

POLYPHARMACY AND DRUG-DRUG INTERACTIONS AMONG ELDERLY IN A TERTIARY CARE HOSPITAL

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Article Received on
13 July 2019,
Revised on 02 August 2019,
Accepted on 23 August 2019
DOI: 10.20959/wjpr201910-15483

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ABSTRACT

Polypharmacy is the concurrent use of multiple medications by a patient. A drug-drug interaction (DDI) is defined as a decrease or increase in the clinical effect of a given drug due to interference by another drug, food, herbs, formulation excipients, containers, or environmental factors (such as tobacco). Polypharmacy being most common cause of initiation of DDIs and hence wide range of drugs have been prescribed to the patients that has become major reason why patients who need intensive care are always more prone to develop several drug- drug interactions. The study aim to evaluate polypharmacy and drug-drug interaction among elderly in the general medicine department of a tertiary care hospital. A prospective cross

sectional study was carried out in General medicine department from February 2018 to August 2018, to elderly patients. A total of 137 elderly patients in general medicine department were enrolled in the study, prescriptions were analyzed for drug-drug interactions and Polypharmacy. Micromedex (version no: 1.61.4b4035) was used to check the drug-drug interactions. The number of drug interactions were propotional to number of drugs prescribed ie as the number of drug increases then number of interactions also increases. The study reveals that nearly two-third of elderly patients are exposed to atleast one DDIs. Identifying and preventing potentially harmful DDIs is a critical component of a pharmacist's mission. To improve drug safety in elderly patients appropriate prescribing is very important.

KEYWORDS: Drug-Drug interaction, Polypharmacy, Elderly patients.

INTRODUCTION

Ageing, one of the most complex biological phenomena, is a multifaceted process in which several physiological changes occur at both the tissue and the whole-organism level, occurring in cascade, especially post-reproduction. Age related chronic diseases such as dyslipidaemia, hypertension, diabetes, and depression usually require the use of multiple drugs, a state known as polypharmacy. This refers to the use of multiple medications and/ or more medications than clinically indicated. It is estimated that more than 40% of adults aged 65 or older use 5 or more medications, and 12% use 10 or more different medications. However, the magnitude of the problem among older adults is still scarcely known in most countries.^[1]

Polypharmacy, defined by the World Health Organisation as "the administration of many drugs at the same time or the administration of an excessive number of drugs" is frequent among the elderly as they often suffer from chronic diseases with concomitant pathologies.

In an ageing society such as ours, polypharmacy is a major public health issue in terms of quality and efficiency of care and health expenditures. It is thus essential to examine the definitions and measurement of polypharmacy.

The scenario above highlights that population ageing is a global phenomenon and the practice of polypharmacy is dangerous for patients, in particular for older adults, because favours the emergence of drug-drug interactions (DDI), adverse drug reactions (ADR), side effects, longer hospital stays, iatrogenic disease and may also lead to complications that induce the patient's death.^[1] Medication errors and increased risk of hospitalization leading to the increase of the cost to manage the same and the quality of life of the patients which is an important fact.^[2]

In order to design feasible preventive strategies, it is imperative first to determine the magnitude of the problem and the common drugs implicated in clinically significant DDIs in our context. Because the clinical conditions and types of drugs we use may vary from developed countries it will not be appropriate to extrapolate findings of developed nations to our set up.^[3] Thus, this study aimed to assess polypharmacy and drug interaction in elderly patients of tertiary teaching care hospital.

MATERIALS AND METHODOLOGY

Materials

- Self designed data entry form
- Micromedex(version no.1.61.4b4035)

Study site

The proposed study is conducted in general medicine department of Iqraa International hospital and Research Centre, Calicut. It is a 350 bedded hospital providing tertiary level multi-super specialty care service.

Study design

Prospective cross sectional study using patient data form for a period of 6 months among patients admitted in general medicine department.

Duration of study

6 months (February2018 — August 2018).

Study population

Both male and female patients above 60 years of age and taking 5 or more drugs admitted in general medicine department at IQRAA International Hospital and Research Centre, Calicut.

Sample size

137 patients admitted in general medicine department.

SELECTION CRITERIA

Inclusion Criteria

- Both male and female patients above 60 years of age admitted in general medicine department.
- Taking 5 or more drugs.

Exclusion criteria

- Emergency and intensive care unit patients.
- Death of patient before being discharged.
- Outpatients and referred patients
- Patients who don't cooperate to give the informed consent.

Study procedure

A prospective observational study of 6 months duration (2018 January to June) was carried out in the Iqraa International Hospital and Research Center, Calicut. Ethical approval for conducting the study was obtained from the Ethics Committee of Iqraa hospital. Patients who are satisfying the study criteria are enrolled in the study. Patient prescriptions are analyzed for drug-drug interaction using Micromedex.

Statistical analysis

Data collected from the study was tabulated in Microsoft Excel 2013 and were keyed into the Statistical Package for Social Sciences computer software version 17.0 (SPSS) for windows and analyzed by appropriate statistical methods.

RESULTS

A total of 610 patients above 60 years of age were admitted in the general medicine department during the study period, from that 137 patients were included in the study based on the study criteria, i.e. patients with 5 or more drugs. The enrolled patient's prescription was analysed and checked for drug-drug interaction using micromedex.

Table no. 1 shows that out of 137 patients enrolled in the study 76 (55.5%) were in the age group between 60-69 years. Table no.2 shows predominance of male patients with 78 (57%) and 59(43%) females.

Table 1: Categorization of study population based on age.

Age	Frequency	Percent
60-69	76	55.5
70-79	44	32.1
80-89	17	12.4
Total	137	100

Table 2: Categorization of study population based on gender.

Gender	Frequency	Percent
female	59	43
male	78	57
Total	137	100

Fig no.1 shows that the minimum number of hospital stay is 2 days and maximum number of days in hospital is 10. Fig no.2 shows that patients are mostly diagnosed with cardiovascular diseases.

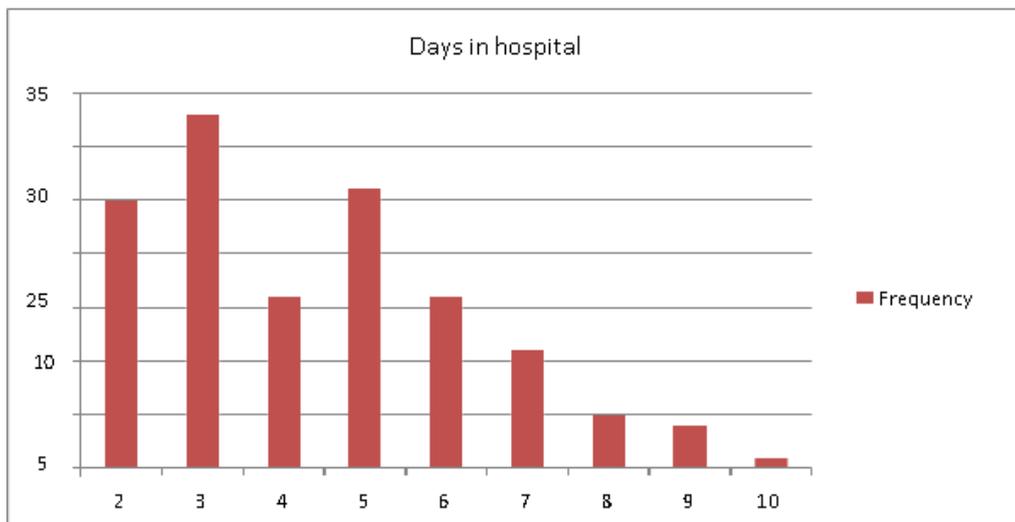


Figure 1: Number of days in hospital.

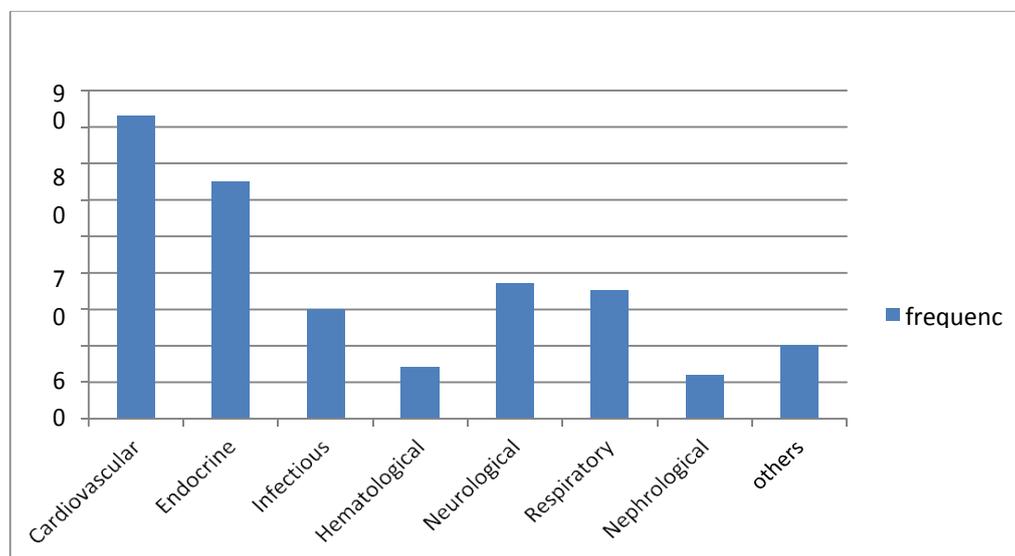


Figure 2: Frequency of most diagnosed disease categories.

Fig no.3 shows that 5 drugs were mostly prescribed for 27 patients. Average number of drugs prescribed per prescription=8.38. Mean number of drugs prescribed to age group between 60-69 is 7.72, 70-79 is 8.51 and 80-89 is 8.89. 5 drugs prescribed for 17 males and 10 females. 6 drugs prescribed for 14 males and 10 females. 7 drugs prescribed for 7 males and 9 females. 8 drugs prescribed for 6 males and 7 females. 9 drugs prescribed for 4 males and 8 females. 10 drugs prescribed for 9 males and 6 females. 11 drugs prescribed for 4 males and 4 females. 12 drugs prescribed for 5 males and 3 females. 13 drugs prescribed for 4 males and 1 female. 15 drugs prescribed for 3 males and 1 female. 1 drugs prescribed for 2 males. 18 drugs prescribed for 2 males and 19 drugs prescribed for 1 male patient.

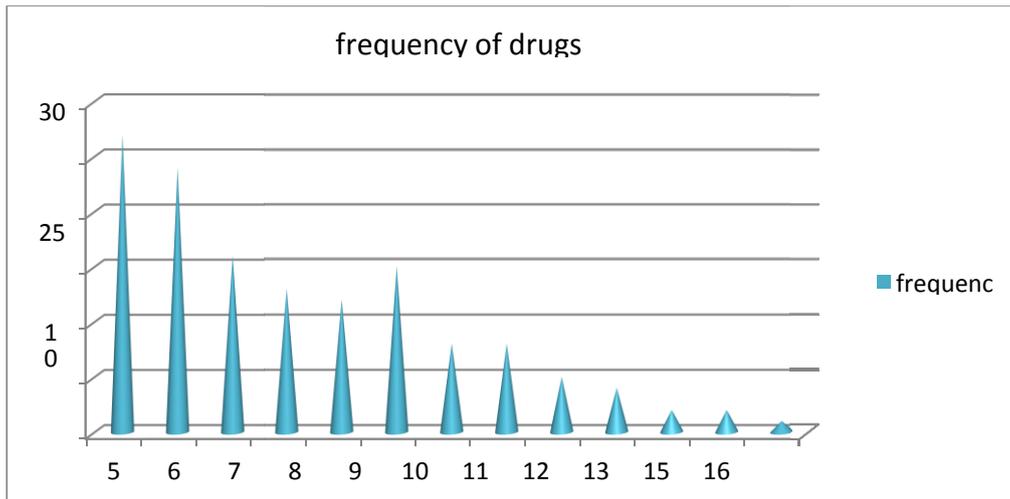


Figure 3: Frequency of drugs prescribed.

Fig no.4 shows that the mostly prescribed class of drug is cardiovascular drugs(189). A linear relationship between number of drugs and number of days in hospital. ie number of drugs increases with number of days in hospital was found. Figure no.5 shows that 68% of total patients have atleast one drug- drug interaction and 32% do not have any drug- drug interactions. 44 patients do not have any drug interaction, 21 patients have 1 interaction,20 patients have 2 interactions, 14 patients have 3 interactions, 18 patientshave 4 interactions,7 patients have 5 interactions, 4 patients have 6 interactions,4patients have 7 interactions,3 patients have 8 interactions, 1 patient have 9 interactions and 1 patient have 10 drug –drug interaction. There is a linear relationship between number of drugs and number of drug-drug interactions ie as number of drugs increases number of interactions also increases.

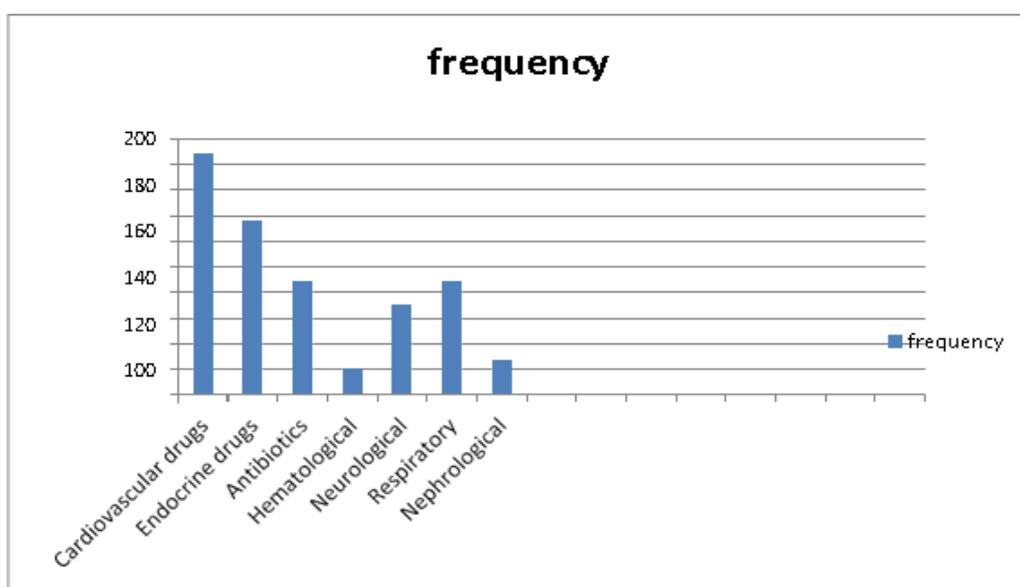


Figure 4: Frequency of drugs prescribed.

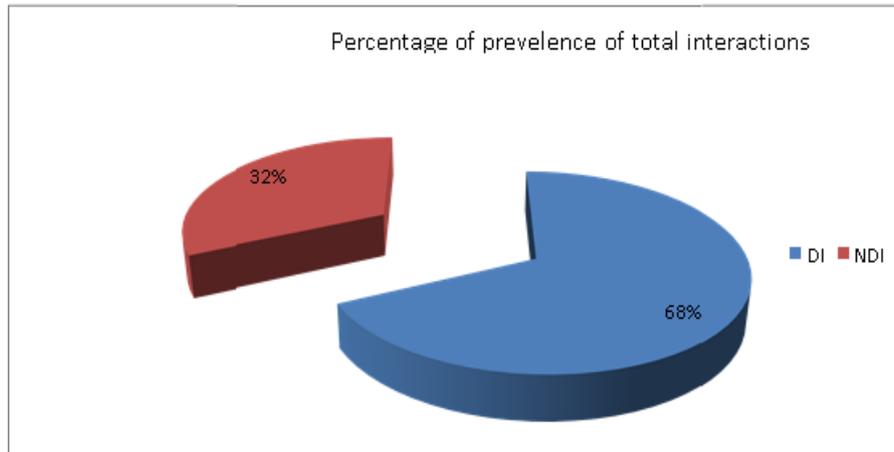


Figure no. 5: Total drug-drug interactions.

Fig no. 6 shows that 49.8% of interactions are major, 41.6% are moderate and 8% minor. fig no.7 shows that aspirin–clopidogrel is the most seen interaction in 21 patients.

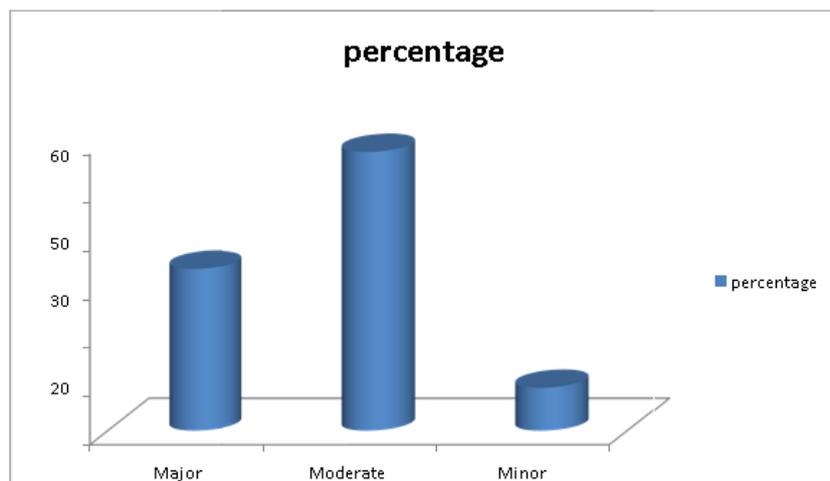


Figure 6: Severity of drug-drug interactions.

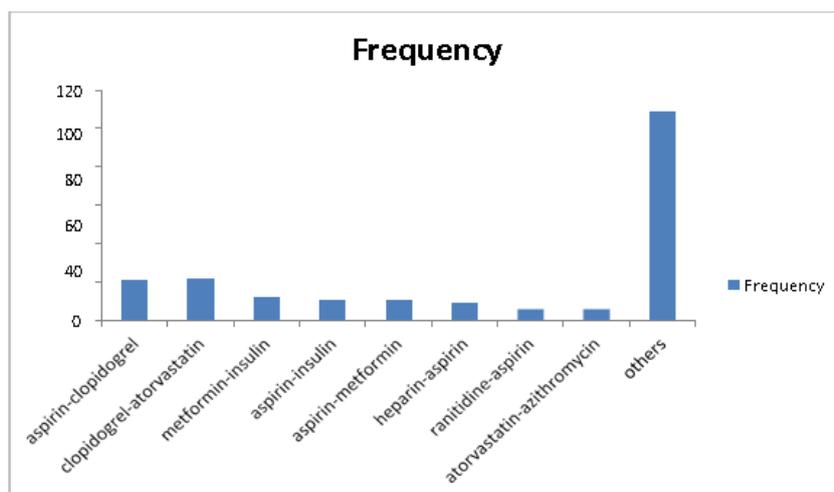


Figure. 7: Most seen interactions.

DISCUSSION

The present study aimed to evaluate polypharmacy and drug-drug interaction among elderly patients. The demographic data of 137 patients admitted to general medicine department was analysed for drug-drug interaction. The study revealed that most number of patients comes in the age between 60-70 years of age, which was similar to that of study conducted by Abraham Mary Anju *et.al*, another study conducted by Teshegar Akililu Yesuf *et.al* reported more number of patients in the age group between 46-65 years of age.

Out of 137 patients 78 were males and 57 were females ie males predominates females, which is similar to the study conducted by Karthik Janardan Salwa *et.al*, another study conducted by Darren Dookeeram *et.al* was in contrast with the present study ie, in that female patients predominate male patients.

The present study showed a linear relationship between number of drugs and length of hospital stay with a p value(0.307) which is similar to that of study conducted by Fanteya Teka *et.al*, in that study also researches found linear relationship between number of drugs and length of hospital stay with a p value (0.168).

The present study found that cardiovascular diseases as the most diagnosed disease category followed by endocrine diseases. The study conducted by Fanteya Teka *et.al* found cardiovascular diseases followed by infectious disease as the most diagnosed disease category. Another study conducted by Javedh Shareef *et.al* found endocrine disease followed by infectious disease as the most diagnosed disease category.

The present study found 8.28 as the mean number of drug per prescription. The study conducted by Kumara Swamy RC *et.al* found 5.95 as the mean number of drug per prescription. Another study conducted by Vijayasree Thyagaraj *et.al* found 6.23as the mean number of drug per prescription.

The present study found cardiovascular drug followed by endocrine drugs as the most prescribed drug category. The study conducted by Venkateshwramurthy nallaswamy *et.al* found cardiovascular followed by respiratory drugs as the most prescribed drug category. In a study conducted by Narmeen Nabeel aber elsoud he found neurological drugs as most prescribed drug category.

The prevalence of total drug-drug interaction was 68% in the present study. The study conducted by kumaraswamy et.al found 54.46% as the prevalence of drug interaction. Another study conducted by Nimmy N John et.al found 58.5% as prevalence of drug interaction.

In the study conducted by Teshegar akilu yesuf et.al the researchers found moderate drug interaction as the common drug interaction (53.7%). The study conducted by Kousalya kaliamoorthy et.al found moderate drug interaction as the common drug interaction(75.6%). In the present study also, moderate drug interaction was the most seen drug interaction(57.7%).

In a study conducted by Javedh Shareef et.al, the researchers found 1 interaction in 12 patients and more than 10 interactions in 44 patients. In the present study 1 interaction were found in 21 patients and 10 interactions in 1 patient.

Fanteya Teka et.al found that as number of drug increases then number of interactions also increases, which is similar to that of present study. Zeru Gebretsadik et.al also found the same relationship ie, when number of drug increases then number of interactions also increases.

In this present study, aspirin-clopidogrel was the most seen drug-drug interaction. The study conducted by Nermeen nabeel Abuelsoud found that metronidazole-simvastatin was the most seen drug-drug interaction, where as ciprofloxacin-azithromycin was the most seen drug-drug interaction in the study conducted by Inamdar sz et.al.

CONCLUSION

The findings of present study reveals that nearly two-third of the study population are exposed to at least one DDIs. ie elderly patients on five or more medications need close monitoring. The unwanted loading of drugs to be avoided for elderly patients. Identifying and preventing potentially harmful DDIs is a critical component of a pharmacist's mission and the clinical pharmacist must remain vigilant in monitoring potential DDIs and making appropriate dosage or therapy adjustments.

ACKNOWLEDGEMENT

We would like to extend our deep sense of gratitude to Dr. Shamsudheen MBBS, DNB IQRAA International Hospital and research centre, who has shared his precious time, deep

knowledge and extreme patience with this work, which have been contributed to the successful completion of this thesis work.

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