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Original Article

A STUDY ON THE PREVALENCE AND SEVERITY OF POSSIBLE DRUG-DRUG INTERACTIONS IN PEDIATRICS DEPARTMENT AT AN INDIAN TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Objective: To study the prevalence and severity of possible drug-drug interactions in the department of pediatrics.

Methods: Case records of the in-patients of the pediatrics department from the medical records department were included and the records of the ambulatory patients were excluded from the study. All the collected cases were subjected to check for the drug-drug interactions by using the software micromedex 2.0 and the interactions were categorized based on the severity into minor, moderate and major.

Results: A total of 142 cases were screened for possible drug-drug interactions (DDIs) and among them 76 cases were observed to be with possible DDIs. The prevalence was found to be 53.5% in this study. Majority of the cases with possible DDIs were observed to be in females. Results of the age wise categorization revealed that majority of the possible DDIS were observed in children (2-12 y) followed by the infants (1 mo–2 y). The drug combinations amikacin+ampicillin, paracetamol+phenytoin and ofloxacin+ondansetron were found to be the frequently observed possible DDIs of minor, moderate and major severities respectively.

Conclusion: Majority of the possible DDIs were of moderate severity followed by major. Clinical pharmacists should take the responsibility in assisting the pediatricians for screening the possible DDIs in the prescriptions there by preventing them and providing a better pharmaceutical care for the pediatric population.

Keywords: Drug-drug interactions, Micromedex, Pediatrics, Polypharmacy

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INTRODUCTION

Drug-drug interactions (DDIs) can be defined as the modification of the pharmacological or clinical response to a drug due to the concomitant administration of another drug [1]. Age, polypharmacy, concurrent disease conditions are some of the risk factors associated with DDIs. The prevalence of DDIs in various countries was reported in between 19.3-88.8%. In terms of a rationale prescription, DDIs have become a major clinical concern and they may tend to cause adverse events majorly in the hospitalized patients where we used to observe the polypharmacy in their prescriptions [2-10]. Careful detection and monitoring of DDIs can enhance the quality and safety of drug therapy. DDIs increase the duration of hospital stay and even the health care costs too [11-15].

DDIs have attained a great attention from the scientific, regulatory and healthcare communities globally. Majority of the studies investigated the possible DDIs in different specialties like general medicine, oncology, cardiology, pulmonology and psychiatry where the information is just restricted to the adult population [16-23]. Very few studies were performed in the pediatrics specialty and hence, in this study we made an attempt to study the prevalence and severity of possible drug-drug interactions in pediatrics specialty.

MATERIALS AND METHODS

The present study was a retrospective cross-sectional study, conducted at Konaseema Institute of Medical Sciences (KIMS), Amalapuram, Andhra Pradesh, India. This study was approved by the institutional ethics committee (No: 97/2015). Case records of the in-patients of the pediatrics department from the medical records department were included and the records of the ambulatory patients were excluded from the study. All the collected cases were subjected to check for the drug-drug interactions by using the software micromedex 2.0 and the interactions were categorized based on the severity into minor, moderate and major [24, 25].

Statistical analysis

SPSS 21.0 was used to perform the statistical analysis. Chi square test was performed and p-values were obtained at 95% confidence interval for finding the statistical significance ($p<0.05$).

RESULTS

Table 1 represents the gender wise categorization of the cases in the department of pediatrics included in the study. A total of 142 cases were screened for possible drug-drug interactions out of which 75 (52.8%) were found to be males and 67 (47.2%) were found to be females. Among the 142 cases which were screened for detecting the possible drug-drug interactions, about 76 cases were observed with possible drug-drug interactions and the prevalence was found to be 53.5%. Among the 76 cases observed with possible drug-drug interactions, about 34 (44.7%) were found to be males and 42 (55.3%) were found to be females.

Table 1: Gender wise categorization of cases included in the study

Gender	Cases observed with interactions (%)	Cases observed without interactions (%)	Total (%)	χ2-value	p-value
Male	34 (44.7)	41 (62.1)	75 (52.8)	4.28	0.03*
Female	42 (55.3)	25 (37.9)	67 (47.2)		
Total	76 (100)	66 (100)	142 (100)		

*indicates statistically significant

Table 2 represents the age wise categorization of patients observed with possible drug-drug interactions. The patients in the age group 2-12 y (children) was observed to be with high a prevalence rate (72.3%) followed by the age group 1month-2years (infants) with a prevalence rate of 14.5%.

Table 3 represents the categorization of patients observed with drug-drug interactions based on duration. Majority of the patients who were observed with possible drug-drug interactions were found to be stayed for 1-5 d (50%).

Table 4 represents the categorization of prescriptions observed with drug-drug interactions based on polypharmacy in the pediatrics department. About 19 (25%) prescriptions were observed to be with major polypharmacy, about 37 (48.7%) prescriptions were observed to be with moderate polypharmacy and about 20 (26.3%) prescriptions were observed to be with minor polypharmacy.

Table 5 and fig. 1 represents the severity of drug-drug interactions in the pediatrics department. A total of 136 possible drug-drug interactions were observed in this department out of which 21 (15.4%) were of minor severity, 70 (51.5%) were of moderate severity and 45 (33.1%) were of major severity.

Table 6 represents the most frequently observed possible minor, moderate and major drug-drug interactions in the department of pediatrics.

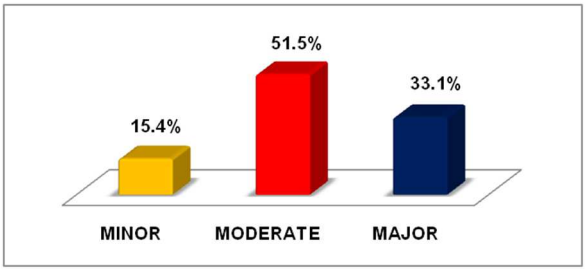

Fig. 1: Severity of the drug-drug interactions in the study

Table 2: Age wise categorization of patients observed with drug-drug interactions

Age group	Male (%)	Female (%)	Total (%)
Neonates (1 d-1 mo)	2 (5.9)	3 (7.1)	5 (6.6)
Infants (1 mo-2 y)	4 (11.8)	7 (16.7)	11 (14.5)
Children (2-12 y)	25 (73.5)	30 (71.4)	55 (72.3)
Adolescents (12-16 y)	3 (8.8)	2 (4.8)	5 (6.6)
Total	34 (100)	42 (100)	76 (100)

Table 3: Categorization of patients observed with DDIs based on duration of stay

Duration of stay (in days)	Male (%)	Female (%)	Total (%)
1-5	15 (44.1)	23 (54.7)	38 (50)
6-10	14 (41.2)	15 (35.7)	29 (38.3)
11-15	4 (11.8)	2 (4.8)	6 (7.8)
16-20	1 (2.9)	2 (4.8)	3 (3.9)
Total	34 (100)	42 (100)	76 (100)

Table 4: Categorization of prescriptions observed with DDIs based on polypharmacy

Type of polypharmacy	Male (%)	Female (%)	Total (%)
Minor (3-5 drugs)	8 (23.5)	12 (28.6)	20 (26.3)
Moderate (6-8 drugs)	17 (50)	20 (47.6)	37 (48.7)
Major (≥ 9 drugs)	9 (26.5)	10 (23.8)	19 (25)
Total	34 (100)	42 (100)	76 (100)

Table 5: Severity of the drug-drug interactions

Severity	Male (%)	Female (%)	Total (%)	χ2-value	p-value
Minor	7 (11.5)	14 (18.7)	21 (15.4)	4.83	0.089
Moderate	28 (45.9)	42 (56)	70 (51.5)		
Major	26 (42.6)	19 (25.3)	45 (33.1)		
Total	61 (100)	75 (100)	136 (100)		

Table 6: Most frequently observed possible DDIs

Minor	Moderate	Major
Amikacin+Ampicillin	Paracetamol+Phenytoin	Ofloxacin+Ondansetron
Amikacin+Piperacillin	Furosemide+Hydrocortisone	Metronidazole+Ondansetron
Carbamazepine+Clobazam	Ondansetron+Tramadol	Midazolam+Phenobarbital

DISCUSSSION

A total of 142 cases were screened for possible drug-drug interactions (DDIs) and among them 76 cases were observed to be with possible DDIs. The prevalence was found to be 53.5% in this study. Majority of the cases with possible DDIs were observed to be in females. Results of the age wise categorization revealed that majority of the possible DDIS were observed in children (2-12 y) followed by the infants (1 mo–2 y). Majority of the patients who were observed with possible DDIs were observed to be stay for duration of 1-5 d (50%) followed by 6-10 d (38.3%).

In this study, majority of the prescriptions were found to be with moderate polypharmacy followed by minor polypharmacy. The

severity of the majority of the possible DDIs in this study was observed to be moderate. This result was found to be similar with the study done by Mohammad Ismail *et al.* [16] and Qorraj-Bytyqi *et al.* [25]. The drug combinations amikacin+ampicillin, paracetamol +phenytoin and ofloxacin+ondansetron were found to be the frequently observed possible DDIs of minor, moderate and major severities respectively.

CONCLUSION

In this study, the prevalence of possible DDIs was found to be 53.5%. Polypharmacy was associated with the occurrence of possible DDIs and in this study majority of the possible DDIs were observed in the prescriptions with moderate polypharmacy. Majority of the possible DDIs were of moderate severity followed by major that indicates that there is a need for the screening of possible DDIs. Clinical pharmacists should take the responsibility in assisting the paediatricians for screening the possible DDIs in the prescriptions thereby preventing them and providing a better pharmaceutical care for the pediatric population.

LIMITATION

This study with a prospective type of approach along with the involvement of other health care professionals would show a significant impact in screening the clinically encountered drug-drug interactions for providing the better pharmaceutical care for the patients by the direct involvement of the clinical pharmacist.

AUTHORS CONTRIBUTION

All authors had equally contributed to the research work.

CONFLICTS OF INTERESTS

None

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