

Analysis of adverse drug reactions encountered in a tertiary care hospital: a cross sectional study

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ABSTRACT

Background: Adverse drug reactions are due to hazards of drug therapy and can occur with any class of drugs. The aim of this study was to evaluate and record adverse drug reactions reported from various departments of a tertiary care hospital.

Methods: A Cross Sectional study conducted in a tertiary care hospital for a period of 4 months from March to June 2017 after Institutional Ethics Committee approval. ADRs reports collected and analyzed for causality, severity and preventability by international standardized scales.

Results: A total of 38 ADR's were reported during the study period with male predominance (58%). Most of the ADR's (42%) were common in patients in the age group 19-39 years. More number of ADR's were from Medicine (29%). Most commonly affected organ systems were skin (45%). The drugs mostly accounted were antibiotics (55%) especially Cephalosporins (33%). According to Naranjo's causality assessment scale 74% of reactions were probable, 26% were possible, Modified Hartwig and Seigel severity assessment scale revealed 45% ADRs to be moderate, 42% were mild and 13% were severe, Modified Schumock and Thorton Preventability assessment scale which revealed 61% ADRs were not preventable, 32% were probably preventable, 7% were definitively preventable.

Conclusions: Adverse Drug Reactions are common and some of them resulted in increased healthcare cost due to need of some interventions and increased length of hospital stay. The health system should promote the spontaneous reporting of ADR's. The proper documentation and periodic reporting to Pharmacovigilance Centres is required to ensure drug safety.

Keywords: Adverse Drug Reactions, Causality, Pharmacovigilance, Spectrum, Spontaneous reporting

INTRODUCTION

The World Health Organization (WHO) defines ADR as "a response to a drug that is noxious and unintended and occurs at doses normally used in man for the prophylaxis diagnosis or therapy of disease, or for modification of physiological function".¹ Adverse drug reaction is the major limitation in providing health care to patients at a global level. The overall rate of ADR - 6.7%. ADR account for 5% of all hospital admissions. Also occurs in 10-20% of hospitalized patients. They are the fourth leading causes of death. All drugs are having the potential to cause ADR.²

ADRs related hospitalizations have consistently increased which has caused an economic burden to the developing countries like India.³ ADRs are commonly encountered at hospital set up where poly pharmacy is practiced usually.⁴ India is the fourth largest pharmaceutical producer in the world and is recognized as an important clinical trial hub in the world. Due to introduction of many drugs in the country, it has become essential to have an effective Pharmacovigilance system nationwide in order to protect interest of public health. The main function of this programme involves data collection and analysis of ADRs.⁵

The Central Drugs Standard Control Organization (CDSCO), New Delhi, under the guidance of Ministry of Health and Family Welfare, Government of India has initiated a countrywide pharmacovigilance programme (PvPI) in 2010, with the All India Institute of Medical Sciences (AIIMS), New Delhi as the National Coordinating Centre for monitoring ADRs in the nation. Our hospital is one of the centres for monitoring and reporting ADRs through this programme.

METHODS

Study design

After obtaining approval of the Institutional Ethics Committee, a cross sectional study and spontaneous reporting study involving active methods (pharmacist actively seeking suspected ADRs) and passive methods (stimulating clinicians to report suspected ADRs) was carried out in all departments of SRM MCH and RC tertiary care teaching hospital, in Potheri for a period of four months.^{6,7} 38 Patients of all age groups who developed Adverse Drug Reactions were included for the study.

Oral Informed consent was obtained from the patients. The data for the study were taken from case sheets, investigation reports, personal interviews with clinicians, and personal interviews with patient or patient’s attendant, past history of medications and reports of Medical and surgical interventions.

Assessment scales

The reported ADRs were assessed for causality using Naranjo’s probability scale. The total score was calculated, based on the score, it was categorized as certain (score >9), probable (score 5-8) and possible (score 1-4).⁸ The severity of ADRs were assessed by using Modified Hartwig’s criteria into seven levels. Level 1 and 2 classified as mild category, level 3 and 4 considered as moderate and level 5, 6 and 7 grouped as severe category.⁹ The Preventability of the reported ADRs were assessed using the Modified Schumock and Thornton scale.¹⁰

Data collection

ADR’s were collected by spontaneous reporting system from outpatient departments as well as wards. The contact number and email id of the study author were provided to the physicians. The collected information included. Patient’s age, gender. Reporting department. Description of reaction. Name of the suspected drug. Route of administration of drug and Dosage and filled in ADR form.

Statistical analysis

SPSS software version 17 and Excel Sheet were used for data analysis.

RESULTS

Total of 38 patients were reported to experience ADR during 4 months study period. Out of 38 patients, 22 (58%) patients were males while 16 (42%) patients were females. Number of ADR’s reported in each month. March - 9 (25%) April - 8 (23%) May - 10 (27%) June - 9 (25%). Most of the reactions were type A (68%) rather than type B (32%) and thus predictable. ADR’s based on route of administration: Parenteral - 28 (74%) Enteral - 10 (26).

A total of 38 ADR’s was reported during the study period with male predominance (Table 1). Most of the ADR’s (42%) were common in patients in the adult age group (Table 1).

Table 1: Gender and age wise distribution of ADRs.

Age range	Male	Female	Total patients (%)
1-18	2	2	4(11%)
19-39	7	9	16(42%)
40-59	7	5	12(32%)
≥ 60	6	0	6(16%)
Total patients	22	16	38

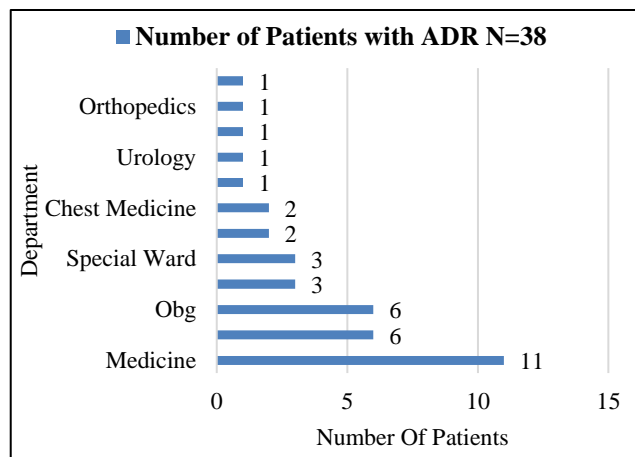


Figure 1: Department wise distribution of ADRs.

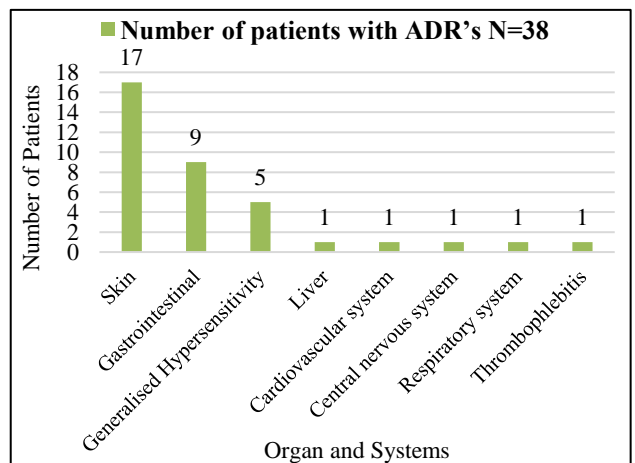


Figure 2: Organ and systems affected by ADRs.

In terms of departments, more number of ADR's were from Medicine (29%) followed by Surgery (16%) and OG (16%) (Figure 1). Most commonly affected organ systems were skin (45%) followed by GIT (24%) (Figure 2).

Table 2: Drugs implicated in ADRs.

Drug group	Name of the drug	No. of ADR's	
Antibiotics 21 (55%)	Cephalosporins -7 (33%)	Cefotaxime	4
		Ceftriaxone	2
		Cefperazone	1
	Quinolones	Ofloxacin	2
		Ciprofloxacin	1
	Pencillins - 6(29%)	Pencillin	2
		Amoxycillin	2
Augmentin		1	
Piperacillin		1	
Others	Azithromycin, Amikacin, Septran, Linezolid, Metronidazole		5
Analgesics	Diclofenac	4	
	Paracetamol	2	
Anti-cancer drugs	Oxaliplatin, Carboplatin, Adriamycin	3	
Enzymes	Hepamerz, Pancrealipase, Cerebroprotein hydroxylate	3	
Haematinics	Hemfer	1	
OHA	Metformin	1	
TCA	Amitriptylline	1	
Local anesthetic	Lignocaine	1	
Antiemetic	Perinorm	1	
Others	RL, Radiocontrast media	2	

Table 3: Causality assessment of ADRs.

Causality assessment (Naranjo's scale)	
Parameters	Number of ADR's (%) N=38
Definite (≥ 9)	4 (11%)
Probable (5-8)	24 (63%)
Possible (1-4)	10 (26%)
Doubtful (≤ 0)	0

The drugs mostly accounted were antibiotics (55%) especially Cephalosporins (33%) (Table 2). According to Naranjo's causality assessment, 74% of reactions were probable, 26% were possible (Table 3). Severity assessment by Modified Hartwig and Seigel scale revealed 45% ADRs to be moderate, 42% were mild and 13% were severe (Table 4). Preventability assessment by modified Schumock and Thornton scale which revealed 61% ADRs were not preventable, 32% were probably preventable, 7% were definitively preventable (Table 5).

Table 4: Severity assessment of ADRs.

Severity assessment (Modified Hartwig and SEIGEL Scale)	
Parameters	Number of ADR's (%) N=38
Mild	16 (42%)
Moderate	17 (45%)
Severe	5 (3%)

Table 5: Preventability assessment of ADRs.

Modified Schumock and Thornton Scale	
Parameters	Number of ADR's (%) N=38
Not preventable	23 (61%)
Probably preventable	12 (32%)
Definitely preventable	3 (7%)

DISCUSSION

In this study 38 ADR's were reported, of which majority (86%) of the drugs were withdrawn for the management of ADR and re-challenge was not done. Majority of ADRs (42%) were seen in adult age group (Table 1) which was comparable with the previous study by Sharma et al where it was 50.4%.¹¹ It is likely that this population is attending hospital more frequently and is a major population receiving drug therapy. The number of ADRs were high in General Medicine and General Surgery departments due to amplified use of antibiotics in these departments for the treatment and prophylaxis of various diseases and also since the patients admitted were with multiple comorbidities requiring poly pharmacy (Bar 1) these results in concurrence with the observation done by Vora et al.¹²

The most frequent ADRs were due to the antibiotics which could be associated with increased frequency of prescription of antibiotics. Among the ADRs, major proportions of adverse reactions were seen with Beta-lactam antibiotics (Table 2) which were similar to the observation by Rodriguez-pena et al, as well as by Raut et al.^{13,14} Since Beta-lactam antibiotics is the one of the most common antibiotics used by the practicing doctors.¹⁵ In accordance with previous studies by Misbah M et al, Oshikoya et al, Shareef et al and Suthar et al, the present study showed the predominance of cutaneous manifestations (Column 1).¹⁶⁻¹⁹ On analyzing the fate of the suspected drugs, it was found that the drug was withdrawn in most of the cases and the dose was reduced in some while no change was made in others considering the risk benefit ratio in particular patients. Most of the ADR's were type A - predictable. Extension of pharmacological effect were commonly found.

According to Naranjo's scale most of the ADR's were probable, since re-challenge was not done in many patients due to ethical issues we didn't get definite relationship. The causality assessment of the reported ADRs according to the Naranjo's scale revealed that no reactions were

certain and most of them were probable with a lesser number of possible ADRs. This data is in correlation with the study of Jose et al.²⁰

As per Hartwig criteria, most of the ADR reports were moderate in nature - patients required discontinuation of offending drug and treatment for ADR's. Majority of the patients recovered completely from the ADR since most of the reactions were moderate (45%) this result was in accordance with Shamna et al and Kala et al were majority was moderate reactions followed by mild and severe ones.^{6,7}

According to Modified Schumock and Thornton scale, most of the ADR's were non-preventable. Those definitely preventable cases have a previous history of similar reaction following same drug intake; which shows the lack of awareness. In probably preventable cases, proper precautionary steps were not taken in few cases. On evaluation of preventability of the ADRs it was evident that most of them were not preventable 61% (n=38) which was similar to the results of Jose et al and Adithan S, et al (Table 5).^{21,22} However, the more common reactions like nausea and vomiting belonged to the category of "definitely preventable".

The significance of this study is to emphasize the awareness to the health-care providers on vigilant monitoring of ADRs and promptly reporting the same so as to prevent the occurrence of the reactions in the vulnerable population. Although the present study has some limitations as it is an analytical study for a very short duration and involved small study population still this study would definitely give an insight into the pattern of ADRs in tertiary health care centres and may help to increase awareness for further Pharmacovigilance studies.

CONCLUSION

Adverse Drug Reactions are common and some of them resulted in increased healthcare cost due to need of some interventions and increased length of hospital stay. The health system should promote the spontaneous reporting of ADRs. The proper documentation and periodic reporting to Pharmacovigilance Centres is required to ensure drug safety.

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