WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.990
Volume 4, Issue 6, 2430-2439. Research Article ISSN 2277– 7105

# A PROSPECTIVE ANALYSIS OF ADVERSE DRUG REACTION IN GERIATRICS AT A TERTIARY LEVEL REFERRAL HOSPITAL IN KERALA.

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Article Received on
16 April 2015,

Revised on 10 May 2015,
Accepted on 02 June 2015

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## ABSTRACT

**BACKGROUND:** Adverse drug reactions (ADRs) are becoming a major health concern in elderly inpatients. Polypharmacy and physiological changes along with poor compliance contribute to increasing adverse events. **AIM:** (1) To study the prevalence of ADRs among elderly inpatients in various departments of a tertiary care hospital (2) To compare the risk factors, severity of adverse reactions and (3) To assess the barriers to ADR reporting. **MATERIALS AND METHODS:** A prospective study was conducted for ADRs among elderly inpatients admitted in various departments of a tertiary care hospital for a period of 10 months (October 2013–July 2014). **RESULTS:** A total of 27 Adverse Drug Reactions were reported showing an increased tendency of ADR as the age increases, with 44% of the ADR belonging to the age group of 70-79 years. Most of the ADRs were reported in males (77%) compared to females (22%). Of all the departments included in the study, General Medicine department reported 37% of the ADRs, followed by Gastroenterology(22%) and Pulmonology(18%). The drugs which caused most of the ADR include Metronidazole, Cefoperazone-Sulbactam, Phenytoin, Hydrocortisone and Ipratropium Bromide. Aspirin and Olmesartan caused other significant ADRs. Among the system wise classification gastrointestinal system showed the highest ADR (40%) followed by skin reactions (18%), Central Nervous System (11%) and Electrolyte imbalances (11%). According to Naranjo Causality Assessment, 51% of the ADRs were assessed as Possible and 48% as Probable. According to WHO-UMC Criteria, 29% of the ADRs were assessed as Severe, 40% as Moderate and 29% as Mild.

**CONCLUSION:** As the incidence ADRs in elderly inpatients is increasing adequate measures must be taken to monitor and report them. Awareness of all healthcare professionals must be assessed and measures to improve ADR reporting should be taken.

**KEYWORDS:** WHO-UMC Criteria, Gastroenterology(22%) and Pulmonology(18%).

## INTRODUCTION

Adverse drug reactions (ADRs) are becoming a major public health concern in elderly. Since the use of medication among the elderly population has increased tremendously over the last decade, there is an increased risk of potential harm, even when medications are prescribed at recommended doses. Polypharmacy and physiological changes affecting the pharmacokinetics and pharmacodynamics of many drugs or poor compliance due to cognitive impairment or depression also contribute to the increasing adverse events in elderly. Since adverse drug reaction (ADR) monitoring activity is in infancy in India, there is an increasing need to assess the pattern and occurrence of ADRs. Elderly patients appear to be at an increased risk of ADRs since this group is receiving several medicines.[4]

Various studies from around the world have shown a correlation between increasing age and adverse drug reaction (ADR) rate. More than 80% of ADRs occurring in hospital are type A (dose-related) in nature, and thus they are predictable from the known pharmacology of the drug and therefore potentially avoidable. The toxicity of some drug combinations may sometimes be synergistic and be greater than the sum of the risks of toxicity of either agent used alone and can cause serious adverse effects. In order to recognize and to prevent ADRs (including drug interactions), good communication is crucial and pharmacist has an important role in the prevention of adverse events. Prescribers should develop an effective therapeutic partnership with the patient and with fellow health professionals and participate in the reporting of adverse events. When adverse events do occur, health professionals need to be aware of their professional responsibility to report suspected adverse drug events (ADEs) and ADRs. 'Rational' or 'obligatory' polypharmacy is increasingly becoming a legitimate practice as increasing numbers of individuals live longer and the range of available therapeutic options for many medical conditions increases. The increasing comorbidities in elderly are also forcing healthcare professionals in obligatory polypharmacy. There is an increased risk of ADRs in this situation and should be considered in the context that dose-related failure of existing therapy to manage the condition adequately may be one of the most

important reasons for admission of the elderly to hospital. Thus, age itself should not be used as a reason for withholding adequate doses of effective therapies.[3]

Although the Indian elderly represent 12.8% of the entire global elderly population, data on prevalence and predictors of ADRs in elderly Indians is extremely limited. So it is necessary to determine the prevalence, severity and risk factors for ADRs in hospitalized Indian elderly.[8] The study was conducted to determine the pattern and extent of occurrence of ADRs in the hospital, to analyse barriers to the ADRs reporting behaviours in healthcare professionals (HCPs), to analyse the knowledge about ADRs in HCP and to analyse the barriers involved in under reporting of suspected ADRs.

**AIM**

(1) To study the prevalence of ADRs among elderly inpatients in various departments of a tertiary care hospital (2) To compare the risk factors, severity of adverse reactions and (3) To assess the barriers to ADR reporting.

**MATERIALS AND METHODS**

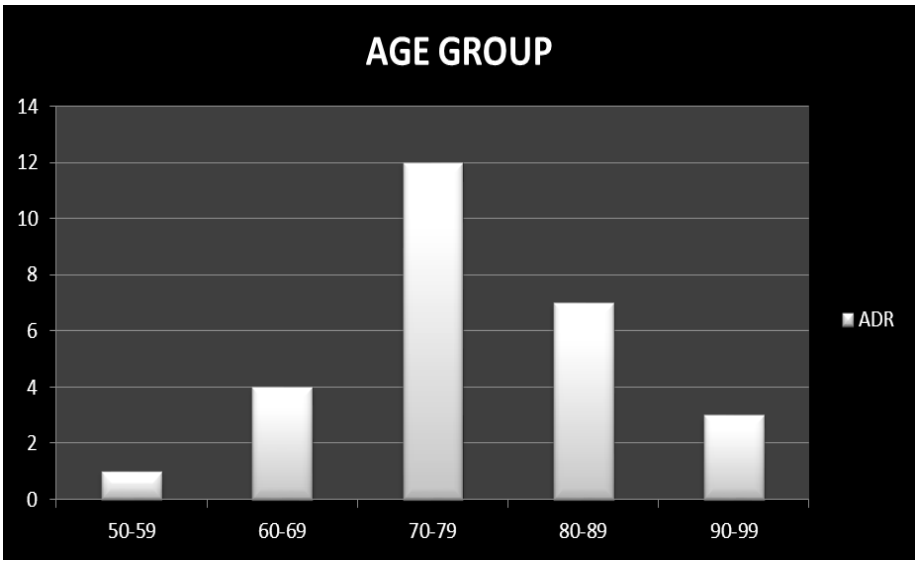
This prospective study was conducted from October 2013 to July 2014 in the General Medicine, Gastroenterology, Nephrology, Pulmonology, General Surgery and Cardiology departments of a tertiary care teaching hospital in Kerala. Patients of either sex aged ≥55years of age were included in the study.

The data were collected from the case records of the patients along with their medication interview. The demographic, clinical and treatment data were collected from the inpatient case records using ADR Reporting Form which included age, gender, complete diagnoses, comorbid factors, laboratory changes, and other relevant pre-existing illness. Data collected on adverse drug reactions included drugs received, nature of ADR, drugs implicated, reaction date, date of recovery, abation of reaction after stoppage of drug, reaction if re-introduced and seriousness of reaction. The details of drug causing ADR were also collected which include brand name, manufacturer, batch number, expiry date, dose, route and reason for use. All the elderly inpatients were screened during ward rounds for any adverse reactions. Case records of patients who experienced ADRs during their hospital stay, as well as of those who were hospitalized due to ADRs, were identified and reported. The assessment was done by WHO-UMC Causality Criteria.Causality of suspected ADRs were assessed and categorized

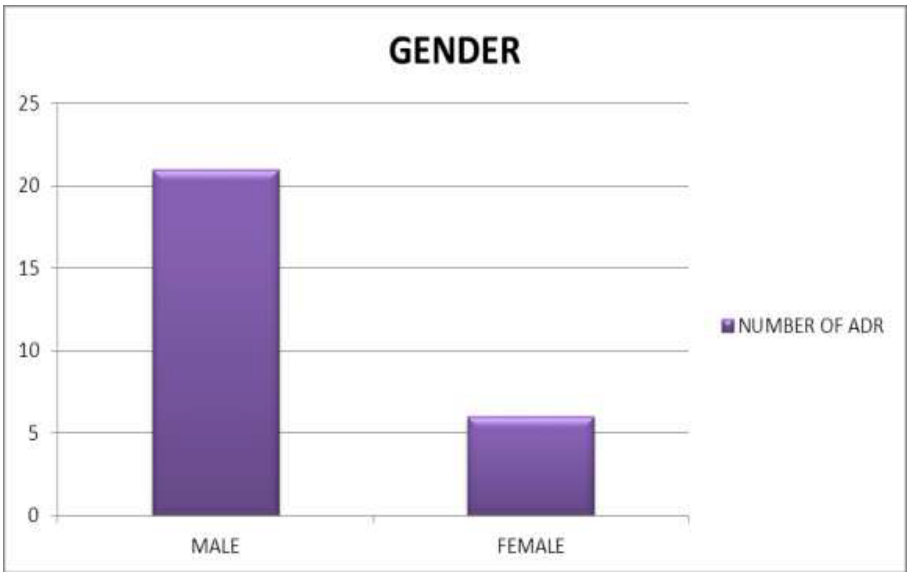
using WHO-UMC scale and Naranjo's algorithm along with organ system involved.The number of ADR in elderly and also with gender variations were also assessed.

**RESULTS**

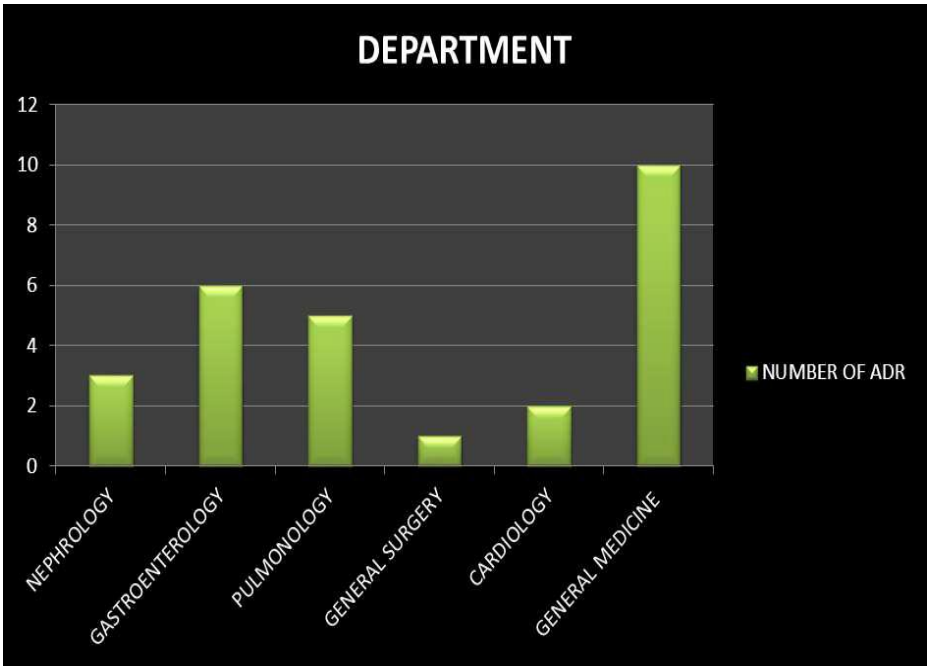
During the study period of 10 months(October 2013 to July 2014), a total of 27 Adverse Drug Reactions were reported in elderly from the various inpatient departments (General Medicine, Gastroenterology, Nephrology, Pulmonology, General Surgery and Cardiology) of the tertiary care hospital.




There is an increasing trend of ADR as the age increases up-to the age group 70 to79years where 44% of the ADR were seen and then there is a decline in this trend with 80-89 years age group showing 26% and 90-99 years age group showing only 11%.

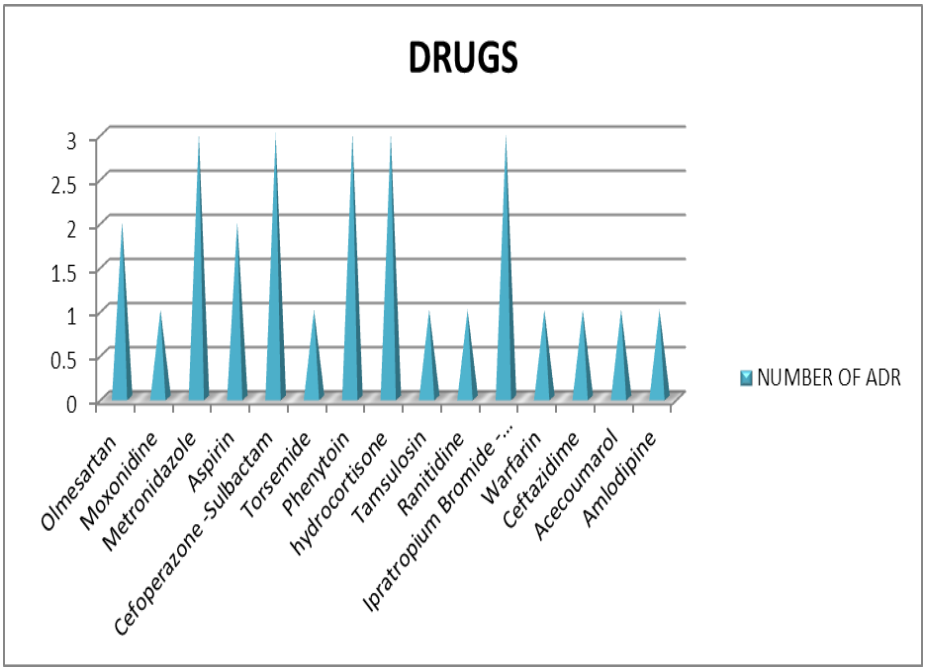



Most of the ADRs were reported in males (77%) compared to females (22%).

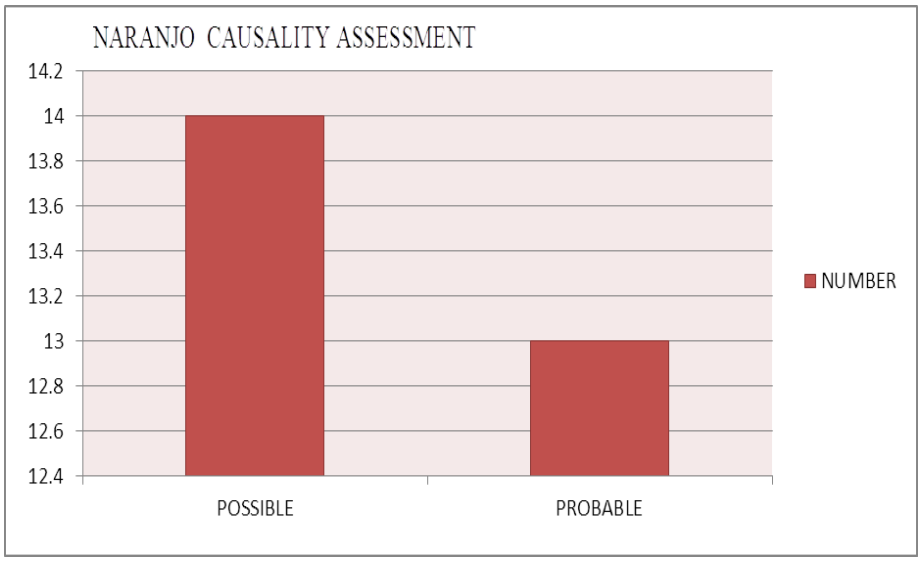



Of all the departments included in the study, General Medicine department reported 37% of the ADRs, followed by Gastroenterology (22%) and Pulmonology (18%).

The major ADRs included Gastro-intestinal system (40%), followed by skin reactions(18%), Central Nervous System (11%) and Electrolyte imbalances(11%).

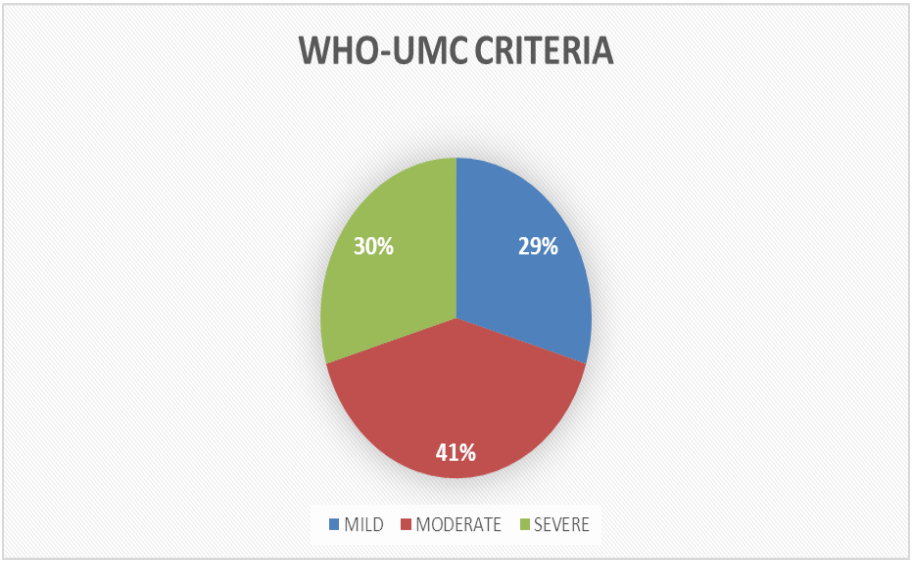



The drugs which caused most of the ADR include Metronidazole, Cefoperazone-Sulbactam, Phenytoin, Hydrocortisone and Ipratropium Bromide. Aspirin and Olmesartan caused other significant ADRs.




According to Naranjo Causality Assessment, 51% of the ADRs were assessed as Possible and 48% as Probable.

Definite ADR were not observed during the study period as drugs were not re-challenged to the same patient.




According to WHO-UMC Criteria, 29% of the ADRs were assessed as Severe, 40% as Moderate and 29% as Mild.

## DISCUSSION

The study was prospective observational in nature and was conducted among the elderly inpatients admitted in various departments (General Medicine, Gastroenterology, Nephrology, Pulmonology, General Surgery and Cardiology) of a tertiary care hospital. The

ADR were observed and identified during routine ward rounds and reviewing of patient records.

The study by Anita Conforti et al. showed a higher incidence of ADR among females which is in contrast with this study that showed an incidence of 77% ADR among males compared to 22% with females. The reason for higher incidence in males was due to the fact that most of the elderly patients admitted were males.

Age was an independent risk factor, as the age increased the incidence of ADR also increased which is in contrast to a study conducted by Min Zhang et al. that showed no effect on ADR with respect to age.[19] This disparity between studies were due to Polypharmacy, physiologic changes, pharmacokinetic and pharmacodynamic properties.

Most of the adverse reactions were moderate in intensity (49%) which is similar to a study conducted by Mandavi et al. having 16% of moderate reactions whereas a study conducted by Anita Conforti etal. showed that most of the adverse reactions were serious(53.5%) in nature.[1,17] This was due to the increased monitoring of medication in elderly.

Anti-infective like cefoperazone-sulbactam and metronidazole caused most of the adverse reactions which was similar to the study conducted by Julie Dupouyet al.[20] In another study conducted by Laxminarayana Kamath etal. insulin caused most of the ADR in elderly followed by salbutamol whereas in another study conducted by Mandavi etal. cardiovascular drugs was responsible for most of the ADRs(57.6%). [1,2] Opioids caused most of the ADR in a study conducted by Miller GC etal.[7] Anti-diabetic drugs caused most ADRs in another study by Abbas H Rupawala et al.[16] This may be due to the fact that majority of drugs used in the elderly patients were antibiotics. In a study conducted by A Harugeri et al. metabolic and nutritional disorders were mostly seen as compared to another study by Julie Dupouy et al.where the CNS abnormalities were seen. [8, 20] Both of these results are in total contrast with the study by Abbas H Rupawala et al. and the current study which are showing cardiovascular abnormalities and gastrointestinal abnormalities respectively as their major organ systems affected by ADR. [20] The major ADR seen were GI disturbances followed by skin reactions as they were easily identified and reported. Majority of the ADR was assessed as Possible (51%) during the study whereas in a study conducted by Mandavi et al. majority were found to probable (88.6%).[1]Since re-challenging is not done there were no certain ADR.

## CONCLUSION

Increased use of drugs by elderly increases the risk of adverse drug reactions causing increased morbidity and mortality. In addition, economic consequences of ADRs constitute a problem of considerable magnitude in developing countries like India which have rapidly aging population and the governments are seeking guidance in promoting healthy and active aging to reduce the economic burden caused. However, strategies to increase opportunities for identifying ADRs and related problems have not been emphasized in current policy responses in India to meet the increase in elderly population with chronic conditions. Also there is an increasing need of trained pharmacists with adequate knowledge and skills in the reporting of ADR. Increase in the number of diseases in the elderly will require more timely and accurate drug safety data and careful monitoring of treatment. Lack of adequate reporting of adverse drug reactions by healthcare professionals also cause an increased risk of ADR in elderly. Lack of adequate information about drug, lack of adequate time to explain the therapy by physician to patient due to increasing patient number along with non-compliance is increasing in elderly patients leading to the hike in adverse drug reactions.There is an increasing need of practising pharmacists in India for enabling more rational therapeutic decisions by individual clinicians and more optimal patient therapy. Given quantitative information on medication risks in elderly, clinicians may be able to reduce potentially harmful drugs in elderly thereby ensuring adequate quality of life in elderly patients. Adequate changes are requires in decision making by Government to study adverse drug reactions, and withdrawal of potentially harmful drugs from market.All healthcare professionals should be made aware of the adverse reaction reporting and its importance.All measures must be taken to reduce the length of stay and complications in elderly inpatients and ensure their improved quality of life as they form an important part of our community.

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