Short Research Article

Prescriptions audit for antibiotics among outpatients in the department of periodontics

ABSTRACT

Aims: This study aims to audit prescription for antibiotics and to evaluate the impact of prescribing different brand names of bioequivalent drugs on and the cost of prescription in the department of periodontics, dental college of a dental college.

Study design: a prospective cross-sectional study.

Place and Duration of Study:

A prospective cross-sectional study was carried out among outpatients in the Department of Periodontics, of dental college in Himachal Pradesh from August 2020 to July 2021.

Methodology:

A total of 849 patients agreed to share their information of which 614 patients were prescribed antibiotics. The data were also analysed against the National List of Essential Medicines of from 2015 to monitor the antibiotics prescription pattern by the list. For for cost minimization evaluation price of prescribed branded standard prescription and generic antibiotics was calculated in INR from CIMS and the Pharmaceutical and Medical Devices Bureau of India. The results were calculated using descriptive statistics and presented in frequency and percentage.

Results:

The three prescribed antibiotics were not there in the National List of Essential Medicines 2015. A fixed-dose combination of Amoxicillin + Clavulanic acid (61.24%) was prescribed most mostly or invariably and accounts for 87.80 % of the total cost of 146669.82 INR of prescribed antibiotics.

Conclusion:

Most of the dental formulations for local use are not on the National List of Essential Medicines. Most of the time, generic medications were actually prescribed; the only difference was that the name was non-generic. Generic medicine should be prescribed in generic names to reduce the cost of the prescription **(this sentence is confusing, not clear, and difficult to understand).**

Keywords: antibiotics, prescription, generic medicine, **(atleast 5 keywords is mandatory).**

INTRODUCTION

Health funding in India has been unsatisfactory, and recent efforts to offer subsidised health care through the implementation of insurance plans have proven ineffective. Medicine costs are often uninsured, and patients must pay for them out of pocket. Thus, they are frequently disproportionately expensive in comparison to most people's income, and they pose a considerable financial burden,

particularly for large groups of individuals living on or near the poverty line. Medicines account for more than half of overall health spending, which is increased by the availability of several branded and generic versions of medicines. **(English language correction needed)**.[1]

Dental care is an essential component of our daily life. Our teeth are extremely vital to us, from young toddlers to adults. Some employees have dental insurance via their jobs, but for the majority of the people, dental expenditures must always be paid out of pocket. For some people, this might be difficult. Paying full money for dental services can be stressful, especially if an extensive procedure is required **(English language correction needed)**. [2]

Periodontal disorders are the most common cause of tooth loss and the main threat to oral health. Periodontal disease affects more than half of Indian people.[3] Antibiotics are frequently prescribed by dentists for a wide range of infectious diseases such as caries and periodontal disease with surgical intervention and oral hygiene measures. [4] Antibiotic use is an essential part of dentistry practice. The rise in bacterial resistance and the misuse and overuse of antimicrobials are all contributing to increased difficulty in the public health care system. [5] There is a scarcity of data on the pharmacoeconomic of medicines used in dental settings. There have been no studies on pharmacoeconomic assessments of antibiotics prescribed to outpatients in the periodontics department. As a result, determining the rationale of its usage and cost is important. This study aims to audit prescription for antibiotics and evaluate the impact of prescribing different brand names of bioequivalent drugs on the cost of prescription in the department of periodontics of a dental college **(language correction needed)**.

METHODOLOGY

A prospective cross-sectional study was carried out among outpatients in the Department of Periodontics in Himachal Pradesh from August 2020 to July 2021 after getting the approval of the institutional ethics committee, as evidenced by letter no. hdc/ethical/pharma/2019/28. Following the purposive sampling technique, the study included all patients undergoing periodontal treatment and being prescribed antibiotics. Prescriptions of outpatients were used to extract the information after the consent of the patient. A total of 849 patients agreed to share their information of which 614 patients were prescribed antibiotics. The demographic information, the name of the prescribed antibiotics, dosage form, dose, strength, frequency, and the reason for prescribing were collected. Prescriptions with monotherapy and with multiple therapies of antibiotics were scrutinized. The data were also analysed against the National List of Essential Medicines in 2015 to monitor the antibiotics prescription pattern by the list. The price of prescribed branded and generic antibiotics was calculated in INR from CIMS and the Pharmaceutical and Medical Devices Bureau of India respectively, and also evaluated for cost minimisation study. Data were collected and entered in Microsoft Excel. The results were calculated using descriptive statistics and presented in frequency and percentage.

RESULTS

A total of 614 patients have been prescribed 689 antibiotics based on the diagnosis. Males have prescribed 400 antibiotics of which 297 were for systemic route and 103 for local oral use. In the case of females, 289 antibiotics were prescribed in which 244 were for systemic route and 45 for local oral use. (Table 1)

Out of total prescriptions, two antibiotics were prescribed in 75, with the majority of those prescriptions being for gingival recession. The majority of systemic antibiotics were prescribed for partial edentulism and the majority of local oral use antibiotics for gingival recession. (Table 1)

Table 1 Description of Antibiotics prescribed with a diagnosis

Diagnosis	Number of prescriptions	Total Systemic Antibiotics prescribed	Total local oral use Antibiotics	Prescription contains one antibiotic	Prescription contains two antibiotics	Total antibiotics

Partial edentulism	214	214	0	214	0	214 (31.05 %)
Gingival recession	51	51	46	5	46	97 (14.07 %)
Furcation	71	71	0	71	0	71 (10.30%)
General stage II grade B periodontitis	38	10	38	28	10	48 (6.96%)
General stage III grade B periodontitis	40	40	1	39	1	41 (5.95%)
General stage IV grade C periodontitis	36	36	1	35	1	37 (5.37%)
General stage III grade C periodontitis	27	27	3	24	3	30 (4.35%)
General stage I grade B periodontitis	22	5	22	17	5	27 (3.91%)
General stage IV grade B periodontitis	22	22	3	19	3	25 (3.62%)
General stage I grade A periodontitis	22	2	20	22	0	22 (3.19%)
Endo periodontal lesion	16	16	0	16	0	16 (2.32%)
Peri-implantitis	15	15	1	14	1	16 (2.32%)
Peri implant mucositis	9	9	4	5	4	13 (1.88%)
Pericoronitis	12	12	0	12	0	12 (1.74%)
General stage II grade A periodontitis	8	1	8	7	1	9 (1.30%)
Acute necrotizing ulcerative gingivitis	5	5	0	5	0	5 (0.72%)
Periodontal abscess	5	5	0	5	0	5 (0.72%)
General chronic diffused gingivitis	1	0	1	1	0	1 (0.14%)
Total	614	541	148	539	75	689

The three prescribed antibiotics named ofloxacin, fixed-dose combination Ofloxacin + Ornidazole and Chlorhexidine gluconate (**Chlorhexidine belongs to a class of drugs known as antimicrobials. It works by decreasing the amount of bacteria in the mouth)** + Lidocaine **(Lidocaine is a local anesthetic not antibiotic)** +Metronidazole combination for local oral use were not there in the National List of Essential Medicines 2015. (Table2)

A fixed-dose combination of Amoxicillin + Clavulanic acid (61.24%) was prescribed most in all antibiotics prescribed following metronidazole (5.8%) and ofloxacin Ornidazole (3.77%) (Table2)

Table 2 Antibiotics with prescription frequency

Sr.No.	Systemic antibiotics	Frequency (N)	Percentage (%)
1	Amoxicillin + Clavulanic Acid	422	61.24
2	Metronidazole	40	5.8
3	Ofloxacin + Ornidazole	26	3.77
4	Amoxicillin	18	2.61
5	Clindamycin	18	2.61
6	Doxycycline	14	2.03
7	Ofloxacin	2	0.29
8	Cefixime	1	0.14
	Antibiotics for local use		
1	Chlorhexidine gluconate + Lidocaine + Metronidazole	148	21.48

Total eight antibiotics were prescribed for systemic use and one antibiotic was for local oral use. A Fixed-dose combination of Amoxicillin + Clavulanic Acid was mostly prescribed in brand names with a price range of 295.35 INR to 343.50 INR and accounts for 87.80 % of the total cost of 146669.82 INR of prescribed antibiotics. (Table 3)

Table 3 Cost of antibiotics prescribed

Sr.No.	Generic name	Prescribed Drug Generic/ branded	Price of Units of prescribed drugs (INR)	Unit Size	Single-dose price (INR)	Frequency (N)	Total cost of prescribed drugs (INR)
1	Amoxicillin + Clavulanic Acid	Branded	300.75	15	20.05	276	83007
		Branded	295.35	15	19.69	91	26876.85
		Branded	343.5	15	22.9	55	18892.5
2	Ofloxacin + Ornidazole	Generic	25	10	2.5	1	25
		Branded	143.22	10	14.322	25	3580.5
3	Clindamycin	Generic	180	20	9	18	3240
4	Amoxicillin	Generic	48	15	3.2	18	864
5	Metronidazole	Generic	9	15	0.6	13	117
		Branded	21.39	15	1.426	1	21.39
		Branded	21.33	15	1.422	26	554.58
6	Cefixime	Generic	50	10	5	1	50
7	Doxycycline	Generic	6.5	5	1.3	14	91

8	Ofloxacin	Generic	13	10	1.3	2	26
9	Chlorhexidine gluconate + Lidocaine + Metronidazole	Branded	63	1	63	148	9324
	Total						146669.82

DISCUSSION

Periodontal disorders may usually be successfully treated by scaling and planing the root surfaces, and the effects can last for a long time if the patient maintains good oral hygiene and receives regular professional treatment to remove newly generated subgingival deposits. So, mechanical treatment alone will not be able to remove these microorganisms in every subject. Complementing mechanical therapy with local or systemic antibacterial therapy may improve treatment effectiveness and hence be beneficial. [6]

The majority of the prescriptions with antibiotics were for partial edentulism and so most antibiotics are prescribed for this condition. Partial edentulism is a dental arch in which one or more natural teeth are missing. The common causes of partial edentulism are Caries, periodontal problems, impactions, traumatic injuries, cystic and neoplastic lesions.[7] Dental caries and periodontal disease are two of the leading causes of tooth loss.[8] Other aspects such as quality of dental services, economic status, educational status, smoking, geographic location, and dental visit patterns are all linked to edentulousness and contribute to its prevalence. [9] Dental implants are increasingly being used to support dental prosthesis and antibiotics help prevent infections following implant placement. Antibiotic prophylaxis is required for high long-term survival as well as success rates of dental implants. [10]

Most of the patients diagnosed with gingival recession were prescribed two antibiotics. In 51 patients 51 systemic antibiotics and 46 local use antibiotic preparations were prescribed. The apical migration of the gingival margin towards the cementoenamel junction is known as a gingival recession. Periodontal disease, accumulations, inflammatory responses, inadequate flossing, harsh tooth brushing, incorrect occlusal relationships, and dominant roots can all cause gingival recession. The presence of supragingival and subgingival calculus is linked to gingival recession.[11] Combination medication therapy has been proposed due to the complicated nature of the subgingival microbial habitat, which contains numerous possible periodontopathogens with variable antimicrobial susceptibilities. [6] Drug distribution into the periodontal pocket can occur in two ways: systemic and direct local insertion. Antimicrobial drugs can be administered locally at levels that the systemic approach cannot reach. Local delivery may also be appropriate for agents that are too toxic to be delivered through the systemic route, and it may be especially effective if the target organisms are confined to a clinically visible focus. On the other hand, systemic antibiotics permeate and influence all microbial eco-niches of the mouth cavity, whether sick or healthy. This might be a significant benefit in cases when periodontopathogens are widely dispersed. [6]

Amoxicillin +Clavulanic acid fixed-dose combination was the most prescribed antibiotic in this study. Systemic Amoxicillin + Clavulanic acid treatment has been employed in guided tissue regeneration to inhibit periodontal bacteria and promote clinical attachment gain. [12] Early dental implant failure happens in around 2% of all instances. Streptococci, anaerobic gramme positive cocci, and anaerobic gram-negative species dominate the bacterial spectrum linked to early dental implant failure. To lower the risk of early implant failure and localized infections surrounding dental implants, systemic antibiotic prophylaxis has been employed.[13] In this study most of the prescriptions with antibiotics prescribed were for partial edentulism for which implants were done. Several studies have shown that Amoxicillin + Clavulanic acid is the best treatment option. [14-16]

The total cost of the antibiotics prescribed was 146669.82 INR. The cost of the most prescribed fixed-dose combination Amoxicillin + Clavulanic acid ranged from 295.35 INR to 343.50 INR for 15 tablets with different brand names, the same drug price in generic name was 130.62 INR. Chlorhexidine

gluconate + Lidocaine + Metronidazole combination for local oral use was the second drug to contribute most to the prescription cost. The antibiotics prescribed in the brand name were the main reason for the cost of the prescription. Prescribing drugs in the generic name could reduce the cost by more than 50% of spending on antibiotics **(this discussion part is not properly discussed with other existing authors and not focusing the main theme of the subject and title)**.

CONCLUSION

Generic drugs serve an important role in delivering cost-effective healthcare coverage. But most of the dental formulations for local use are not on the National List. Medicine costs in India are regulated by the National Pharmaceutical Pricing Authority. This, however, is limited to medications on the National List of Essential Medicines, which is contained in the First Schedule of the Drugs (Prices Control) Order, 2013. Manufacturers are permitted to set their marketing expenditures for non-scheduled medications. [17] According to WHO generic drugs are those for which the original patent has expired and manufactured by companies other than the original originator.[18] Most of the time, generic medications were actually prescribed; the only difference was that the name was 'non-generic. Generic medicine should be prescribed in generic names to reduce the cost of the prescription **(conclusion is not appropriate)**.

RECOMMENDATION

The price of generic branded drugs should be controlled to ensure the right to health or medical treatment, including the availability of inexpensive and suitable medicines. There should be a separate National List of Essential Medicine for dentistry in which the most prescribed medicine for local oral use should be listed. Complications between branded and non-branded generics should be rectified, and pricing differences among these need to be kept to a minimum.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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