RESEARCH ARTICLE

Prescription analysis based on the World Health Organization core prescribing indicators in pediatric population having respiratory tract infections

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ABSTRACT

Background: Data regarding local drug prescribing are scarce, especially in pediatric population. Evaluation of prescriptions will be helpful in promoting rational prescribing, minimizing adverse effects and should also provide cost-effective care. **Aims and Objectives:** The objectives of this study were as follows: (i) To analyze the prescriptions based on the World Health Organization (WHO) core prescribing indicators and (ii) to suggest modifications, if necessary in prescribing patterns. **Materials and Methods:** A prospective and observational study was conducted for a period of 1 year after obtaining institutional ethical committee approval. A total of 210 prescriptions of children aged 0–18 years were analyzed according to the WHO prescribing indicators. **Results:** Average number of drugs prescribed per prescription was 1.89 and average number of antibiotics prescribed per prescription was 0.70. About 23.80% of drugs were prescribed by generic name. About 18.09% of drugs were given through injectable route. All drugs (100%) were prescribed from the National List of Essential Medicines, 2015. About 87.89% of children received monotherapy (single antibiotic), whereas polytherapy (more than one antibiotic) was prescribed only in 12.11% of the prescriptions analyzed. **Conclusion:** This study indicates that prescriptions in pediatric population having respiratory tract infections were found to be in accordance with the WHO indicators. However, there is under usage of generic drugs.

KEY WORDS: Prescription Analysis; World Health Organization Core Prescribing Indicators; Respiratory Tract Infections; Pediatric

INTRODUCTION

Prescribing drugs are an important skill which needs to be assessed frequently and modified accordingly. It not only shows physician's diagnostic and therapeutic ability including consideration of most cost-effective management but also reflects his detailed knowledge of pharmacology, pathophysiology and microbiology, and clinical judgment.[1,2] However, various systematic reviews have emphasized that prescribing errors are common and can range from 4.2 up to 82% of prescriptions.[3] The frequent analysis of prescriptions not only helps us to analyze the immense variation in drug prescribing pattern but also motivates the doctor to update and upgrade himself and help him choosing the right antibiotic for the right disease.[1,4] However, for rationalizing drug therapy, it is essential to carry out drug utilization research on periodic basis.[5,6] The rational use of medicines is a fundamental pillar of medical practice that is particularly relevant in the case of antibiotics. Antibiotics have become mainstay and are prescribed frequently for the treatment of various pediatric illnesses. Respiratory tract infections (RTIs) account for 75%

of all antibiotic prescriptions. Majority of children received an antibiotic once the diagnosis of RTI had been made.[7] This random and higher rates of inappropriate prescription practice of antibiotics have led to increased occurrence of overuse, adverse effects, and antibiotic resistance among pediatric population.[8-10] Therefore, a high proportion of antibiotic prescriptions for patients with acute RTIs is unnecessary or inappropriate.[11] Prescribing pattern also helps in evaluating local consumption/resistance pattern for optimized therapeutic effect of medications. It also helps in planning various steps to be taken to minimize adverse drug reactions as children are more susceptible to them.[12] Many guidelines on rationale antibiotic prescribing have been established. However, these guidelines are not being routinely followed and daily practices are far from ideal approach, leading to overprescribing and non-optimal choice of antibiotics.[13] The World Health Organization (WHO) in the early nineties collaborated with the International Network of Rational Uses of Drugs and developed a set of indicators to evaluate the performance of health-care services related to consumption of drugs (WHO 1993).[14] Pediatric population significantly differ in pharmacokinetics and pharmacodynamics profile and differ from adults in a physiological, psychological, and developmental sense, so the use of drugs in this population, including antibiotics, requires special knowledge and skill.[15]

Hence, we undertook this study with the objectives to –
- Analyze the prescriptions based on the WHO core prescribing indicators
- Suggest modifications, if necessary in prescribing patterns.

MATERIALS AND METHODS

A prospective and observational study was conducted for a period of 1 year in the Department of Paediatrics in collaboration with the Department of Pharmacology, Rohilkhand Medical College and Hospital, Bareilly, after obtaining the Institutional Ethical Committee approval.

Patients of the age group of 0–18 years and of either gender having RTIs attending pediatrics outpatient department (OPD). All critically ill patients requiring admission were excluded.

Prescriptions were collected either by doing photocopy or by taking carbon copy or photography. No follow-up of OPD prescriptions was done. Prescriptions were analyzed using the WHO core prescribing indicators and compared with optimal value provided by the WHO. A specially designed pro forma was used to gather required data. Analysis of rationality of prescription using the WHO core prescribing indicators and compared with optimal value provided by the WHO.[14] Data were evaluated and tabulated using Microsoft Excel 2007. Results are displayed by the help of table and figure.

RESULTS

A total of 210 prescriptions were analyzed according to the WHO prescribing indicators and it was revealed that average number of drugs prescribed per prescription was 1.89 and average number of antibiotics prescribed per prescription was 0.70. About 23.80% of drugs were prescribed by generic name. About 18.09% of drugs were given through injectable route. All drugs (100%) were prescribed from the National List of Essential Medicines, 2015 [Table 1].
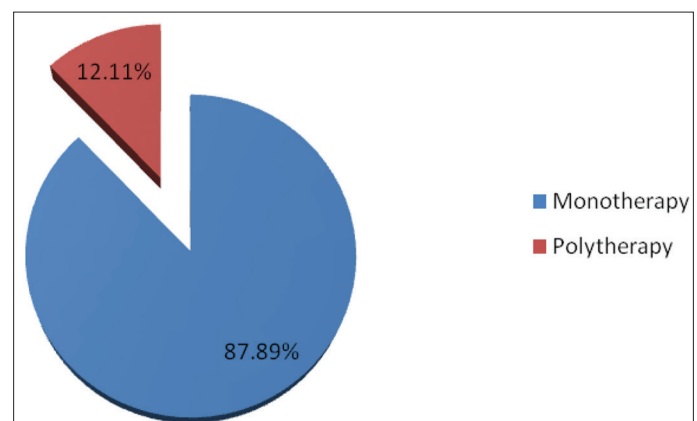
In this study, polytherapy (more than one antibiotic) was prescribed only in 12.11% of the prescriptions analyzed while rest 87.89% received monotherapy (single antibiotic) as shown in Figure 1.

DISCUSSION

In our study, the data collected were analyzed for various prescribing indicators as laid down by the WHO for analysis of drug use parameters. A total of 210 prescriptions were analyzed according to the WHO core prescribing indicators. Average number of drugs prescribed per prescription was 1.89 and average number of antibiotics

Table 1: Analysis of prescriptions according to the World Health Organization core prescribing indicators		
Drug use indicators	Outcome	Optimal value
Avg. number of drugs prescribed per prescription	1.89	1.6–1.8
Avg. number of antibiotics per prescription	0.70	1.6–1.8
Percentage of antibiotics prescribed by generic name	23.80%	100%
Percentage of drugs prescribed by injectable route	18.09%	13.4–24.1%
Percentage of antibiotics prescribed from the National List of Essential Medicines, 2015	100%	100%

Figure 1: Monotherapy versus polytherapy

prescribed per prescription was 0.70. About 23.80% of drugs were prescribed by generic name. About 18.09% of drugs were given through injectable route. All drugs (100%) were prescribed from the National List of Essential Medicines, 2015. About 87.89% of children received monotherapy (single antibiotic), whereas polytherapy (more than one antibiotic) was prescribed only in 12.11% of the prescriptions analyzed.

The WHO recommends that the average number of drugs per prescription should be <2 which is in line with our observations, in which average number of drugs per prescription was 1.89. Of which average number of antibiotics was found to be 0.70. Other authors Pandit *et al.*,[16] have also noted similar type of findings, whereas Mohsin *et al.*[17] and Shruthi *et al.*[18] revealed that children were frequently prescribed drugs and mean number of drugs was as high as 5.5 and 3.75, respectively. Average number of drugs per prescription should be at lower side, as observed in our study. Since higher number of drugs not only will rise the incidence of adverse effects drug–drug interactions but also inflate the cost of treatment. The reason for lesser number of drugs per prescription is due to non-pharmacological measures and lesser dependence on drugs, as most of the RTIs are self-limiting. Of all the cases analyzed, majority of patients were treated with single antibiotic (monotherapy). In line with our observations Malpani *et al.*[19] and Shruthi *et al.*[18] also observed that majority of children received at least one antibiotic which is supporting our findings. Contrary to this, Baidya *et al.*,[20] Sharma and Agrawal,[21] Prajapati and Bhatt,[22] and Deshmukh and Mahajan[23] observed that prescribing two antibiotics are very common. Our findings regarding the use of antibiotics per prescription are even less than the WHO optimal value range indicates that many of the patients were treated symptomatically by supportive therapy with no antibiotic therapy. At present, there is strong evidence to support a "no prescribing policy" for upper RTIs and such guidelines have already been implemented in few countries.[24] Moreover, lesser antibiotic prescribing practice could be the positive impact of antibiotic stewardship program conducted for doctors in this teaching hospital. In our study, we observed only 23.80% of drugs to be prescribed by generic name while 76.20% of drugs were prescribed by brand name. Similar type of prescribing trend was observed by various studies where the number of drugs prescribed by generic name was low.[23,25,26] However, Baidya *et al.*[20] and Laune *et al.*[27] reported higher use of antibiotics by generic name. The near 100% generic prescribing is the ideal approach which is lacking in our findings. The reason for lesser utilization of generic drugs in our study is due to the fact that the physicians are accustomed of prescribing branded drugs. Generic substitution should be preferred as these drugs are not only cost effective but also beneficial, provided enough quality control is secured.[28] Most of the antibiotics were prescribed orally and only 18.09% of patients were given injectables in our study, which is in desirable range as

recommended by the WHO. However, majority of patients were given antibiotics parenterally in various study[22] (optimal value 13.4–24.1%). The higher use of parenteral administration in other studies is due to increased severity of illness. The WHO recommends lesser use of injection as it is helpful in reducing the cost of treatment and its disadvantages.[22] In this study, all the antibiotics were prescribed from the National List of Essential Medicines, 2015. Contrary to this, Venkateswaramurthy *et al.,*[29] Joseph *et al.,*[30] Sharma and Agrawal,[21] and Laune *et al.*[27] observed less drugs prescribed from essential list (optimal value of 100%). Review and upgradation of essential drug list is a regular mandatory continuing process in this teaching hospital which promotes physician to prescribe essential drugs. Underutilization of drugs from National List of Essential Medicine (NLEM) in various other studies is area of great concern and this issue should be dealt by providing adequate impetus to prescribers to promote NLEM utilization. Incorporation of drugs from NLEM will promote rational prescribing in terms of efficacy, safety, and cost.[28]

This study highlights the need of rationale prescribing practices among pediatric population by adhering with the WHO prescribing indicators and provides baseline data on utilization of drugs in children having RTIs. However, the limitation of this study is that we have not analyzed the pattern of the usage of individual antibiotics and evaluating their adverse drug reactions and cost-effectiveness. This will further help in promoting rational and cost-effective medical care, minimizing both drug-related toxicity and development of antimicrobial resistance.

CONCLUSION

Patients suffering from RTIs were usually advised lesser number of drugs per prescription. A decreasing trend of prescribing antibiotics was noted that the previous studies and usage of drugs from the National List of Essential Medicines are found to be appropriate; however, percentage of drugs prescribed by generic name is on the lower side. Hence, these issues need to be addressed and corrected and we recommend that the prescribing pattern should be improved by adhering to the WHO prescribing indicators.

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