ejpmr, 2018,5(11), 303-307

SJIF Impact Factor 4.897

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

A PHARMACOVIGILANCE STUDY IN ICU PATIENTS AT DEPARTMENT OF MEDICINE IN TERTIARY CARE HOSPITAL, SGMH REWA, MP, INDIA

Pandey vivek[1], Raj Bhupendra*[2], Singh Prabhakar[3], Singh Amita[4] and DubeyVandana[5]

Tutor[1], Professor & HOD Pharmacology[2], Professor Pharmacology[3], Associate Professor Physiology[4], Sr. Biochemist Pharmacology[5]

Professor & Head, Deptt. of Pharmacology, SS Medical College, Rewa, MP.

***Corresponding Author: Raj Bhupendra**

Professor & Head, Deptt. of Pharmacology, SS Medical College, Rewa, MP.

Article Received on 27/08/2018 **Article Revised on 17/09/2018** **Article Accepted on 07/10/2018**

ABSTRACTS

Pharmacovigilance is "the science and activities relating to the detection, assessment, understanding and prevention of adverse effects of pharmaceutical products. ***Aims & Objectives:*** The aims of study is to assess the frequency & pattern of ADRs and the group of drugs commonly involved to producing the suspected ADRs in intensive care unit of medicine department. ***Material and Methods:*** This study was conducted between August 2015 to July 2016. All cases that have suspected ADRs conform to WHO definition, having of age 18 years or more were enrolled in the study. Total 164 cases with suspected ADRs were presented during study. The data were analyzed by Microsoft word - excel version 2007. All the multiple responses were presented in terms of number and percentage. ***Results:*** Total 4860 patients were admitted in medicine ICU during study period, out of which 2714 were males and 2146 were females. Maximum 49 (29.13%) patients with suspected ADRs were belong to ≥60 years of age and minimum 13 (6.08%) were belong to 30-39 years of age group. Gastrointestinal system is the most commonly (35.21%) involved organ system and nausea is most commonly (19.13%) reported ADR, followed by vomiting, diarrhea and skin rashes. Among the drug groups antimicrobials were associated with maximum (17.73%) ADRs followed by NSAIDs (9.56%), hypoglycemics (6.08%), steroids and others. ***Conclusion:*** In our study the majority of patients with suspected ADRs were females. The gastrointestinal system is the most common affected organ system; nausea is the most common ADR and antimicrobials are the drugs having highest incidence of suspected ADRs.

KEYWORDS: Pharmacovigilance, World Health Organization (WHO), Adverse drug reaction (ADR), Adverse drug event (ADE).

INTRODUCTION

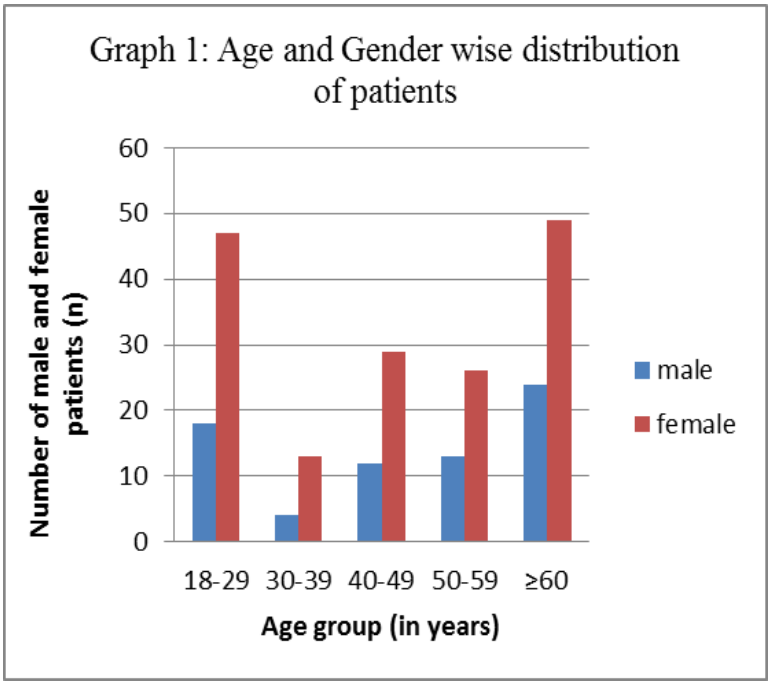
Pharmacovigilance is "the science and activities relating to the detection, assessment, understanding and prevention of adverse effects of pharmaceutical products.[1] The Uppsala Monitoring Centre is the international collaborating centre for monitoring of the ADR located at Sweden. The Pharmacovigilance centers are located in most of the countries. In India, National Pharmacovigilance center is located at Ghaziabad and there are two zonal centers which are located at AIIMS New Delhi & KEM Mumbai. Incidence of adverse drug events (ADEs) and adverse drug reactions (ADRs) are higher in the intensive care unit (ICU) than other areas of the hospital[2] because patients of the intensive care unit (ICU) have multi organ dysfunction as well as altered pharmacokinetic parameters. Hence these patients are more susceptible to develop adverse drug reactions (ADRs). Several parameters like age, sex, number of drugs, type of drugs have been act as significant risk factors for the development of ADRs.[3,4] The detection and monitoring of ADRs is of vital importance for patient safety, as more than 50% of approved drugs are associated with some types of adverse effects that are not detected prior to their approval for clinical use.[5] The ICU has been known to be the land of polypharmacy for many years. Polypharmacy is known to increase the risk of adverse drug reaction (ADRs), drug-drug and drug-disease interaction. It has been claimed that patients taking two drugs, face a 13% risk of adverse drug interactions, incidence rising up to 38% when taking four drugs and rose up to 82% if seven or more drugs are given simultaneously.[6] ADRs monitoring and evaluation plays vital role for the doctors to make a decision when it comes to choosing a drug treatment. This behaves as the key component of effective drug regulation systems, clinical practice and public health programmes. In India, ADR monitoring was started since 1982 under the chairmanship of Drugs Controller General of India (DCGI). This was started as an institutional activity, where intensive monitoring of 58,194 cases collected from various centers was done in 1987 under the guidance of Indian Council of Medical

research. However, as far as India is concerned, ADR reporting rate observed to be very low.

MATERIAL AND METHODS

This study was conducted after getting approval from institutional ethics committee, in the department of Pharmacology, SS Medical college and department of Medicine, Sanjay Gandhi Memorial Hospital, Rewa (M.P.) between Aug. 2015 to July 2016, total 12 months of duration, to assess the incidence and pattern of ADRs and the group of drugs which are mostly associated with suspected ADRs among patients admitted in the department of Medicine. Total 164 cases with suspected ADRs were enrolled after taking their informed written consent with willingness to available for follow up. All cases that have suspected ADRs conforms to WHO's definition, having of age 18 years or more of either gender with suspected ADRs, patient with suspected ADRs developed after being admitted to the hospital or having suspected ADRs prior to being admitted in hospital. All the patients having unclear drug intake history, patient those not willing to complete the procedure, ADRs occurs due to alternative medicines like Ayurveda, Homeopathy & Unani system and patients having psychiatric illness were excluded from study**.** Before conducting the study; resident doctors, nursing staff and paramedical staffs were motivated to report the suspected ADRs. Data of spontaneously reported suspected ADRs were collected by healthcare professionals. For each patient with suspected ADR, a detailed history including drug history, personal history, family history, present and past medical history and history of previous drug allergy were documented any untoward event was labeled as suspected adverse drug reaction after discussion with the treating physician. Data were analyses to detect any predisposing or underlying disease/pathological factors and to assess pattern and severity of suspected ADRs by using Microsoft word - excel version 2007. All the multiple responses were presented in terms of number and percentage.

OBSERVATIONS



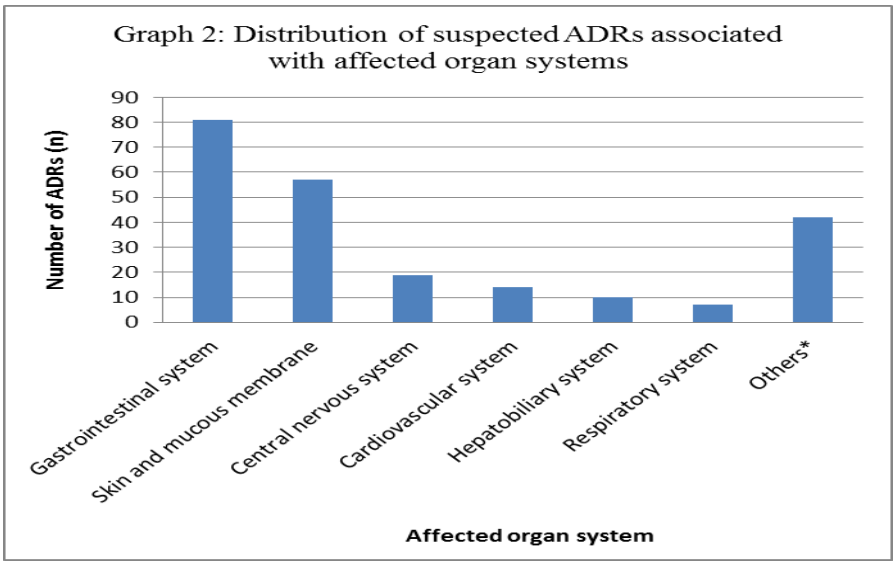
Graph 1: Age and gender wise distribution of patients and reported suspected ADR.

Table 1: Gender wise distribution of reported suspected ADR and its incidence.

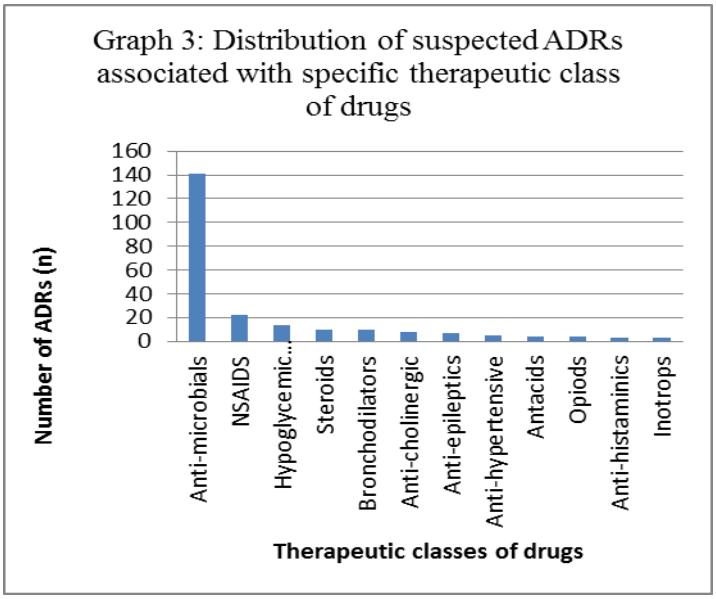
S.no.	Gender wise distribution of patients	Numbers and percentage (%) of reported suspected ADRs	Number of patients with ADR/total number of patients admitted during the study period	Incidence of suspected ADR (%)
1	Male	106 (46.08%)	71/2714	2.61%
2	Female	124 (53.91%)	93/2146	4.33%
	Total	230 (100%)	164/4860	3.37%

Table 2: Frequency distribution of pattern of suspected ADRs reported during study period.

S.no.	Pattern of Suspected ADRs reported during study period	Number and Percentage of suspected ADRs	
		Number	Percentage (%)
1	Nausea, vomiting & Diarrhea	44	19.13%
2	Skin rashes /Pruritis	29	12.6%
3	Gastritis/GI upset/burning sensation	26	11.3%
4	Rigor & chills	19	8.26%
5	Fever	12	5.21%
6	Breathlessness	9	3.91%
7	Oral ulcers	9	3.91%
8	Dryness of mouth	8	3.47%
9	Headache	8	3.47%
10	Deranged Liver function	8	3.47%
11	Weakness & sweating (hypoglycemia)	7	3.04%
12	Constipation	6	2.60%
13	Pedal edema	6	2.60%
14	Dizziness/drowsiness/disorientation	5	2.17%
15	Oral candidiasis	5	2.17%
17	Tinnitus	5	2.17%
18	Anxiety	4	1.73%
19	Swelling of lips	4	1.73%
20	Gum hypertrophy	3	1.30%
22	Hypotension	3	1.30%
23	Palpitation	3	1.30%
24	SJS	3	1.30%
25	Altered sensorium	2	0.86%
26	Bullous eruption	2	0.86%
	Total	230	100%



Graph 2: Distribution of suspected ADRs associated with affected organ systems.



Graph 3: Distribution of suspected ADRs associated with specific therapeutic class of drugs.

RESULTS

In this study total 4860 patients were admitted in medicine ICU during study period, out of which 2714 were males and 2146 were females. *(Table1)* Among which the maximum number (49 patients, 29.13%) of patients were belong to ≥60 years of age group followed by 18-29 years (47 patients, 26.52%); 50-59 years (26 patients, 20.0%); 40-49 years (29 patients, 18.26%) and minimum (13 patients,6.08%) with 30-39 years of age group. *(Graph1)* Total 230 suspected ADRs were reported during study in total of 164 patients, of which 106 (46.08%) were reported in 71 males and 124 (53.91%) in 93 female patients. The overall incidence of suspected ADRs is 3.37%. (Table1) On basis of affected organ system the maximum ADRs (35.21%) that were reported are related to the gastrointestinal system, followed by skin and mucous membrane (24.78%), central nervous system (8.26%), cardiovascular system (6.08%), hepatobiliary system (4.34%) and respiratory system (3.04%) in decreasing order and others 18.26% ADRs were related to genitourinary, musculoskeletal and endocrine system. *(Graph2)* Among reported suspected ADRs; the nausea is most commonly (19.13%) reported followed by vomiting and diarrhea, Skin rashes and pruritus (12.60%), Gastritis/GI upset and burning sensation (11.30%), Rigor and chills (8.26%), Fever (5.21%), Breathlessness and oral ulcer (3.91%), Headache, deranged liver function and dryness of mouth (3.47%), Weakness & sweating (hypoglycemia) 3.04%, pedal edema and constipation (2.60%). Oral candidiasis, dizziness, drowsiness and disorientation (2.17%), anxiety and swelling of lips (1.73%) whereas SJS, Gum hypertrophy and palpitation (1.30%) and altered sensorium and Bullous eruption were seen with minimum (0.86%) incidence.*(Table2)* Amongst different groups of drug; antimicrobials were reported with maximum (61.30%) ADRs followed by NSAIDs (9.56%), hypoglycemics (6.08%), steroids, bronchodilators (4.34%) and anti-cholinergic drug (3.47%). Anti-epileptics were associated with 3.04%, antacids and opioids 1.73% and anti-histaminic and Inotropes were associated with minimum 1.30% ADRs. *(Graph3).*

DISCUSSION

In the present study maximum number of patients (29.13%) with suspected ADRs were belong to ≥60 years of age group. This was similar to spontaneous study conducted by *Jose J et al*[7] *(2006),* in which significantly higher percentage of suspected ADRs were occurs among geriatric patients compare to adults. This may occur because geriatric patients have higher incidence of admission in the intensive care unit (ICU) with multi-organ dysfunction as well as altered pharmacokinetic parameters. Hence they are more susceptible to appear adverse drug reactions.[10,11] In the present study the overall incidence of ADRs were very low (3.37%) compare to two other meta-analysis conducted by *Lazarou et al*[8] *(1998)* and *Murphy BM et al*[9] *(1993)* in which the incidence of ADRs were 15.1% and 35% respectively. This discrepancy could be due to relatively small sample size, inclusion of only the medicine ICU patients and also due to the under reporting of cases. The reasons for under reporting are more likely due to lack of initiative, fear of personal liability etc. The higher incidence of ADRs was seen in female population (4.33%) compare to male population (2.61%) in our study, this is similar to the study conducted by *Camargo AL et al*[10] *(2006).* There are various reasons have been proposed to explain the higher incidence of ADRs in females like difference in pharmacodynamic response, difference in drug metabolism through CYP 3A4 whose activity is higher in females than males. *Camargo AL et al*[10] *(2006).* Female gender may have enhanced tissue sensitivity, lower weight, sex related differences in pharmacokinetic parameters and pharmacological, immunological and hormonal differences are also responsible for the higher incidences of ADRs.[15,16,17] In

the present study, the gastrointestinal system was commonest (35.21%) affected organ system, followed by Skin and mucous membrane (24.78%), this was similar to the study conducted by *Chatterjee S et al*[11] *(2006),* in which gastrointestinal system was the main organ system affected by the ADRs with the incidence of 31.63%, this result was also similar to the study conducted by *Kathiria J M et al*[12] *(2013),* in which gastrointestinal system was most commonly affected organ system (26.67%) followed by skin and mucous membrane (20%), central nervous system (15.56%) and the least affected organ system was respiratory system which having only 2.22% of incidence of ADRs. In our study the maximum reported ADR is nausea, vomiting and diarrhea (19.13%) followed by skin rashes and pruritus (12.60%). This result was dissimilar to the earlier study conducted by *Jose J et al*[7] *(2006),* in which the highest incidence of reported ADR was diarrhea (12.24%) and another study conducted by *Saravanan S et al*[13] *(2014),* in which diarrhea was the commonest (28.57%) reported ADR followed by skin rashes (14.28%). In our study the highest percentage (61.30%) of ADRs were reported with antimicrobials followed by NSAIDs (9.56%), and lowest (1.30%) with anti-histaminic and Inotropes, which was similar with the previous studies conducted by *Murphy BM et al*[9] *(1993); Arulmani R et al*[14] *(2008); Wester et al*[15] *(2007); Gour et al*[16] *(2008); Vora et al*[17] *(2011)* where most of the ADRs were associated with antimicrobials & NSAIDS. Various other studies[18,19] also supports the results of our study in which the maximally suspected ADRs were associated with the antibiotics. These findings probably indicate the pattern of drug usage in clinical practice.

REFERENCES

1. World Health Organization, 2005: 13.
2. Kane-Gill SL, Devlin JW. Adverse drug event reporting in intensive care units: a survey of current practices. The Annals of Pharmacotherapy, 2006 Jul-Aug; 40(7- 8): 1267-73.
3. Bates DW, Spell N, Cullen DJ, Burdick E, Laird N, Petersen LA, et al. The costs of adverse drug events in hospitalized patients. Adverse Drug Events Prevention Study Group. JAMA., 1997; 277: 307-11.
4. Bates DW, Miller EB, Cullen DJ, Burdick L, Williams L, Laird N, et al. Patient risk factors for adverse drug events in hospitalized patients. Arch Intern Med., 1999; 159: 2553-60.
5. Rabbour RSM, EmmertonL. An introduction to adverse drug reporting system in different countries, 2005; 13(1): 91-100.
6. Rahmawati F, Pramantara DP, Rohmah W, Sulaiman SA. Polypharmacy and unnecessary drug therapy on geriatric hospitalized patients in Yogyakarta hospitals, Indonesia. Int J Pharm Pharm Sci., 2009; (1, suppl 1): 6-11.
7. Jose J. and Rao P. G. M. Pattern of adverse drug reactions notified by spontaneous reporting in an Indian tertiary care teaching hospital. Pharmacological Research, 2006; 54(3): 226–233.
8. Lazarou J, Pomeranz BH and Corey PN. Incidence of Adverse Drug Reactions in Hospitalized Patients. A Meta analysis of Prospective Studies. Journal of American medical Association, 1998; 279(15): 1200-1205.
9. Murphy BM and FrigoLC. Development, Implementation and Results of a Successful Multidisciplinary Adverse Drug Reaction Reporting Program in a University Teaching Hospital., 1993; 28: 1199-1204.
10. Camargo A. L., Cardoso F., Maria B., and Heineck I. Adverse drug reactions: a cohort study in internal medicine units at a university hospital. European Journal of Clinical Pharmacology, 2006; 62(2): 143–149.
11. Chatterjee S, Ghosh AP, Barbhuiya J, Dey SK. Adverse cutaneous drug reactions: A one year survey at a dermatology outpatient clinic of a tertiary care hospital. Indian J Pharmacology, 2006; 38: 429-431.
12. Kathiria J.M., Sattigeri B.M., Desai P.M., Patel S.P. A study of adverse drug reactions in patients admitted to intensive care unit of a tertiary care teaching rural hospital, International Journal of Pharmacy and Pharmaceutical Sciences, 2013; 5(1): 160-3.
13. Saravanan S Selva, Kavitha P, Ponnuswamy T.K. Patterns of Adverse Drug Reactions in the Medical Intensive Care Unit of an Indian Tertiary Care Hospital, International Journal of Pharmaceutical & Biological Archives., 2014; 5(3): 64 – 68.
14. Arulmani R, Rajendran SD, Suresh B. Adverse drug reaction monitoring in a secondary care hospital in India. Br J Clin Pharmacol, 2008; 65: 210–216.
15. Wester K, Jonnson AK, Spigset O, Druid H, Hagg S. Incidence of fatal adverse drug reactions: a population based study. Br J Clin Pharmacol, 2007; 65(4): 573-579.
16. Gour AP, Desai SV. Adverse drug reactions (ADR) in the inpatients of medicine department of a rural tertiary care teaching hospital and influence of pharmacovigilance in reporting ADR. Indian J Pharmacol, 2008; 40(1): 37-40.
17. Vora MB, Trivedi HR, Shah BK, Tripathi CB. Adverse drug reaction in inpatient of internal medicine wards at a tertiary care hospital: a prospective cohort study. J Pharmacol Pharmacother, 2011; 2(1): 21-25.
18. Gurwitz J. H. and Field T. S. et al. Incidence and preventability of adverse drug events among older persons in the ambulatory setting. Journal of the American Medical Association, 2003; 289(9): 1107–1116.
19. Leape L. L., Brennan T. A., Laird N., and Lawthers A. G. et al. The nature of adverse events in hospitalized patients. New England Journal of Medicine, 1991; 324(6): 377–384.