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DRUG UTILIZATION PATTERN IN DENTAL OUTPATIENT DEPARTMENT OF A RURAL TERTIARY CARE HOSPITAL

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ABSTRACT

The present study was undertaken to know the trends of drug prescribing in dental outpatient department (OPD) of a rural tertiary care hospital. A prospective prescription audit was conducted for a period of 3 months from February 2015 to April 2015 at dental OPD and data was analyzed using WHO indicators/guidelines. The total number of prescriptions analyzed was 250. Average number of medicines per prescription was 2.8. Of the total medications prescribed, 32% each were antimicrobial agents and analgesics-antiinflammatory agents, and the percentage of antiulcer drugs was 26.1%. Most commonly prescribed antimicrobial agent (87.5%) was a fixed dose combination of amoxicillin and cloxacillin. Most commonly prescribed analgesic-anti inflammatory agent (57.01%) was a fixed dose combination of ibuprofen and paracetamol. Some other medications included preparations of multivitamins and oropharyngeal mouthwashes and pastes. Antimicrobial agents and analgesic-antiinflammatory agents were prescribed as fixed dose combinations to a majority of patients. The high incidence of their use as fixed dose combinations needs to be addressed by a feedback to the prescribers. The prescribers need to be sensitized regarding rational prescribing as well as the importance of choosing drugs from essential drug list.

KEYWORDS: **Drug utilization, prescription pattern, Dental OPD, WHO indicators.**

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INTRODUCTION

Drugs play an important role in healthcare and disease prevention. The availability and affordability of quality drugs and their rational use is needed for effective healthcare. WHO addresses drug utilization as marketing, distribution, prescription, and use of drugs in a society, considering its medical, social or economic consequences[1]. However, irrational use of drugs is a major problem of the present-day medical practice. Although found globally, irrational prescribing was known to be more prevalent in developing countries[2]. Irrational prescribing is known to lead to ineffective treatment, precipitation of adverse effects of drugs, economic burden on patients and society, and development of resistance in case of antibiotics. As per WHO, inappropriate prescribing, dispensing, and sale has been noticed for more than half of the medications, and half of the patients fail to take them correctly[3]. Drug utilization studies seek to monitor, evaluate, and suggest modifications in prescribing practices with the aim of making medical care rational and cost effective and may be useful in maximum utilization of resources. Number of studies have been undertaken to study pattern of drug prescribing by physicians, but data is scarce regarding drug usage patterns in dentistry[4]. Antiinflammatory and analgesic medications as well as antimicrobials and antiseptics are commonly used in dental practice for many conditions including toothache, dental caries, periodontal abscess, and gingivitis; however, there is a need to ascertain the rationality in prescribing. Hence the present study was undertaken to audit the drug prescribing pattern in the dental outpatient department of Dr Bhausaheb Sardesai Talegaon Rural Hospital (BSTRH), a tertiary care hospital at Talegaon Dabhade, Pune (India).

AIMS AND OBJECTIVES

The primary aim of the present study was to develop the primary data on drug prescribing pattern in dental OPD. The secondary aims were: (1) To evaluate the rationality of prevalent prescribing practices on the basis of WHO prescribing indicators (2) To provide feedback to the prescribers so as to enable them to help rationalize their prescribing practices (3) To develop hospital formulary for the treatment of dental conditions.

MATERIALS AND METHODS

Prospective observational study was carried out in the dental outpatient department of BSTRH attached to MIMER Medical College, Talegaon Dabhade after securing permission from the institutional ethics committee (IEC) to access the prescriptions issued from the dental OPD. Number of prescriptions collected was 250, over a period of 3 months (From February to April 2015). Relevant and necessary data was compiled from the prescriptions such as demographic details (name, age, sex of the patients) and drug related data (name, dosage form, dose, frequency, route of administration, and duration of treatment). Drugs included in the study were the medicines prescribed for treatment or relief of dental conditions. All the information pertaining to the prescribed medications was analyzed by using WHO guidelines as described in accordance with 'How to investigate drug use in health facilities'[4]. The WHO indicators applied to the present study are as follows:[5] The core indicators include: (1) average number of drugs per encounter, (2) percentage of drugs prescribed by generic name, (3) percentage of encounters with an antibiotic prescribed, (4) percentage of encounters with an injection prescribed, and (5) percentage of drugs prescribed from Essential Drug List – India, WHO. The economic indicator applied was the average cost of the treatment.

RESULTS

Total number of prescriptions collected was 250 and the data was tabulated.

Table I
Incidence of dental diseases in male and female patients attending dental OPD

Age (year)	Male	Female	Total (%)
Less than 8	9	7	16 (6.4)
9-20	12	15	27 (10.8)
21-30	33	37	70 (28)
31-40	22	28	50 (20)
41-50	12	26	38 (15.2)
51-60	7	14	21 (8.4)
More than 60	13	15	28 (11.2)
Total	**108**	**142**	**250**

The number of male and female patients who attended the dental OPD was 108 (43%) and 142 (57%) respectively. In this population, the dental diseases were more common in the age group of 21-40 years, who constituted 48% of patients.

Table II
Data on prescribing pattern in dental OPD

Description	Number/Percentage
Total no of prescriptions	250
Total no of drugs prescribed	700
Average no of drugs per prescription	2.8
No of prescriptions with AMAs (Antimicrobial Agent)	207 (83%)
Total no of AMAs prescribed	225 (32.14%)
Average no of AMAs per prescription	0.9
No of prescriptions with NSAIDs	219 (88%)
Total no of NSAIDs prescribed	228 (32.57%)
Average no of NSAIDs per prescription	0.9
Total no of prescriptions with oropharyngeal preparations	60 (24%)
Total no of oropharyngeal preparations prescribed	68 (9.71%)
Average no of oropharyngeal preparations per prescription	0.27
No of prescriptions with H_2 blockers	183 (73.2%)
Total no of H_2 blockers prescribed	183 (26.14%)
Average no of H_2 blockers per prescription	0.73
No of prescriptions with multivitamins	13 (5.2%)
Total no of multivitamins prescribed	13 (1.86%)
Average no of multivitamins per prescription	0.05

The number of medications (items) prescribed in 250 prescriptions was 700. Average number of drugs per prescription was 2.8. (Table II). Table II shows a comprehensive data about the different drug groups prescribed and mean no of drugs per prescription in each drug group. Out of the 250 prescriptions, 207 prescriptions contained 225 antimicrobial agents constituting 32.1% of total drugs prescribed. Antimicrobials and analgesics-antiinflammatory agents were the most commonly prescribed drug groups; 83% and 87% respectively with the mean of 0.9 each per prescription. The other drug groups prescribed were H_2 blockers (73%), oropharyngeal preparations (24%), and multivitamins (5.2%).

Table III
Ten most commonly prescribed drugs (n=700)

No	Drug	Number (%)
1	Amoxicillin plus cloxacillin	197 (28.14)
2	Ranitidine	174 (24.8)
3	Ibuprofen plus paracetamol	130 (18.5)
4	Aceclofenac plus Paracetamol	73 (10.4)
5	Chlorhexidine mouthwash	20 (2.8)
6	Paracetamol plus diclofenac	15 (2.1)
7	Amoxycillin	12 (1.7)
8	Metronidazole	11 (1.5)
9	Potassium nitrate plus Strontium chloride toothpaste	11 (1.5)
10	Benzocaine ointment	10 (1.4)

Table IV
Pattern of prescribing of AMA

No	Antimicrobial agents (AMA)	Frequency of prescribing (%) (n=250)	Percentage amongst AMAs (n=225)
1	Amoxicillin plus cloxacillin	197 (78.8)	87.55
2	Amoxicillin	12 (4.8)	5.3
3	Metronidazole	11 (4.4)	4.8
4	Doxycycline	2 (0.8)	0.8
5	Ofloxacin	2 (0.8)	0.8
6	Ciprofloxacin plus tinidazole	1 (0.4)	0.4

Table IV shows that amoxicillin plus cloxacillin (87.5%) was the most commonly prescribed antimicrobial combination.

Table V
Pattern of prescribed analgesic-antiinflammatory drugs

No	Analgesic-antiinflammatory agent	Frequency (%) (n=250)	Percentage amongst analgesic-antiinflammatory drugs (n=228)
1	Ibuprofen plus paracetamol	130 (52)	57.01
2	Aceclofenac plus paracetamol	73 (29)	32.01
3	Paracetamol plus diclofenac	15 (6)	6.5
4	Diclofenac	6 (2.4)	2.63
5	Ibuprofen plus paracetamol plus chlorzoxazone	4 (1.6)	1.7
6	Aceclofenac	7 (0.4)	0.4
7	Ketorolac	1 (0.4)	0.4

Table V shows data on NSAIDs. The results showed that ibuprofen-paracetamol and aceclofenac-paracetamol were the most commonly prescribed fixed dose combinations (FDCs). The mean duration of treatment was 5 days. All the medications were prescribed to be taken by oral route of administration in the standard recommended doses.

Table VI
Pattern of prescribing of oropharyngeal preparations

S.N	Oropharyngeal agents	Frequency (%) (n=250)	Percentage amongst oropharyngeal preparations (n=60)
1	Chlorhexidine gluconate mouthwash	20 (8%)	33.33
2	Potassium nitrate plus sodium monoflorophosphate oinment	19 (7.6)	31.66
3	Potassium nitrate plus strontium chloride toothpaste	11 (4.4)	17.74
4	Benzocaine ointment	10 (4)	16.66
5	Eucalyptol plus menthol plus methylsalicylate plus thymol mouthwash	4 (1.6)	6.66
6	Potassiumnitrate plus sodiummonofluorophosphate toothpaste	1 (0.4)	1.6
7	Triclosan plus sodium fluoride plus xylitol toothpaste	2 (0.8)	3.3
8	Choline salicylate plus Benzalkonium chloride plus lignocaine gel	1(0.4)	1.6

Table VI shows usage of oropharyngeal preparations in 68 prescriptions. Chlorhexidine was the most commonly used oropharyngeal preparation prescribed to 20 patients (33.33%). Drugs were not prescribed by generic names. Percentages of prescribed drugs/combinations from the "Essential Drug List" of WHO and India were 0.8% and 1.1% respectively. None of the prescriptions had an injectable formulation.

DISCUSSION

Drug utilization studies are useful for obtaining information about patterns of drug use. The findings and analysis from drug utilization studies have been shown to be useful in improving standards of medical treatment[6]. Polypharmacy implies using a large number of medications at the same time, and it leads to increased probability of drug interactions, cost, noncompliance, and emergence of resistance in case of use of antimicrobials. Therefore WHO recommends that the average number of drugs per prescription should be less than 2[5]. The mean number of drugs prescribed in the present study was 2.8 per prescription, which was comparable to other studies[7,8,9] The prescription analysis showed that there were ten drug categories prescribed in dental OPD, implying usage of a limited number of drugs for orodental conditions. As far the number of drug categories in use, the present study found appropriate prescribing pattern as is observed in some other studies[8]. Antimicrobial agents (82%) and analgesic-antiinflammatory drugs (87%) were the most commonly prescribed drugs, as commonly found in the prescriptions from the discipline of dentistry.[7,8,9]. So also majority of prescriptions had an H_2 blocking agent prescribed. Fixed dose combination of amoxicillin and cloxacillin was the most commonly prescribed antimicrobial agent and the trend was to prescribe a fixed dose combination of amoxicillin and cloxacillin rather than amoxicillin alone. Since the common oral pathogens respond well to beta-lactam antibiotics, amoxicillin is commonly prescribed at many centers[8,10,11]. Since infection control and prevention is a factor of prime importance in outpatient dentistry and the most common pathogens are gram positive bacteria, so the use of an extended spectrum penicillin like amoxicillin is justified. Moreover, amoxicillin is known to achieve effective concentrations in gingival crevicular fluid[12]. However, the usage of a fixed dose combination of amoxicillin and cloxacillin found in the present study is difficult to justify. Irrational prescribing of this combination has also been reported in various studies[4,7,]. Drug utilization pattern and pharmacoeconomic study in pediatric patients reported amoxicillin and cloxacillin combination was the commonest FDC prescribed[11]. Cloxacillin, a penicillinase resistant penicillin is in fact alone able to inhibit both sensitive as well as resistant organisms, thus eliminating the need of amoxicillin. Hence the combination is not considered rational.

Moreover, there is no evidence for the presence of resistant organisms forming major bulk in the oral cavity[13]. Thus, for any given infection, one of the components may not have a role, and then in that case would add to cost and adverse effects. So also amoxicillin is inactive against most strains of staphylococci as they produce ß-lactamase, and cloxacillin has less activity against streptococci. Moreover, inadequate amounts of individual ingredients may reduce the efficacy providing a chance for selection of resistant strains[14]. It is also known that both the drugs in this combination belong to beta lactam antimicrobials and thus act by same mechanism, offering no synergism or additive effect when combined[15]. The advice to take these antimicrobials before food was justified so as to enhance the absorption leading to increased efficacy[16]. NSAIDs are effective in controlling the pain due to periodontal disease, caries, and tooth extraction, which is the most common complaint. So prescribing these is justified. The FDC of ibuprofen and paracetamol was the most common analgesic-antiinflammatory used in the present study. The combination of aceclofenac and paracetamol was the second most commonly used analgesic-antiinflammatory FDC, as reported in a study[6]. Combining two NSAIDs does not improve the efficacy of treatment as they act on the same enzyme and offer no synergy. There is no convincing evidence that such combinations are superior to single agents, either in efficacy or in safety[17]. Combinations of NSAIDs are known to cause direct damage to kidney[15]. A study of prescribing pattern of NSAIDs in the dental OPD of a tertiary care teaching hospital reported, 56.4% were given monotherapy[18]. A study done in eastern Nepal reported diclofenac (60.86%) and ibuprofen (27.32%) were prescribed as monotherapy[8].A study in paediatric dentistry stated 90% of NSAIDs were monotherapy[11]. Monotherapy is known to be safer, less expensive, and leading to better patient compliance as compared to the use of FDCs[18]. Ranitidine was prescribed to most of the patients (73%) receiving NSAIDs, which seemed to bear a thought in mind that the NSAIDs could precipitate hyperacidity and epigastric distress. Prophylactic use of H_2 blockers or antacids is without benefit and is not recommended[18]. It should have been added depending upon history of acid-peptic disease. Studies have shown that if NSAIDs are taken for short duration and in low doses, then they are relatively safe for GI tract[19]. Most of the prescriptions contained an advice to take ranitidine half an hour before food. Effects of H_2-receptor blockers are affected by food intake[20]. The oropharyngeal preparation chlorhexidine prescribed has an antiseptic action in prevention of dental caries[21], and hence its use is justified. Regarding the issue of prescribing by generic or brand names, the trend in the present study was to prescribe by brand names. Common brand names used were capsule Tressmox (amoxicillin plus cloxacillin), tablet Combiflam (ibuprofen plus paracetamol), Tablet Aciloc (ranitidine), and Hexidine (chlorhexidine) mouthwash. Not prescribing generic drugs is likely to have increased the cost of treatment, and is amenable to the possibility of prescribing errors. Generic prescribing reduces the potential for confusion as only one name for a drug is used and it reduces the number of brands that are stocked by pharmacists which in turn reduces administrative inconvenience[6]. Development of hospital formulary, making drugs available in hospital pharmacy, and model treatment guidelines may increase the practice of prescribing drugs by generic name. After reviewing the above prescriptions it was found that drugs prescribed from EDL of WHO and India were significantly low as compared to other studies[7,6,9]. The reason may be related to lack of awareness about the essential drug concept and essential drug list among prescribers. This lack of awareness was also observed in a study done in tertiary care teaching hospital in Maharashtra[22].Prescribing from the essential drug 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[10]. Prescribing from such a list should be encouraged to ensure rational use of medicines. Prescribing from hospital formularies can reduce the number of irrational combinations entering the market.

CONCLUSION

Drugs are useful tools in the prevention and treatment of symptoms and diseases, but if not used judiciously may be harmful and cause adverse effects or produce suboptimal effect. As per the common trends in dental prescribing, most of the prescriptions in the present study had antimicrobials and analgesic-antiinflammatory drugs as the most commonly prescribed drug groups. The irrational combination of amoxicillin and cloxacillin was commonly used, which could be replaced by individual agents or the use of beta-lactamase inhibitors with amoxicillin as needed per the justification in an individual case. Development of antibiotic policy and therapeutic guidelines and formulary also would facilitate rational drug use. As an analgesic-antiinflammatory agent, ibuprofen alone would be a more rational choice rather than using the fixed dose combinations of analgesic-antiinflammatory drugs. It is necessary to make dental physicians aware about the use of drugs from EDLs, the importance of prescribing drugs with generic names, and considering the cost effectiveness of medications from the point of view of the patients. Developing and implementing standard treatment guidelines for various conditions and putting principles of evidence based medicine in practice are two important measures for eliminating or at least minimizing irrational use of medicines.

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