IJPSR (2022), Volume 13, Issue 1 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 18 February 2021; received in revised form, 04 July 2021; accepted, 08 July 2021; published 01 January 2022

A RETROSPECTIVE AUDIT OF DRUG PRESCRIBING PATTERNS AMONG THE PATIENTS VISITED THE DENTAL CLINIC OF A PRIVATE MEDICAL UNIVERSITY IN KEDAH, MALAYSIA

Dinesh Kumar Upadhyay [*1], Gun Irene Ching [1], Praveen Bhoopathi [2] and Sonam Pandey [3]

Faculty of Pharmacy [1], Faculty of Dentistry [2], AIMST University, Jalan Bedong-Semeling, 08100 Bedong, Kedah, Malaysia, Independent Researcher [3], Jalan Bedong-Semeling - 08100, Bedong, Kedah, Malaysia.

Keywords:

Antibiotics, Drug prescriptions, Gingivitis, NSAIDs, Periodontitis

Correspondence to Author:
Dr. Dinesh Kumar Upadhyay

Faculty of Pharmacy,
Jalan Bedong-Semeling - 08100,
Bedong, Kedah, Malaysia.

E-mail: dinesh17dec@rediffmail.com

ABSTRACT: Introduction: Irrational use of drugs is widespread in present-day medical practice. Hence, the present study aimed to analyze the drug prescribing pattern among the patients who visited the Faculty of Dentistry dental clinic, AIMST University. **Methods:** A retrospective, cross-sectional study was conducted to analyze the drug prescribing pattern of dentists of AIMST University, Kedah, Malaysia. A total of 857 patients' medical records were scrutinized between January 2018 to March 2018, and only 532 patients' medical records were identified to have drug prescriptions. Patients' drug prescription data were collected and analyzed using descriptive statistics. **Results:** Drug prescription books of 532 patients were analyzed. Female patients were greater in number [325(61.09%)]. The most common dental problem was gingivitis [275(28.29%)] followed by dental carries [215(22.12%)], periodontitis [198(20.37%)] and edentulous [157(16.16%)]. A total of 965 drugs were prescribed, with an average number of 1.81 drugs per prescription. The commonest therapeutic class of drug prescribed was NSAIDs [432(44.77)] followed by antimicrobials [309(32.02)]. The percentage of encounters with an antibiotic prescription was higher (32.02%) than the WHO standard value (20-27%). Generic drug prescription was 64.77%. Most drugs (84.37%) are prescribed from the essential drug list of Malaysia. **Conclusion:** Study revealed a moderate drug prescribing behaviour of dentists. However, low generic drug prescriptions and irrational use of antibiotics enhance the probability of antibiotic resistance, adverse effects, and economic burden on patients. Dentists must be motivated for generic prescribing and judicious use of antibiotics to ensure a good standard of care in dental practice.

INTRODUCTION: Oral disease remains a public health problem due to increasing urbanization, lifestyle changes, environmental factors and accessibility of oral health services.

QUICK RESPONSE CODE

DOI:
10.13040/IJPSR.0975-8232.13(1).215-20

This article can be accessed online on
www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.13(1).215-20

Most oral diseases are preventable if appropriate treatment is initiated at an early stage of disease occurrence. The effective use of drugs in disease treatment and prevention should be of good quality and affordable to achieve better patient-related outcomes [1, 3].

Rational drug prescription with the least number of drugs results in optimum therapeutic outcomes in desired time and at a reasonable cost compared to irrational drug prescriptions [4, 5]. Unreasonable drug use is a global problem, but it is more prevalent in

developing nations due to inappropriate and unjustified use of multiple drugs that affect the safety, quality of care, and wastage of resources [2, 6]. To ensure rational use of drugs, health care professionals should adopt the five important criteria that include accurate diagnosis; appropriate drug prescription; correct drug dispensing; suitable drug packing and patient adherence to disease and medication(s) [7]. Moreover, rational drug prescription should identify the professional, patient and drug treatment, patient guidance, and information [8].

A comprehensive analysis of drug prescription can be done by using standard drug use indicators developed by WHO and International Network for the Rational Use of Drugs (INRUDs) to assess the rational drug therapy and utilization of resources [2, 9]. Several studies in developing countries have identified inappropriate antibiotics prescribing [3, 4, 10, 13], more branded drug prescriptions 3, 4, 6 and polypharmacy 4, 14 due to noncompliance to available treatment guidelines resulting in antibiotic resistance and treatment failure, antibiotic substitution, and financial burden on patients. In the Malaysian context, studies identifying the prescribing pattern of dental practitioners in private dental clinics are lacking and only few questionnaire-based studies highlighted the misuse of antibiotics by dental practitioners in some clinical dental conditions [15], prescribing skills of undergraduate dental students [16] and their compliance with antibiotic prescribing guidelines for dental infections [17]. An audit of drug prescription is a very vital aspect of patient care that determines the quality of care provided to the patients by healthcare practitioners [4]. Hence, the present study aimed to assess the drug prescribing pattern among the patients who visited the dental clinic of a private medical university in Kedah state, Malaysia.

MATERIALS AND METHODS: A retrospective, cross-sectional study was conducted in the dental clinic of the faculty of dentistry, Asian Institute of Medicine, Science, and Technology (AIMST) University, Kedah, Malaysia, for the duration of 3 months (January 2018 - March 2018) **Fig. 1.** AIMST University dental clinic is a non-profitable out-patient clinic that provides free of cost dental care services to the local community. The study was approved by AIMST University Human Ethics Committee (AUHEC/FOP/2018/14) and permission was taken from the Faculty of Dentistry to carry out the study. To ensure the privacy, names of the patients and dentists were kept confidential, and data were used for the study purpose. The study included medical records and drug prescription books of the patients who visited the dental clinic of the Faculty of Dentistry, AIMST University, for their dental care and received medication(s) from the dentist. However, patient's medical records without drug prescription(s) and missing data from patient's medical records were excluded from the study.

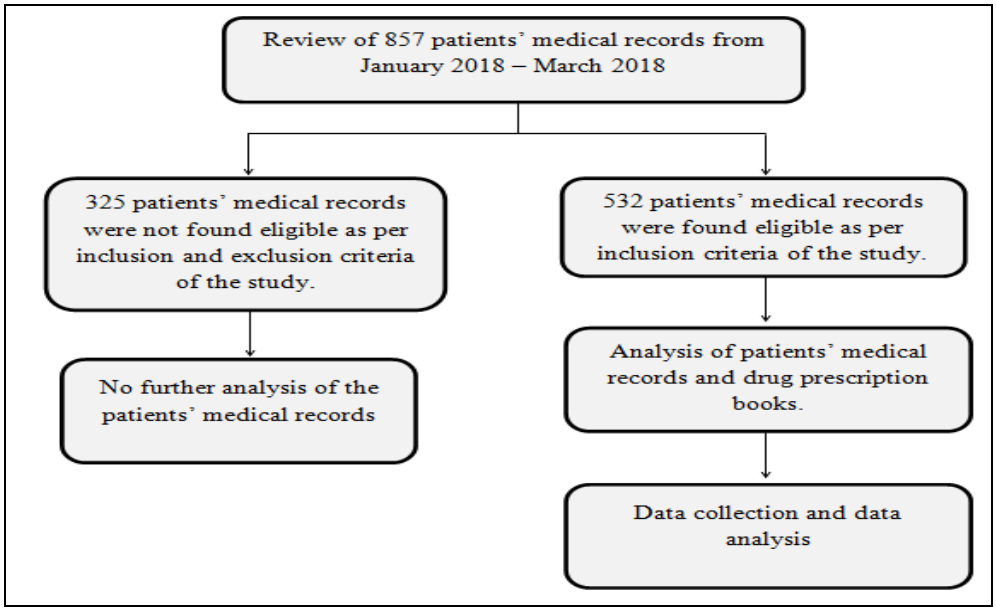

FIG. 1: THEORETICAL FRAMEWORK

Medical records and drug prescription books of the patient were used as data sources. Patient's medical records and drug prescription books were stored in the dental record room of the faculty of dentistry for future reference. Patient's medical records and drug prescription books were identified by using patients' medical registration numbers.

A total of 857 patients' medical records were scrutinized as per inclusion and exclusion criteria of the study by convenient sampling method in stipulated time capsule frame (3 months) and only 532 patients' medical records were identified to have drug prescriptions. Essential Drug List (EDL) of Malaysia and WHO drug prescribing indicators were used as resource materials to identify whether the drugs are being prescribed from EDL and according to the WHO drug prescribing indicators or not.

Patient's demographic characteristics and drug prescription information were collected in a well-designed data collection form. Patient's related information such as age, gender, occupation, ethnicity, family and social history, past medical history, history of allergy, and clinical diagnosis were documented in demographic form.

However, drug prescription details such as drug name (branded *vs* generic drug); dosage form, drug strength; dose; frequency; duration of treatment; the number of drug(s) prescribed were entered in data collection form. All the data were scrutinized and entered in Microsoft spreadsheet and SPSS version 22 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp) for further analysis. Descriptive statistics were used to analyze the quantitative data in the form of frequency, percentage, mean and standard deviation.

RESULTS:

Demographic Characteristics of Patients: The mean age and standard deviation of the patients were 36.21 ± 14.30. Female patients were greater in number [325 (61.09%)]. Most of the patients [365 (68.60%)] were found non-working. Malay patients were more in number [255 (47.93%)] followed by Indian [185 (34.77%)] and Chinese [145 (27.25%)]. Only 345 (64.84%) patients did not have any family history of the disease. About 97.74% and 95.86% of patients were non-alcoholic and non-smoker, respectively. Only 6.57% (n=35) and 4.69% (n=25) patients had drug and food allergy, respectively. However, about 65.60% (n=365) of the patients were not having any history of medical problems.

Clinical Diagnosis of the Patients: The most common dental problems among the patients were gingivitis followed by dental caries, periodontitis, and edentulous **Table 1.**

TABLE 1: CLINICAL DIAGNOSIS OF THE PATIENTS

Clinical diagnosis	Number of patients	Percentage (%)
Gingivitis	275	28.29
Dental carries	215	22.12
Periodontitis	198	20.37
Edentulous	157	16.16
Pulpitis	98	10.08
others	29	2.98
Total	**972**	**100%**

Therapeutic Class of Drugs Prescribed To the Patients: The commonest therapeutic class of drugs prescribed was NSAIDs followed by antimicrobials. Diclofenac (62.35%) and amoxicillin (67.96%) were the most common NSAIDs, and antimicrobials prescribed among the patients, respectively. A total of 965 drugs were prescribed among 532 patients, with an average number of 1.81 drugs per prescription. About 64.77% of generic drugs were prescribed among the patients visited the dental clinic **Table 2.**

TABLE 2: THERAPEUTIC CLASS OF DRUGS PRESCRIBED

Therapeutic class	Number of drugs (%)
Non-steroidal anti-inflammatory drugs (NSAIDs)	432 (44.77)
Antimicrobials	309 (32.02)
Antihistamine	79 (8.19)
Topical agents	68 (7.05)
Anti-ulcer drugs	33 (3.42)
Muscle relaxants	25 (2.59)
Others*	19 (1.96)
Total number of drugs prescribed	965
Average number of drugs per prescription	965/532=1.81 drugs
Total number of generic drugs prescribed	625 (64.77%)
Total number of branded drugs prescribed	340 (35.23%)

*Vitamins and Minerals (0.85%); Antihypertensive (0.28%); Local anaesthetics (0.32%) Antivirals, Antifungals and Antacids (0.17% each)

Frequency and Duration of Prescribed Drugs Treatment among Visited Patients: A greater number of drugs 634 (65.69%) were prescribed three times per day (TID) followed by two times per day (BD) [255 (26.42%)]. Nevertheless, 865 (89.63%) drugs were prescribed for the duration of treatment less than or equal to one week to the patients visited the clinic.

Number of Drugs Prescribed In Various Dosages Forms: Most of the drugs were prescribed in tablet [535 (55.41%)] followed capsule [298 (30.89%)] formulations in solid dosage form. However, semisolid [68 (7.06%)] and liquid [64 (6.64%] dosage forms were found less in prescription.

Drug Prescribing Pattern as Per WHO Prescribing Indicators: The average number of drugs per encounter was 1.81. About 64.77% of the drugs were prescribed with a generic name. However, only 32.02% of the encounters were with an antibiotic drug, which was higher than the standard value recommended by WHO. Majority of the drugs (84.37%) prescribed to the patients were from the essential drug list of Malaysia **Table 3.**

TABLE 3: DRUG PRESCRIBING PATTERN AS PER WHO PRESCRIBING INDICATORS

WHO prescribing indicators	Percentage	WHO standard value*
Average number of drugs per encounter	1.81	1.4 to 1.8
Percentage of drugs prescribed by generic name	64.77%	100%
Percentage of encounters with an antibiotic prescribed	32.02%	20 - 27%
Percentage of encounters with an injection prescribed	0.32%	13.4 - 24.1%
Percentage of drugs prescribed from essential drugs list	84.37%	100%

*Standard value for prescribing indicators

DISCUSSION: Rational drug prescribing is an important phenomenon in a healthcare system that ensures the patients' safety and therapeutic outcomes. An attempt was made to assess the drug prescribing pattern of the dentists among the patients visited to the out-patient clinic of the Faculty of Dentistry. The present study found the mean age of the patients affected with dental disorders as similar as one Indian study [6] with a high proportion of female patients who visited the dental clinic [4, 13, 14] but opposite to the findings reported by Priyanka and her associates [6]. More female patients with dental problems in the present study could be due to their different salivary composition and flow rate; hormonal fluctuations; gender-based dietary habits; genetic makeup; reproductive history, and social life [18].

Gingivitis was the most common dental problem among the patients, followed by dental carries, edentulous and periodontitis, reflecting the relatively high prevalence of gingivitis disease in the local community, similar to the prevalence of gingivitis in developing countries [19, 20, 4]. Gingivitis is a non-destructive type of periodontal disease, if left untreated, may progress to periodontitis. Periodontal disease is a common dental disorder that mostly affects middle-aged adults, and about 15%-20% of such cases become severe [4]. The commonest therapeutic class of drug prescribed as monotherapy to the patients for pain and inflammation was NSAIDs followed by antimicrobials for surgical site and post-operative bacterial infections [21, 6]. The most common NSAIDs and antimicrobials prescribed were diclofenac and amoxicillin, respectively [12, 14, 22, 23] in the present study, whereas chlorhexidine mouthwash and paracetamol followed by ibuprofen and amoxicillin/clavulanate were the commonest drugs reported from the study conducted in Oman [19]. Most drugs were prescribed either in tablet or capsule dosage forms for 3 to 5 days treatment with twice to thrice daily administration [22, 23]. However, a study conducted in Kosovo reported analgesics in only 33 patients (1.35%) of the total number of patients (n=2442) registered for dental care [24].

The average number of drugs per encounter was comparable to WHO standard value in the present study, indicating the absence of polypharmacy and risk of drug-drug interactions similarly to one Indian study but lower than the reporting from other studies [14, 24, 25]. Generic drug prescriptions in the present study were lower than the WHO standard value (100%), and slightly more than one-third of the branded drugs were prescribed to the patients, which is lower than the branded drug prescriptions reported by Fader and his co-investigator from their study conducted in Nigeria [4]. Similarly, studies conducted in India, Nepal, and

Kosovo highlighted low generic and high branded drug prescription among the patients visited to the dental clinic [6, 25, 26]. Moreover, percentage of encounters with an antibiotic prescription (32.02%) was higher than the WHO standard value (20-27%) and mostly drugs were prescribed from essential drug list of the country [6, 26]. However, a study conducted in Nepal described a smaller number of drugs prescribed from EDL [25]. The high use of antibiotics in the treatment of dental infections could be due to empirical therapy given to the patients, which is evidence for an increase in inappropriate use of antibiotics in dentistry [10]. Prophylactic use of antibiotics in dental settings is recommended to prevent surgical sites and post-operative infections [27]. Rational use of antibiotics is essential in dental practice to ensure maximum efficacy and minimum adverse effects and resistance. A study conducted in India reported half of the encounters with an antibiotic prescription [14] in out-patient dental clinic, whereas the USA-based study highlighted the antibiotic prophylaxis in the majority of the patients undergoing dental procedures to prevent surgical site and post-operative infections [28].

CONCLUSION: Drugs are used to prevent and treat symptoms and diseases if used rationally, whereas irrational drug prescribing may be harmful and cause adverse effects or sub-optimal effects. Though the present study revealed a moderate drug prescribing behaviour of dentists, low generic drug prescription and high use of antibiotics are still the areas of concern that enhance the probability of antibiotic resistance, adverse drug effects and economic burden on patients.

Drug utilization in dental settings is considered a potential area for improvement in the treatment process to ensure patient safety and satisfaction. Therefore, dentists must be aware of the importance of generic drug prescription and judicious use of antibiotics to ensure a good standard of care in dental practice. The study sample size was small and restricted to one dental clinic of a private medical university in Kedah state, and therefore, study findings cannot be generalized. There is a probability of underestimating the prescribing drug pattern due to no consideration of patient's medical records and drug prescriptions, which might remain in the out-patient dental clinics and were not returned to the medical record room during the study period.

ACKNOWLEDGEMENT: Authors acknowledge the AIMST University Human Ethics Committee and Faculty of dentistry for approval to carry out this study. The authors would like to thank the in-charge of the medical record department for facilitating the study.

Funding: The study was self-funded.

CONFLICTS OF INTEREST: The authors declare that there is no conflict of interest regarding the publication of this article.

REFERENCES:

1. Peres MA, Macpherson LM, Weyant RJ, Daly B, Venturelli R, Mathur MR and Listl S: Oral diseases: a global public health challenge. The Lancet 2019; 394(10194): 249-60.
2. Bansal R, Jain A, Goyal M, Singh T, Sood H and Malviya HS. Antibiotic abuse during endodontic treatment: A contributing factor to antibiotic resistance. Journal of Family Medicine and Primary Care 2019; 8(11): 3518-24.
3. Waheed R, Shaheen R, Amin F and Sadeequa S: Drug prescribing pattern in dental teaching hospitals. Pakistan Oral & Dental Journal 2016; 36(1): 49-54.
4. Fadare JO, Oshikoya KA, Obimakinde OS, Sijuade AO, Afolayan JM and Adeleke AA: Patterns of drugs prescribed for dental outpatients in Nigeria: findings and implications. Acta Odontologica Scandinavica 2017; 75(7): 496-06
5. Jain A, Gupta D, Singh D, Garg Y, Saxena A and Chaudhary H: Knowledge regarding prescription of drugs among dental students: A descriptive study. Journal of Basic and Clinical Pharmacy 2015; 7(1): 12-16.
6. Patel PS, Patel SN and Bhave A: Evaluation of prescribing pattern at dental outpatient department at a hospital, Gujarat. National Journal of Physiology Pharmacy and Pharmacology 2017; 7(1): 47-50.
7. Kia SJ, Behravesh M and Khalighi Sigaroudi A: Evaluation of drug prescription pattern among general dental practitioners in rasht iran. Journal of Dentomaxillofacial 2012; 1(2): 18-23.
8. World Health Organization. Guide to good prescribing: a practical manual. Geneva WHO 1994.
9. Tefera BB, Getachew M and Kebede B: Evaluation of drug prescription pattern using World Health Organization prescribing indicators in public health facilities found in Ethiopia: systematic reviews and meta-analysis. Journal of Pharmaceutical Policy and Practice 2021; 14(1): 1-10.
10. Konde S, Jairam LS, Peethambar P, Noojady SR and Kumar NC: Antibiotic over usage and resistance: A cross-sectional survey among pediatric dentists. Journal of Indian Society of Pedodontics and Preventive Dentistry 2016; 34(2): 145-51.
11. Desalegn AA: Assessment of drug use pattern using WHO prescribing indicators at Hawassa University teaching and referral hospital, south Ethiopia: a cross-sectional study. BMC Health Services Research 2013; 13(1): 1-6.

12. Rachmawati MW, Yoshida N, Tsuboi H and Kimura K: Antibiotic utilization in a dental teaching hospital in Yogyakarta, Indonesia. Sci J Clin Med 2014; 3(3): 37-42.
13. Maslamani M and Sedeqi F: Antibiotic and analgesic prescription patterns among dentists or management of dental pain and infection during endodontic treatment. Inter Nat Medical Principles and Practice 2018; 27(1) 66-72.
14. Fayisa K: Drug utilization patterns of antibiotics in outpatient department of educare dental hospital at Malappuram, Kerala, India. International Journal of Basic & Clinical Pharmacology 2019; 8(5): 930-933.
15. AbdulKader HK, Ali SM, Hassan MI and Manan MM: Knowledge of prescribing antimicrobial among dental practitioners in klang valley region. Malaysian Dental Journal 2010; 31(1): 35-43.
16. Akram A, Zam Zam R, Mohamad NB, Abdullah D and Meerah SM: An assessment of the prescribing skills of undergraduate dental students in malaysia. Inter Nat Pharma Journ of Dental Education 2012; 76(11): 1527-31.
17. Wong YC, Mohan M and Pau A: Dental students' compliance with antibiotic prescribing guidelines for dental infections in children. Journal of Indian Society of Pedodontics and Preventive Dentistry 2016; 34(4): 348-53.
18. Ferraro M and Vieira AR: Explaining gender differences in caries: a multi factorial approach toa multi factorial disease. International Journal of Dentistry 2010; 649643.
19. Al-Rashdi MS, Abdulaziz B and Al Balushi KA: Drug prescribing practices in dental care patients at a dental and maxillofacial surgery clinic in oman. Oman Medical Journal 2020; 35(6): 191.
20. Peric M, Perkovic I, Romic M, Simeon P, Matijevic J and Mehicic GP: The pattern of antibiotic prescribing by dental practitioners in zagreb, Croatia. Central European Journal of Public Health 2015; 23(2): 107-13.
21. Hajj A, Azzo C, Hallit S, Salameh P, Sacre H and Abdou F: Assessment of drug-prescribing perception and practice among dental care providers: a cross-sectional lebanese study. Pharmacy Practice 2021; 19(1): 2234.
22. Sturrock A, Landes D, Robson T, Bird L, Ojelabi A and Ling J: An audit of antimicrobial prescribing by dental practitioners in the northeast of england and cumbria. BMC Oral Health 2018; 18(1): 206.
23. Ramachandran P, Rachuri NK, Martha S, Shakthivel R, Gundala A and Battu TS: Implications of over prescription of antibiotics: A cross-sectional study. Journal of Pharmacy & Bio Allied Sciences 2019; 11(2): 434-37.
24. Hashemipour MA, Navabi N, Lotfi S, Sepehri G and Rastgarian A: Pattern of logical drug prescription among iranian general dental practitioners. Pesquisa Brasileiraem Odontopediatria e Clínica Integrada 2019; 19: 4460.
25. Sah AK, Yadav SK, Sah P and Jha RK: Prescribing trends of non-steroidal anti-inflammatory drugs used in dental outpatient department of a tertiary hospital in nepal. Journal of Pharmaceutical Sciences and Research 2012; 4(3): 1779-82.
26. Haliti NR, Haliti FR, Koçani FK, Gashi AA, Mrasori SI and Hyseni VI: Surveillance of antibiotic and analgesic use in the oral surgery department of the university dentistry clinical centre of kosovo. Therapeutics and Clinical Risk Management 2015; 11: 1497-03.
27. Ministry of Health Malaysia. Clinical practice guidelines: Antibiotic prophylaxis in oral surgery for prevention of surgical site infections. 2nd ed. Ministry of Health Accessed on 2020; 17: 2015.
28. Suda KJ, Henschel H, Patel U, Fitzpatrick MA and Evans CT: Use of antibiotic prophylaxis for tooth extractions, dental implants and periodontal surgical procedures. In Open Forum Infectious Diseases 2018; 5(1): 1-5.

How to cite this article:
Upadhyay DK, Ching GI, Bhoopathi P and Pandey S: A retrospective audit of drug prescribing pattern among the patients visited to the dental clinic of a private medical university in kedah, Malaysia. Int J Pharm Sci & Res 2022; 13(1): 215-20. doi: 10.13040/IJPSR.0975-8232.13(1).215-20.