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Original Work

Study of polypharmacy and associated problems among elderly patients

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ABSTRACT: The study aims at the assessment of prescribing pattern for elderly patients, since they are more prone to prescription of multiple medications. The prescription of multiple medications leads to polypharmacy, more adverse drug reactions and non-adherence to treatment. The study was conducted on OPD basis in a rural health centre for a period of six months. Information pertaining to the age, sex, religion, monthly income, education level, any previous illnesses, or any chronic diseases, any drug treatment, adherence to the treatment, and self medication or non-allopathic treatment was collected. The study included 310 elderly patients, among which 51.9% were males and 48.1% were females. The prevalence of polypharmacy was 25.20%, more among elderly men (26.10%) than women (24.20%), the odds ratio (OR) was 1.11. The major fraction 35.81% of the patients was in the age group of 60-64 years. Only 59.3% were literate. 64.41% belonged to lower socioeconomic status. The cardiovascular diseases 139 (44.83 %) followed by arthritis 121 (39.03%), and diabetes 58 (18.71%) were the most common ailments. Anti-hypertensive drugs were prescribed in 26.13%, analgesics/antipyretics in 19.68%, and anti-diabetic drugs in 18.71%. Non-adherence to therapy was seen in 49.68%. Self medication habits were seen in 23.90% patients, who most commonly used analgesics/antipyretics and antacids/anti-ulcer drugs. Polypharmacy is very common among elderly and interventions to improve the optimal use of medication in elderly could lead to reduction in the problems associated with polypharmacy.

KEY WORDS: *Non-adherence; Polypharmacy; Self medication*

INTRODUCTION

In India, life expectancy has steadily gone up from 32 years at the time of independence to over 63 years in 2001. In 2011 life expectancy has reached 66.8 years, in males it is 65.77 years and 67.95 years in females. There is no United Nations standard numerical criterion, but the UN agreed cut-off is 60+ years when referring to the elderly population[1]. In India, the elderly (above 60 years) account for 7% of the total population. According to Census 2011, 5.5% of the India population is above 65 years of age. By 2020, 10.4% of population amounting to 142 million people 60 years or older will be living in India[2]. A number of

factors are believed to increase the risk of drug related problems in the elderly, including medication errors, inappropriate use of medications, polypharmacy, non-adherence to therapy and self medication[3]. The term "Polypharmacy" is appropriately defined as the use of multiple medications and/or the administration of more medications than are clinically indicated, representing unnecessary drug use[4]. The most common results of polypharmacy are increased adverse drug reactions, drug-drug interactions and higher costs[5]. Polypharmacy is most common in the elderly but is also widespread in the general population[6]. Patients at greatest risk of polypharmacy consequences include the elderly, psychiatric patients, patients taking five or more drugs concurrently, those with multiple physicians and pharmacies, recently hospitalized patients, individuals with concurrent comorbidities[7], low educational level[8], and those with impaired vision or dexterity. The study was primarily targeted at

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the elderly because, as a group they take more drugs than their younger counterparts and are known to be at risk of the side effects of many of the drugs they consume because of age-associated physiologic changes that may cause reduction in functional reserve capacity (i.e. the ability to respond to physiologic challenges or stress). These physiological changes with age have important practical implications for the clinical management of elderly patients: drug metabolism is altered, changes in response to commonly used drugs make different drug dosages necessary and there is need for rational preventive programs of diet and exercise in an effort to delay or reverse some of these changes[9].

METHODOLOGY

The study was done on OPD basis and patients above the age of 60yrs attending the rural health centre OPD run by Rohilkhand medical college & Hospital, Bareilly, Uttar Pradesh during a five month period from 1Aug 2008 to 31Jan 2009 were registered under the study. The research protocol was approved by institutional ethical committee and informed consent obtained from each subject prior to inclusion in the study. The information was collected regarding- the age, sex, religion, monthly income, education level, any previous illnesses, or any chronic diseases, any drug treatment, adherence to the treatment, and self medication or treatment in any other system of medicine (like

Homeopathy, Ayurveda, Unani, naturopathy). The socioeconomic status was assessed using Modified Prasad's socioeconomic classification. Modified Prasad's classification (1997) divides the population in to five classes based on per capita monthly income: class 1-1900 and above, 2 - 950 to 1899, 3 -570 to 949, 4 -285 to 569, 5 -284 and below.

RESULTS

The study included 310 elderly patients, among which 161 (51.9%) were males and 149 (48.1%) were females. The prevalence of polypharmacy was 25.20%, more among the elderly men (26.10%) than women (24.20%). Out of 161 males and 149 females, polypharmacy was noticed in 42 males and 36 females (odds ratio [OR] 1.11).

The Socio-demographic characteristics of the study population was collected and compiled in **Table 1**. Table 1 show that a major fraction (35.81%) of the patients were in the age group of 60-64 years old, while only 14.84 % of the patients were above 75 years of age. Males were in higher proportion in the study. 59.3% Literacy rate was found in the study population of patients. A majority of study population 64.41% belonged to lower socioeconomic status (Class 4 & 5) and 25.80% to middle class 3. Most of the study population were Hindus (210, 67.74%) followed by Muslims (71, 22.90%).

Table 1. Socio-demographic characteristics

Variables	Male (n=161)	Female (n=149)	Total (n=310)
Age (yrs)			
60-64	58 (36.02%)	53 (35.57%)	111 (35.81%)
65-69	45 (27.95%)	49 (32.88%)	94 (30.32%)
70-74	32 (19.87%)	27 (18.12%)	59 (19.03%)
>75	26 (16.15%)	20 (13.42%)	46 (14.84%)
Education			
Illiterate	46 (28.57%)	80 (53.69%)	126 (40.64%)
Literate	115 (71.43%)	69 (46.31%)	184 (59.35 %)
Socio-economic status			
Class 1	6 (3.73%)	3 (2.01%)	9 (2.90%)
Class 2	9 (5.59%))	12 (8.05%)	21 (6.80%)
Class 3	46 (28.57%)	34 (22.82%)	80 (25.80%)
Class 4	92 (57.14%)	79 (53.02%)	171 (55.16%)
Class 5	8 (4.97%)	21 (14.01%))	29 (9.35%)

This study showed that cardiovascular diseases 139 (44.83 %) followed by arthritis 121 (39.03%), and diabetes 58 (18.71%) were the most common diseases in elderly. (**Table 2**) In cardiovascular diseases we included hypertension, angina, Ischemic Heart Diseases and stroke. In respiratory diseases, we included asthma, COPD and tuberculosis. The most commonly prescribed medications on chronic basis in elderly patients were anti-hypertensives in 81(26.13%), NSAIDs in 61 (19.68%), anti-diabetic in 51 (18.71%), and anti-platelets in 53(17.10%) patients (**Table 3**).

36

Table 2: Disease pattern of elderly

Disease	Male (n=161)	Female (n=149)	Total (n=310)
Cardiovascular diseases	83	56	139 (44.84%)
Diabetes	31	27	58 (18.71%)
Respiratory diseases	26	28	54 (17.42%)
Cataract	43	37	80 (25.81%)
Arthritis	69	52	121(39.03%)
Piles	23	9	32(10.32%)
Benign prostrate hypertrophy	32	00	32(10.32%)
Hearing loss	29	11	40(12.90%)
Neurological disorders	17	14	31(10.0%)

Table 3: Drug utilization pattern in elderly

Drug group	Male (n=161)	Female (n=149)	Total (n=310)
Anti-hypertensives	52	39	81(26.13%)
Anti-platelets	30	23	53(17.10%)
Anti-anginal	11	4	15(4.84%)
Hypolipidemics	9	5	14(4.52%)
Anti-diabetic	31	27	58 (18.71%)
NSAIDs	32	29	61 (19.68%)
Bronchodilators	13	15	28(9.0%)
Anti-tubercular	9	5	14(4.52%)
Anti-depressants	12	11	23(7.42%)
Anti-parkinsonism	5	3	8(2.58%)
Steroids	16	17	31(10.0%)

Out of 310 patients only 156 were regularly taking the medications and were adherent to the treatment, rest 154 (49.68%) were non-adherent to one or more medications prescribed to them. The reasons for non-adherence were:
- Poor economic status 112 (71.80%)
- Illiteracy 64 (41.03%)
- Lack of proper care at home 46 (29.48%)
- Forgetfulness 29 (18.83%)
- Poor drug supply 43 (27.56%)
- Adverse drug reactions 42 (26.92%)
- Unable to swallow medication 19 (12.18%)

The incidence of self medication in our study was 23.90% (74). Eighty-nine percent of the respondents used analgesics/antipyretics, Antacids/anti-ulcer drugs were used in 71.62% patients, followed by Expectorants/cough suppressants in 40.54%, Iron-multivitamins in 43.24%, Ayurvedic medicines in 25.70% and Homeopathic drugs in 17.6% (**Table 4**).

Table 4. Self medications in elderly patients

Drug Category	Male(n=41)	Female(n=32)	Total=74
Analgesics/Antipyretics	39	27	66(89.20%)
Antacids/Antiulcer	31	22	53(71.62%)
Expectorants/cough suppressants	17	13	30(40.54%)
Iron-Multivitamin	11	21	32(43.24%)
Ayurvedic medicines	12	7	19(25.70%)
Homeopathy medicines	10	3	13(17.60%)

DISCUSSION

The term "Polypharmacy" is appropriately defined as the use of multiple medications and/or the administration of more medications than are clinically indicated, representing unnecessary drug use[3]. It is defined as concomitant use of five or more drugs and it could enhance drug interactions and drug related problems [10]. The prevalence of potential drug-drug interactions increases in a linear mode with increasing age and with the number of drugs prescribed[11]. Polypharmacy is very commonly seen among ICU treated patients as it is difficult to treat patients in the ICU with multiple co-morbidities with less number of drugs as they require drugs for treatment of specific condition as well as for prophylaxis, but it is also essential to keep a balance between the number of drugs and effective pharmacotherapy[12]. In our study 310 elderly patients (above 60yrs age) were included, among which 161 (51.9%) were males and 149 (48.1%) were females. The polypharmacy was more among the elderly men than women, it was noticed in 42 males and 36 females (odds ratio [OR] 1.11). In a similar study, the prevalence of polypharmacy in patients over 65 years-old was 33.77%[13]. This study showed that cardiovascular diseases 139 (44.83 %) followed by arthritis 121 (39.03%), diabetes 58 (18.71%) were the most common diseases in elderly. The most commonly prescribed medications on chronic basis in elderly patients were anti-hypertensive drugs in 81 (26.13%), NSAIDs in 61 (19.68%), anti-diabetic in 51 (18.71%), and anti-platelets in 53(17.10%). In a similar study, cardiovascular drugs, anti-rheumatics, and analgesics were the most frequently consumed therapeutic classes[14]. Out of 310 patients only 156 were regularly taking the medications and were adherent to the treatment, the other 154 (49.68%) showed non-compliance to the treatment. The most common associated factors for non-compliance were poor economic status (71.8%) followed by illiteracy (41%). The percentage of non-compliance in our study was comparable to other similar studies[15]. The compliance was noted to be on higher side when pharmacist provided the prescribed drug and counseled the patient at home[15]. Literacy rate in India in 2011 is 74.04%. In India, among elderly people literacy rate ranges from 80% to 38% in different studies[16,17]. Our study showed that 41.7% of respondents were illiterate. It was observed in this study that illiteracy is higher among females (53.69%) than males (28.57%). The disparity in literacy status may be attributed to the fact that educating females in those days was not considered as important as establishing a marriage at an early age. The incidence of self medication in our study was 23.90% (74). Previous Over-the-Counter (OTC) medicine use studies indicate that about 50% of adults over 65 regularly use OTC pain relievers and vitamins, 23% regularly use antacids, and 10% regularly use cold remedies or antihistamines[18]. In another study, 59.3% reported taking something for pain over the month preceding the survey. Of these, 49.5% reported taking an OTC NSAID pain reliever (e.g. aspirin, ibuprofen, Motrin, Advil, Excedrin, etc.) and 39.4% reported taking acetaminophen (e.g. generics or Tylenol) most often for pain[19].

Polypharmacy in the elderly should be addressed emphatically as it leads to associated problems of non-adherence and self medication, apart from causing adverse drug reactions, drug interaction and increased cost of therapy.In one study on polypharmacy, the clinical pharmacist performed the drug therapy reviews and taught the patients about drug safety and polypharmacy. They also colloborated with the physicians and patients to correct polypharmacy problems. Similar programs are likely to reduce the potentially deleterious consequences of polypharmacy. Such programs hinge upon patients and doctors informing pharmacists of other medications being prescribed, as well as herbal, over-the-counter substances and

38

supplements that occasionally interfere with prescription-only medication[20].

CONCLUSION

Results of the study revealed that polypharmacy is a significant issue and little research has been conducted regarding the methods primary care providers utilize to assess polypharmacy. Interventions to improve the optimal use of medication will need to target policy, patients and physicians. Better information needs to be provided to physicians and patients about the risks and benefits of drug therapy, and the problems of patient compliance and inappropriate and unnecessary prescribing need to be addressed.

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