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RESEARCH ARTICLE

A STUDY ON RATIONAL DRUG PRESCRIBING PATTERN IN GERIATRIC PATIENTS IN HYDERABAD METROPOLITAN

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ABSTRACT

To describe rational drug prescribing in general practice for elderly patients, using patients age, sex, encounters and the occurrence of some predefined inappropriate drug prescribing, according to Beer's criteria, drug-drug interaction of common OTC drugs and WHO essential drug list. A retrospective study on rational drug prescribing patterns in geriatric patient was carried out using prescriptions issued to the geriatric patients, 65 years and above, attending the outpatient and inpatient department of various hospitals and clinics of Hyderabad. Of the 150 prescriptions consecutively selected, Anti diabetics (142, 15.58%) were the most commonly prescribed medicines with metformin being the most prescribed anti diabetic. The medications prescribed by generic names were 92 (10.08%). 40% of medicines were prescribed from the WHO essential drug list. 17 (11.3%) prescriptions had one or more potentially inappropriate medicines from Beer's criteria and in 16 (10.6%) prescriptions drug – drug interactions were ascertained according to drug - drug interactions of common OTC drugs. The drug prescribing pattern among the elderly is still suboptimal. Appropriate interventions are needed for both health care providers and patients alike.

Key words: Geriatric patient, Drug-drug interactions, Essential drug list, rational drug use.

INTRODUCTION:

One of the most pressing problems facing public health providers and administrators in many countries is the rational use of drugs.[1]Therefore; the concept of rational drug use during the past few years has been the theme of various national & international gatherings. Various studies conducted in developing as well as in developed countries during past few years regarding the safe and effective use of drugs show that irrational drug use is a global phenomenon and only few prescriptions justify rational use of drugs.[2, 3]

It is well documented that safe and effective drug therapy is most possible only when patients are well informed about the medications and their use. Every member of the healthcare team should practice rational drug therapy. The WHO defined rational use as follows: The rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community. The five important criteria for rational drug use are accurate diagnosis, proper prescribing, correct dispensing, suitable packing and patient adherence. The prescribers should make an accurate diagnosis and prescribe rationally and the pharmacist should ensure that effective form of the drug reaches the right patient in prescribed dosage and quantity, with clear instructions on its appropriate use. The pharmacists should have an easy access to complete and unbiased information on the drugs used and should undergo prerequisite training programs.[4, 5]

Medicines are used rationally when patients receive the appropriate medicines, in doses that meet their own individual requirements, for an adequate period of time and at the lowest cost both to them and their community.[6]

Rational medication prescribing dictates that the fewest medications be used to achieve the therapeutic goals as determined by clinician and patient. Multiple medications not only add to the cost and complexity of therapeutic regimens, but also place patients at greater risk for adverse drug reactions and drug- drug interactions.[7]

Worldwide, it is estimated that over half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take their medicine correctly.[8]Inappropriate use and overuse of medicines waste resources often out of pocket payments by patients result in significant patient harm in terms of poor patient outcomes and adverse drug reactions. It can stimulate inappropriate patient demand, and lead to reduced access and attendance rates due to medicine stock outs and loss of patient confidence in health system.[9]It can also reduce the quality of life and cost of health care is unnecessarily increased.

Rational drug use assumes significance in elderly as they use more prescribed and over the counter (OTC) drugs than the younger population. A disproportionate number of elderly people suffer from chronic and degenerative pathology, leading in turn to a demand for more medication. However, knowledge about the efficacy and safety of many drugs is often sparse for the frail elderly because they are generally excluded from clinical trials. While being the major consumers and the greatest beneficiaries of modern drug therapy, elderly patients are particularly vulnerable and most at risk of suffering adverse drug reactions (ADRs). ADRs in the elderly have been characterized as "a major modern epidemic." The control of this 'epidemic' demands insight into physicians' drug prescribing patterns, because the identification of the

quantity and the type of prescribing problems are the fundamental first steps in trying to improve the quality of prescribing. ADRs in the elderly are in fact often caused by inappropriate prescribing.[10-12]

Various factors are responsible for the 3-7 times greater incidence of adverse drugs reactions (ADRs) in the elderly as compared to the age group 20-29 years. Up to 30% of drug intake may result in ADRs contributing to 10% of hospital admissions in elderly. The decline in physiological reserve in the geriatric population results in poor compensation and recovery from ADRs. Elderly population should receive drugs only for well defined indications at the lowest effective doses.[13-15]

The concept of rational drug use is age old, as evident by the statement made by the Alexandrian physician Herophilus 300 B.C that is "Medicines are nothing in themselves but are the very hands of god if employed with reason & prudence".[2]

The objective of study is to describe Rational drug prescribing on generel practice for elderly patients, using patients age, sex, encounters and the occurrence of some predefined inappropriate drug prescribing, according to Beer's criteria, drug-drug interactions of common OTC drugs and WHO essential drug list

METHODS:

Study design:

A retrospective study on rational drug prescribing patterns in geriatric patient was carried out using prescriptions issued to the geriatric patients, 65 years and above, attending the outpatient and inpatient department of various hospitals and clinics of Hyderabad as follow. The prescriptions were collected from Dec 2010 to Feb 2011 i.e.; for a period of 3 months.

1. Central government health scheme - Tarnaka.
2. Medwin hospitals - Abids.
3. Kamala clinic - Yakutpura.
4. Jaferia hospital. Institute of social medicine & research centre - Noor khan bazaar.
5. Ruqia medical centre - Noor khan bazaar.
6. Princess Durrushehvar children's and general hospital - Puranihaveli.
7. Yashoda cancer institute - Somajiguda.
8. Navodaya nursing home - Amberpet.
9. New national hospital - Rain bazaar.
10. Remedy hospitals - Himayatnagar.
11. Care hospital - Banjara hills.
12. Vijaya clinics - Tarnaka
13. Mind and soul clinic - Chanchalguda.
14. Uro surgical clinic - Malakpet.
15. Sahay's diabetic clinic and research centre - Ameerpet.
16. Fehmi care hospital - Yusufguda.
17. Heritage hospital - Somajiguda.
18. Yashoda super speciality hospital - Somajiguda.

Sample size and collection:

A total of 150 prescriptions for patients ≥ 65 years old emanating outpatient and inpatient departments of hospitals and clinics were consequently selected. This sample size exceeds the minimum of 100 suggested by WHO [DAP research series, WHO], was employed in order to enhance the reliability of the results.[16]

Data collection:

A data collection format was designed to aid collation of data. Data on age, sex, and number of medicines per prescription, percentage encounter of these drugs as generics, percentage occurrence of injections, percentage occurrence of antibiotics, percentage of essential drugs, dose and duration of the prescribed drugs were obtained.

Occurrence of irrational prescribing for these geriatric patients and various drug-drug interactions were ascertained using parameters such as Beer's criteria, WHO Essential drug list and Drug-drug interactions of common OTC drugs.[17-19]

Data analysis:

For easy sorting all data obtained were entered into Microsoft Excel 2007 and cross-checked for accuracy. The data collected were analyzed to obtain averages and percentages. Values obtained were compared with International network on rational use drug (INRUD) parameters (WHO prescribing indicators) and critical reasoning on information obtained from appendix I[20] were used to determine the types of irrational prescribing that occurred in each encounter.

Procedure for calculating prescribing indicators:

Average number of drugs per encounter was calculated by dividing the total number of drugs prescribed by the number of prescriptions surveyed. Percentage of drugs prescribed by generic name was determined by dividing the number of drugs prescribed by generic name by the total number of drugs, which was then multiplied by 100.Percentage of encounters with an antibiotic and injection prescription was calculated by dividing the number of patient encounters during which an antibiotic or an injection was prescribed by the total number of encounters surveyed, which was then multiplied by 100, respectively. Percentage of drugs prescribed from the WHO essential drug list was determined by dividing the number of products prescribed from the essential drug list by the total number of drugs prescribed, and then multiplied by 100.[16]

RESULTS:

Demographics:

The demographic characteristics of the geriatric patients are shown in Table 1. Out of 150 prescriptions studied, 83 (55.34%) belonged to males and the rest 67 (44.37%) to females, giving a male to female ratio of 1:0.80.

Table 1: Demographic characteristics of the geriatric patients (N=150).

Characteristics	Number of prescriptions	%
Age (years)		
65-70	82	54.67
71-75	28	18.67
76-80	17	11.34
81-90	19	12.67
≥ 90	4	0.026
Sex		
Males	83	55.34
Females	67	44.67

Prescribed medicines:

The distribution of the medicines prescribed in their therapeutic groups is shown in Table 2. Anti diabetics were the most prescribed medicines (N = 142, 15.58%) with metformin being the most prescribed anti diabetic. Analgesics ranked second (N = 129, 14.16%) with aspirin being the most prescribed analgesic while cardiovascular drugs such as anti hypertensive's (losartan potassium, enalapril, atenolol), anti angina drug (isosorbide mono nitrate, isosorbide di nitrate)and cardiac glycosides (digoxin) ranked third (N = 120, 13.17%). Vitamins/minerals occurred in 118 (12.95%) of the prescriptions with becosules being the most prescribed vitamin. Psychotherapeutic drugs (phenytoin sodium, carbamazine, haloperidol) occurred in 78 (8.56%) of the prescriptions. Injectables were prescribed in 64 (7.02%) of the prescriptions. Gastrointestinal drugs were prescribed in 63 (6.91%) of the prescriptions. Respiratory system drugs were prescribed in 50 (5.48%) of the prescriptions. Antibiotics were prescribed in 33 (3.62%) of the prescriptions with ampicillin being the most prescribed antibiotic. Diuretics were prescribed in 27 (2.96%) of the prescriptions.

Table 2: Therapeutic distribution of encountered medicines per prescription

Therapeutic group	Number of drugs for 150 prescriptions	%
Anti diabetics	142	15.58
Analgesics	129	14.16
Cardiovascular drugs	120	13.17
Vitamins/minerals	118	12.95
Psychotherapeutic drugs	78	8.56
Injectables	64	7.02
Gastrointestinal drugs	63	6.91
Respiratory system drugs	50	5.48
Antibiotics	33	3.62
Diuretics	27	2.96
Others	107	11.74

WHO prescribing indicators:

The distribution of the number of medicines prescribed is shown in Table 3.

Average number of medicines per prescription:

The average number of medicines per prescription was 6.07; the range being 1 to 21medicines.

Percentage of medicines prescribed by generic names:

A total of 92 (10.09 %) of the drugs wereprescribed in their generic names.

Percentage of encounters with an antibiotic prescribed:

33 (3.62%) prescriptions had one or more antibiotics prescribed.

Percentage of encounters with an injection prescribed:

A total of 64 (7.02%) of the prescriptions had atleast one injection prescribed along withother drugs.

Percentage of drugs prescribed from the WHO essential drug list:

About 40% of medicines were prescribed from the WHO essential drug list.

Table 3: Values obtained for prescribing indicators versus WHO standards. (N=150)

Prescribing indicator	Values obtained	WHO standard
Average number of drugs per prescription	6.07	1.6-1.8
% of drugs prescribed as generics	10.09	100%
% of antibiotics per prescription	3.62	20-26.8%
% of injections per prescription	7.05	13.4-24.1%

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Extent of potentially inappropriate medicines;

Of the 150 prescriptions studied, 17 (11.3%) had one or more potentially inappropriate medicines from Beer's criteria. In 16 (10.6%) prescriptions drug-drug interactions were ascertained according to drug-drug interactions of common OTC drugs.

DISCUSSION

Prescribing patterns of drugs reflects the clinical judgment of the clinicians. Our study revealed poly pharmacy in geriatric patients with an average number of drugs per prescription being 6.07. This deviates from the WHO standard of 1.6-1.8. Poly pharmacy unfortunately is very common in India[21] and some other countries.[22-24]It results in increased cost of treatment, which may lead to non-adherence by patients as they have more medicines than they can cope with. It also increases the risk of significant adverse drug interaction.

This study revealed the use of many therapeutic groups among the elderly. Anti-diabetics were the most frequently prescribed, with metformin ranking as the highest of them. The next most frequently prescribed therapeutic group is of analgesics and aspirin most prescribed analgesic. The use of analgesics in the elderly is due to complaints of body pains by this special population.

The third most prescribed therapeutic group is of the cardiovascular drugs among which anti hypertensives were most frequently prescribed. The incidence of hypertension in the geriatric population is very high and is a significant determinant of cardiovascular risk in this group. The tendency for blood pressure to increase with age may depend on environmental factors such as diet, stress, and inactivity. Senescent changes in the cardiovascular system leading to decreased vascular compliance and decreased baroreceptor sensitivity contribute to rising blood pressure. The hallmark of hypertension in the elderly is increased vascular resistance.[25]

Vitamins/minerals were the fourth most prescribed medicines. The high occurrence of vitamin and other health supplements in the prescriptions is not surprising as many people don't consume an optimal amount of all vitamins by diet alone. Pending strong evidence of effectiveness from randomized trials, it appears prudent for adults to take vitamin supplements. Physicians should make specific efforts to learn about their patients use of vitamins to ensure that they take only the vitamins that they should.[26]

10% of medicines prescribed were generics. This finding is similar to those of previous studies, [27, 28] but falls short of WHO recommendation of 100%. This implies that the prescribers are not complying with the recommendations of WHO prescriber indicator. Prescribing by generic name allows flexibility of stocking and dispensing various brands of a particular drug that are cheaper than and as effective as proprietary brands. This is the basis of essential drug list use.[29] Moreover, from our study we found that only 40% of prescribed drugs were fall on WHO essential drug list which need more attention of the clinicians.

It is worth noting that prescribing of antibiotics fell within the WHO recommended range of20 – 26, while prescribing of injections was lower than the recommended range of WHO (13.4 – 24.0 %). A lower rate of injection prescribing (7.5 %) has also been reported by Akande and Ologe.[30]

In a large number of prescriptions drugs were prescribed by brand names where less expensive generic equivalents are available. This could be because the prescribers are more conversant with the brand names than generic names of the drug products. Also pressure from the medical representatives of the branded products to prescribe their own brand may have contributed immensely to this high rate.

Of great importance is the occurrence of inappropriate prescribing among the elderly observed in this study. This form of irrational drug use brings about high economic burden on the patients who have to buy the branded products at a higher cost than a generic with the same bioequivalence.

About 11.3% of prescriptions met Beer's criteria for inappropriate prescribing in the elderly and 10.6% of prescriptions met drug-drug interactions of common OTC drugs. The reasons for inappropriate prescribing may be partly due to the relatively weak evidence based guidelines for appropriate prescribing in elderly patients and existence of particulars justifying exceptions to the rules in individual patients.[31]

Inappropriate medication use in patients, 65 years and above has been linked to many adverse drug reactions; poor physical functioning and excess health care use.[32] Interventions could target more appropriate drug selection by physician to elderly patients. In most of the prescriptions dose and duration were not mentioned which also justifies inappropriate prescribing.

CONCLUSION

Prescribing for the elderly was found to be suboptimal and there was occurrence of inappropriate prescribing. This calls for caution on the part of prescribers and pharmacists alike and also the need for awareness of tools that can be used by practitioners for detecting drug therapy problems. More studies are required on the pattern of inappropriate prescribing over a long period of time and on intervention programs to reduce potentially adverse health outcomes in elderly patients most at risk in the area where this study was undertaken.

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