Cost Minimization Study of Analgesics Prescribed to Outpatients Undergoing Periodontal Treatment

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Authors' contributions

This work was carried out in collaboration among all authors. Author DS contribution was in the literature review, designing the study, data analysis, write up and editing, collecting and entering data; author AC contributed to designing the study; author RN contributed to designing the study; author SS contribution was in the write-up and editing and in data analysis. Author SC contributed in data collection. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Aims: Drug use reviews are useful quantitative tools for assessing options for drug prescribing in dental pain. Regular drug use pattern evaluations help to identify current medication usage patterns, improve treatment efficacy, reduce adverse effects, and advise prescribers. The goal of this study was to look at the analgesics prescribed to outpatients in the department of periodontics to see if they could be cut back on costs.
Methodology: A prospective cross-sectional drug utilisation evaluation was conducted among outpatients in the department of periodontics of a dental college in Himachal Pradesh from August 2020 to July 2021. In order to determine prescriber adherence to WHO guidelines, the proportion of analgesics written in generic names and from the NLEM 2015 were determined. The costs of prescribed analgesics (brand name and generic name) were calculated to determine the patient's out-of-pocket expenses.

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Result: The prescribed analgesics cost 74632.75 INR. The Aceclofenac/ paracetamol/ serratiopeptidase combination was the most commonly recommended analgesic. If all medicines were prescribed with generic names, the cost of analgesics could be cut by 85%.
Conclusion: Prescriptions for brand names were the primary cause of the prescription's high cost. The use of generic drugs should be expanded. In order to satisfy WHO requirements, it is necessary to increase the number of medications prescribed in line with NLEM.

1. INTRODUCTION

The drug utilization studies are valuable tools for monitoring medication prescribing patterns and the efficiency and cost-effectiveness of drugs [1]. Most diseases in general practice are treated with drugs. A rational drug prescription uses the smallest possible number of drugs to get the most significant possible results in the shortest possible time and at an acceptable cost. The five most critical criteria for rational medication usage are accurate diagnosis, adequate prescription, correct dispensing, appropriate packaging, and patient adherence [2].

Pharmacoeconomics is a branch of economics that examines the relative costs and benefits of various medicines and medication therapies. 30 to 40% of the overall health expenditure of third world nations is spent on medications, many of which are useless [3]. Cost minimization analysis mainly focuses on expenses, often limited to those incurred by the healthcare system. It is only appropriate when the results are comparable and do not require separate consideration [4].

The most common reason someone seeks dental care is for pain. Several structural and anatomical factors can lead to pain, and they can be odontogenic or not. The pulpal pathology is usually the root of this problem. The main job of a dental surgeon is to find and remove the source of the pain. The three "D" principle is used commonly in pain management, i.e., diagnosis, dental treatment, and drug [5]. Analgesics, including opioids and non-opioids, are frequently prescribed to relieve pain in dental pain management [6]. These medicines are the most regularly recommended to adults and children. In addition, non-steroidal anti-inflammatory medications are used by more than 30 million individuals daily [7,8]. The extensive use of analgesics has raised concerns about drug-induced toxicity, which has the potential to cause serious health consequences. There are no medications that are entirely free of side effects or completely safe, but their safe use in clinical practice would include increasing the therapeutic efficacy while limiting the side effects to the greatest extent possible [7].

No study from India has reported the cost minimization evaluation among patients undergoing periodontal treatment. Untreated, periodontal infections, one of the common causes of tooth decay, are a severe threat to oral health and should be treated immediately [9]. Periodontal disease affects more than half of the population of India [10]. This study aimed to assess the prescriptions for cost minimization. So, we evaluated prescriptions containing analgesics prescribed to outpatients in the department of periodontics.

2. MATERIALS AND METHODS

A prospective cross-sectional drug utilisation evaluation for cost minimisation was conducted among outpatients in the department of periodontics in a dental college in Himachal Pradesh from August 2020 to July 2021.

2.1 Inclusion Criteria

· Patients of age 18 years and older.
· Patients consented to participate in the study

2.2 Exclusion Criteria

· Patients referred to other faculties or hospital.

2.3 Sources of Data

Patient case records, prescription and lab test reports.

2.4 Study Variables

Drug name, route, strength, dose, quantity and duration. Drugs prescribed in generic names, brand names, and from EDL (Essential Drugs List).

2.5 Self-reported Practice

A total of 849 patients agreed to provide their information. The information gathered included demographic information, the name of the analgesics prescribed, the dosage form, the dose, the strength, the frequency, and the reason for prescribing. The percentages of analgesics written in generic names and from the National List of Essential Medicines (NLEM) 2015 were calculated to find prescribers' adherence to the WHO guidelines. The costs of prescribed analgesics (brand name and generic name) were calculated to determine the patient's out-of-pocket expenses. The costs were reported in Indian rupees (INR). The price of branded drugs was determined from drug reference CIMS, while for the drugs prescribed in generic names, the Pharmaceutical and Medical Devices Bureau of India website.

2.6 Data Analysis

Observations were entered and organised in Microsoft Excel 2010. Cases with incomplete data were deleted and eliminated from the Excel file. To analyse the data, it was exported to SPSS (23.3; IBM Corp., Armonk, NY, USA). Descriptive statistics were performed on all variables, and frequency and proportions were calculated.

3. RESULTS

Out of 849 patients, 517 were prescribed analgesic single and fixed-dose combinations. 39.10% of patients were treated without giving them analgesics. The diagnosis was Classified into four categories according to the Classification of Periodontal and Peri-implant diseases and conditions, 2018. patients diagnosed with other conditions affecting periodontium were prescribed 298 analgesics (57.6%), periodontitis 196 analgesics (37.9%) followed by peri implant diseases and conditions 22 analgesics (4.2%). Periodontal Health, Gingival Diseases and Conditions were prescribed only 1(0.1%) (Table 1).

Table 1. Description of Analgesics prescribed in periodontal disease

Prescribed Drug	Periodontal Health, Gingival Diseases and Conditions (n=135)	Periodontitis (n=344)	Other conditions affecting periodontium (n=324)	Peri-implant Diseases and conditions (n=46)
Ketorolac	0	6	12	0
Diclofenac	0	1	0	0
Ibuprofen	0	3	0	1
Aceclofenac/ paracetamol/ serratiopeptidase	0	16	217	0
Diclofenac sodium/ serratiopeptidase	1	159	57	14
Paracetamol/ tramadol	0	11	9	7
Aceclofenac/ tizanidine	0	0	3	0

Table 2. Analgesics with prescription frequency and cost

Prescribed Drug	Frequency of prescribing brand Name	Frequency of prescribing generic name	Frequency
Ketorolac	18	0	18
Diclofenac	0	1	1
Ibuprofen	0	4	4
Aceclofenac/ paracetamol/ Serratiopeptidase	233	0	233
Diclofenac sodium/ serratiopeptidase	209	22	231
Paracetamol/ tramadol	0	27	27
Aceclofenac/ tizanidine	3	0	3
Total	463	54	517

Table 3. Comparison of price

Prescribed Drug	Cost of prescribed drugs (INR)	Cost if prescribed only generic names (INR)
Ketorolac	1989.9	180
Diclofenac	5	5
Ibuprofen	32	32
Aceclofenac/paracetamol/serratiopeptidase	32503.5	5941.5
Diclofenac sodium/serratiopeptidase	39367.35	4851
Paracetamol/tramadol	486	486
Aceclofenac/tizanidine	249	0*
Total	74632.75	11495.5

*Price of Aceclofenac/ Tizanidine was not available on Pharmaceutical and Medical Devices Bureau of India website

Most prescribed analgesics were fixed-dose combination of aceclofenac/paracetamol/ serratiopeptidase (45.0%) and diclofenac sodium/serratiopeptidase (44.6%). Only 10.4 % of total analgesics were prescribed in generic names. Only two drugs diclofenac and ibuprofen were from the National List of Essential Medicine 2015 (Table 2).

Table 3 presented the cost of actually prescribed drugs, and it was compared with the cost if all drugs prescribed were generic. For example, the most costlier drug combination of diclofenac sodium/ serratiopeptidase could be reduced to around 88 % if the generic name was prescribed. Similarly, aceclofenac/ paracetamol/ serratiopeptidase could be reduced to 81.7 %, and ketorolac could be reduced to 91 %.

4. DISCUSSION

It has become more important for society, health insurers, and healthcare professionals to make the most effective and efficient use of their available resources [11]. This research attempted to find the extra spending on analgesics for reducing dental pain because the most significant roadblock to establishing universal health coverage has been affordability [12].

According to our findings, the most commonly prescribed analgesics for periodontal patients were aceclofenac/paracetamol/serratiopeptidase and the diclofenac sodium/serratiopeptidase combinations. In accordance with previous findings in India by Nagarajan et al [13] paracetamol/aceclofenac was the most often recommended for periodontal pain treatment. Cinthura et al [14] reported that paracetamol alone and paracetamol/aceclofenac were the most often prescribed analgesics. According to Rajaraman et al [15], dentists preferred combination analgesics. Ramanath et al [16]

reported that diclofenac/paracetamol and aceclofenac/paracetamol were often used analgesics in periodontitis, which was consistent with our findings. According to Ravinthar et al [17] paracetamol was the most often prescribed medicine by dentists, while the most frequently prescribed combination medication was paracetamol and diclofenac. In overseas research, Shrestha et al [18] reported dentists recommending paracetamol for periodontitis, but mostly in combination with ibuprofen.

It was found that less than one percent of the medicines prescribed were from the National List of Essential Medicines 2015, which is a concerning finding. However, we have found a higher percentage by other researchers, as Shrestha et al [18] 89%, Patel et al [19] 85.03%, Inder et al [20] 80% and Shrestha et al [21] 32.36%.

Only 10% of analgesics are prescribed in generic names. We have evaluated this percentage only for analgesics, but in other studies, many researchers found the percentage of all drugs prescribed to dental outpatients, as by Seyed et al [2] 82.9 %, Shrestha et al [21] 63.26%, Shrestha et al [18] 34.5%, Sarkar et al [22] 21%, Pratiti et al [23] 10.97%, Patel et al [19] 1.58%, Rehan et al [24] 1.5%, and Inder et al [20] 0.5%. If all analgesics were prescribed using generic names, spending on analgesics might be reduced by 85%. (Table 3) The economic consequences of using generic medicines cannot be ignored, and in many countries, their usage is required in order to keep healthcare spending under control [25].

For Indian patients, the cost of medicine is a significant concern. The government's generic medicine programme (Jan Aushadhi scheme), which has more than 3600 outlets across the country, was created to make low-cost, high-quality medicines available to everyone. The

Bureau of Pharma PSUs of India (BPPI) procures and distributes all generic medications purchased and distributed under the Jan Aushadhi plan to assure quality and efficacy. However, this cannot be guaranteed for the low-cost brands now available in the market [26]. There is an obvious need for more measures to address concerns such as high brand costs, ensuring the quality of generics, improving the ceiling price policy, and putting restrictions on pharmaceutical companies.

6. CONCLUSION

In this paper, we have reviewed the analgesics prescribed to outpatients in the department of periodontics. Prescribing brand names was the major cause for the high cost of the prescription. The usage of generic drugs should be expanded. In order to satisfy WHO requirements, it is required to increase the number of medications prescribed in line with NLEM. Workshops for dentists should be compulsory to increase their awareness of prescription standards, the relevance of WHO's key prescribing indicators and treatment should be affordable to everyone.

DISCLAIMER

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.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Data collected after institutional ethical committee approval with the reference number hdc/ethical/pharma/2019/28.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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