ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 10, Issue 3, 2017

Online - 2455-3891
Print - 0974-2441

Research Article

PATTERN OF ADVERSE DRUG REACTIONS IN A TERTIARY CARE TEACHING HOSPITAL: A CROSS-SECTIONAL STUDY

SANGEETHA RAJA*, JAMUNA RANI R, KALA P

Department of Pharmacology, SRM Medical College Hospital and Research Centre, SRM University, Potheri, Tamil Nadu, India.
Email: sangeeraja@gmail.com

Received: 01 November 2016, Revised and Accepted: 30 November 2016

ABSTRACT

Objective: The aim of this study was to carry out adverse drug reactions (ADRs) monitoring in various departments of a tertiary care teaching hospital.

Methods: A cross-sectional study was conducted on ADRs reported in the hospital from December 2012 to May 2013 after obtaining Institutional Ethics Committee approval.

Results: A total of 40 ADRs were reported, 47.50% were males and 52.50% were females. The female adult population was 45%. The majority of ADRs were due to antimicrobial agents especially beta-lactam antibiotics (42.5%) followed by NSAIDs (7.50%). A maximum number of patients (75%) were reported with dermatological manifestations. The department of medicine reported the highest number of ADRs (37.5%). As per Naranjo's probability scale, 62.5% reports were assessed as probable. 62.5% reports were documented as mild according to Modified Hartwig's criteria for severity assessment.

Conclusion: This study was done to sensitize the practicing physicians on the importance of adverse drug monitoring and reporting.

Keywords: Pharmacovigilance, Adverse drug reactions, Tertiary care teaching hospital, Antimicrobial agents.

 DOI: http://dx.doi.org/10.22159/ajpcr.2017.v10i3.15972

INTRODUCTION

Drug safety is a major concern in the field of medicine. Adverse drug reaction (ADR) reports can indicate the important safety issues on drug treatment. Documentation of these reports can direct the changes in the pattern of prescribed drugs and it could even lead to the withdrawal of the drug from the market. Serious adverse events can cause admission to hospital, prolongation of hospitalization, increase in investigations or treatment costs, poor work adherence, birth defects, and danger to life leading to death. ADRs may act through the same physiological and pathological pathways as in different diseases; hence, they are difficult and sometimes impossible to distinguish the features. The World Health Organization's (WHO) defined the ADR as "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 for the modification of physiological function' [1]. The safety of an approved drug is examined extensively in preclinical studies and in all the human clinical trials. Even in large clinical trials which are conducted for FDA approval, not all safety issue will be recognized. In preclinical animal studies, it is insufficient to predict the human safety. The rare side effect cannot be detected during the clinical trials in human as it involves limited subjects, which could be explored during postmarketing surveillance [2]. Thalidomide tragedy provoked the establishment of drug monitoring systems. It took more than a decade to ban the drug Terfenadine for its serious side effect of fatal cardiac arrhythmia [3]. Most of the drugs do not cause adverse drug effect; even those reaction which had occurred might be attributed to their individual pharmacogenomic pattern. Pharmacovigilance Programme of India (PvPI) 2014 stated that 6.7% of patients had serious adverse events. Similar studies have documented that hospital admissions due to ADR were 3.4%, hospital readmissions 3.7%, and mortality 1.8% [4]. Adverse reactions are recognized as the fourth-leading cause of death in the developed world. Although India is the third largest medicine market of the world, it had documented only 2% of global ADRs until 2013. PvPI increased the ADRs monitoring centers from 90 to 150 including the private hospitals, which led to increasing in ADR reporting. India became the first country in reporting the Individual Case Safety Reports of more than one lakh to Vigiflow, Uppsala Monitoring Centre. It has to be made mandatory for all health-care providers such as physicians, dentists, nurses, pharmacists to report ADRs as part of their professional responsibility, even if they are doubtful about the specific relationship with the given medication. One of the most important ways to prevent adverse drug events is to share information since all medication errors are preventable which can be achieved by sensitizing awareness among the healthcare professionals to report and follow-up the events.

METHODS

A cross-sectional study was conducted for a duration of 6 months from December 2012 to May 2013 at SRM Medical College Hospital and Research Centre after obtaining the approval of the Institutional Ethics Committee. ADR details were collected from the patient after the oral informed consent. During this period, routine ward rounds were carried out and awareness was given to all health-care professionals for the voluntary reporting system. The ADR information was documented based on the treating physician's report. Patient information such as age, gender, IP number, weight, diagnosis, relevant investigations, and drug information such as name of the drug, dose, route of administration, frequency of administration, duration of therapy, types of ADR, treatment and outcome of the reaction were collected and the data were documented in the study proforma; each reported patients were assessed individually. Causality assessment was done based on Naranjo's probability scale. The total score was calculated based on the score and it was categorized as certain (score >9), probable (score 5-8), and possible (score1-4) [5]. Modified

Hartwig's criteria were used to assess the severity of ADRs into seven levels: Levels 1 and 2 was classified as mild category; levels 3 and 4 as moderate category; levels 5, 6, and 7 were grouped as the severe category.

RESULTS

During the period of this study, 40 ADRs were reported. Of these 19 (47.50%) were males and 21(52.50%) were females (Fig. 1).

The maximum number of ADRs which were reported in this study was adult females (45%) of age group 18-60 years followed by adult males (27.5%) of the same age group (Fig. 2).

Maximum ADRs were reported from Department of Medicine (37.5%) followed by surgery (25%) and otorhinolaryngology (10%) (Fig. 3).

42.5% ADRs were due to beta-lactam antibiotics followed by fluoroquinolone and metronidazole (Fig. 4).

Based on the severity of the reaction, most of the cases (62.5%) were mild (Fig. 5). Causality assessment showed 62.5% of cases in the probable category, only one patient had an assessment as certain (2.5%) (Fig. 6).

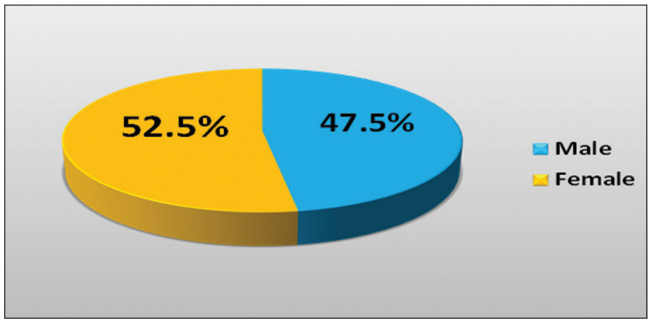

Fig. 1: Gender distribution in reported adverse drug reactions

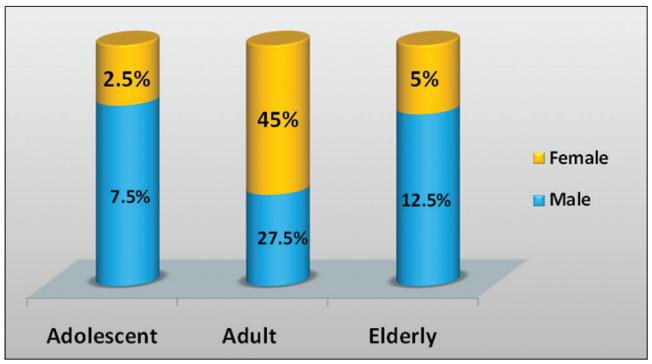

Fig. 2: Age distribution in reported adverse drug reactions

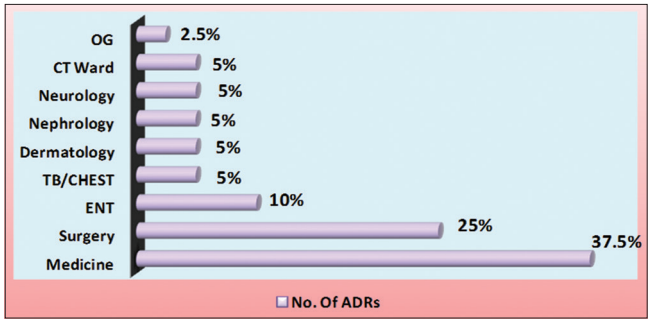

Fig. 3: Adverse drug reactions reported from various departments

About 75% of the ADR cases had skin lesions like urticaria and erythematous rash due to cephalosporin's group of antibiotics and NSAIDs (Tables 1 and 2).

DISCUSSION

India holds the second place in the global population and the third place in drug marketing but only 2% ADRs are reported. This study was done to emphasize the need for ADR documentation. Out of the 40 patients reported during this study, there was an insignificant increase in prevalence among female (52.5%) than male (47.5%) which was similar to a study done by Saravanan *et al.* [6]. When we analyze according to the age group, the prevalence was more in the female adult population (45%) compared to adolescent and elderly females which could be explained by the fact that women are more into polypharmacy, drug intake and prone for more sensitivity toward medication [7,8]. Due to more patient inflow, the majority of incidence were found to be in general medicine and general surgery department in concurrence with the observation done by Vora *et al.* [9] Among the ADRs, major proportions of adverse reactions were seen with Beta-lactam antibiotics which were similar to the observation by

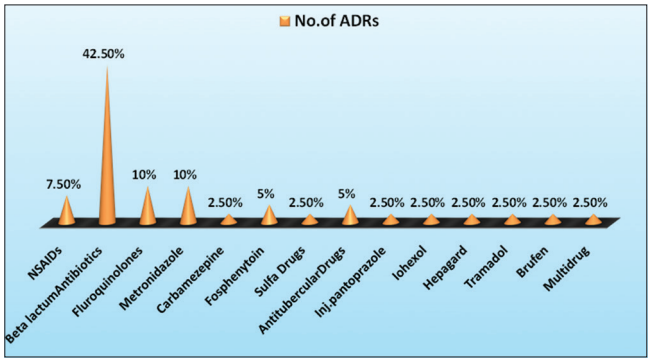

Fig. 4: Drugs in reported adverse drug reactions

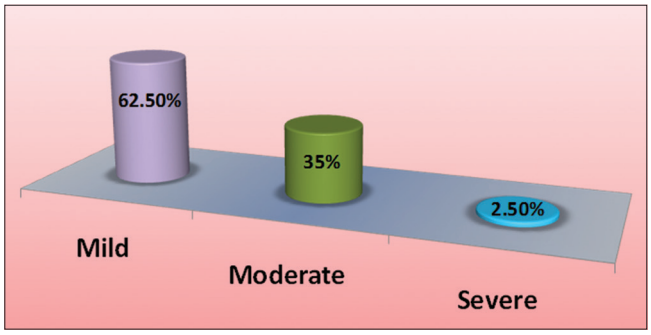

Fig. 5: Severity of reported adverse drug reactions (in percentage)

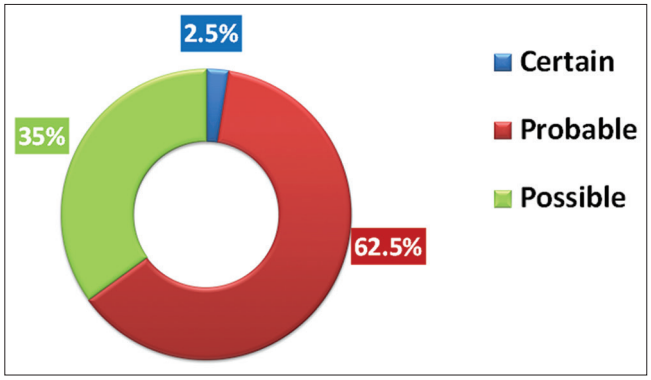

Fig. 6: Causality assessment in reported adverse drug reactions

Table 1: Types of reactions for drugs in reported ADRs

Reactions	Drugs	Number of ADRs (%)
Urticaria	Ceftriaxone with Sulbactam, Ceftriaxone, Ceftriaxone with Tazobactam, Cefotaxime, Phenytoin, Ciprofloxacin, Cotrimoxazole, Metronidazole	20 (62.5)
Erythematous skin lesion	Diclofenac Sodium, Cotrimoxazole, Paracetamol, Phenytoin, Carbamezapine, Clindamycin	6 (18.75)
Chest tightness and pain	Metronidazole, Lopamide	2 (6.25)
Throat irritation	Ciprofloxacin	1 (3)
Facial edema	Cefotaxime	1 (3)
Rigor	Vancomycin	1 (3)
Lip edema	Cotrimoxazole	1 (3)

ADRs: Adverse drug reactions

Table 2: List of organs system in ADRs

Organ system	Number of ADRs (%)
Skin	75
Gastrointestinal system	15
Cardiovascular system	-
Central nervous system	-
Respiratory	5
Genitourinary	5
Eyes, ears, nose and throat	-

ADRs: Adverse drug reactions

Rodriguez-Pena *et al.* as well as by Raut *et al*. [10,11] Since beta-lactam is one of the most common antibiotics used by the practicing doctors [12]. In this study, most of the reactions were mild (62.5%) followed by moderate (35%) and only 3% showed severe reaction similar ratio of reactions were also documented in a study by Shamna *et al.* [13] The severity of the reactions were assessed based on the Modified Hartwig's criteria for severity assessment, patients who had reactions were advised to stop the drug immediately, those who had mild to moderate reactions were treated with antihistamine and steroids as per their need, whereas the patient who had severe reactions got hospitalized and all the patients who had ADRs recovered completely after treatment. They were given counseling to report to their treating physicians about their drug history to avoid such reactions in future. According to the Naranjo scale, the causality assessment of the reported ADRs in this study revealed that 62.5% of reactions were recognized as Probable, in accordance with a study done by Mandavi *et al*. which had reported 88.6% as probable [14,15]. Only one patient had the causality assessment as certain for drug ciprofloxacin which was ascertained by rechallenge by the patient who took the medication without consulting the doctor using the old prescription, but this time the itching was very much pronounced than the previous episode hence she had come to the hospital for treatment.

When we analyze the presentation of reactions, almost 75% showed cutaneous reactions like urticaria, erythematous rashes, this was in correlation with the study done by Jose *et al*. and Chawla *et al*. [16]. When we observed the type of reactions caused by drugs it was noted that most of the cephalosporins group of drugs caused urticaria, it was also observed that NSAIDs drugs developed erythematous rashes, one patient had developed chest tightness following administration of contrast dye iopamide, and another patient had rigor following treatment with vancomycin [17]. Cutaneous ADRs were common with antimicrobials (62.5%) followed by non-steroidal anti-inflammatory drugs (18.75%) which were in sequence to a study done by Sharma *et al*. who had claimed that 40% and 35% of the cutaneous ADRs were due to antimicrobial and NSAIDs, respectively[18]. Many studies have attributed that altered liver and renal function tests may predispose to severe cutaneous ADRs because of abnormal drug metabolism and clearance from the body [19].

CONCLUSION

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. Frequent pharmacovigilance programs should be initiated to sensitize the health-care workers on the importance of reporting the ADRs. Above all, proper counseling for the patient to inform about their previous drug allergy if any, to the treating physician and also should be emphasized to avoid self-medications. A systematic comprehensive monitoring and documentation of ADRs can curtail many untoward reactions in patient care and will lead to an effective drug administration.

ACKNOWLEDGMENT

We are grateful to our respectable Medical Director, Dean (Medical), Medical Superintendent for their support and granting permission to carry out our research.

REFERENCES

1. Gershanik J, Boecler B, Ensley H, McCloskey S, George W. The gasping syndrome and benzyl alcohol poisoning. Engl J Med 1982;307(22):1384-8.
2. Apte AA. Reporting of adverse events for marketed drugs: Need for strengthening safety database. Perspect Clin Res 2016;7(3):111-4.
3. Yap YG, Camm AJ. Drug induced QT prolongation and torsades de pointes. Heart 2003;89(11):1363-72.
4. Lihite RJ, Lahkar M. An update on the Pharmacovigilance Programme of India. Front Pharmacol 2015;6:194.
5. Naranjo CA, Busto U, Sellers EM, Sandor P, Ruiz I, Roberts EA, *et al.* A method for estimating the probability of adverse drug reactions. Clin Pharmacol Ther 1981;30(2):239-45.
6. Saravanan SS, Kavitha P, Ponnuswamy TK. Patterns of adverse drug reactions in the medical intensive care unit of an Indian tertiary care hospital. Int J Pharm Biol Arch 2014;5(3):64-8.
7. Rademaker M. Do women have more adverse drug reactions? Am J Clin Dermatol 2001;2(6):349-51.
8. Kathiria JM, Sattigeri BM, Desai PM, Patel SP. A study of adverse drug reactions in patients admitted to intensive care unit of a tertiary care teaching rural hospita. Int J Pharm Pharm Sci 2013;5(1):160-3.
9. Vora MB, Trivedi HR, Shah BK, Tripathi CB. Adverse drug reactions in inpatients of internal medicine wards at a tertiary care hospital: A prospective cohort study. J Pharmacol Pharmacother 2011;2(1):21.
10. Rodriguez-Pena R, Antunez C, Martin E, Blanca-Lopez N, Mayorga C, Torres MJ. Allergic reactions to beta-lactams. Expert Opin Drug Saf 2006;5(1):31-48.
11. Raut A, Pawar A, Pankaj M, Srivastava P, Mishra A. Clinical pattern and severity of cutaneous adverse drug reactions. Int J Pharm Pharm Sci 2013;5 Suppl 2:612-6.
12. Bhattacharya S. The facts about penicillin allergy: A review. J Adv Pharm Technol Res 2010;1(1):11-7.
13. Shamna M, Dilip C, Ajmal M, Linu Mohan P, Shinu C, Jafer CP, *et al.* A prospective study on Adverse Drug Reactions of antibiotics in a tertiary care hospital. Saudi Pharm J 2014;22(4):303-8.
14. Mandavi, Dcruz S, Sachdev A, Tiwari P. Adverse drug reactions & their risk factors among Indian ambulatory elderly patients. Indian J Med Res 2012;136:404-10.
15. Stavreva G, Pendicheva D, Pandurska A, Marev R. Detection of adverse drug reactions to antimicrobial drugs in hospitalized patients. Trakia J Sci 2008;6(1):7-9.
16. Chawla S, Kalra BS, Dharmshaktu P, Sahni P. Adverse drug reaction monitoring in a tertiary care teaching hospital. J Pharmacol Pharmacother 2011;2(3):196-8.

17. Hiware S, Shrivastava M, Mishra D, Mukhi J, Puppalwar G. Evaluation of cutaneous drug reactions in patients visiting out patient departments of Indira Gandhi Government Medical College and Hospital (IGGMC and H), Nagpur. Indian J Dermatol 2013;58(1):18-21.
18. Sharma R, Dogra D, Dogra N. A study of cutaneous adverse drug reactions at a tertiary center in Jammu, India. Indian Dermatol Online J 2015;6(3):168-71.
19. Suthar JV, Desai SV. A study of adverse cutaneous drug reactions in outdoor patients attending to Skin and V.D. Department of Shree Krishna Hospital, Karamsad. Int J Res Pharm Biomed Sci 2011;2:2229-3701.