antimicrobials per prescription, duration of the antimicrobial agent prescribed, number of fixed-dose drug combinations (FDCs), number of antimicrobials prescribed by International Non proprietary Name (INN, generic name) or brand name and number of antimicrobials prescribed from the WHO Model List of Essential medicines.

Results: A total of two hundred prescriptions containing one or more antimicrobials were collected for analysis as per study parameters. The demographics showed that out of 200 patients included in the study, 123 (61.5%) patients were males and 77 (38.5%) were females. Highest number of patients [103,51.5%] were within the age group of 41 to 60 years and least number of the patients [7, 3.5%] were in the age group of less than 20 years. Demographic characteristics of patients are shown in Table 1.

Table 1: Demographic Characteristics Of Patients

Variables	n(%)
Gender	
Male	123(61.5%)
Female	77(38.5%)
Age(Yrs.)	
Less Than 20	07(3.5)
21 – 40	37(18.5)
41-60	103(51.5)
More than 60	53(26.5)

In our study, it was observed that antimicrobials were prescribed for periodontal diseases, endodontic diseases, dental carries and surgical

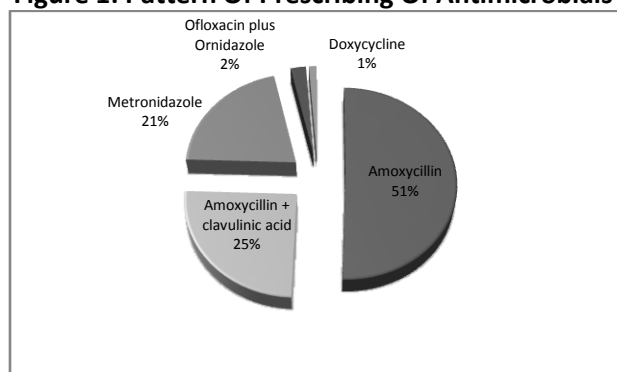
procedures. Periodontal diseases [93,46.5%] were found to be the most common indication for antibiotic use, followed by endodontal diseases [77,38.5%], surgical procedures [70,35%] and dental carries [43,21.5%] (Table 2).

Table 2: Disease Pattern And Number Of Patients

Diseases/procedures	No. Of patients n (%)
Periodontal diseases	
Chronic generalized periodontitis	57(28.5)
Acute periodontitis	33(16.5)
Acute necrotizing ulcerative gingivitis	3(1.5)
Endodontic diseases	
Chronic pulpitis	42(21)
Periapical abscess	35(17.5)
Dental carries	
	43(21.5)
Surgical Procedures	
Tooth extraction	23(11.5)
Root canal treatment (RCT)	47(23.5)

In the present study, five antimicrobial drug formulations were prescribed among 200 patients leading to a total of 253 drug uses. Out of five formulations, three contained one active ingredient [184(72.72%) of all drug uses] whereas the rest were fixed dose drug combinations (FDCs) [69(27.27%) of all drug uses]. The average number of antimicrobials prescribed per patient was 1.61. Amoxicillin 500 mg alone (64%) was the most commonly prescribed antimicrobial formulation followed by Amoxicillin plus clavulanic acid 500mg +125 mg(31.5%), Metronidazole 400 mg (26.5%), Ofloxacin plus Ornidazole 200mg+500mg(3%) and Doxycycline 100 mg(1.5%)(figure:1). The duration of antibiotic treatment was found to be 5 days in 69.17% of all drug uses and 3 days in 30.83%.

Approximately half [128,50.59%] of total antimicrobial drug formulations were prescribed by their International Non proprietary Names (INN, generic name) and remaining half [125,49.40%] by their brand names. Except ofloxacin plus ornidazole combination, all of the prescribed antimicrobials have been included in the WHO Model List of Essential medicines. No medicine was prescribed by parenteral route.

Figure 1: Pattern Of Prescribing Of Antimicrobials

Discussion: Dental practitioners use antibiotics as adjunct to dental intervention to prevent and treat infections^{6,7}. Dental infections are polymicrobial in nature involving a combination of gram positive, gram negative, facultative anaerobes and strict anaerobic bacteria⁸. As a result, the use of broad spectrum antibiotics is widespread. Though the use of broad spectrum antibiotics can produce dramatic benefits in certain indications, indiscriminate use can contribute to the ever increasing prevalence of antibiotic resistance. Our results found three major disease indications for antibiotic use with periodontal diseases being the most common followed by endodontic diseases and dental caries. Manasa et al and Rauniar et al had similar results with periodontal diseases being the most commonly reported indication^{9,10}. Periodontitis that is actively progressing is usually associated with specific bacterial infections and requires the adjunctive use of systemic antibiotic therapy.

The average number of drugs per prescription reflects the standard of prescribing and baseline data for the same may serve as a target for an educational intervention in the future. The mean number of antibiotics per prescription was found to be 1.61 in the present study. When we compared our findings to that of other similar studies (Salman MT et al and Kulkarni MD et al)^{11,12} on dental patients in India, we found the mean number to be more than that of the Kulkarni MD et al study (1 antibiotic per prescription) but closer to that found in the Salman et al study (2 antibiotics per prescription). In our study, amoxicillin was found to be the most commonly prescribed antibiotic either alone or in

combination with clavulanic acid. This is consistent with the available literature¹³. Of all prescriptions where amoxicillin was prescribed, approximately one fourth also had metronidazole. In most cases antimicrobials were prescribed empirically. Such practice may contribute to antimicrobial resistance. Antimicrobial drug use was found to be appropriate in terms of dosage form, dose, frequency and route of administration in all patients. However, duration of treatment was found to be inappropriate in 30.83% of all drug uses. In all of these instances amoxicillin was found to be the drug prescribed.

Two fixed dose drug combinations (FDCs) were used in the present study amounting to approximately one fourth of all antimicrobial drug uses. The more commonly prescribed fixed dose drug combination was amoxicillin plus clavulanic acid (91%). All antimicrobials prescribed are those included in the WHO Model List of Essential except ofloxacin plus ornidazole. Approximately half of total antibiotic drug formulations were prescribed by their brand names. Though this number is lower than that found in other similar studies done in India^{11,12}, generic drug prescribing should be further encouraged. Prescription by brand names increases the cost of the treatment as compared to generic drug prescribing. Generic drug prescribing increases the cost effective options for the patients and reduces the administrative inconvenience. It is important to note here that even the Medical Council of India (MCI) had advised the doctors registered under its authority to prescribe medicines using generic names¹⁴. Further, the government of Gujarat has issued a circular on 1st July 2013, making it mandatory for all doctors working in hospitals run by government or funded by it, to prescribe medicines by generic names in interest of patients¹⁵.

Conclusion: Drug utilization data may help to provide information on prescribing habits and to measure specific aspects of drug use and patient care. Development of a hospital committee for prescription audit, establishment of guidelines for antibiotic usage and educational initiatives to increase awareness can encourage the rational and appropriate use of drugs in dentistry.

References:

1. World Health Organisation. Introduction to drug utilization research. Geneva: World Health Organisation; 2003
2. Poveda – Roda R, Bagan JV, Sanchis – Bielsa JM, Carbonell – Pastor E. Antibiotic use in dental practice, a review. *Med Oral Patol Oral Cir Bucal*. 2007; 12: 186-192
3. Palmer NAO, Peeling R, Ireland RS, Martin MV. A study of therapeutic antibiotic prescribing in National Health Service general dental practice in England. *Br Dent J*. 2000;188 (10): 554-558.
4. Sharma HL and Sharma KK. Dental pharmacology. New Delhi: Paras medical publisher; 2014. P.348
5. Select Committee on Science and Technology (1998). Resistance to antibiotics and other antimicrobial agents. London: HMSO.
6. Pallasch TJ. Antibiotics in endodontics. *Dent Clin North America*. 1979; 23: 737-746.
7. Abbott PV, Hume WR, Pearmar JW. Antibiotics and endodontics. *Australian Dent J*. 1990; 35: 50-60.
8. J. F. Siqueira Jr., I. N. Rocas, and M. G. Silva, "Prevalence and clonal analysis of *Porphyromonas gingivalis* in primary endodontic infections," *Journal of Endodontics*, vol. 34, no. 11, pp. 1332–1336, 2008.
9. Manasa CR, Dass AP. Prescribing patterns of antibiotics in dental practice. *International Journal of Basic and Applied Medical Sciences* 2013; 3(2):336-339.
10. Rauniar GP, Das BP. A prospective study of dental disease pattern and drug utilization at the dental department of a tertiary care teaching hospital in eastern Nepal. *Journal of Nepal Medical Association* 2001; 40:6-11.
11. Salman MT, Khan FA. Drug Prescribing Pattern in Dental Teaching Hospital. *JK Science* 2009; 11(2):107
12. Kulkarni MD, Baig MS. Drug utilization pattern in OPD of government dental college and hospital, Aurangabad. *International Journal of Basic & Clinical Pharmacology* | 2013; 2(1):69-70
13. Dar-odeh NS, Abu- Hammad OA. Antibiotic prescribing practices by dentists: a review. *Therapeutics and Clinical Risk Management* 2010; 6:301-306
14. Medical Council of India. The Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations, 2002 inter-alia prescribes as under regarding use of generic names of drugs vide clause 1.5. Online Available from: http://www.mciindia.org/tools/announcement/Circular_Ethics_21.01.2013.pdf Accessed 15 Nov 2013
15. Health and family welfare, Government of Gujarat, GR No BGT/10/2013/G issued on 1 Jul 2013

Conflict of interest: None
Funding: None