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Screening of prescriptions in geriatric population in a tertiary care teaching hospital in north India

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Abstract

The objective of our study was to assess the pattern of prescribing prescriptions and cost analysis among the geriatric patients attending the Medicine Outpatient Department of NIMS Medical College and Hospital, Jaipur. After taking permission from the Institutional Ethical Committee, prescriptions of 235 geriatric patients attending the medicine outpatient department of NIMS Medical College and Hospital, Jaipur, were noted and demographic profile, commonly prescribed drugs as per Anatomical Therapeutic Chemical Classification (ATC) and WHO core indicators were assessed after taking written informed consent from the patients. Out of 235 patients, 130(55.31%) were males and 105(44.68%) were females and most of the patients were in the age group of 81-85 for males 65-70 for females. Maximum number of patients were having cardiovascular diseases (n=196) followed by respiratory disorders (n=172) and musculoskeletal diseases (n=153). 89 patients (38%) were having three comorbid conditions. Average number of drugs per prescription was 5.51(1296/235). Drugs on WHO EML were 546 while on NLEM was 779. Drugs prescribed by generic names were 31.94%, is less than that prescribed by their brand names 68.05%. Average cost per prescription was INR 18.75 per day. Drugs prescribed as fixed dose combinations were 324. Drugs acting on cardiovascular system (n=356) were the most commonly used drugs in our study followed by antibiotics (n=127) and bronchodilators (n=126). Thus irrational prescribing and polypharmacy were prevalent among elderly.

Keywords: Drug utilization studies, Geriatric pharmacology, ATC code, Rational prescription, Beer's criteria.

Introduction

Drug utilization study is of utmost importance in the elderly. According to WHO, Drug utilization research was defined as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences.^{1, 2} The consumption of drug amongst elderly segment of society is maximum and many of them use at least three prescribed drugs concurrently.³⁻⁵ One of the plausible explanation of usage of large number of medicines is prevalence of multimorbidities as well as suffer from chronic and degenerative pathology⁶ amongst them along with the alteration of pharmacokinetics and pharmacodynamics of many drugs are altered with advanced age.⁷ Previous studies have revealed that because of exclusion of frail elderly from clinical trials, the knowledge about the efficacy and safety of many drugs is often sparse.^{6, 7} It is evident from epidemiological studies that the elderly population is increasing rapidly

still rational prescribing of medicines in elderly continues to present a major challenge.⁸ Inappropriate prescribing or use trends are common in elderly and to prevent this many guidelines and criteria like Beer's criteria have been used but still there is a need of improvement in this field.⁹

Till date there is a paucity of research work in prescribing pattern in elderly and our study with special emphasis on gerontopharmacological data have tried to fill this gap.

The objective of present study was to evaluate the drug utilization pattern and cost analysis among geriatric patients. The study has described the sociodemographic characteristics of the elderly, morbidity pattern, associated comorbidities, commonly prescribed medications according to the WHO-ATC/DDD classification and rationality of the prescription.

Materials and methods

A prospective, observational, cross sectional study was done among the geriatric patients attending the Medicine Outpatient Department of NIMS Medical College and Hospital, Jaipu. The study was conducted after getting approval from the institutional ethical committee and written informed consent from the patients. The study was done for a period of six months from June 2013 to December 2013 in NIMS Hospital.

Inclusion criteria:

Geriatric patients attending Medicine OPD of NIMS Medical College were included.

Exclusion criteria:

Paediatric age group patients, adults and pregnant females were excluded from the study.

Statistical analysis

The data was subjected to descriptive analysis using Microsoft Excel. Drugs were classified according to the WHO ATC classification and verified by WHO EML (Essential Medicine List) as well as NLEM (National List of Essential Medicines) 2011. Different parameters were given as percentage.

Results and discussion

Total number prescriptions of geriatric patients attending the Medicine Outpatient Department of NIMS Medical College and Hospital, Jaipur, were noted during study period and different data were used to assess sociodemographic profile, commonly prescribed drugs as per Anatomical Therapeutic Chemical Classification (ATC) and WHO core indicator, most commonly used drugs, comorbid conditions & average cost per prescription.

Prescription records of 235 patients were analysed. Out of 235 patients, 130 (55.31%) were males and 105 (44.68%) were females. Most of the patients were in the age group of 81-85 for males 65-70 for females as depicted in figure-1.

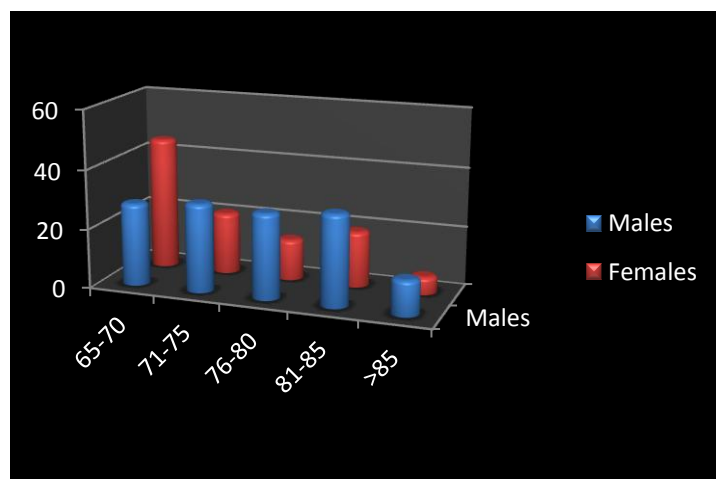


Figure 1: Age Distribution of Patients

In our study male preponderance was seen which is in accordance with previous studies on geriatric patients.^{14, 17, 23} which is in sharp contradiction to few other studies.^{9, 15, 16, 18, 20, 22} where number of females is more than males.

Overall, maximum number 73 (31.06%) of patients were in the age group of 61-70. In a study done by Torres Faggiani F et al 2007 amongst elderly living in Brazil, the age varied between 60- 88. Equal distribution in age group 65-69 and 70-74, was also reported in one study done in Mangalore.²³

A detail about sociodemographic characteristics of patients has been described in table-1.

Table-1: Sociodemographic data of the geriatric patients

Sociodemographic parameters	Characteristic group	Number of Males patients	Number of Females patients	Total
Age	61-70	28(21.53%)	45(42.85%)	73(31.06%)
	71-75	30(23.07%)	21(20%)	51(21.70%)
	76-80	29(22.30%)	14(13.33%)	43(18.29%)
	81-85	31(23.84%)	19(18.09%)	50(21.27%)
	>85	12(9.23%)	6(5.71%)	18(7.66%)
Literacy	Illiterate	10(7.69%)	21(20%)	31(13.19%)
	Upto 10 th	12(9.23%)	44(41.90%)	56(23.83%)
	Upto 12 th	45(34.61%)	30(28.57%)	75(31.91%)
	Graduation	61(46.92%)	7(6.66%)	68(28.93%)
	Postgraduation	2(1.53%)	3(2.85%)	5(2.12%)
Socioeconomic status	Lower middle class	40(30.76%)	45(42.85%)	85(36.17%)
	Middle class	59(45.38%)	36(34.28%)	95(40.42%)
	Upper middle class	31(23.84%)	24(22.85%)	55(23.40%)
Employment	Working	29(22.30%)	11(10.4%)	40(17.02%)
	Not working	101(77.69%)	94(89.52%)	195(82.97%)
Status of living	Living alone	97(74.61%)	76(72.38%)	173(73.61%)
	Living with family	33(25.38%)	29(27.61%)	62(26.38%)

Majority of patients 75(31.91%) had their education till 12th while 31(13.19%) patients were illiterate. Maximum number of patients 95 (40.42%) belonged to middle class socioeconomic background and 195 (82.97 %) of patients were unemployed. Only 62 (26.38%) patients were living in family while 173 (73.61%) patients were living alone.

When the morbidity pattern was studied, it was found that maximum number of patients were having cardiovascular diseases (n=196) followed by respiratory disorders (n=172) and musculoskeletal diseases (n=153). Details have been depicted in figure-2.

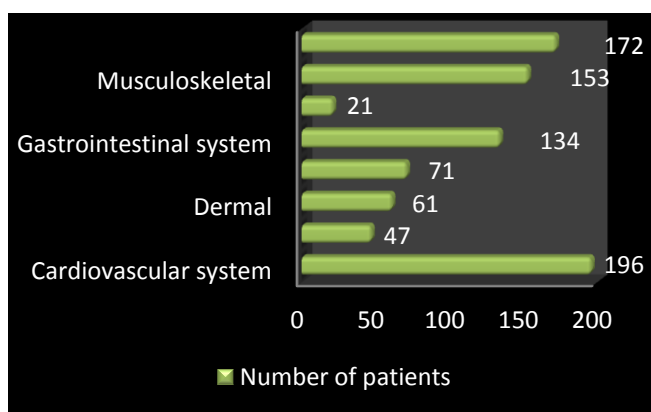


Figure 2: morbidity pattern among geriatric patients

The morbidity pattern same as found by Shah R B et al 2012 and other studies.^{8, 9, 14, 19, 20} One of the plausible reason might be sedentary habits in elderly with age-related deranged heart function and altered lipid profile.

89 patients (38%) were having three comorbid condition together while 86 (37%) patients had two diseases.6% patients had more than three diseased condition as depicted in figure-3.

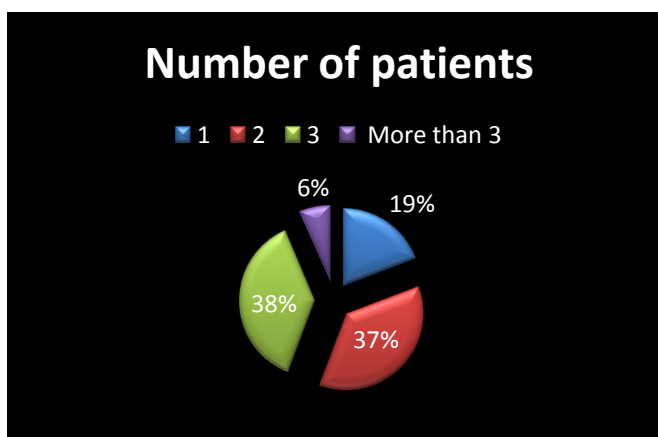


Figure 3: Comorbid conditions in geriatric patients

Total 235 prescriptions were studied and WHO core indicators were assessed as explained in table-2.

Surprisingly drugs acting on cardiovascular system (n=356) were the most commonly used drugs in our study followed by antibiotics (n=127) and bronchodilators (n=126) which has been shown in figure-4.

We could compare this result with previous geriatric studies.^{9, 22} Similar findings are reported by Rathnaker et al 2010.²³

Taufik G Momin et al 2013 reported²⁰ aspirin as the most commonly prescribed drug in elderly which is similar to one Nigerian study¹⁸ whereas Zaveri et al 2010 reported⁸ Atenolol as the most frequently used drug, being prescribed to 26.53% of patients followed by paracetamol (21.86%), aspirin (19.41%), and Vitamin B complex (12.53%). In a study done among elderly attending cardiology clinic, antiplatelets were the most commonly prescribed drug.²³ Major drugs according to WHO- ATC classification^{10, 24} of each class as found in our study has been explained with the help of table -3.

Average number of drugs per prescription is an important index and should be kept as low as possible.²¹ Average number of drugs per prescription as we found was 5.51(1296/235) which shows polypharmacy while it was 3.8 in one study done in Brazil²² which is almost equal to a study done in Nigeria¹⁸ (3.9) whereas it was found to be 4.53 in another study²³ which was less than that observed in our study. Polypharmacy was also resulted in similar studies done previously in geriatric set up.^{9, 14, 22, 23} The reason for that is coexistence of more than one comorbid conditions in geriatric patients. This can lead to multiple drug-drug interactions and serious adverse effects.²³ surprisingly 31% of patients was taking homeopathic treatment while 16% of patients were consuming Ayurvedic treatment along with allopathic treatment. Drugs on WHO EML¹¹ were 546 while on NLEM¹² was 779. This high prevalence of NLEM drugs was also reported by Rathnaker et al 2010.²³ But Uchenna IH Eze et al 2010 reported 95.4% of drugs from Nigeria's Essential Medicine List. Drugs prescribed as fixed dose combinations were 324.⁸ Total encounters having injectable formulation were 194.

We found that, drugs prescribed by generic names were 31.94% is less than that prescribed by their brand names 68.05% which is in accordance with other geriatric studies.¹⁴ Generic drugs should be promoted in the prescription by all doctors in present Indian scenario. Incomplete address were found in 15/235 (6.38 %) prescriptions. 8/235 (3.40 %) prescriptions were found with incomplete diagnosis. 5 out of 235 prescriptions (2.12 %) were found incomplete without signature of the doctor while 19/235 (8.08 %) prescriptions were found without proper dose and duration of the doctor. Average cost per prescription was INR 18.75 per day.

Table-2: Elaborates WHO core indicators

Core indicators	Result
Total number of drugs	1296
Number of drugs per prescription	5.51(1296/235)
Drugs on WHO EML	546
Drugs on NLEM 2011	779
Drugs prescribed as fixed dose combinations	324/1296(25%)
Total encounters having injectable formulation	194/1296(14.96%)
Drugs prescribed by generic name	414/1296(31.94%)
Drugs prescribed by brand name	882/1296(68.05%)

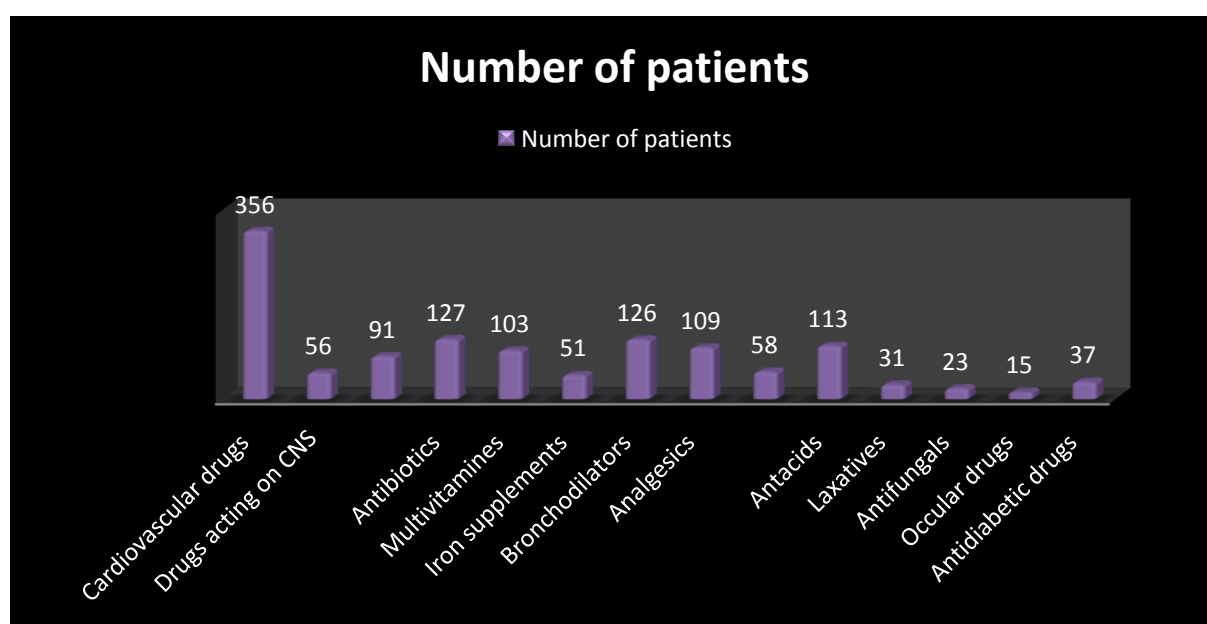


Figure 4: Consumption of drugs amongst geriatric patients

Table 3: Drugs used in detail according to WHO- ATC classification

S. NO.	DRUG CLASS	DRUG- NAME	ATC –CODE	DOSAGE FORM
•	Cardiovascular drugs	Amlodipine	CO8CA01	Oral
		Chlorthalidone	C03BA04	Oral
		Atorvastatin	C10AA05	Oral
		Carvedilol	C07AG02	Oral
		Enalapril	C09AA02	Oral , parenteral
•	Drugs acting on CNS	Alprazolam	N05BA12	Oral
		Fluoxetine	N06AB03	Oral
		Sertraline	N06AB06	Oral

•	Drugs used for musculoskeletal disorders	Calcium (different salts in combinations)	A12AA20	Oral	
		Calcium + vit D ₃	A11JB	Oral	
		Chondriotin sulphate	M09AX02	Oral	
		Collagen combinations	D11AX57	Oral	
•	Antibiotics	Ceftriaxone	J01DA13	Parenteral	
		Cefoperazone and sulbactam	J01DD62	Parenteral	
		Cefuroxime and tazobactam	J01RA03	Parenteral	
		Amoxicillin and enzyme inhibitor	J01CRO2	Oral	
		Metronidazole	J01XD01	Parenteral	
		Levofloxacin	J01MA12	Oral, parenteral	
		Amikacin	J01GB06	Parenteral	
•	Multivitamin	Multivitamins and other minerals including combinations	A11AA03	Oral	
•	Iron preparation	Iron various combinations	B03AE10	Oral	
•	Bronchodilators	Adrenergic and anti cholinergic	R03AL	Inhal. Solution	
		Salmeterol and other anti- asthmatics	R03AK06	Inhal. Aerosol powder	
		Salbutamol	R03AC02	Inhal. Solution	
		Formeterol	R03AC13	Inhal. Aerosol powder	
		Theophylline	R03DA04	Oral, parenteral, rectal	
•	Analgesics	Paracetamol combinations	N02DE51	Oral	
		Paracetamol	N02DE01	Oral	
		Diclofenac combinations	M01AB55	Oral	
•	Cough and cold preparations (R05)	Codeine combinations	N02AA59	Oral	
		Bromhexine	R05CB02	Oral	
		Dextrometharphan	R05DA09	Oral	
•	Antacid	Proton pump inhibitor			
		Pantoprazole	A02BC02	Oral	
		Rabeprazole	A02BC04	Oral	
		H ₂ antagonists	Ranitidine	A02BA02	Oral, parenteral
		Others	Sucralfate	AO2BX02	Oral

		Aluminium hydroxide	A02AB01	Oral
•	Laxative	Liquid paraffin	A06AA01	Oral
•	Antifungals	Clotrimazole	C03BA04	Topical
		Amphotericin	A07AA07	Oral
		Antifungals dermatological combinations	D01AA20	Topical
•	Ocular	Artificial tears and other combinations	S01XA20	Topical
		Ciprofloxacin	S01AX13	Topical
		Clobetasone and antiinfectives	S01CA11	Topical
•	Antidiabetic drugs	Metformin	A10BA02	Oral
		Glimepiride	A10BB12	Oral
		Sitagliptin	A10BH01	Oral
		Insulin long acting	A10AE30	Parenteral
		Insulin (human)	A10AE01	Parenteral
		Insulin lispro	A10AB04	Parenteral

Irrational prescribing and polypharmacy are prevalent among elderly and to prevent this specific gerontopharmacological education is needed to be inculcated in medical students. There is a scarcity of data on vulnerability of elderly towards different disease conditions and drug related problems. Our results might not be concluding because of less number of patients but to the best of author's knowledge, it is definitely going to throw light on geriatric pharmacology shadowed by inappropriate drugs amongst elderly. Our study is definitely going to be an eye-opener in making prescription rational and cost effective.

Conflicts of Interest

The authors declare that they have no competing interests.

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