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Prescribing pattern in a pediatric out-patient department in Gujarat

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Abstract

This study was carried out to find the medicine-prescribing pattern in children taking treatment in pediatric out-patient department of a tertiary care teaching hospital in rural Gujarat. Prescriptions of 606 patients were collected over a period of six months and analyzed for (i) average number of medicines per prescription, (ii) percentage of medicines prescribed by official names, (iii) essentiality status of medicines, (iv) appropriateness of medicines used and (v) cost of prescription. The average number of medicines per prescription was 3.72 ± 0.07 and 46.7% patients were prescribed up to 3 medicines. Of the 1483 medicines prescribed, 456 (30.7%) were prescribed by official names and 77.61% were essential. Only 20.13% prescriptions could be reckoned as most appropriate. Twenty percent of the total cost was on account of non-essential medicines, of which 95% was contributed by non-essential fixed dose drug combinations.

Introduction

Children constitute about 40% of India's population. Infants and children suffer from frequent but usually non-serious illnesses. Most of these are self-limiting (Straand et al., 1998) and are often treated not only inappropriately, but also resorting to polypharmacy (Ghai and Paul, 1988). Prescribers and the consumers are flooded with a vast array of pharmaceutical preparations with innumerable trade names, available often at an unaffordable price. Epidemiological evaluation of medicine use in the elderly is now a highly visible topic, but drug utilization studies in pediatric population have been limited. The assessment of medicine utilization is important for clinical, educational and economic purposes (Uppal et al., 1984). The ultimate goal is to achieve rational and cost effective medical care, particularly in the economically developing countries.

Considering these facts, this study was planned to find the medicine prescribing pattern in children taking out patient treatment in the pediatric department of a tertiary care rural teaching hospital in Gujarat state of India.

Materials and Methods

A prospective study was carried out over six months (April to September 2000) in the pediatric out-patient department of Shree Krishna Hospital, attached to the Pramukhswami Medical College, Karamsad, after obtaining requisite permission. Prescriptions were collected randomly. Necessary data were obtained from a total of 606 prescriptions and analyzed for (i) number of medicines per prescription, (ii) medicines prescribed by official names, (iii) essentiality status of medicines, (iv) appropriateness of medicines used and that of prescriptions and (v) cost of prescription.

The prescriptions were subjected to measuring the appropriateness of medicines by applying the 'appropriateness scale' to each medicine or medicine

combination. It is a semi-scientific scale, evolved by us for understanding whether a medicine was used appropriately or inappropriately after its selection. For measuring the appropriateness of medicine use, the following parameters were applied to each medicine/ medicine formulation with respective score.

Dosage form and route of administration: A medicine was given the score of 2 when a suitable dosage form was prescribed by the right route. A score of 0 was assigned to a medicine that was not prescribed by either in a right dosage form or/and by a right route.

Dose: A medicine prescribed absolutely in a right dose/ dose range, as found in standard textbooks of pediatrics/pharmacology, was allotted a score of 2. When the dose was standard recommended dose/dose range ± 25%, it was accorded the score of 1, while the rest were assigned the score of 0.

Frequency of administration: Medicines prescribed in right frequency or at right dosage interval were assigned the score of 2, while those not prescribed in right frequency were allotted the score of 0.

Duration of treatment: Depending on the condition and diagnosis of the patient, a score of 2 was given to a medicine prescribed for optimum duration. A score of 1 was granted to a medicine that was prescribed for duration shorter or longer by not more than 25% of optimum duration, rest were allotted the score of 0.

Essentiality: Medicines or fixed-dose drug combinations mentioned in the model list of Essential Medicines (WHO, 2005) or National Essential Drug List (Government of India, 2002) or logical substitutes thereof were considered as 'essential' while the rest were accorded the status of 'non-essential'. Essential medicines or fixed-dose drug combinations were allotted the score of 2 while non-essential were assigned the score of 0.

Thus, based on above 5 parameters and criteria, a medicine or medicine combination could have a score of minimum 0 to a maximum of 10 in the appropriateness scale.

After assigning score to each medicine of a prescription, an average score of appropriateness for medicines in a prescription was obtained by dividing the total score of all medicines by number of medicines in that particular prescription. Then, the prescriptions were allotted to following 3 categories: most appropriate prescription – a score of >8; appropriate prescription – a score of >5 and up to 8; inappropriate prescription – a score of 5 or <5.

Results

Total 1,483 medicine formulations were prescribed to 606 patients. In all 2,257 medicines were prescribed with a mean of 3.72 ± 0.07 per prescription. As shown in Table I, 46.7% (283) patients were prescribed up to 3 medicines and the rest 53.3% were prescribed from 4 to 11 medicines.

Table I: Number of medicines prescribed

No. of medicines	No. of prescriptions (%)	n (%)
1	41 (06.76)	283 (46.7)
2	120 (19.80)	
3	122 (20.13)	
4	144 (23.76)	323 (53.3)
5	94 (15.51)	
6	48 (07.92)	
7	27 (04.45)	
8	6 (00.99)	
9	2 (00.33)	
10	1 (00.16)	
11	1 (00.16)	
Total	606 (100)	

Table II. Essentiality status of medicines and fixed-dose combinations (FDC)

Parameter	Essential n (%)	Non-essential n (%)	Total n (%)	FDC as % of total non-essential medicines
Medicines	1151 (77.61)	332 (22.39)	1483 (100)	96.69
FDCs	205 (38.97)	321 (61.03)	526 (100)	

Table III. Appropriateness score

Parameters	Score		
	0	1	2
Route of administration & dosage form	5	-	1,478
Dose	290	325	868
Frequency of administration	587	-	896
Duration of treatment	957	25	501
Essentiality	332	-	1151

Of the total 1,483 medicine formulations prescribed, 1,027 (69.3%) were prescribed by brand names. Of total medicine formulations, 1,151 (77.61%) were matching well with those listed in the model list of Essential Medicines (EML) or their substitutes, whereas remaining 332 (22.39%) medicine formulations could be construed as non-essential (Table II). Of the total 332 non-essential medicine formulations, 321 (96.69%) were in the form of fixed-dose combinations.

The distribution of "appropriateness score" for individual prescription is shown in Table III. A score of 2 for the most appropriate dosage form and route of

administration was assigned to 1,478 (99.66%) medicine formulations and also the same for dose, frequency of administration, duration of treatment and essentiality were assigned to 58.53%, 60.42%, 33.78% and 77.61% medicines respectively.

Distribution of "appropriateness of prescriptions" is shown in Table IV. It was found that only 122 (20.13%) prescriptions could be labeled as the most appropriate whereas 101 (16.67%) as inappropriate. A large majority of prescriptions (63.67%) qualified as appropriate only.

The mean cost per prescription was Rs. 50.41. Of the total cost of prescriptions, Rs. 6140.45 (20.10%) was due to non-essential medicines. The fixed-dose drug combinations accounted for 95.59% of the cost of non-essential medicines.

Table IV: Appropriateness status of prescription

Average score of prescription	Total	Appropriateness status
0 up to 1	1	101 (16.67)*
>1 up to 2	9	
>2 up to 3	17	
>3 up to 4	22	
>4 up to 5	52	
>5 up to 6	143	383 (63.20)**
>6 up to 7	122	
>7 up to 8	118	
>8 up to 9	74	122 (20.13)***
>9 up to 10	48	
Total	606	

*Inappropriate – score 5 or < 5; **Appropriate - score > 5 up to 8; *** Most appropriate – score > 8 up to 10

Discussion

Correct diagnosis of a disease and its management with medicines, constitute important aspects of patient care which is even more important in case of pediatric patients. For this it is very prudent to study the prescribing practice in pediatric patients in order to find out lacunae, if any, and suggest remedial measures to overcome the same. In the present study, on an average 3.72 medicines were prescribed per patient, which is much higher as compared to 1.4 and 2.3 in similar studies from Sweden and Spain (Sanz and Boada, 1988). Gajjar et al., (1999) showed the average number of medicines to be 3.32 per prescription in adult patients. Prakash et al, (1989) and Ansari et al (1998) found this number to be 5.86 and 5.05 medicines per prescription respectively in their studies. We also found that more than half of the patients were given four or more medicines. Thus it is evident that the polypharmacy and over prescribing are common in India, an economically developing country, as compared to economically developed western countries. Various reasons can account for this situation like lack of self confidence in doctors for diagnosing and treating common disease conditions; unrealistic expectations and demand for quick relief from the patients; availability of non-essential and irrational drug combinations; and aggressive medicine promotion and unethical marketing practices of pharmaceutical companies (Ansari et al., 1998).

More medicines increase the risk of drug interactions, adversely affect the patient compliance and hike the cost of treatment. In this study, 30.7% of the medicines were prescribed by their official names. Biswas et al. (2000) in three Delhi based teaching hospitals found that the medicines prescribed by official names ranged from 6.32% to 25.14%. On the other hand, Shewade and Pradhan (1998) reported that 43.9% medicines were prescribed by official names in their study. Prescribing medicines by official names avoids the confusion and makes the medicine therapy rational and cheaper. Moreover in the teaching institutions world over, in textbooks, in scientific journals and in the research publications, medicines are always mentioned by official names. Despite this, most doctors prescribe the medicines by their brand names. The reasons for this could be (i) tradition, (ii) aggressive medicine promotion, (iii) availability of multi-ingredient fixed-dose drug combinations, (iv) faulty medicine policy and lack of "political will" etc.

Essential medicines and rational use of medicines are two sides of a coin – inseparable from each other and mutually dependent. Increase in the use of essential medicines makes the medicine therapy more rational (Desai S, 2001). In this study, 77.61% of the medicines could be rated as essential. Biswas et al. (2000) found 96%, 94% and 74% of essential medicines prescribed in three Delhi based hospitals. This is certainly higher than in our study. One reason for this could be an effective and successful implementation of EML in government hospitals of Delhi. This clearly shows how "political will" can bring about a desirable change.

In the present study 39% fixed-dose combinations could be considered as essential which is much higher than that (11%) in the study of Kasturi et al (1999). Formulating and implementing a drug formulary based on essential medicines concept at this institution could be one reason for this difference. The higher percentage (96.59%) of non-essential fixed-dose combinations (not available from our hospital pharmacy, but prescribed from out side) in this study is responsible for irrational use of medicines.

It is important to choose the right medicine(s) for a patient and in an appropriate manner in order to achieve the best results of medicine therapy. It is heartening to note that for 99.67% of medicines, a right dosage form and right route of administration were chosen. More than 3/4 of the medicines used were essential. However in respect of duration of treatment, in nearly two thirds of medicines it was totally inappropriate. These aspects of medicine use certainly need correction. A possible reason for this observation could be due to the fact that in a teaching hospital all prescriptions are not written by senior consultants but some are written by postgraduate students and interns who are in a formative period of training. However this increases the responsibility of supervising seniors and right kind of training inputs would go a long way in making the prescribing behavior of young doctors more rational.

On the basis of appropriateness scale, more than 80% prescriptions could be rated either as appropriate or most appropriate. Only about 1/6 of all prescriptions were found to be inappropriate. Considering the fact that the study was conducted in a tertiary care teaching institution, high proportion of appropriateness is not unexpected. We also found that more than 95% of total cost on account of non-essential medicines was due to prescribing of non-essential fixed-dose drug combinations. If conscious efforts are made to curtail the use of non-essential fixed-dose drug combinations, one can certainly decrease this wasteful expenditure on medicines. Srivastava and Desai (1997) showed that there is a wide variation in cost amongst different brands of common antibacterials. In certain cases the ratio of costliest to cheapest brands of same antibacterial was more than four. Prescribing medicine by official names can therefore drastically bring down the cost of medicine treatment and lead to better patient compliance.

For achieving the goal of rational use of medicines it is not sufficient to choose the right medicines only but also they must be employed in the most appropriate manner. There is an ample scope of improving the prescribing pattern by keeping the number of medicines as low as possible, prescribing medicines by official names, using medicines appropriately after selecting and consciously keeping the cost of therapy low.

References

Ansari KU, Singh S, Pandey RC. Evaluation of prescribing pattern of doctors for rational drug therapy. Indian J Pharmacol. 1998; 30 : 43-46.

Biswas NR, Biswas RS, Pal PS. Patterns of prescriptions and drug use in two tertiary hospitals in Delhi. Indian J Physiol Pharmacol. 2000; 44: 109-12.

Desai S. Essential drugs and rational drug therapy. Bull Soc Rational Ther. 2001; 12: 2-7.

Gajjar BM, Desai S, Srivastava S. Evaluation and comparison of prescribing pattern of physicians from "The Institute" and "The Private" sectors for rational drug therapy. (Dissertation). Vallabh Vidyanagar, S. P University, 1999.

Ghai OP, Paul VK. Rational drug therapy in pediatric practice. Indian Pediatr. 1988; 25: 1095-1109.

Kasturi N, Singh S, Ansari KU. An audit of prescriptions for rational use of fixed-dose drug combinations. Indian J Pharmacol. 1999; 31: 367-69.

Prakash O, Mathur GP, Singh YD, Kushwalia KP. Prescription audit of under six children living in periurban areas. Indian Pediatr. 1989; 26: 900-04.

Sanz EJ, Boada JN. Drug utilization by children in Tenerif Island, Spain. Eur J Clin Pharmacol. 1988; 34: 495-99. http://dx.doi.org/10.1007/BF01046708 PMid:3203710

Shewade DG, Pradhan SC. Auditing of prescriptions in a government teaching hospital and four retail medical stores in Pondicherry. Indian J Pharmacol. 1998; 30: 408-10.

Srivastava SK, Desai SV. Cost variation of some commonly used antimicrobial agents. J Indian Med Assoc. 1997; 95: 439 -40.

Straand J, Rokstad K, Heggedal U. Drug prescribing for children in general practice: A report from the More and Romsdal prescription study. Acta Pediatrica. 1998, 87: 218-24. http://dx.doi.org/10.1080/08035259850157705 PMid:9512212

Uppal R, Chhabra A, Narang A. Pattern of drug use in neonatal intensive care unit. Indian Pediatr. 1984; 35: 647-49.

WHO Model list of essential medicines. 14th ed. 2005.