

## SPONTANEOUS ADVERSE DRUG REACTION REPORTING IN A TERTIARY CARE HOSPITAL IN CALICUT

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### ABSTRACT

**Objective:** The study was conducted to assess the adverse drug reactions (ADRs) reported in a tertiary care hospital in Calicut.

**Methods:** Spontaneous ADR reporting method was followed for the study. The ADRs reported by the health-care professionals, or the patients were confirmed with the physician-in-charge. Further, the assessments of type, severity, and preventability of reported ADRs were done using Wills and Brown classification, modified Schumock and Thornton severity scale, and modified Hartwig and Siegel preventability scale.

**Results:** A total of 30 ADRs were reported. A study found that the incidence of ADRs was more in males (1.14%) when compared to females (0.79%). Geriatric patients showed more incidences of ADRs (1.04%) when compared to pediatrics (0.69%) and adults (1.02%). More number of ADRs was associated with antibiotics (23.33%) and anticonvulsants (23.33%) than another category of drugs. Based on type or mechanism involved 80% of ADRs were pharmacologically related (Augmented) ADRs. Severity assessment showed that 50% were mild, 46.67% were moderate, and 3.33% were severe. Assessment of preventability showed that 63.33% of ADRs were not preventable, 30% were preventable, and 6.67% were probably preventable.

**Conclusion:** The study was useful in finding the age category and drugs that were more prone to ADRs. This will render precautions and monitoring in the future. The importance of ADR monitoring unit and aid of clinical pharmacist in the monitoring and assessment were very well considered during the study.

**Keywords:** Adverse drug reaction, Spontaneous reporting, Type, Severity, Preventability.

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### INTRODUCTION

The World Health Organization defines an adverse drug reaction (ADR) as any response to a drug which is noxious, unintended and occurs at doses normally used in men for prophylaxis, diagnosis, or therapy of disease or for the modification of physiologic function. This definition excludes accidental or intentional drug abuse, treatment failure, and administration errors [1]. Every medication has potential adverse or side effects, also many medications have potential interactions with other substances. To prevent these types of adverse effects, the health-care practitioners should select and prescribe the best and safest medicines according to the medical needs of the patients [17]. Efficacy and safety are the two major concerns of drug, where the efficacy of drug can be quantified with relative ease, but the same cannot be done for safety.

Epidemiological studies have estimated ADRs to be the fourth to sixth leading cause of death [14]. It has been estimated that approximately 2.9–5% of all hospital admissions are caused by ADRs and as many as 35% of hospitalized patients experience an ADR during their hospital stay. Serious ADRs account for 6.7% of all hospital admissions. ADRs have an economic burden on the patients as well as on the health-care establishment [2]. In India, a study concluded that 9.8% incidence of ADRs, of which 3.4% of ADRs were associated with hospital admission [14]. Another study concluded that admissions due to ADRs accounted for 0.7% of the total admissions and the deaths due to ADR accounted for 1.8% of total ADRs. At present, tracking of ADRs is mandated by the regulatory agencies. Due to lack of reporting, the real effects of ADRs are difficult to estimate. Hospital-based ADRs monitoring and reporting programs can identify and quantify the risks associated with the use of drugs and are useful in identifying and

minimizing preventable ADRs. This study here had various assessments for monitoring ADRs which was not previously done in the hospital. The study was an approach to provide the hospital with a fully-fledged ADR monitoring program by the clinical pharmacy division.

The objectives of this study were to assess the type of ADRs reported in the hospital and determined its severity and preventability.

### METHODS

This prospective spontaneous ADR reporting study was conducted in the inpatient wards of PVS Hospital (P) Ltd., Calicut, for 7 months (October 2016–April 2017). The study was conducted after attaining approval from the institutional ethics committee of the hospital. Medical professionals were provided with the awareness on ADR monitoring and reporting. Each day the patients were interviewed and checked for the occurrence of any ADRs. The ADRs reported by the health-care professionals and/or patients were confirmed with the help of physician-in-charge. Further, the reported ADRs were assessed for the type based on Wills and Brown classification, preventability using modified Schumock and Thornton scale, and severity using modified Hartwig and Siegel scale. Statistical analysis was performed using Chi-square test and SPSS software 4 windows version 20 was used for the analysis.

### RESULTS

#### Demographic characteristics

ADR was found in a total of 30 patients among 3074 inpatient admissions during the study period. The incidence rate was found to be 1.95%. The demographic characteristics of the patients are represented

in Table 1. Incidence rate was found to be more for the male patients when compared to the female patients, although the findings did not show any statistical significance. The tertiary references such as clinical and medical textbooks and some journals supported the fact that females were more prone to ADRs, but our findings showed difference.

The study showed higher incidence in case of geriatrics followed by adults and pediatrics, respectively. This may be because the number of hospital admissions of geriatrics was more compared to the other two age groups, and pediatricians tend to limit the number of drugs in their patients.

Among ADRs reported, 23.33% were associated with antibiotics and anticonvulsants followed by antihypertensives (20%). Therapeutic classifications of drugs associated with ADRs are represented in Table 2.

#### Assessments of ADRs

Wills and Brown classification was used to categorize the ADRs based on the reason or mechanism. It was found that 24 (80%) of the ADRs reported were type A (augmented) or pharmacological reaction followed by 5 (16.67%) type H (hypersensitivity) reaction and 1 (3.33%) type C (chemical reaction).

Modified Hartwig and Siegel severity scale was used for the assessment of severity. Among the 30 ADRs, 15 (50%) were mild, 14 (46.67%) were

moderate, and 1 (3.33%) was severe. The severity subcategorizations are represented in Fig. 1.

Modified Schumock and Thornton scale was used for the preventability assessment of the reported ADRs. Here, 19 (63.33%) of the ADRs were found to be not preventable, 9 (30%) of the ADRs were found to be preventable, and 2 (6.67%) of the ADRs were found to be probably

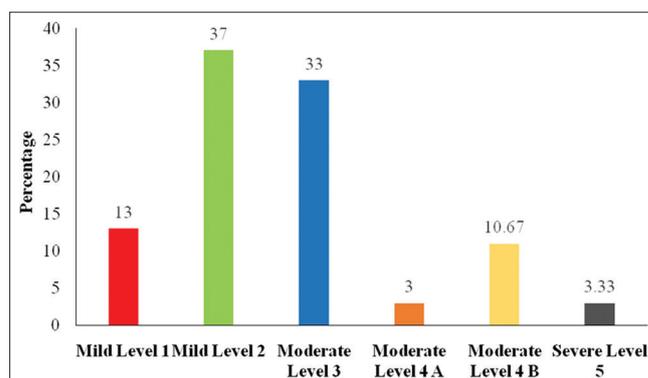


Fig. 1: Severity of the adverse drug reactions

Table 1: Demographic details

Characteristics	Number of patients with ADR	Number of inpatients	Incidence rate (%)	p value
Gender				
Male	18	1572	1.14	0.329
Female	12	1502	0.79	
Age group				
Pediatrics	4	573	0.69	0.754
Adult	11	1069	1.02	
Geriatrics	15	1432	1.04	

ADRs: Adverse drug reactions

Table 2: Drug class associated with ADRs

Drug Class N (%)	Drug Name N (%)	ADR (N)
Antibiotics 7 (23.33)	Amoxicillin+Clavulanic acid 1 (3.33)	Induration at the forearm (1)
	Piperacillin+Tazobactam 2 (6.67)	Seizure (1)
	Ceftriaxone 1 (3.33)	Thrombocytopenia (1)
	Tazomac 1 (3.33)	Thrombocytopenia (1)
	Metronidazole 1 (3.33)	Rashes (1)
	Ofloxacin 1 (3.33)	Severe headache (1)
		Redness on the forearm (1)
Anticonvulsants 7 (23.33)	Clobazam 1 (3.33)	Cough (1)
	Phenytoin 1 (3.33)	Dilantin toxicity (1)
	Carbamazepine 2 (6.67)	Ataxia (1)
	Sodium Valproate 1 (3.33)	Blurred vision (1)
	Topiramate 1 (3.33)	Alopecia (1)
	Levetiracetam 1 (3.33)	Anorexia (1)
		Drowsiness (1)
Antihypertensives 6 (20)	Losartan 2 (6.67)	Increased creatinine and blood urea levels (2)
	Telmisartan 2 (6.67)	Cough (2)
	Furosemide 2 (6.67%)	Muscle cramps (2)
Hypoglycemic agent 2 (6.67)	Glimepiride 1 (3.33)	Pruritis (1)
	Glimepiride+Metformin+Voglibose 1 (3.33)	Hypoglycemia (1)
Antihistaminics 1 (3.33)	Phenergan 1 (3.33)	Acute cervical dystonia (1)
Immunoglobulins 1 (3.33)	Seroglobulin 1 (3.33)	Rashes and Pruritis (1)
Antitubercular 1 (3.33)	Ethambutol 1 (3.33%)	Gastric irritation (1)
Dyslipidemic agent 1 (3.33)	Atorvastatin 1 (3.33)	Muscle pain (1)
Antipsychotic 1 (3.33)	Quetiapine 1 (3.33)	Dry mouth (1)
Glucocorticoid 1 (3.33)	Prednisolone 1 (3.33)	Hypoglycemia (1)
Antiemetic 1 (3.33)	Prochlorperazine 1 (3.33)	Extrapyramidal side effect (1)
Antiparkinsonism 1 (3.33)	Carbidopa+Levodopa+Entacapone 1 (3.33)	Nocturnal confusion (1)

ADRs: Adverse drug reactions

preventable. It may be difficult to prevent all the ADRs; however, it is possible for the future precautions.

## DISCUSSION

The study shows that incidence rate of ADRs was found to be more for males when compared to females. Our findings were similar to the study conducted by Devang Ashwinkumar Rana *et al.* [3] and Dilip *et al.* [4]. The study also showed that the incidence rate for geriatrics to be higher than adults and pediatrics. This could be due to the increased hospital admissions of geriatric patients. These findings were consistent with the study carried out by Shamna *et al.* [5] and Prudhivi Ramakrishna *et al.* [6].

Our study found that antibiotics and anticonvulsants were the class of drugs more prone to ADRs. One possible reason could be the wide usage of antibiotics in our study site and more reporting from the neurology department. These findings were similar to the study findings of Raut *et al.* [7]. The study found that 80% of the ADRs reported were type A reaction or pharmacological reaction followed by 16.67% of type H (hypersensitivity) reaction and 3.33% of type C (chemical reaction). These findings were similar to the study result found by Surjeet and Wafai [8]. Hypersensitivity reactions are easily detected, whereas other types need a regular monitoring by the health-care professionals. Most of the ADRs were found to be mild and findings had similarity to the study by S. Ponnusankar *et al.* [9]. Majority of the ADRs were not preventable (63.33%). These findings on preventability showed similarity to the study by Mandavi *et al.* [10]. The preventability assessment can help in minimizing the ADRs or taking proper precautionary measures in future with the same or similar drugs.

## CONCLUSION

ADRs are inevitable risk factor associated with the use of medicines. However, careful attention to dosage, age, and renal function can minimize the risk of developing ADRs in many patients. The study came across age, gender, drug class, causality assessments, severity, and preventability. The study found the age group and common drugs that are more prone to ADRs. The clinical pharmacist can take precautions in the future on these aspects and try to adopt the best measures to minimize or avoid ADRs. To minimize the problem associated with ADRs, it is advisable that every hospital should have pharmacovigilance centers involving clinical pharmacist services that can provide the most for the assessment and reporting.

## AUTHOR'S CONTRIBUTION

Dr. Siraj Sundaran has provided the design, intellectual content, innovations, and protocol for conducting the study along with mentorship.

Mr. Abhijith P S, Ms. Aleena Alex, Ms. Amrutha Krishnan, and Ms. Angel Tisa Jacob have involved with the ADR reporting and data processing.

Dr. Sudeep Balakrishnan has involved with the advisory and monitoring of the study.

## CONFLICTS OF INTEREST

The authors of this study declare that there are no conflicts of interest regarding the publication of this article.

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Nil.

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