

A PROSPECTIVE OBSERVATIONAL STUDY ON THE EVALUATION OF INCIDENCE OF POLYPHARMACY AND CHANCES OF DRUG INTERACTIONS IN CRITICAL CARE UNIT OF A TERTIARY CARE HOSPITAL

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ABSTRACT

A common feature among individuals requiring CCU management include their complex pathophysiologic states and the use of a large number of pharmacologic agents in their management, many having narrow therapeutic index. CCU patients are particularly predisposed to the development of drug interactions, and this predisposition is complicated by disease severity and organ failure, both of which can change the pharmacologic response to medications. This study aims to find out Poly pharmacy, chances of DDI and potentially inappropriate drugs in elderly patients admitted in CCU of a tertiary care hospital. From the study we concluded that the prevalence of DDI in a geriatric population may be high because of poly pharmacy. Out of 863 medicines prescribed on admission, 428 potential drug– drug interactions were observed. To improve drug safety in this high risk population, rational prescribing is important.

KEYWORDS: Polypharmacy, drug interaction, critical care management.**INTRODUCTION**

“Drugs are Double Edged Weapons. Inappropriate prescription of drugs is the major problem of health care system. 111belowbelow.^[1] Many elderly patients have at least one reasonably detectable chronic illness, e.g. cardiac condition, diabetes, and so forth, that is the focal point of treatment, these results in poly pharmacy. European studies defined poly pharmacy according to the number of medications taken and World Health Organization defined Poly pharmacy as “Use of more medications than clinically necessary”^[2] The use of multiple medications increases the possibility of drug interaction and adverse reaction to drugs, poorer compliance, increased risk of hospitalization and medical error caused by drugs. Critical care unit (CCU) patients are especially at increased risk to the development of drug interactions and this condition complicated by disease severity and organ failure, both of which can alter the pharmacologic response to medications.^[2] Non-adherence with drugs in older adults has been associated with complicated medication regimens and poly pharmacy. Non-adherence rates in community dwelling elderly adults has been reported to be between 43-100%.^[3] This study was done to find out Poly pharmacy, chances of DDIs and potentially inappropriate drugs among elderly patients admitted in CCU of a tertiary care hospital.

MATERIALS AND METHODS

The study was prospective observational stud carried out in theCritical care unit of 350 bedded cosmopolitan hospital situated in Trivandrum and the study was carried out for a period of six months (December 2016 – May 2017).In-patients of the age > 65 years of both gender with co- morbidity admitted in CCU with complete medical records and willing to participate in the study were included in the study. Patient undergoing dialysis or surgical procedures were excluded. Data was collected through direct review of medical records of all patients and other relevant information are obtained by interviewing the bystander or patient admitted in CCU. Medical records of all admitted patients from the hospital were reviewed each day during the study period. Such review of case sheets were considered only once for each patient during one single admission. A total of 100 patient case sheets were collected within 6 months.

DISCUSSION

In this study majority of patients admitted in department of medicine are between age group 65-75 years. The mean number of drugs prescribed increased with age of patients which is similar to another study conducted by Baumgartner D^[4] and also similar to the study findings of KartikJanardan Salwe et al.^[5] More than half of the elderly patients received drugs between 5 to 9, Also we observed that more than 5 drugs were prescribed for 88% of patients.

Number of drugs prescribed to specific age group of elderly patients in CCU

Table 1. showing Number of drugs prescribed to specific age group of elderly patients in CCU.

Age group	Number of drugs prescribed (mean)
65-74	8.91
75-84	8.96
≥85	10.3

Our study results are similar to the study conducted by Ali A et al^[6], Schuler Jet al^[7], and kartikjanardansalwe et al.^[5] All of them observed poly pharmacy in more than 55% of admitted elderly. According to Kaufman the use of more than 5 drugs means Poly pharmacy.^[8] Poly pharmacy in our study observed was higher than that reported internationally.^[9,10] This study showed that Respiratory medicines were most commonly prescribed drugs in elderly patients and Levosulbutamol nebulization and ipratropium bromide nebulization being the most prescribed respiratory medicine. PPIs were second mostly prescribed drugs in CCU with pantoprazole being the commonest. Out of total 863 medicines prescribed on admission, 428 (49.59%) potential drug – drug interactions were observed. In another study in 2005, Nazari *et al.* evaluated the drug interactions in 567 ICU prescriptions and found 413 DDIs. There was a direct relationship between the number of drugs per prescription and the frequency of interactions.^[11] We found that Drug-related problems including DDIs are significant public health drug problems. There were an extraordinary number of potential drug-drug interactions observed in this study. The drug-drug interactions were found more when more drugs were prescribed to the elderly patients. In our study most common potential drugs interaction were of moderate grade (38%). Potentially severe drug interactions are (36%) of total potential drug-drug interactions.

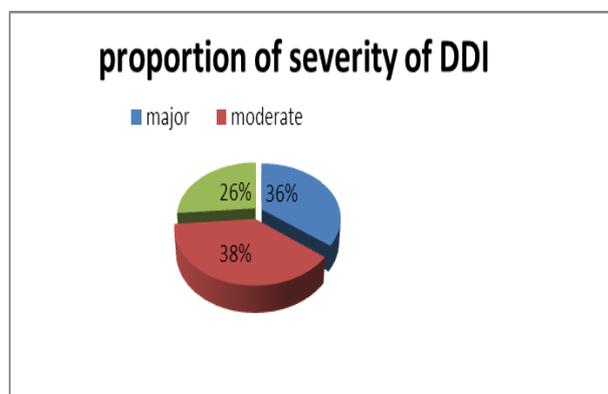


Figure 1: Showing Proportion of severity of potential drug interactions.

We found less potential drug-drug interactions when compared to study conducted by Björkman IK et al., in which there were drug interactions in 46% of patients.^[12] But study conducted by Gosney M et al., showed

potential drug-drug interactions in 33% of all prescriptions in admitted elderly patients.^[13] In variety of studies different computerized drug-drug interaction programmes were used to find out drug interactions. Studies assessing actual drug interactions i.e. with an adverse patient outcome from as a result of drug interaction should be separated from those looking at potential drug-drug interactions.^[14] Generally the prevalence of clinically relevant drug interactions is about 6% in patients taking two to four medications, 50% in those taking five and almost 100% in those taking 10 medications. So in our study we observed no potential drug-drug interaction inpatients taking less than 5 and observed potential drug-drug interaction in patients prescribed with more than five drugs.

Beers criteria are a frequently used method for evaluating appropriateness of prescribing in elderly. It was developed in 1999 & recently updated by American geriatric society in 2012.^[15] The most common potential inappropriate medications used were Levetiracetam and Quetiapine. Insulin also comes under potential inappropriate medicines but if it is prescribed in Sliding scale. Similarly for Zolpidem, clonazepam, amioderon intervention or close monitoring might be required. Increased number of medications' use may point to the likelihood of exposure to potential inappropriate medicines, it may not necessarily reflect the irrational use of medicines as in few patients it may be appropriate to use more number of medications. The commonest drug causing drug interaction was found to be clarithromycin, frusemide and aspirin with 10%, 9% and 9% frequency respectively.

This study provides data to assess the prevalence of Poly pharmacy, potentially dangerous drug-drug interactions and potentially inappropriate medicines among elderly patients. Poly pharmacy is unavoidable as elderly patients usually suffer from many chronic diseases which demand use of multiple drugs resulting in complex regimen. Clinicians remember common drug-drug interactions but it is impracticable for clinicians to remember all the drug- drug interactions and their clinical significance. Though clinician may give such prescriptions by weighing benefits verses adverse effects of drug-drug interactions. It warrants time to time updates on such medications. To reduce burden of drug-drug interactions due to poly pharmacy, educational programmes should be taken but it may require a considerable amount of time and close monitoring. Additionally, pitfalls may be encountered if a provider attempts to make multiple changes to a regimen at a single point in time.^[16] Therefore, a more rational approach to drug discontinuation might involve tapering a single drug at a time with careful monitoring for symptoms of withdrawal and disease exacerbation.^[17] As a general rule, healthcare providers should minimize the number of medications prescribed for older adults, keep the dosing schedule as simple as possible, and limit the frequent number of medication changes. This must be

followed by periodic review at specific intervals. Today, most of the hospitals are well connected with information technology. Possibility of dangerous drug-drug interactions can be reduced with the help of regularly updated or online Computer- assisted drug-drug interaction checker software. There is need of increase in awareness of potentially inappropriate medication for elderly patients as listed in the Beers criteria. Harmonizing drug policy and regulatory measures with respect to potentially inappropriate medication use should be a major focus e.g., withdraw harmful medications, establish prescribing limits for the elderly, and approve safer alternatives.^[18] Raising physician's awareness and steps to sensitize higher authorities regarding Poly pharmacy and dangerous drug interactions may help to curb irrational prescriptions and ensure safety of the Elderly.

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