

Evaluation of Drug Utilization Pattern among Geriatric Patients in a District Head Quarters Government Hospital using World Health Organization Indicators

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ABSTRACT

Objectives: The aim of the study is to know about the drug utilization pattern among geriatric patients in a district headquarters government hospital using World Health Organization indicators. Among all age groups, geriatric patients are prescribed with more medicine and the possibility of the drug related problems also very high. Hence this study is conducted with a broad aim to understand the drug utilization pattern among geriatric patients. **Methods:** This is a cross-sectional prospective observational study involving 150 geriatric patients. All the patients are inpatients and no ambulatory patients were included in the study. It was a thirteen months study conducted between October 2018 and October 2019. Relevant information for analysis was obtained through accessing patient's case sheets. **Results:** It was found that the patients in the age group of 60–65 years (45%) were more prevalent for the diseases. There was a male patient preponderance (63%) in our findings. The mean number of drugs per prescription was found to be 7 (normal value = 1.3 – 1.6). The antibiotics were prescribed in about 70% of prescription (normal value = 20 – 26.8). Polypharmacy was prevalent in 79% of total prescriptions. Majority of drugs were prescribed in generic names which was 92% (normal value = 100%). And all the drugs were only prescribed from essential medication list (normal value = 100%). **Conclusion:** This Study of drug utilization pattern helps in examining the quality of patient care and to promote the rational use of drugs. It also increases its importance in pharmacoepidemiological interventions.

Key words: Antibiotics, Drug utilization pattern, Geriatrics, Injectables, Prescribing indicators, Polypharmacy.

INTRODUCTION

In 1977 World Health Organization (WHO) describes Drug utilization research as the study of marketing, distribution, prescription and use of drugs in society, with special emphasis on the resulting medical, social and economic consequences.¹ Drug utilization research may drive into different views like drugs usage and prescribing, usage patterns, usage quality, usage determinants and outcome of drug usage. Prescribing indicators are used to measure the performance of health care providers in several key dimensions related to appropriate use of drugs.² Among all age groups, geriatric Patients are the only age group whom are prescribed with more number of drugs. So events of ADRs and polypharmacy are highest among geriatric

Patients. With these broad aim to understand the drug utilization pattern among geriatric patients and the influence of factors like age, gender, education status, socio economic status, etc. on drug prescribing in geriatric patients, this study was conducted.³

Average number of drugs per prescription

This indicator measures the degree of polypharmacy issues in geriatric patients. In this study, combination drugs are counted as a single drug. Polypharmacy is the simultaneous use of more medications taken by any patients. The most commonly used definition for polypharmacy is more than five medications taken per day by a

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patient. Polypharmacy issue is increased with increase in age due to declined normal physiology and other comorbidities. Polypharmacy is always associated with a decreasing in quality of life, including decreased mobility and cognition.⁴ By avoiding prescribing too many drugs, the patient's adherence to the therapy can be improved. The average number of drugs per prescription can be calculated by dividing the total number of drugs prescribed by the total number of prescriptions sampled.

Average number of antibiotics per prescription

Inappropriate use of antibiotics is a global public health challenge in recent days and has been associated with antibiotic resistance in due course of time. The assessment of this indicator helps to avoid the irrational use of antibiotics and to promote the rational use of antibiotics. That would really be benefited by the patient. Antibiotics should never always be prescribed empirically in common clinical therapeutic practices. It should be prescribed after obtaining the report of culture and sensitivity tests. The average number of antibiotics per prescription is the ratio of total number of antibiotics prescribed to the total number of prescriptions sampled.

Percentage of drugs prescribed in generic name

Percentage of drugs prescribed by generic name is calculated to measure the tendency of prescribing drugs in generic name. As it is mandated nowadays to write all the prescriptions in generics in order to avoid confusion and to reduce the common occurrence of errors it was calculated by finding, the ratio of the number of drugs prescribed by generic names to the total number of drugs prescribed and multiplied by 100. The cost of generic medications are always less in comparison to that of the branded medicines. When drugs are prescribed in generic names, it promotes the cost-effective means of treatment so that patients would be benefited.

Percentage of drugs prescribed as injections

The purpose of this indicator is to measure the overall level of use of two important, (oral drugs and injections) but commonly overused becomes the costly form of drug therapy (injections). Decreasing the injectable and early switching to oral formulations will predominantly reduce the cost of both the drugs and non-drugs (cost of injection, surgical items and hospital and nursing charges). The advantage of oral dosage forms can be self-administered but injectable are not always possible. Such a dosage form may also require the direct supervision of physicians even. Hence reducing such dosage forms would be expedient for geriatric patients. The percentage of drugs prescribed as injections can be calculated by

finding, the ratio of the number of drugs prescribed as injections to the total number of drugs prescribed and multiplied by 100.⁵

MATERIALS AND METHODS

A cross-sectional prospective observational study was conducted between October 2017 and October 2019 in Virudhunagar District Headquarters Government Hospital, Tamil Nadu, India. The study sample comprised of case sheets of patients collected during clinical ward rounds with due permission from different departments of the rural health care hospital during the above mentioned period of time.

Sample Size

One hundred and fifty (150) patients in the geriatric patient groups (age above 60 years) from the various departments of Virudhunagar District Headquarters Government Hospital were only included for our study. All of them were inpatients and evaluated for the polypharmacy prevalence among them.

Inclusion and Exclusion Criteria

Patients of both the gender those who completed 60 years of age from different departments like general medicine, surgery, psychiatric, fever, post-operative, emergency and ocular were selected randomly and included in the study. No ambulatory geriatric patients were included for the study and other patients were excluded for our study.

Patients unable to communicate, seriously ill patients who need ICU admissions were also not included in the study. All the selected inpatients were visited twice weekly in the wards in which they were admitted during the hospital stay. All the patients who were involved in the study were followed up until he/she was discharged and their information were gathered by reviewing their case sheets and documented.

Data collection

Students of second and third-year Doctor of pharmacy were involved in data collection. The data collected was collected from inpatient geriatric patient case sheets including age, sex and economic status of patients, provisional diagnosis, final diagnosis, various lab parameters like, serum creatinine, urea and hemoglobin levels, dose, dosage and frequency of prescribed drugs by visiting along with the physicians in various departments of the hospital. All information has not discussed in this article, parameters required for indicators were only used for analytical interpretations. The samples were collected by systematic random sampling method.

Prescribing indicators measurement

The WHO prescribing indicators like an average number of drugs per prescription, an average number of antibiotics per prescription, percentage of drugs prescribed in generic name, percentage of drugs prescribed as injections were pre-tested. The tests were done using the formulas given by WHO in their prescription indicators manual.

Patient care indicators measurement

Patient care indicators includes the average time for consultation, the average time for drug dispensing, the percentage of drugs dispensed actually and patient's knowledge of correct dosage.⁶ Among these tests, the average consultation time of physicians in the inpatient setting was measured. The consultation time was divided into three categories as follows; less than 5 min, 5-10 min and above 10 min. Longer consultation time has been linked to better health care outcomes.

Health facility indicators measurement

It is the measurement of the ability to prescribe drugs rationally. It includes checking of availability of a copy of essential drugs list or formulary and checking for the key drugs availability. And here the key drugs availability was checked. The key drugs selected were oral rehydration salts, cotrimoxazole tablets, procaine penicillin injection, pediatric paracetamol tablets, chloroquine tablets, ferrous sulfate + folic acid tablets, mebendazole tablets, tetracycline eye ointment, iodine, gentian violet or local alternative, benzoic acid + salicylic acid ointment, paracetamol tablets for adults, retinol. These key drugs were selected according to the WHO's Model List of key drugs for testing drug availability.

Data analysis

All the data collected from case sheets were segregated and were analyzed using Microsoft Excel 2007. The indicators are reported as means and proportions. 150 prescriptions in the case sheets were analyzed.

RESULTS

Out of 150 geriatric patients, 94 were male (63%) and 56 were female (37%). Majority of the patients (72) were between the age group 60 – 65. That accounts for 48%. This is represented in the Table 1.

The total numbers of drugs in 150 prescriptions were found to be 978. As far as the prescription indicators are considered the average number of drugs per prescription is found to be 7. The majority of

prescriptions contain more than five drugs (118); that is 79% out of 150 prescriptions. The total number of antibiotics prescribed was 144. The average number of antibiotic per prescription is 0.96 approximately 1. And it constitutes 15% of the total drugs. Ampicillin is the most frequently prescribed antibiotic. Most of the prescriptions (48%) contain at least one antibiotic (normal value = 20 – 26.8%). The pattern of antibiotics prescription is mentioned in Table 2.

These data were collected from the Virudhunagar District Headquarters Government Hospital. Almost all the drugs were prescribed in a generic name (902), there is only 8% of drugs that were prescribed in trade names (normal value = 100%).⁷ The total number of drugs prescribed as injectable was 373 which is 38% out of 978 drugs which means a prescription contains at least 2 injectable. For the measurement of health facility indicators, the key drug availability was tested.⁸ Out of 12 key drugs; oral rehydration salts, ferrous sulfate + folic acid tablets, iodine, benzoic acid + salicylic acid ointment, paracetamol tablets were either mentioned in the prescription or seen during dispensing. Hence out of 12 key drugs, 6 (50%) drugs were available.

Table 1: Socio demographic details of study population.

Characteristics	Frequency (N)	Percentage (%)
Age In Years		
60 -65	72	48%
66- 70	48	32%
71- 75	17	11%
76- 80	10	7%
Above 80	3	2%
Gender		
Male	94	63%
Female	56	37%

Table 2: Prescription pattern of antibiotics.

Prescription Indicator	Frequency (N)	Percentage (%)
No. of prescriptions without antibiotics	45	30%
No. of prescriptions with 1 antibiotic	72	48%
No. of prescriptions with 2 antibiotics	28	19%
No. of prescriptions with 3 antibiotics	4	2%
No. of prescriptions with more than 3 antibiotics	1	1%
Total No. of prescriptions	150	100%

For the measurement of patient care indicators, consultation time is considered. Emergency cases like poisoning are consulted for the least amount of time (0 – 5 min). Cases like hypertension, COPD, diabetes are consulted for a medium amount of time (6 – 10 min). Chronic cases like CKD, AIDS are consulted for a prolonged time (11 – 15 min). This data is mentioned in Table 3.

When the prevalence of diseases is considered 30 patients were suffered from GI interventions, it includes Gastro enteritis, Hernia, Appendicitis, Pancreatitis, Diarrhoea, etc.⁹ The patient suffered from Respiratory illness were 19; most of the patients have COPD and Asthma, some patients are also associated with systemic hypertension and diabetes mellitus. Patients with Cardiovascular diseases are 15, which include coronary artery disease, hypertension, myocardial infarction and angina. Some of these patients also possess with stroke, chronic kidney disease and diabetes mellitus. Patients with Renal disorders were 14, which includes chronic kidney disease, urinary tract infection and renal failure. Many patients have hypertension and anemia associated with chronic kidney disease. There were 12 patients diagnosed to be diabetic and some of them have foot ulcer and some have hypertension. Ten patients suffered fever most of them were common cold fever and some also had typhoid and viral fever. Ten patients suffered the cerebra vascular attack. And 21 patients suffered various indications like giddiness, anemia, accidents, poisoning and etc. The disease distribution among geriatric patients is Table 4.

DISCUSSION

The geriatric population is more vulnerable to more number of diseases and drug-related problems. Particularly in India, limited data are available about drug utilization patterns in the geriatric population. And this study helps to understand the drug utilization pattern and related issues among geriatric patients in a community. Polypharmacy was prevalent among 79% of prescriptions. This shows that the older population is increasing and with it, polypharmacy issue is also increasing. More physicians treating a patient, increased comorbidities and availability of various drugs, contribute to the adverse

Table 3: Distribution of patient care indicator.

Consultation time: (minutes)	Total no. of prescriptions (N = 150)	Percentage (%)
0 – 5	23	15%
6 -10	97	65%
11- 15	30	20%

Table 4: Disease prevalence among patients.

Indications	Frequency (n=150)	Percentage (%)
GIT Interventions	30	20
Respiratory Illness	19	13
Cardiovascular Diseases	15	10
Renal disorders	14	9
Diabetes Mellitus	12	8
Fever	10	7
Cerebrovascular Diseases	10	7
Cellulitis	9	6
Cancer	5	3
Psychiatric Disorders	5	3
Others	21	14

effects of polypharmacy on the elderly patient.^{10,11} Most geriatric patients are prone to respiratory illnesses like asthma and COPD. It accounts for 13% of the total cases. It is comparable to co-morbidities which are a significant problem in the elderly population but are rarely presented and analyzed for interdependencies among the various co-existing chronic diseases.¹² 48% of prescriptions contain at least one antibiotic. Infectious diseases possess a major challenge in the geriatrics for two reasons: i) the geriatrics are more susceptibility to infection with increase in age ii) on the other hand, it is difficult to diagnose and the uncertainty is more in geriatric population. And geriatric facilities are reservoirs for multidrug-resistant microorganisms and other nosocomial (hospital acquired) pathogens and infectious diseases.¹³ So physicians should assure appropriate infection control measures in this population. Ampicillin is the most frequently used antibiotic. A study shows that plasma clearance after i. v. ampicillin was found to be significantly decreased in the elderly ($P < 0.05$, $0.08 \text{ l h}^{-1}\text{kg}^{-1}$ versus $0.18 \text{ l h}^{-1} \text{ kg}^{-1}$). It also shows a steep increase in $t_{1/2}$ beta, AUC infinity and maximum plasma concentration of ampicillin after oral administration in elderly.¹⁴ Dose adjustments for really excreted drugs are essential for renally impaired geriatric patients. Out of all dosage forms, injectable contribute to 38%. The decreased usage of injections and achievement of injection safety will prevent the injection-associated infections.¹⁵ Better communication between prescriber and patients and managerial approaches (i.e. restricting access to selected unnecessary and dangerous injectable drugs) can reduce overuse.

CONCLUSION

Drug utilization pattern study is significant because it provides the method for defining the denominator data

needed in pharmacoepidemiological research. The study of drug utilization is an emerging field. Particularly in India, data about drug use patterns among geriatrics is less. The use of computerized databases that links drug utilization to diagnosis, although subject to some inherent limitation, is contributing to the expansion of this area of study. Drug utilization pattern study increases its importance in pharmacoepidemiology by connecting more closely with other areas such as public health, rational drug use, evidence-based medicine, pharmacovigilance, pharmacoconomics, eco pharmacovigilance and pharmacogenetics.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

WHO: World Health Organization; **ADR:** Adverse Drug Reaction; **COPD:** Chronic Obstructive Pulmonary Disease; **CKD:** Chronic Kidney Disease; **ICU:** Intensive Care Unit; **GIT:** Gastro Intestinal Tract; **AIDS:** Acquired Immuno Deficiency Syndrome.

SUMMARY

Drug utilization derives its importance in pharmacoepidemiology from the fact that it provides the methodological rigor for defining the denominator data needed in pharmacoepidemiological research. The study of drug utilization is an evolving field. Particularly in India, data about drug use pattern among geriatrics is less. The use of computerized databases that links

drug utilization to diagnosis, although subject to some inherent limitation, is contributing to expansion of this area of study. Drug utilization pattern study increases its importance in pharmacoepidemiology by bridging more closely with other areas such as public health, rational use of drugs, evidence based drug use, pharmacovigilance, pharmacoconomics, eco pharmacovigilance and pharmacogenetics.

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