

# Drug prescribing pattern among paediatricians in an out-patient department of tertiary care teaching hospital

Dinesh KG\*, Padmasani L, Vasantha J, Veera RB, Sudhakar P, Uma MR.

Department of Pharmacy Practice, Faculty of Pharmacy, Sri Ramachandra Medical University, Chennai - 76.

## ABSTRACT

Submitted: 17/1/2011

Accepted: 16/5/2011

Children are more vulnerable to various adverse events related to drugs and the poor understanding of instructions on prescription by the patient or caretakers were likely to cause medication error and less effective treatment. To compare the drug prescribing patterns of pediatricians in an outpatient department and to assess the understanding of instructions on prescription by the patients or caretakers after consultation with physicians. A prospective cross-sectional study was conducted for a period of six months. 863 prescriptions written by the consultants (Professor/Asst. Professor/Post Graduate trainee) were collected and analyzed for the patterns and the patients were subjected to analysis for their understanding of instructions on prescription provided by the consultants by using a semi-scientific scale. Out of 863 prescriptions 76 were written by Professors, 229 by Asst. professors, 558 by Postgraduate trainees. On an average each consultant (professor/Asst.professor/post graduate trainee) prescribed 2.07 (Mean $\pm$ SD 2.07 $\pm$ 0.9) drugs per prescription suggesting there were no discernible difference between the prescribing behaviors of physicians in the pediatric unit. Patients or caretakers understanding of instructions on prescription provided by the consultants were ranged from 23.9% for the well understood, 58% for the moderately understood, 18.1% for the poorly understood. The study provides important insights in to the drug use patterns of pediatricians and helped to identify significant problem involved in knowledge gap of patients or caretakers understanding of instructions on prescription provided by the consultants.

**Keywords:** Prescribing pattern, pediatricians, Prescription instruction, Drug utilization.

## INTRODUCTION

Prescribing practices are a reflection of health professional's abilities to discriminate among the various choices of drugs and determine the ones that will most benefit their patients.<sup>1</sup> The study of prescribing patterns is a part of the medical audit and seeks to monitor, evaluate and if necessary, suggest modifications in prescribing practices to make medical care rational and cost effective.<sup>2</sup> Appropriate drug utilization studies are important tools to evaluate whether drugs are properly utilized in terms of efficacy, safety, convenience and economic aspects at all levels in the chain of drug use.<sup>3</sup> Regardless of considerable improvements in the availability and control of drugs in the hospitals, rational drug use is still a worldwide concern.<sup>4</sup> The measurement of these interventions is an integral part of the program such as drug utilization review studies and drug utilization review programs. Drug utilization review studies are usually one time project, not

routinely conducted. They provide for only minimal feedback to the involved prescriber and, most importantly, do not include any follow up measures to ascertain whether any changes in drug therapy have occurred whereas drug utilization review program is an intervention in the form of an authorized, structured and ongoing system for improving the quality of drug use within a given health care institution.

Children constitute about 40% of India's population. Infants and children suffer from frequent but usually non-serious illness. Most of these are self-limiting<sup>5</sup>, and are treated not only inappropriately, but also reporting to polypharmacy.<sup>6</sup> Compared to adult medicines, drug use in pediatrics is not extensively researched and the range of licensed drug in appropriate dosage form is limited.<sup>7</sup> Prescribers and consumers are flooded with a vast array of pharmaceutical preparations with innumerable trade names, available often at an unaffordable price.

Physicians may assume that prescription instructions are well understood by the patients. Davis et al (2008) says that, four out of five patients (79%) in his study misinterpreted one or more of the ten common prescription label instructions they

### Address for Correspondence:

Dinesh Kumar. G, Address: No: 85/1, Gandhi road, Nadupet, Gudiyatham-632602. Vellore district, Tamilnadu.

E-mail : gd\_pharm@ ahoocoo.in

encountered.<sup>8</sup> Although the instructions were brief and of minimal reading difficulty, Rate of patient or caretakers understanding varied widely particularly in case of pediatric population.

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 purpose<sup>9</sup>, so the ultimate goal is to achieve rational and cost effective medical care, particularly in the economically developing countries.

## METHODOLOGY

**Place of study:** The study was conducted in the outpatient department of pediatrics of Sri Ramachandra medical centre, a tertiary care teaching hospital, Chennai,

**Period of study:** six months.

**Type of study:** Prospective cross-sectional study.

### Study population:

863 prescriptions written by the consultants (Professor/Asst.professor/Post graduate trainee/) of outpatient department of Pediatrics.

### Study procedure:

A patient data collection form was specially designed for the study which includes patients demographic details, physician details (Professor/Asst.professor/Postgraduate trainee), drug details and Patients/Caretakers understanding of their Drug use parameters: Indication, Dose, Frequency, to be taken Before/After food, Duration, Awareness of side effects after consultation with physician was recorded. In a Pediatric OPD there were 4 units, each unit contains 6 physicians which include (Professor/Asst.professor/Postgraduate trainee). The prescriptions written by them were collected and a copy of the original prescription was used for data collection.

As the study was conducted in a tertiary care teaching hospital, all the patients who attended the Pediatric OPD were first reviewed by post graduate trainees and if required they sent the patient to the Assistant Professor and Professor Level.

The patients who were not willing to participate in the study were excluded and the data collected from 863 prescriptions were analyzed for the following indicators:

- Common Pediatric problems.
- Prescribing pattern among physicians.

(Professor/Asst.Professor/Post Graduate Trainee).

- Average number of Drugs per prescription.
- Medicines prescribed by Brand/Generic names.
- Antibiotic usage.
- Dose appropriateness based on body weight.
- Patients/Caretakers understanding of their Drug use (Indication, Dose, Frequency, Duration, to be taken Before/After Food, and Awareness of side effects).
- Average cost per prescription.
- Interactions (D-D, D-F, D-Disease).

The prescriptions were subjected to analysis by measuring the indicators mentioned above. The Patients/Caretakers understanding of their drug use were measured by using grading scale.<sup>10</sup> It is a semi scientific scale, evolved by us to assess whether patients/caretakers understood the instructions given by the physician at the end of the consultation. For measuring the scale, the following parameters were used to assess their adequacy and inadequacy. (Indication of the drug (for what), Dose, Frequency, to be taken Before/After food, Duration and Awareness of side effects). Patients/caretakers adequacy of each parameter was given a score of 1 and score of 0 for inadequacy. Based on these six parameters and criteria, each patient could have a score of minimum "0" to a maximum of "6". After assigning a score to each parameter, the sum of scores obtained by the patient was considered as a grade for their adequacy in understanding the instructions given by the physician. The scores obtained by the patients/Caretakers were rated as follows.

## RESULTS

Out of 863 patients 54.9% were Males and 45.1% were Females with age ranging from 1 month to 16 years. In the study, the 76 prescriptions issued by professors of pediatrics had a mean of 2.1 (9.2%) drugs per prescription, whereas the 229 prescriptions issued by the Asst.professor had 2.1 (27.9%) drugs per prescription and for PG's 2.0 (62.9%) drugs per prescriptions out of 558 prescriptions ( $p=0.075$ ) (Table 1).

| SCORE | RATING                |
|-------|-----------------------|
| >3    | well understood       |
| 3     | Moderately understood |
| <3    | Poorly understood     |

The results were analyzed and tabulated statistically.

On an average 2.07 (Mean $\pm$ SD of 2.07 $\pm$ 0.9) drugs were prescribed per prescription. Only 377 (21.1%) out of 1788 drugs were found to be prescribed in generic names. Paracetamol, Albendazole, Amoxicillin were the most common drugs prescribed by their generic name (Table 2). Of 1788 drugs prescribed 226 (12.6%) drugs were found to be Antibiotics (Table 3). Among the Antibiotics, the Penicillin group (39%) was most commonly prescribed followed by Macrolide (30.1%) and Cephalosporin (11%). 60.4% of Medicines were prescribed as syrup/suspension/oral drops/liquids/nasal drops and 32% was prescribed as Tablets/capsules. All other dosage forms comprised about 7.6% (Table 4). The traditional cough suppressants and medicines against the common cold are the drugs most commonly given as syrups. Only 6 patients received benzathine penicillin injection for treating rheumatic fever. No other patients received any injections. The diagnostic patterns of outpatients enrolled in the study shows that upper respiratory tract illness was the most common problem affecting 364 patients (42.2%) in this study which was followed by others. In dose appropriate status 94.8% of prescriptions were found to have appropriate dose whereas, only 5.2% of prescriptions were found with in-appropriate doses. The average cost per prescription was found to be Rs.66.84. As the average number of drugs in each prescription

was only 2.07 and no major interactions were found.

Although the instructions were brief, Rate of patient understanding varied widely. In this study 58% of patients/caretakers were found to have moderately understood, whereas, 23.9% were found to have well understood and 18.1% were found to have poorly understood (Table 5).

## DISCUSSION

The type and volume of drugs prescribed and the prescribing pattern of the individual physician have provided useful information for effective therapy. The focus of this study was to review Prescription orders for drug use evaluation by a clinical pharmacist. As this study was conducted in a tertiary care teaching hospital, the majority of prescriptions were written by postgraduate students who are in a formative period of training. However this increases the responsibility of senior physicians/professors in providing the right kind of training inputs that make way for rational prescribing. The result of this study (2.07 drugs per prescription) conformed to WHO prescribing standards recommending a limit of 2.0<sup>(11)</sup> drugs per prescription. Prescribing by generic names is known to reduce the cost of drug treatment, rationalize drug therapy, avoids confusion. Despite this clinicians often prefer to prescribe by brand name, with which they are confident,

**Table: 1 Number of Drugs/Prescription by Physicians  
(Professor/Asst.Professor/Postgraduate Trainee)**

| No. Of Drugs | Professor (n=76)                        | Asst.Prof (n=229) | PG (n=558)  | Total (n=863) |
|--------------|-----------------------------------------|-------------------|-------------|---------------|
| 1 Drug       | 16 (21.1%)                              | 44 (19.2%)        | 164 (29.4%) | 224 (25.9%)   |
| 2 Drugs      | 39 (51.3%)                              | 114 (49.8%)       | 260 (46.4%) | 413 (47.9%)   |
| 3 Drugs      | 17 (22.4%)                              | 58 (25.3%)        | 97 (17.4%)  | 172 (19.9%)   |
| 4 Drugs      | 3 (3.9%)                                | 11 (4.8%)         | 35 (6.3%)   | 49 (5.7%)     |
| 5 Drugs      | 1 (1.3%)                                | 2 (0.9%)          | 2 (0.3%)    | 5 (0.6%)      |
| Total (n)    | 76                                      | 229               | 558         | 863           |
| P value      | 0.075 Not Significant (chi-square test) |                   |             |               |

**Table: 1 Number of Drugs/Prescription by Physicians  
(Professor/Asst.Professor/Postgraduate Trainee)**

| Physician | Total No. of Drugs (n=1788)                           | No. of Drugs by Generic Names | No. of Drugs by Brand Names |
|-----------|-------------------------------------------------------|-------------------------------|-----------------------------|
| PROFESSOR | 162(9.2%)                                             | 37(22.8%)                     | 125(77.2%)                  |
| ASST.PROF | 500(27.9%)                                            | 103(20.6%)                    | 397(79.4%)                  |
| PG        | 1126(62.9%)                                           | 237(21.1%)                    | 889(78.9%)                  |
| TOTAL     | 1788                                                  | 377(21.1%)                    | 1411(78.9%)                 |
| P value   | 0.077      0.324<br>Not Significant (chi-square test) |                               |                             |

Table 3: Antibiotics Used

| Class of Antibiotic | No. of Drugs (n=226) | P Value                                   |
|---------------------|----------------------|-------------------------------------------|
| Penicillin Group    | 88 (39%)             | 0.000<br>Significant<br>(chi-square Test) |
| Cephalosporin Group | 24 (11%)             |                                           |
| Fluroquinolone      | 23 (10.2%)           |                                           |
| Macrolide           | 69 (30.1%)           |                                           |
| Others              | 22 (9.7%)            |                                           |
| Total               | 226 (12.6%)          |                                           |

OTHERS: Sulphonamides, urinary antiseptic, amino glycosides, Oxzolidinediones.

Table 4: Various Dosage Forms Used in Each age Group

| Formulations | Age (yrs) |           |          |          |           | Total (n=1778) |
|--------------|-----------|-----------|----------|----------|-----------|----------------|
|              | ≤ 1       | > 1 - ≤ 4 | >4 - ≤ 8 | >8 - ≤12 | >12 - ≤16 |                |
| Oral Drop    | 93        | 21        | 0        | 0        | 0         | 114(6.4%)      |
| Suspension   | 25        | 104       | 46       | 2        | 1         | 178(9.9%)      |
| Syrup        | 79        | 262       | 135      | 67       | 21        | 564(31.6%)     |
| Nasal Drop   | 72        | 47        | 12       | 6        | 3         | 140(7.8%)      |
| Liquid       | 11        | 19        | 26       | 16       | 11        | 83(4.7%)       |
| Tablet       | 2         | 41        | 122      | 200      | 165       | 530(29.7%)     |
| Capsule      | 0         | 1         | 10       | 13       | 18        | 42(2.3%)       |
| Others       | 43        | 49        | 13       | 19       | 13        | 137(7.6%)      |

OTHERS: Ointments, Suppositories, Cream, Lotion, Respiratory solution for nebulisation.

Table: 5 Patients/caretakers Understanding of Instructions on Prescription Provided by the Consultants

| Physician  | No. of Prescriptions (n=863)            | Well Understood | Moderately Understood | Poorly Understood |
|------------|-----------------------------------------|-----------------|-----------------------|-------------------|
| Professor  | 76                                      | 13 (17.1%)      | 50 (65.8%)            | 13(17.1%)         |
| Asst. Prof | 229                                     | 60 (26.2%)      | 134 (58.5%)           | 35(15.3%)         |
| PG         | 558                                     | 133 (23.8%)     | 317(56.8%)            | 108(19.4%)        |
| Total      | 863                                     | 206 (23.9%)     | 501(58.0%)            | 156(18.1%)        |
| P value    | 0.348 Not Significant (chi-square test) |                 |                       |                   |

familiar and the patients find them easier to procure. Children, differ from adults in their response to drugs. So, special care is needed in children and doses should always be calculated with care. Hence, it is important to monitor the appropriateness of doses in children. Considering the fact that the study was conducted in a tertiary care teaching institution, a high proportion of appropriateness is only to be expected.

The interactions are generally more in patients who received more number of medications.<sup>12</sup> As the study contains the average number of drugs in each prescription with 2.07 and reduces the possibilities for major interactions. Physicians may assume that prescription instructions are well understood by the patients. Davis et al (2008) says that, four out of five patients (79%) in his study misinterpreted one or more of the

ten common prescription label instructions they encountered.<sup>8</sup> Although the instructions were brief, Rate of patient understanding varied widely. There was a significant knowledge gap in patient understanding of drug use. Therefore explicit instructions to patients on “when to take” the medicines using time periods (e.g. 8 am, 5 pm) may be better understood compared to instructions that more vaguely state the number of times per day or hourly intervals. All attempts to enhance quality of prescribing by a clinical pharmacist should be encouraged and also education of patients / caretakers remains crucial.

## CONCLUSION

This study provides important insights in to the Drug use patterns in the pediatric out Patient department of a Tertiary

care Teaching Hospital. It has helped to identify significant problems involved in knowledge gap of patients or caretakers understanding of instructions on prescription provided by the consultants. Hence the clinical pharmacist must be considered to be an integral part of the multidisciplinary healthcare team. They should be involved in collection and presentation of prescribing data as part of clinical audit and also education of patients / caretakers.

## ACKNOWLEDGEMENTS

The authors duly acknowledge the contribution and help of patients and physicians of pediatric department without whom the study would not be possible.

## REFERENCES:

1. Crockett AB Nurs clin North Am. 2005; 40: 33-49.
2. Srishyla MV, Krishnamoorthy M, Nagarani MA. Prescription audit in an Indian Hospital Setting using the DDD (Defined Daily Dose) concept. Indian Journal of Pharmacology 1994; 26: 23-8.
3. Dukes MNG (ed.) Drug utilization studies; Methods and uses, WHO regional publication. EUR ser No.45, WHO regional office for Euro; WHO, Copenhagen, 1993.
4. Hogerzel HV. Promoting rational prescribing; An International perspective. British Journal of Clinical Pharmacology 1995; 39: 1-6.
5. Straand J, Rockstad K, Heggedal U. Drug Prescribing for Children in General Practice, A Report from the more and romsdal prescription Study, Acta paediatrica 1998; 87: 218-24.
6. Ghai OP, Paul VK Rational Drug Therapy in Pediatrics Practice, Indian Pediatrics 1988; 25: 1905-1909.
7. Roger Walker, Clinical Pharmacy and Therapeutics, 4<sup>th</sup> edition Published by Elsevier Churchill Livingstone.
8. Alex D, Federman, Robert H Jackson, Ruth M Parker Davis. Improving patient understanding of prescription Drug label instructions, Journal of General Internal Medicine 2008, 24(1): 57-62.
9. Uppal R, Chhabra A, Narang A, Pattern of Drug Use in Neonatal Intensive Care Unit. Indian Journal of Pediatrics 1984; 35: 647-49.
10. Nazima Y. Mirza, Sagun Desai. Prescribing Pattern in a Pediatric Out-patient department in Gujarat, Bangladesh Journal of Pharmacology 2009; 4: 39-42.
11. Gajjar BM, Desai S, Srivastava S. Evaluation and comparison of Prescribing Pattern of Physicians from the Institute and the private sector for Rational Drug therapy. (Dissertation). Vallabh Vidyanagar, S.P University 1999.
12. Zuckermann, Dos Santos et al, Profile of Drug interaction in Hospitalized Children, Journal of Pharmacy practice 2007; 5(4): 157-161.