EVALUATION OF DRUG UTILIZATION PATTERN USING WHO PRESCRIBING INDICATORS IN ENDODONTIC DEPARTMENT AT A TERTIARY HOSPITAL IN EASTERN NEPAL

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ABSTRACT

Introduction

Irrational or inappropriate prescribing practice is common in developing countries that can lead to ineffective treatment, prolonged hospitalization, harm to the patient, increased treatment cost and development of drug-resistant organisms. The prescription of antibiotics and other drugs in endodontics is lwimited to patients with progressive and diffuse swelling and with systemic infection. However, antibiotics continue to be over-prescribed by more than 66% dentists without a rational justification. Therefore, the periodic assessment of drug utilization pattern is important to know the existing pattern of drug use, decrease adverse effects and provide feedback to the prescribers.

Objective

To evaluate the drug utilization pattern in endodontics using the World Health Organization prescribing indicators.

Methodology

A cross-sectional prospective study was conducted among the patients visiting the outpatient department of Conservative Dentistry and Endodontics. After obtaining the informed consent, the relevant data were collected on a self-designed proforma by reviewing the health cards of the patients. The WHO prescribing indicators were calculated. Descriptive statistics were calculated using SPSS version 11.0.

Result

Out of 187 patients, 101 (54%) were female. Mean age was 38.9±16.6 years. Majority of the patients suffered from acute apical periodontitis (30.5%). A total of 281 drugs were prescribed to 187 patients. Paracetamol + Ibuprofen (44.1%) was the most frequently prescribed drugs. Most of the patients were prescribed one drug (78.6%). Average drug per prescription was 1.5. Majority of the drugs (89.0%) were prescribed from Essential drug list of Nepal.

Conclusions

Analgesics were the most frequently prescribed drug. The prescription practice was rational. There is need to increase the number of medicine prescribed from National List of Essential medicines. Educational initiatives should be undertaken to further strengthen the rational prescription among dental practitioners.

KEYWORDS

Dentistry; drug utilization; Nepal.

INTRODUCTION

The World Health Organization (WHO) has defined drug utilization research as "the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences".[1] Irrational use of medicines is a global problem. More than half of all medicines are prescribed, dispensed or sold improperly.[2] More than 66% of dentists prescribes antibiotics for dental conditions inappropriately.[3] Irrational use of drugs leads to ineffective treatment, prolonged hospitalization, harm to the patient, increased treatment cost and development of drug-resistant organisms. An effort should be made to describe and quantify the already existing situation related to drug utilization to promote rational drug use. The WHO has suggested several prescribing indicators for evaluating the drug utilization at health care centers including average number and types of prescribed drugs, percentage of antimicrobial drugs and percentage of drugs prescribed by generic name and from Essential Drug List.[4]

The primary treatment for most of the endodontic infections is removal of the intra canal debris by cleaning and shaping the root canal system.[5] The prescription of antibiotics and other drugs in endodontics is limited to patients with progressive, diffuse swelling, with systemic signs of infection. Antibiotics are also used prophylactically in medically compromised patients or having prosthetic cardiac/heart valves and infective endocarditis.[6] There is no adequate evidence of the benefits of antibiotics in irreversible pulpitis, necrotic pulp, retreatment or reducing postoperative pain.[7] However, antibiotics continue to be over-prescribed in daily dental practice, without a rational justification.[8] Information on the prescribing patterns of drugs in Endodontic department is lacking in Eastern Nepal. The periodic assessment of drug utilization pattern is important to know the existing pattern of drug use, increase the therapeutic efficacy, decrease adverse effects and provide feedback to the prescribers.[9] The objective of the study was to evaluate the drug prescribing patterns in the endodontic department using WHO core drug use indicators.

METHODOLOGY

Type of study: Cross-sectional prospective

Study Site: Department of Conservative Dentistry and Endodontics, College of Dental Surgery, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.

Study Population: Patients visiting the Department of Conservative Dentistry and Endodontics

Inclusion criteria:

The patients aged >18 years who visited Conservative Dentistry and Endodontics department and who were prescribed at least one drug were enrolled in the study.

Exclusion Criteria:

Patients unable to communicate, unconscious/mentally retarded, suffering with psychiatric diseases and unwilling to participate in the study were excluded from the study.

Sampling Methods:

Random sampling method was used

Sample size and its calculation:

Using the formula Z^2*P*Q/L^2, a sample size of 166 was calculated considering prevalence of 39% at 95% confidence interval and 80% power.[10]

Study Variables

Age, gender, marital status, occupation, educational status, comorbidities, diagnosis and drugs prescribed (route of administration, single or Fixed dose combination, branded or generic) were the baseline variables and WHO prescribing indicators were the outcome variables.

Data Collection Tool: A semi-structured proforma was used to collect the relevant data. It was pre-tested and validated in 10% of the study population and those patients were not included in the study.

Data Collection Techniques: The objective of the study was explained to the patients and written consent was taken. The principal investigator collected the relevant data from the patients' OPD card directly on the proforma. The National List of Essential Medicines (5th revision) was used as a basis to determine drugs as generic or brand name.[11] Two or more drugs that are prescribed in a fixed dose ratio for a given health condition were considered as Fixed Dose Combination (FDC).

No personal information was collected to maintain the confidentiality of the patients. The study was approved by Institutional Review Committee (IRC: 1403/018), BPKIHS.

Statistical analysis: Data were entered in Microsoft Excel 2010 and the following WHO prescribing indicators were calculated.

i) The average number of drugs prescribed per prescription: It was calculated by dividing the total number of different drug prescribed by the number of prescriptions/patients. Combinations of drugs prescribed for one health problem was counted as one.
ii) Percentage of drugs prescribed by generic name: It was calculated by dividing the number of drugs prescribed by generic name by total number of drugs prescribed, multiplied by 100.
iii) Percentage of prescription in which an antibiotic prescribed: It was calculated by dividing the number of patient encounters in which an antibiotic is prescribed by the total number of patients, multiplied by 100.
iv) Percentage of prescription with an injection prescribed: It was calculated by dividing the number of patient in which an injection is prescribed by the total number of patients, multiplied by 100.
v) Percentage of drugs prescribed from an Essential Drug List (EDL): It was calculated by dividing number of drugs prescribed from the National List of Essential Medicines (2016) by the total number of drugs prescribed, multiplied by 100.[11]

vi) Percentage of FDC prescribed= Number of FDC/Total drugs*100

Descriptive statistics percentage, frequency, mean and Standard deviation (SD) were calculated using SPSS version 11.0.

RESULTS

Out of 187 patients, 101 (54%) were female and 86 (46%) male. Majority of the patients (72.2%) were married. Most common age group was 18-30 years (39.6%). Most of the patients (34.2%) had completed bachelor level of education. Forty nine (26.2%) patients were housewife. The age ranged from 18-76 years. Mean age of the patients was 38.9±16.6 years. Comorbidities were present in 44 (23.5%) patients and hypertension (14.4%) was the commonest comorbidity (Table 1).

Table 1: Sociodemographic characteristics of the patients (n=187)

Variables		Frequency	Percentage
Gender	Male	86	46.0
	Female	101	54.0
Age group (years)	18-30	74	39.6
	31-45	52	27.8
	46-60	34	18.2
	61 and above	27	14.4
Marital status	Married	135	72.2
	Single	52	27.8
Educational level	Illiterate	16	8.6
	Primary	34	18.2
	Secondary	36	19.3
	Intermediate	37	19.8
	Bachelor and above	64	34.2
Occupation	Housewife	49	26.2
	Student	47	25.1
	Businessman	36	19.3
	Skilled Job	31	16.6
	Farmer	24	12.8
Co-morbidities	Hypertension	27	14.4
	Type 2 diabetes	11	5.9
	Gastritis	5	2.7
	Coronary artery disease	3	1.6
	Others*	10	5.3

*Others include arthritis, lipoma, Epilepsy, thyroid disorders, Hepatitis C, Sinusitis, Bronchial asthma.

Most common diagnosis was acute apical periodontitis (30.5%) followed by chronic periapical abscess (15.5%) and chronic irreversible pulpitis (9.6%) (Figure 1).

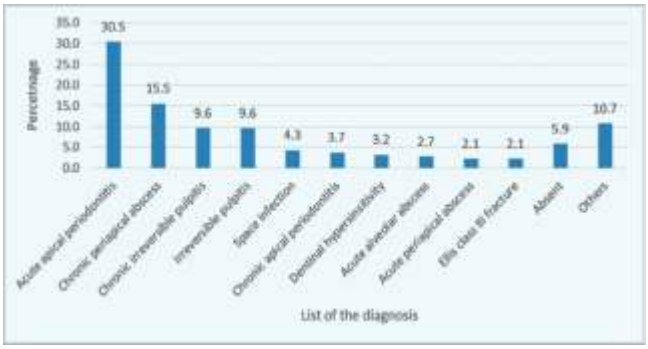


Figure 1: List of the diagnosis in the patients (n=187)

A total of 281 drugs were prescribed to 187 patients. Non-steroidal anti-inflammatory drugs (60%) were the commonest group of drugs prescribed followed by antibiotics (32%) (Figure 2).

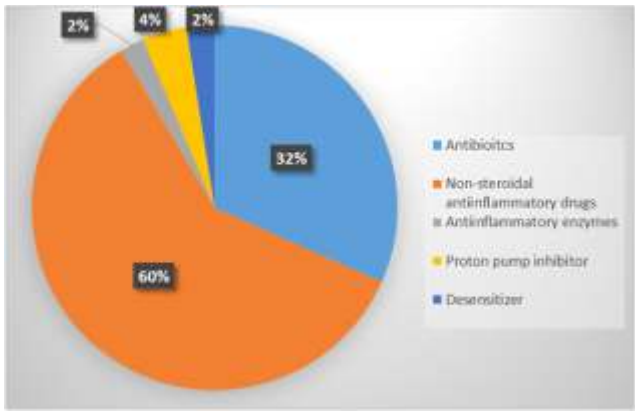
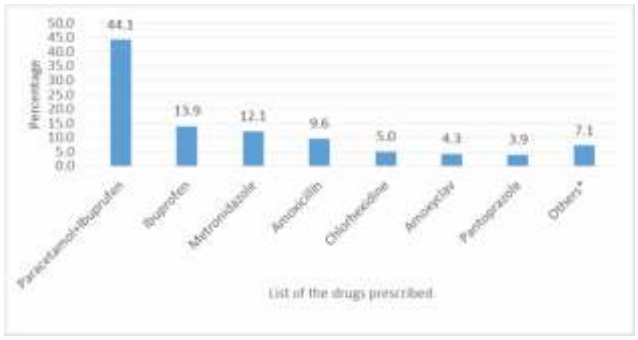


Figure 2: Therapeutic class of drugs prescribed to the patients (n=281)

Paracetamol + Ibuprofen (44.1%) was the most frequently prescribed drugs followed by Ibuprofen (13.9%), Metronidazole (12.1%) and Amoxicillin (9.6%) (Figure 3).



*Others include RA thermoseal, Serratopeptidase, Paracetamol, Trypsin-chymotrypsin, topical analgesic.

Figure 3: List of individual drugs prescribed (n=281)

Most of the patients were prescribed one drug (78.6%) followed by three or more than three drugs (18%) (Figure 4).

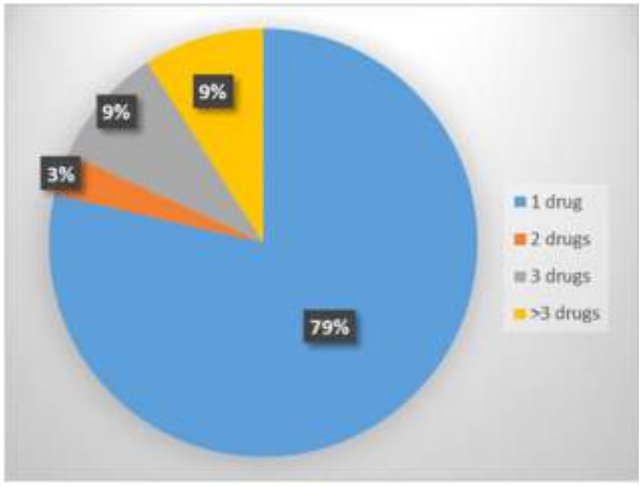


Figure 4: Numbers of drugs prescribed (n=187)

The WHO prescribing indicators is given in Table 2. Average drug per prescription was 1.5. None of the drugs were prescribed by injection. Majority of the drugs (89.0%) were prescribed from Essential drug list of Nepal.

Table 2: WHO prescribing indicators (n=187)

WHO prescribing indicators	
Average number of drugs per prescription	1.5
Percentage of drugs prescribed by generic name	34.5%
Percentage of prescription in which an antibiotic prescribed	27.8%
Percentage of prescription in which an injection prescribed	0
Percentage of drugs prescribed from the essential drug list	89.0%
Percentage of fixed-dose combination (FDC) prescribed	53.7%

DISCUSSION

The WHO prescribing indicators is a well-established gold standard method to describe and quantify the problems related to drug utilization and to promote rational drug prescription in developing countries.[4] In this study, WHO prescribing indicators have been used to evaluate the drug utilization pattern in the endodontic department. Most of the patients were females and similar finding had been reported by Sarkar et al.[10] According to Lukacs, poor oral health in female population is due to the higher burden of dental diseases compared to males.[12] Earlier tooth eruption among girls and longer exposure of their teeth to the cariogenic oral environment, easier access to food supplies by women and frequent snacking during food preparation, vomiting, neglected oral hygiene and nutritional changes during pregnancy are some of the common causes of higher prevalence of dental diseases among females.[13] Tobacco smoking and chewing and alcohol intake are also risk factors for dental caries.[14] However, tobacco smoking and chewing and alcohol intake is more common in male.[15] The more number of the female patients in our study may be due to the increased awareness of the dental diseases. Almost half of the patients in our study were housewife and students which indicates low priority of preventive oral health among these individuals. As most of the patients were literate, education regarding preventive oral health should be frequently given to the patients through radio, television, newspapers and other social media.

Pain has been consistently identified as the most common reason for seeking dental attention as it is a feature of infection and inflammatory oral diseases.[16] In our study the most common diagnosis was apical periodontitis which is a highly painful condition and requires analgesics. The most commonly prescribed group of drugs were analgesics followed by antibiotics. In contrast to this, antibiotics were most commonly prescribed in other study.[17] Type of NSAIDs prescription varies in different part of the world.[18] Paracetamol +Ibuprofen was the most frequently prescribed drugs in our study. Similar finding had been reported by Sah et al.[19] However, Diclofenac + Paracetamol was the most common drug prescribed in another study.[20] A combination of paracetamol and an NSAID may offer superior analgesia compared with either drug alone.[21] However, the combination increases the cost of the therapy and adverse drug effects. Ibuprofen was the second most common analgesic prescribed. It has a favorable safety profile and rarely causes bleeding in upper gastrointestinal tract and hence considered one of the safest NSAID on gastrointestinal tract and an effective analgesic for many acute and chronic pain conditions including dental pain.[22] The addition of an opioid analgesic may be considered if NSAIDs are not beneficial and ineffective.[23]

Metronidazole was the commonest antibiotics used in our study followed by Amoxicillin. A combination of amoxicillin and metronidazole were also prescribed to one fifth of the patients. The rationale for the choice of metronidazole and amoxicillin could have been its wide spectrum and enhanced the anaerobic activity in the combination as endodontic infections are polymicrobial and predominantly caused by anaerobic bacteria and certain facultative bacteria.[24] Antibiotic coverage is not required in irreversible pulpitis is with preoperative symptoms with or without acute periodontitis. Therefore, antibiotic therapy in endodontics should be limited to patients having progressive and diffuse swelling, systemic signs of infection such as fever, malaise, and lymphadenopathy or immunocompromised conditions.[6]

The mean number of drugs 1.5 per prescription was comparable to other findings.[10] Number of prescribed drugs fewer than three enhances the patient compliance to the prescribed medicines.[25] This is a good sign of rational prescribing. Only one third of the drugs were prescribed in generic name and Sarkar et al had reported a lower prescription in generic name.[10] WHO highly recommends prescribing medications by generic name as it identifies the drug clearly, enables better information exchange and allows better communication between health care providers and also safe to the patients.[26] Generic prescribing reduces the potential for confusion as only one name for a drug is used as well as reduces the number of brands that are stocked by pharmacists that in turn reduces the administrative inconvenience. It also increases the cost effective options for the patients.[27] Effective implementation of the existing policy of generic prescribing is not satisfactory in Eastern Nepal. This can lead to increased cost of drugs, chances of generic duplication leading to the adverse effect and drug related toxicity and unethical marketing by some industries. Thus, the policy on generic prescribing in Nepal has to be strictly followed by the prescribers.

The prescribers should remain adherent to the national guidelines and the WHO guidelines on rational prescribing of drugs. Most of the drugs were prescribed from Essential Drug List (EDL) of Nepal (Fifth edition, 2016).[11] A lower percentage of drugs were prescribed from EDL in another study.[17] WHO states 100 percent of drugs should be prescribed from Essential Medicine List of any country.[28] The prescribers should remain updated about the national EDL so as to follow the standards to achieve better health care delivery. More than half of the drugs were FDC. As FDCs usually cost more than single ingredient preparations and side effects are additive, avoiding unnecessary FDCs may help in reducing prescribing costs and maximize the patient safety.[29]

CONCLUSION

Analgesics and antibiotics were the most commonly prescribed drugs. The prescription practice was rational. There is need to increase the number of medicine prescribed as per national EDL so as to match the WHO guidelines. National EDL should be made available in the

health institution. Generic prescription should be increased. Educational initiatives should be undertaken to strengthen the rational prescription among dental practitioners. Regular workshops, seminars, training should be conducted to promote the value of core prescribing indicators of WHO. The findings may help to formulate appropriate clinical guidelines for drug use and facilitate rational use of drugs in population. Further studies for a longer period of time in a greater number of patients are required.

LIMITATIONS

Our study have some limitations. It has a small sample size. It was carried out at one dental department at a dental college and hence the findings cannot be generalized. We could not use SANE criteria (safety, availability, need and efficacy) to assess the drug use pattern. Cost of the drug therapy and affordability could not be assessed.

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CONFLICT OF INTEREST

No conflict of interest

FINANCIAL DISCLOSURE

None declared

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