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Study of Effects, Advantages and Disadvantages of Poly Pharmacy in Elderly Patients in a Teaching Hospital of Southeast Asia

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Abstract

Objective: This study was performed to assess and establish prevalence of polypharmacy in geriatric population, to identify adverse drug reactions due to polypharmacy and to investigate whether polypharmacy is an indicator for occurrence of unnecessary drug therapy. *Materials and Methods:* This prospective observational study was carried out in the General Medicine department of a tertiary care hospital, demographic data, medical and medication history were collected from patient's case sheets. Then collected information was analysed according to their age, gender and therapeutic category. Beers criteria is used to identify potentially inappropriate medications and Causality assessment of all Adverse drug reactions was done by using Naranjo ADR scale. Unnecessary drug therapy classified into No medical indication, No drug therapy was more recommended and duplicate therapy. Basic statistic tools were used to analysis the data with help of Graph Pad Prism software, values were expressed as actual numbers and percentage *Results:* Our study results showed that out of 100 patients included in the study, 66% of them were females and 34% were males and 30% of the patients received more than ten drugs.

Distribution of drugs associated with unnecessary drug therapy-belong to gastrointestinal, cardiovascular system and respiratory system accounting for 64% of total medication Most common adverse drug reactions are confusion, constipation, palpitations, tremors and abdominal pain. Drug classes most commonly implicated in adverse drug reactions are sedatives, anticholinergic, opioids, antihypertensive drugs and respiratory system drugs Potentially harmful drugs recognised in this study according to Beers criteria are Amiptrytiline, dicyclomine, Danazol, Nandrolone and Aceclofenac. *Conclusion:* As polypharmacy increases the risk of ADRs and inappropriate medication use in elderly, efforts should be made to improve the prescribing practices and health care professionals should be aware of the risks and fully evaluate all medications at each patient visit to prevent polypharmacy from occurring.

Keywords: Polypharmacy; Beers Criteria; Adverse Drug Reactions; Unnecessary Drug Therapy.

Introduction

The term poly pharmacy refers to use of multiple medications, typically five or more Recently, it has been used to describe use of inappropriate medications or more medications than clinically indicated [1]. Prevalence of inappropriate medication use in the elderly ranges from 11.5%–62.5% [2].

Consequences of polypharmacy include adverse drug reactions and interactions, non-adherence, increased risk of cognitive impairment, impaired balance and falls, and increased risk of morbidity, hospitalization, and mortality [3-8].

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As people age, they develop more chronic conditions, often resulting in more medications, prescribers are often reluctant to change drugs other prescribers have started, and may have difficulty in recognizing medication side effects, thus increasing the risk of prescribing cascades (new medications added to manage side effects) [9].

With advancing age, progressive functional decline in organ systems leads to changes in the way medications are handled and expressed. As little pharmacokinetic data are available for the elderly, we must make assumptions about what drugs might be affected. Altered concentrations of neurotransmitters and receptors, as well as altered receptor binding properties and responsiveness, are thought to contribute to pharmacodynamics changes resulting in exaggerated drug effects [10-12].

In addition to these effects, polypharmacy can result in a greater demand for care, an increase in the number of hospital admissions, and higher costs for the health system [13]. It can also affect the quality of a prescribed drug treatment when it is combined with self-medication, which is common among the elderly [1].

A number of factors have been associated with polypharmacy among elderly, such as female gender, having a poor self-perception of health, belonging to a more advanced age group, having a low level of schooling and the presence of chronic diseases. Added to this is ease of obtaining medicines in pharmacies without prescriptions, which increases exposure of elderly to excessive drug use and unnecessaryfinancial expense [3,4,5,14].

Elderly are underrepresented in drug trials, yet they are greatestconsumers of medications [15,16,17,18] therefore, despite wealth ofguidelines available for chronic disease states, few specifically address how to approach the very old or frail elderly [19,20]. Adhering to guidelines often results in the addition of medications without considering remaining life expectancy, goals of care, and time to potential benefit of medications [21].

One of simplest ways to address polypharmacy is to use screening criteria to help identify potentially inappropriate medications (PIMs) in the elderly: medications with no clear evidence-based indications; medications that carry a substantially higher risk of adverse effects; or medications that are not cost- effective. Two commonly used screening Tools are Beers and STOPP criteria, which differ slightly in content and sensitivity for detecting drug-related problems [22,23].

Common geriatric presentations that can caused by drugs: Falls, Cognitiveimpairment, Incontinence, constipation, delirium, diarrhoea, Gastrointestinal bleeding.

Objective

This study was performed to asses and establishprevalence of polypharmacy in geriatric population, to identify adverse drug reactions occurring as a result of polypharmacyand to investigate whether polypharmacy is a suitable indicator for occurrence of unnecessary drug therapy in a hospital setting.

Materials and Methods

This prospectivenon-interventional observational study was carried outin OPD of General Medicine department of Govt. General Hospital, Kakinada. Research protocol was approved by Institutional Human Ethical Committee and informed consent was obtained from patients. Demographic data, medical and medication history were collected from patient's case sheets. Then collected information was analysed according to their age, gender and therapeutic category. Study is completed over a period of 6 months from July 2015 to December 2015.

Inclusion Criteria

1. Patients ≥ 60 years.
2. Elderly patients who are on and more than 5 drugs.

Exclusion Criteria

1. Patients less than 60 years
2. Elderly patients who are on <5 drugs.

Out of 100 selected geriatric patients, 66% were women and 34% are men andout of 100 patients, 90 members reported symptoms related to adverse drug reaction due to multiple medications Beers criteria is used to identify potentially inappropriate medications and Causality assessment of all Adverse drug reactions was done by using Naranjo ADR scale.

Beers Criteria

1. Medications to avoid regardless of diseases or conditions.
2. Medications considered inappropriate when used in patients with certain diseases or syndromes
3. Medications to be used with caution.

Unnecessary drug therapy classified intoNo medical indication, No drug therapy was more recommended and duplicate therapy

The basic statistic tools were used to analysis the data with help of Graph Pad Prism software, values were expressed as actual numbers and percentage

Results

Out of 100 selected geriatric patients, 66% were women and 34% are men and majority of patient's ages were between 60-80 years. Our study showed a total of 700 drugs were prescribed for geriatric patients, with range 5-15 drugs. There were 30 patients in total who were receiving more than 10 medication (Table 1-7).

Table 1: Number of drugs prescribed per day

Number of medications used per day	Number of patients
5-7	30
7-9	20
9-10	20
>10	30

Table 2: Types of unnecessary drug therapy

Unnecessary drug therapy	Number	Percentage
No medical indication	89	76
No drug therapy was more recommended	5	4.3
Duplicate therapy	23	19.7
Total	117	100

Table 3: Distribution of medication associated with unnecessary drug therapy

Class of medication	Number	Percentage
Gastrointestinal system	38	31.6
Cardiovascular system	22	18.3
Respiratory system	18	15
Vitamins and minerals	4	3.3
Endocrine system	10	8.3
Neuromuscular system	8	6.6
Antibiotics	16	13.3
Corticosteroids	3	2.5
Nutrition	1	0.83
Total	120	100

Table 4: Most commonly prescribed drugs

Name of the drug	Number of patients
Aspirin	50
Amlodipine	30
Atorvastatin	50
Pantoprazole	48
Theophylline	20
Alprazolam	30
Hyoscine butyl bromide	20
Nitrates-Isosorbide mononitrate	30
ACE inhibitors- Enalapril	40
Sulfonyl ureas-Glibenclamide	30
Furosemide	20

Table 5: Incidence of adverse drug reactions and drugs implicated

Adverse drug reaction	Number of patients reported	Drugs implicated
Confusion	40	Alprazolam,Hyoscine,Nitrates, Amitriptyline, sulfonylureas
Constipation	40	Tramadol,Amlodipine Calcium supplements
Abdominal pain	10	Iron preparations
Palpitations	20	Theophylline
Cough	8	Angiotensin converting enzyme inhibitors
Tremors	10	Theophylline
Incontinence	8	Diuretics

Table 6: Drugs class responsible for adverse drug reactions

Symptoms or signs	Class of drugs implicated
Confusion	Sedatives, Anticholinergics, Antihypertensives, antidepressants, antidiabetics
Constipation	Opioids, Calcium channel blockers, Calcium supplements
Palpitations	Drugs affecting respiratory system
Diarrhoea	Antibiotics, Proton pump inhibitors, SSRIs
Incontinence	Alpha-blockers, diuretics

Table 7: Potentially harmful drugs based on Beer's criteria

Name of the drug	Number of patients receiving
Amitriptyline	10
Dicyclomine	5
Danazol	3
Nandrolone	2
Aceclofenac	8

Discussion

Due the fact that people are living longer, elderly population, often suffers from multiple chronic diseases requiring multiple medications,these patients are much more likely to experience poly pharmacy and its negative consequences, especially adverse drug reactions (ADRs) [24-28].

Polypharmacy is overlooked because symptoms it causes can be confused with symptoms of normal aging or another disease,resulting in still more drugs prescribed to tracenew symptoms [29, 30].

Our study results showed that out of 100 patients included in the study, 66% of them were females and 34% were males and 30% of the patients received more than ten drugs.

Most common drugs prescribed belong to cardiovascular system, Gastrointestinal and respiratory system and those are Aspirin, Atorvastatin, Pantoprazole and Theophylline.

Distribution of drugs associated with unnecessary drug therapy-belong to gastrointestinal, cardio-vascular system and respiratory system accounting for 64% of total medication Majority cost of unnecessary drug therapy was antibiotics, drugs of cardiovascular and gastrointestinal system. This study showed that unnecessary drug therapy occurred in 65 cases (65%) with total 120 events of unnecessary drug therapies.

Most common adverse drug reactions are confusion, constipation, palpitations, tremors and abdominal pain.

Drug classes most commonly implicated in adverse drug reactions are sedatives, anticholinergic, opioids, antihypertensive drugs and respiratory system drugs Potentially harmful drugs recognised in this study according to Beers criteria are Amiptrytiline, dicyclomine, Danazol, Nandrolone and Aceclofenac The finding of our research indicates high prevalence of poly pharmacy in elderly patients and incidence of adverse drug reactions is more with multiple medicationsand risks of having unnecessary drug therapy increases with each additional drug supplied.

Similar research, Larson found the potential of ADRs occurrence equal 6% among patient who got two kinds of drug, 50% among the patient accepting five kinds of drug and 100% at the patient accepting eight or more kinds of drug [31].

Limitations

Short period of 6 months might be a limitation to this study, another major limitation of this study

is its inability to evaluate association between various comorbidities and poly pharmacy and factors associated with poly pharmacy.

Conclusion

Polypharmacy is a widespread problem, and physician, clinical pharmacists, and patients are all responsible, patients may contribute to the problem by self-medicating, failing to follow prescribed directions and failing to report all medications used.

As polypharmacy increases risk of ADRs and inappropriate medication use in elderly, efforts should be made to improve prescribing practices and health care professionals should be aware of risks and fully evaluate all medications at each patient visit to prevent polypharmacy from occurring.

Conflict of Interest: Nil

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