Cost minimization study of analgesics prescribed to outpatients undergoing periodontal treatment

ABSTRACT

Aims: Drug use reviews are useful quantitative tools for assessing dental pain options for treatment. Regular drug use pattern evaluations help identify current medication usage patterns, improve treatment efficacy, reduce adverse effects, and advise prescribers. This study's objective was to cost minimization evaluation of analgesics prescribed to outpatients in the department of periodontics.

Methodology: A prospective cross-sectional drug utilisation evaluation was conducted among outpatients in the department of periodontics in a dental college of Himachal Pradesh from August 2020 to July 2021. In order to determine prescriber adherence to government 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.

Result: The prescribed analgesics cost 74632.75 INR. Aceclofenac/paracetamol/Serratiopeptidase was the most usually recommended analgesic. Spending on analgesics could be reduced by 85% of all medicines were prescribed using generic names.

Conclusion: Prescribing brand names was the primary cause of 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.

Keywords: Analgesics, prescription, generic, cost, periodontics, NLEM

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 is using 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 achieving 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 medicine [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. 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 [9].

No study from India has reported the cost minimization evaluation among patients undergoing periodontal treatment. Periodontal infections, the most common cause of tooth decay, are the most severe threat to oral health and should be treated immediately. 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.

MATERIALS AND METHODS

A prospective cross-sectional drug utilisation evaluation was conducted among outpatients in the department of periodontics in a dental college in Himachal Pradesh from August 2020 to July 2021. Data collected after institutional ethical committee approval with the reference number hdc/ethical/pharma/2019/28. 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 government 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. The data was gathered and put into Microsoft Excel using a spreadsheet programme. A descriptive statistical analysis was utilised to obtain the results, which were then reported in frequency and percentage.

RESULT

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 preimplant 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

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 drugs 2015. The total cost of analgesics prescribed was 74632.75. Diclofenac Sodium/ Serratiopeptidase was contribute to this cost 52.7% and Aceclofenac/ Paracetamol/ Serratiopeptidase 43.5 % (Table 2)

Table 2 Analgesics with prescription frequency and cost.

Prescribed Drug	Frequency of prescribing brand Name	Frequency of prescribing generic name	Frequency	Total cost
Ketorolac	18	0	18	1989.9
Diclofenac	0	1	1	5
Ibuprofen	0	4	4	32
Aceclofenac/ Paracetamol/ Serratiopeptidase	233	0	233	32503.5
Diclofenac Sodium/ Serratiopeptidase	209	22	231	39367.35
Paracetamol/ Tramadol	0	27	27	486
Aceclofenac/ Tizanidine	3	0	3	249
Total	463	54	517	74632.75

DISCUSSION

This research attempted to find the extra spending on analgesics for reducing dental pain. Because the most significant roadblock to the establishment of universal health coverage has been identified as affordability [11].

According to our findings at the department of periodontics, the most commonly prescribed analgesics were the combination of Aceclofenac/paracetamol/Serratiopeptidase combination and the diclofenac sodium/Serratiopeptidase combination. In accordance with previous findings in India by Nagarajan et al [12] paracetamol/Aceclofenac was the most often recommended for periodontal pain treatment. Cinthura et al [13] reported that paracetamol alone and paracetamol/Aceclofenac were the most often prescribed analgesics. According to Rajaraman et al [14] dentists preferred combination analgesics. Ramanath et al [15] reported that Diclofenac/paracetamol and Aceclofenac/paracetamol were often used analgesics in periodontitis, which was consistent with our findings. According to Ravinthar et al [16] 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 [17] 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. 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 percentage of all drugs prescribed in dental outpatients, as by Seyed et al [7] 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%. Spending on analgesics might be reduced by 85% if all analgesics were

prescribed using generic names. (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].

Table 3. Comparison of price

Prescribed Drug	Price of prescribed drugs	Cost if prescribed only generic names
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

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.

REFERENCE

1. Yu J, Nie EM, Jiang R, Zhang CY, Li X. Analgesic and Antibiotic Prescription Pattern among Dentists in Guangzhou: A Cross-Sectional Study. Pain Res Manag. 2020;2020.

2. Mittal P, Chan OY, Kanneppady SK, Verma RK, Hasan SS. Association between beliefs about medicines and self-medication with analgesics among patients with dental pain. PLoS One. 2018;13(8):1–11.

3. Şermet S, Akgün MA, Atamer-Şimşek Ş. Analgesic prescription pattern in the management of dental pain among dentists in İstanbul. Marmara Pharm J. 2012;16(1).

4. Lupşe I, Muntean A, Chiş I-A, Daniliuc A-I, Ghergie M. Anti-Inflammatories and Analgesics in Paediatric Dentistry. Rom J Stomatol. 2021;67(2):71–5.

5. Sermet S, Akgun MA, Atamer-Simsek S. Analgesic prescription pattern in the management of dental pain among dentists in İstanbul. Marmara Pharm J. 2012;16(1):41–7.

6. Kaur S, Rajagopalan S, Kaur N, Shafiq N, Bhalla A, Pandhi P, et al. Drug Utilization Study in Medical Emergency Unit of a Tertiary Care Hospital in North India. Emerg Med Int. 2014;2014:1–5.

7. Kia SJ, Behravesh M, Khalighi Sigaroudi A. Evaluation of Drug Prescription Pattern among General Dental Practitioners in Rasht, Iran. J Dentomaxillofacial Radiol Pathol Surg. 2013;1(2):18–23.

8. Shrestha B, Pradhan M. A Prospective Drug Utilisation Study and Pharmacoeconomic Analysis in Paediatric Dentistry at a Tertiary Hospital. Med J Shree Birendra Hosp. 2020;19(2):60–4.

9. Gattani SG, Patil AB, Kushare SS. Pharmacoeconomics review. Asian J Pharm Clin Res. 2009;2(3):15–26.

10. Janakiram C, Mehta A, Venkitachalam R. Prevalence of periodontal disease among adults in India: A systematic review and meta-analysis. J Oral Biol Craniofacial Res. 2020;10(4):800–6.

11. Mundy L, Trowman R, Kearney B. Overcoming the Barriers to Achieving Universal Health Care in The Asian Region. Int J Technol Assess Health Care. 2018;Jan;34(4):352–9.

12. Nagarajan K, Ganapathy D, Balasubramanian A. Analgesic prescription practice for periodontal pain in Chennai population. Int J Pharm Res. 2020;12:175–81.

13. Cinthura C, Ganapathy D, Rajasekar A. Analgesic prescription practice for Pulpal pain — an institution-based retrospective study. Int J Res Pharm Sci. 2020;11(Special Issue 3):972–6.

14. Rajaraman V, Dhanraj M, Jain AR. Knowledge, awareness, and practice about post-implant prescription of analgesics - A survey among clinicians in Chennai. Drug Invent Today. 2018;10(4):437–42.

15. Ramanath K V., Singh R, Shaj AV, Gopinath D, Chacko SM, Chama S. Study on drug utilization pattern in Dental Department of a Tertiary Care Teaching Hospital: A prospective study. Res J Pharm Biol Chem Sci. 2016 Sep 1;7(5):319–27.

16. K. R, E.D. W. Analgesic drugs in dentistry- a cross-sectional study among dentists in a private dental college. Int J Pharm Sci Res. 2016;7(12):5092–8.

17. Shrestha S, Agrawal N, Sarraf DP. Evaluation of Drug Utilization Pattern Using WHO Prescribing Indicators in Endodontic Department at a Tertiary Hospital in Eastern Nepal. Birat J Heal Sci. 2020;5(3):1191–5.

18. Shrestha S, Agrawal N, Sarraf DP. Evaluation of Drug Utilization Pattern Using WHO Prescribing Indicators in Endodontic Department at a Tertiary Hospital in Eastern Nepal. Birat J Heal Sci. 2020 Dec 30;5(3):1191–5.

19. Patel PS, Patel SN, Bhave A. Evaluation of prescribing pattern at dental outpatient department at a hospital, Gujarat. Natl J Physiol Pharm Pharmacol. 2017;7(1):47–50.

20. Dukes MNG, editor. Introduction to Drug Utilization Research World. World Health Organization WHO. BioMed Central; 2003.

21. Shrestha R, Shrestha SS, Koju S, Humagain M. Study of dental disease pattern and drug utilization evaluation among patients visiting dental outpatient department of tertiary care center. J Chitwan Med Coll. 2020 Mar 14;10(31):19–23.

22. Sarkar C, Das B, Baral P. An audit of drug prescribing practices of dentists. Indian J Dent Res. 2004;15(2):58–61.

23. Pratiti D, Datta PP. Drug utilization pattern in oral medicine department of Saveetha Dental College, Tamil Nadu, India. Natl J Med Res. 2015;5:272–4.

24. Rehan HS, Singh C, Tripathi CD, Kela AK. Study of drug utilization pattern in dental OPD at tertiary care teaching hospital. Indian J Dent Res. 2001;12(1):51–6.

25. Dunne S, Shannon B, Dunne C, Cullen W. A review of the differences and similarities between generic drugs and their originator counterparts, including economic benefits associated with usage of generic medicines, using Ireland as a case study. BMC Pharmacol Toxicol. 2013;14(1):2–19.