Research Article

DRUG UTILIZATION PATTERN AND PHARMACOECONOMIC STUDY IN PAEDIATRIC DENTISTRY AT A TERTIARY HOSPITAL

JAYANTHI M.K[1]*, SUSHMA NAIDU V[2]

Dept of Pharmacology, JSS Medical College, JSS University, Mysore, Karnataka. Email: dr14jayagatti@gmail.com

ABSTRACT

Objective: To evaluate drug utilization and cost analysis in paediatric dentistry at J.S.S Dental college & Hospital.

Methods: Retrospective record based study was conducted at Department of paediatric dentistry at J.S.S Dental College & Hospital, Mysore. About 600 prescriptions were screened, drugs prescribed were noted, tabulated and analysed.

Results: Total no. of prescriptions 600, total no. of drugs prescribed 320, average no of drugs per prescription 0.52. Out of total drugs prescribed 50% were antibiotics and 25% were NSAIDS and 25% were multivitamins. Among antibiotics betalactam antibiotics were commoner followed by macrolides and cephalosporins, 80% of the antibiotics prescribed were monotherapy and 20% were Fixed dose combinations, amoxicillin was the commonest betalactam antibiotic prescribed and amoxycillin with cloxacillin combination was the commonest fdc`s prescribed. Among NSAIDS 90% were monotherapy, 37.5% Ibuprofen, 30% diclofenac followed by 22.5% Paracetamol.

Conclusion: Based on the results obtained every fifth child was exposed to drugs, Most of the prescriptions were rational. Among the antibiotics amoxicillin was the commonest and among NSAIDS Ibuprofen was given frequently. Only few were given multivitamins.

Keywords: Drug utilization, Cost analysis, Pediatric dentistry, Prescription.

INTRODUCTION

Drug utilization patterns are powerful, tools to ascertain role of drugs in medical practice. They create a sound and economic basis for health care and out patient clinics deliver therapeutic service to a large segments of the patients. Assessment of prescribing pattern in these important medical care facilities is of obvious relevance to identify problems regarding rational use and to propose interventions.[1]

Drug utilisation research was defined by WHO as "the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences" (WHO, 2003)[2]. Since then, a number of other terms have come into use and it is important to understand the interrelationships of the different domains, epidemiology, pharmacoepidemiology, pharmacovigilance, and pharmacoeconomics.

Drug utilisation data are needed for developing and monitoring policies because data on expenditure are not sufficient [3].

Utilisation data are both quantitative and qualitative. Patterns of drug utilisation can be used to determine how variations in need, prescribing choice and price account for differences in drug use in different countries [3.]

The ultimate goal of drug utilisation research is to assess whether drug therapy is rational or not. All links of the therapeutic chain, from development of medicines to their use by consumers, may be studied. Drug utilisation studies can be medicine-oriented (focused on the use of a particular medicine or group of medicines) or problem-oriented (focused on the treatment of a particular condition or disease).

Drug utilisation research helps in Estimating number of patients exposed to specified drugs within a given time period,Describe the extent of use at a certain moment and/or in certain areas, particularly useful to follow trends, Estimate the degree of proper use, overuse or underuse, Determine the pattern or profile of drug use and the extent to which alternate drugs are being used to treat particular conditions [4]Prescription order is an important transaction between the physician and the patient [5]. It brings into focus the diagnostic acumen and therapeutic proficiency of the physician with instruction for palliation or restoration of the patient's health.

The data regarding drug usage patterns in Dentistry in India are particularly lacking. Dentistry is a special branch of medicine having varieties of patients requiring varieties of medicines including antibiotics, analgesics, vitamins and other supplements and various drugs under dental pharmacotherapy. The objective of the present study was to evaluate and compare patterns of drug prescribing practiced in our dental out patient department.

Pharmacoeconomics refers to the scientific discipline that compares the value of one pharmaceutical drug or drug therapy to another. It evaluates the cost (expressed in monetary terms) and effects (expressed in terms of monetary value, efficacy or enhanced of a pharmaceutical product. There are several types of pharmacoeconomic evaluation: cost-minimization analysis, cost-benefit analysis, cost-effectiveness analysis and cost-utility analysis. Pharmacoeconomic studies serve to guide optimal healthcare resource allocation, in a standardized and scientifically grounded manner.[6]

One important consideration in a pharmacoeconomic evaluation is to decide the perspective from which the analysis should be conducted. This study tried to establish the pattern of utilization of adjunctive pharmacotherapy for patients attending outpatient depts., find out how close we are to optimal care, determine the different variables that can affect this pattern, and evaluate the effect of this practice at follow up. This also would encourage good evidence based practice and facilitate appropriateness of drugs.

Keeping these facts in consideration the present study was planned to define the pattern of drug use for the common paediatric dental conditions, their availability in the hospital pharmacy and to evaluate the cost analysis of each prescription in the Out Patient Department at Tertiary Care Hospital in Mysore, India

MATERIALS AND METHODS

This retrospective study was carried out by collecting prescriptions of the patients attending out patient department of pediatric dentistry of JSS dental college after securing Institutional Ethical Committee permission to assess the prescribing patterns of drugs. Total 600 prescriptions containing various drugs were collected from the hospital record section for the study. Prescriptions were collected irrespective of the indications. The data were collected in a proforma, containing information regarding age and sex of the patients as well as trade/generic name of the drug, numbers of drugs

prescribed, their dosage, frequency, route of administration, duration of therapy along with the clinical diagnosis.
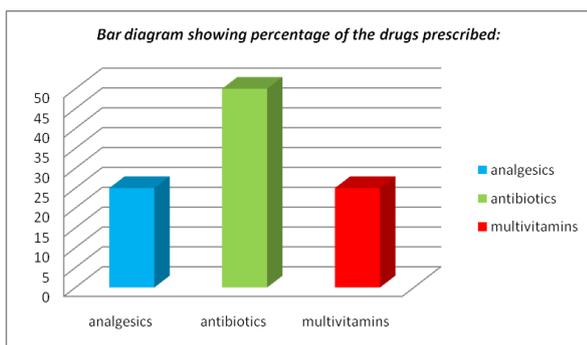

Fig. 1: Bar graph showing percentage of the drugs prescribed

Cost of the individual prescriptions worked from prices as given in Indian Drug Review. The patients included were those who were registered in the pediatric dentistry OPD during the period July-September 2011.

Study Setting: Outpatient Department of pediatric dentistry attached to JSS dental college Hospital, Mysore.

Sample Size: During the period of 3 months (July-September 2011) a total of 600 prescriptions of patients diagnosed to have all varieties of conditions were collected.

Informed Consent: Not applicable as the study involved only retrospective analysis of records.

Statistical Analysis: In this study, Data was analyzed using Descriptive Statistics. Analysis of pattern of prescription between the groups is done using chi square test.

RESULTS

Total no. of prescriptions 600, total no. of drugs prescribed 320, average no of drugs per prescription 0.26. Among the monotherapy category, the various classes of drugs used were as follows analgesics (25%), antibiotics (50%), multivitamins (25%)

Among antibiotics betalactam antibiotics were the most commonly prescribed followed by macrolides and cephalosporins. 80% of the antibiotics prescribed were monotherapy and 20% were Fixed dose combinations, amoxicillin was the commonest betalactam antibiotic prescribed and amoxycillin with cloxacillin combination was the commonest fdc`s prescribed. Among NSAIDS 90% were monotherapy (70% Ibuprofen & 30% Paracetamol) were commonly prescribed followed by diclofenac.

Table 1: Showing No. of drugs prescribed

	Analgesics	Antibiotics	Multi Vitamins
Monotherapy	72	128	-
FDC	08	32	-
Total	80	160	80

Table 2: Showing Analgesics prescribed

Analgesics	No. (%)
Ibuprofen	30(37.5%)
Paracetamol	18(22.5%)
Diclofenac	24(30%)
Ibuprofen+Paracetamol	04(5%)
Diclofenac +paracetamol	04(5%)

Total No of Prescriptions=600

Total no of drugs prescribed=320

Avg no of drugs per prescription=0.52

Total no of analgesics prescribed=80

Total no of antibiotics prescribed=160

Total no of multi vitamins=80

Table 3: Showing Antibiotics prescribed

Name of Drug	No (%)
1. Penicillins	**76(47.5%)**
Amoxicillin	44(27.5%)
Amoxicillin+cloxacillin	18(11.25%)
Amoxicillin+ Clavulanic acid	14(8.75%)
2.Macrolides	**32(20%)**
Azithromycin	24(15%)
Roxithromycin	8(5%)
3.Fluroqinlones	**24(15%)**
Sparfloxacin	10(6.25%)
Ciprofloxacin	14(8.75%)
4.Cephalosporins	**28(17.5%)**
Cefixime	16(10%)
Ceftriaxone	1297.5%)

Table 4: Showing Fixed drug combinations prescribed

FDC	%
Ibuprofen + Paracetamol	4(5%),
Diclofenac+ Paracetamol	4(5%),
Amoxicillin+cloxacillin	18(11.25%)
Amoxicillin+ Clavulanic acid	4(8.75%)

Table 5: Pharmaco economic data of the prescriptions

S. No.	Parameter Cost in INR
1	Average total cost 115.230
2	Average total cost per prescription 1.59*
3	Average hospital pharmacy cost per prescription 49.40 *
4	Average outside pharmacy cost per prescription 65.83*

(*= p<0.05); 1 US $= 66 (28th aug, 2013)

Analgesics

The analgesics used were Ibuprofen, Paracetamol, diclofenac among which 90% were monotherapy followed by the rest being used in combination.

Antibiotics

The antibiotics commonly prescribed were Beta lactams followed by metronidazole. The Macrolides commonly prescribed were Azithromycin and Roxithromycin. Sparfloxacin was the common Fluroquinolone used. Ciprofloxacin was used in 4 cases. Amoxicillin was used alone, and in combination with cloxacillin, and Clavulanic acid. The cephalosporin's used were cefixime and ceftriaxone.

Cost

The total amount spent on these prescription was 7,590.The average cost per prescription was 105. Antibiotics accounted for 49% of the total cost followed analgesics (30%) and multivitamins(21%). The frequency and the quantity of the individual drug prescribed were written in all prescriptions.

Average total cost per prescription was found to be INR1.59, while average hospital and outside pharmacy costs were INR49.40 and INR 65.83 respectively

DISCUSSION

Drug utilization studies and pharmacoeconomics are useful for obtaining information about drug use patterns and for identifying high cost drugs [7]. Such analysis not only improves the standards of medical treatment at all levels in the health system, but also helps in the identification of problems related to drug use such as poly-pharmacy, drug-drug interaction, and adverse drug reaction [8,9,10].The

data regarding drug usage patterns in dentistry in India are particularly lacking. Keeping these facts in consideration the present study was planned to define the pattern of drug use for the common pediatric dentistry conditions, their availability in the hospital pharmacy and to evaluate the cost analysis of each prescription in the pediatric dentistry Out Patient Department at Tertiary Care Hospital in Mysore, India.

A prescription by a doctor is a reflection of physicians' attitude towards the disease and the role of drug in its treatment 11. The ultimate outcome of the dental prescription analysis gives a message to the prescribing physician to achieve rational and cost effective medical care 12. It also provides an insight into the nature of health care at that facility. Pharmacoeconomic evaluation is an analytical tool used with increasing frequency to assist decision making in the financing and management of pharmaceutical products in the health care system or national health insurance programs of an individual country. The Cost Benefit Analysis (CBA) is based on the economic standard of efficiency. CBA requires the measuring of all benefits and costs which are either directly or indirectly attributable to the outcome under investigation. CBA is important to healthcare economists and policy makers because it identifies inefficiency, and inefficiency equates to welfare loss (ideally, the aim is to minimize welfare loss). CBA has become the standard of modern welfare economics.

The Cost Effectiveness Analysis (CEA) ratio can be a more practical tool for decision making than CBA in that it involves the comparison of the costs of achieving a particular non-monetary objectives; such as lives saved, health improvement, or quality of life. CEA ratios can be applied when the costs are expressed in money (i.e., dollars) and the benefits are in specific health outcomes. 13 Patients with multiple conditions are a growing population in the community which can be managed with pharmaceutical therapy. The field of pharmacoeconomics has been increasingly used to enhance this population's quality of life (QoL) 14.However, to successfully impact a patient's life many factors such as the cost to the patient of purchasing multiple pharmaceuticals and the impact of those costs to society need to be addressed.

In this study it was observed that the total no. of drugs prescribed were 320. The different drugs that were prescribed were analgesics, antibiotics and multivitamins. Among the analgesics, both monotherapy and polytherapy were followed. In the monotherapy category the drugs given were ibuprofen, paracetamol and diclofenac. The FDCs included combinations of ibuprofen+ paracetamol and diclofenac+ paracetamol. The next category of majorly prescribed drugs were antibiotics among which majority was monotherapy followed by combination drugs. Antibiotic prescription included many classes of drugs out of which those prescribed in the monotherapy category included amoxicillin from the beta lactams group, azithromycin and roxithromycin from macrolides group, sparfloxacin and ciprofloxacin from fluoroquinolones group, cefixime and ceftriaxone from the cephalosporins group. In the combination group, amoxicillin+ cloxacillin and amoxicillin+ clavulinic acid were prescribed. Multivitamins formed 25% of the prescription. The cost analysis of these prescriptions was done. Average total cost per prescription was 115.230$, Average hospital pharmacy cost per prescription was 49.40$, Average outside pharmacy cost per prescription was 65.83$.

CONCLUSION

Drugs are a useful tool in the prevention of and treatment of symptoms and diseases, but if not used properly, they may be harmful and cause adverse effects or produce sub optimal effect. The

prescription should be rational and hospital guidelines should be followed in consideration of patient's financial status. This study has shown to analyse the drug utilization pattern in pediatric dentistry patients along with the pharmacoeconomic evaluation based on the results obtained every fifth child was exposed to drugs. Most of the prescriptions were rational. Analgesics and antibiotics form the cornerstone of therapy in dentistry practice. Both monotherapy and polypharmacy were practiced. Safer drugs with less adverse effect profile were considered.Among the antibiotics amoxycillin was the commonest and among NSAIDs, Ibuprofen was given frequently.

Only few were given multivitamins.Further studies from time to time are required in drug utilization pattern and standard treatment guidelines to be circulated among practicing physicians.

REFERENCES

1. Yadav pramila, Kanase vanita, Lacchiramka preety, Jain siddharth.Drug utilization trends in ENT out patient department in a teaching hospital. International Journal of Pharma and Bio Sciences 2010;1(4):153
2. World Health Organization (WHO) Collaborating Centre. (2003) *Introduction to Drug Utilization Research*. World Health Organisation (WHO). (2009). Medicines use in primary care in developing and transitional countries. Fact book summarizing results from studies reported between 1990 and 2006. Geneva: WHO
3. Mossialos, E., Mrazek, M.F. Data needed for developing and monitoring policies.*Int J Risk Safety Med* 2002, 15: 15-27.
4. Bergman, U. The history of the Drug Utilization Research Group in Europe.Pharmacoepidemiol Druf Saf 2005; 15(2): 95-98.
5. Benet LZ. Principles of prescription order writing and patients compliance instructions. In:Goodman AG, Rall TW, Nies AS, Taylor P, Eds. Goodman and Gilman's pharmacological basis of therapeutics, 8th Ed. New York: Pergamon Press Inc; 1991.p. 1640
6. Arnold RJG and Ekins S. Time for cooperation in health economics among the modeling community, PharmacoEconomics, 28(8):609-613, 2010
7. Lamichhane, D.C., Giri, B.R., Pathak, O.K., Panta, O.B., Shankar, P.R. Morbidity profile and prescribing patterns among outpatients in a teaching hospital in Western Nepal. MJM 2006 ;9(2):126-133.
8. Michael, J.C., John, T., Catherine, H., Julie, C., Victoria, B., Rachid, T.A., et al. An audit of adverse drug reactions to aqueous cream in children with atopic eczema. The Pharmaceut. J 2003; 271: 747-748.
9. Sweileh, W.M. Audit of prescribing practices of topical corticosteroids in outpatient dermatology clinics in north Palestine. Eastern Mediterranean Health J 2006; 12(1/2): 161-9.
10. Chester, B.G. Polypharmacy in elderly patients with diabetes. Diabetes Spectrum 2002;15(4): 240-8.
11. Shankar, R.P., Partha, P., Shenoy, N. Prescribing patterns in medical outpatients.
12. Clinical Medicine and Health Research 2010
13. Dirk, BR., Howard, IM. (). Dermatologic Pharmacology, in: Bertram G. Katzung(Eds.),Basic and clinical pharmacology. 10th edition. Boston: McGraw Hill publications., 2007.p.991-1008.
14. Black, William. "A Graphical Representation of Cost-Effectiveness.". Med Decis Making 1990 ;10 (3): 212–214.
15. Kheir, NM; van Mil, JW, Shaw, JP, Sheridan, JL. "Health-related quality of life measurement in pharmaceutical care. Targeting outcome that matters.". Pharm World Sci 2004; 26 (3): 125–8