Adverse drug reaction monitoring study in hospitalized patients: support for pharmacovigilance at a tertiary care hospital

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INTRODUCTION

An Adverse Drug Reaction (ADR) may be defined as “any response to a drug which is noxious and unintended, and which occurs at doses normally used in man for prophylaxis, diagnosis, or therapy of disease, or the modification of physiological function.” ADRs are a leading cause of morbidity and mortality in healthcare system. ADRs related admissions in hospital have consistently increased which has resulted in economic burden especially in developing countries like India. ADRs are frequently encountered in hospital settings where polypharmacy is commonly observed.

In India, Pharmacovigilance program of India (PvPI) has been launched since June 2010 with the objective to ensure safe use of drugs and generate ADR data. Adverse drug reaction monitoring is a process of continuously monitoring of undesired effects suspected to be associated with the use of medicinal products. It facilitates collection of unbiased drug safety data observed during clinical practice in real life circumstances. ADR reporting is considered to be an important step in monitoring and achieving safe use of drugs.

However, it has been observed that under reporting of adverse drug reactions is widespread and an alarming
challenge in Pharmacovigilance (PV). This is due to the fact that India follows a system of spontaneous and voluntary reporting of ADRs. Due to the lack of awareness among healthcare professionals and patients, spontaneous reporting of ADR is in its infancy stage.

ADRs in hospitalized patients are broadly divided into two categories: those that cause admission to hospital and those that occur in hospitalized patients after admission. Hospital based ADR monitoring can provide valuable information on drug usage. ADR reporting programmes on an institutional basis can support the setting up of a sound pharmacovigilance system in the country.

The present study was planned with the aim to evaluate the adverse drug reactions that occurred in hospitalized patients and to study the pattern of reported ADRs in terms of its frequency, causality and severity.

**METHODS**

**Study design**

The present study was a prospective observational study conducted in hospitalized patients in departments of Medicine, Surgery and Orthopaedics of a tertiary care hospital in North India for a period of 6 months.

Approval from Institutional Ethics Committee was obtained before starting the study. Informed consent was obtained from all patients before the commencement of study.

**Inclusion criteria**

Inclusion criteria were 1) patients of either sex above 18 years of age 2) patients admitted in Medicine, Surgery and Orthopedic wards 3) patients willing to participate in the study.

**Exclusion criteria**

Exclusion criteria were 1) patients less than 18 years of age 2) patients admitted in emergency, intensive care unit as well as in outpatient departments 3) patients not willing to participate in the study.

All relevant details of the patient and suspected ADRs were recorded carefully in suspected ADR reporting form by Central Drug Standard Control Organization (CDSCO).

Suspected ADRs were analyzed for causality using WHO-Uppsala Monitoring Scale (UMC) scale. The severity of ADRs was evaluated using Modified Hartwig’s and Siegel scale.

**Statistical analysis**

The data was entered in Microsoft excel 2010 worksheet. Descriptive statistics was applied to analyse the collected data. The data was expressed in n (%).

**RESULTS**

Total 111 cases of suspected adverse drug reactions were reported during the study period of 6 months.

Out of 111 ADRs, 44 (39.63%) ADRs were reported from Department of Medicine, 36 (32.43%) from Department of Surgery while 31 (27.92%) ADRs were reported from Orthopaedics department.

**Age and sex distribution of ADRs**

Out of 111 patients, 88 (79.28%) patients were adults (age between 19-59 years) while 23 (20.72%) patients were in the geriatric age group (Table 1).

61 patients (54.96%) were male and 50 patients (45.04%) were females (Figure 1).

**Table 1: Age distribution of ADRs (n=111).**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Total no. of reported ADRs</th>
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<tbody>
<tr>
<td>Adult (19-59 year)</td>
<td>88 (79.28%)</td>
</tr>
<tr>
<td>Geriatric (above 60 year)</td>
<td>23 (20.72%)</td>
</tr>
</tbody>
</table>

**Figure 1: Sex distribution of ADRs (n=111).**

**Organ system affected**

In the present study, gastrointestinal tract system (36.36%) was most commonly affected followed by Skin (21.21%) and Central Nervous system (19.69%) as depicted in Figure 2.
Drugs implicated in causing ADRs

Ceftriaxone (13 (11.71%)) was most frequently implicated in causing ADRs followed by Tramadol (10 (9.01%)) and Amikacin (8 (7.2%)) as depicted in Figure 3.

Types of adverse drug reaction

Out of 111 adverse drug reactions, 96 (86.49%) reactions were Augmented or predictable and 15 (13.51%) reactions were Bizarre or unpredictable reactions as per Rawlins and Thompson’s classification.15

Causality assessment (using WHO-UMC scale)

It was observed that majority of ADRs were possible (83 (74.77%)) followed by probable (25 (22.52%)) while only 3 (2.7%) ADRs were certain.

Assessment of severity of ADRs

Out of 111 adverse drug reactions, 92 (82.88%) adverse drug reactions were mild, 17 (15.31%) reactions were moderate and 2 (1.8%) reactions were severe as per Modified Hartwig’s and Siegel scale.

DISCUSSION

Adverse drug reactions have a major role in affecting the quality of life and health care system. ADR monitoring is a vital component of health care system. However, it is often ignored and not considered essential.16 Under-reporting of ADRs is a major concern.5-7 Establishing pharmacovigilance units in the hospitals has facilitated this activity to a great extent. Thus, the present study was conducted in order to evaluate the pattern of adverse drug reactions that occurred in hospitalized patients at a tertiary care teaching hospital in North India.
A total of 111 adverse drug reactions were recorded during the study period with maximum ADRs reported from the Department of Medicine which is in concordance with a study conducted earlier. The incidence of ADRs was found to be higher in adults (88.79%28%) as compared to geriatric patients (23.8%22%) as seen in a similar study conducted earlier. Majority of patients were males (61.5%) while 50 (45.0%) patients were female. These results are concurrent with another study conducted previously.

In this study, gastrointestinal system (36.36%) was most commonly affected by adverse drug reactions as observed in another similar study. Among the drugs implicated in causation of ADRs, Ceftriaxone (11.71%) was most the most common offending drug. These results are consistent with another study conducted earlier.

Majority of ADRs were found to be Augmented/Type-A reactions. Augmented reactions are dose related and are related with the pharmacological action of a drug. The incidence of augmented or Type-A reactions was 86.49% while 13.51% ADRs were Type-B reactions. These results are similar to another study which showed that majority of ADRs were classified as Type-A reactions.

Causality assessment of ADRs by WHO-UMC scale revealed that 74.77% of ADRs were possible, 22.52% of ADRs were probable and 2.7% of ADRs were definite. Another similar study concluded that probable cases constituted majority (66.9%) of ADRs followed by 33.06% of ADRs as possible. On assessing the severity of ADRs using Modified Hartwig’s and Siegel scale, most of the ADRs were mild while a very low proportion of ADRs were severe in nature as seen in similar other study.

CONCLUSION

The present study concludes that ADR monitoring is the need of the hour. It highlights the fact that under reporting of ADRs is commonly observed. It is essential to create awareness among patients, clinicians and para-medical staff towards reporting of adverse drug reactions to ensure patient safety thus strengthening pharmacovigilance. This study had some limitations since it is an observational study of a short duration. Nevertheless, it helps to give an insight into the current pattern of ADRs in a tertiary care teaching hospital and serves to increase awareness for pharmacovigilance activities in future.

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