



**ASSESSMENT OF DRUG UTILIZATION OF GASTROINTESTINAL AND
RESPIRATORY DRUGS AMONG GERIATRIC ON DAILY DEFINED DOSE
CONCEPT IN TEACHING HOSPITAL**

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ABSTRACT

Aim: To use the Anatomical Therapeutic Chemical Classification (ATC) /Defined Daily Dose (DDD) concept to study the Drug Utilization in geriatric patients in a rural tertiary care teaching hospital.

Materials and Method: A observational study was conducted at Rajah Muthiah Medical College Hospital (OPD&IPD) over a period of six months from November 2018 to April 2019. The data was collected from 204 patients using specially designed data collection form. The patients were selected based on inclusion and exclusion criteria.

Results and Discussion: A total number of 204 patients were included in the presence study. The study population consisting of males 130(63.7%) and females 74(36.2%). Diseases related to the cardiovascular system 67(32.84%) were the most common cause for the geriatric patients to attend the hospital, followed by surgical diseases 47(23.03%), Oncological diseases 2(0.98%) were the least frequency encountered. The most frequently prescribed Gastrointestinal drugs were B complex, Ranitidine, Pantoprazole followed by Ascorbic acid (vit C), Calcium +D3, Human insulin, Domperidone, Ondansetron, Metformin

and Thiamine (vitB1). The most frequently prescribed Respiratory drugs were pheniramine, Levocetirizine, Cetirizine Followed by Doxofylline, Promethazine, Ambroxol, Montelukast, Dexchlorpheniramine, xylometazoline And Salbutamol.

Conclusion: Drug utilization studies may ultimately help in improving the quality of healthcare given to the geriatric patients and help in improving rational use of medicines

Keywords: Anatomical Therapeutic Chemical Classification, Defined Daily Dose System, Drug utilization, Geriatric Patients, Rational Drug

INTRODUCTION

Drug utilization studies are used as potential tool in the evolution of health care system. Drug utilization research as defined by WHO in 1977 is “the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences” [1, 2]. It provides information about pattern, quality and outcome of drug use. Pattern of drug utilization is studied to estimate the incidence and prevalence of drug use, to analyse that the recommended guidelines for prescription are being followed or not. The aim of drug utilization study is to promote rational and appropriate use of drugs at lowest possible of dose and cost [3-5]. The Anatomical Therapeutic Chemical (ATC) classification system and the Defined Daily Dose (DDD) as a measuring unit have become the gold standard for international drug utilization research. The ATC/DDD system is a tool for exchanging and evaluating drug use data at international, national or local

levels. The main purpose of the ATC/DDD system is to serve as a tool for drug utilization research in order to improve quality of drug use. One component of this is the presentation and comparison of statistics on drug use at international and other levels [6]. The comparing, analysis and present statistical data on drug use research, the anatomical and therapeutic chemical (ATC) classification systems is accepted worldwide and recommended by WHO. It is used by international drug monitoring center Upsala, the WHO collaborating center for classification of ADRs. Defined daily dose is the average maintenance dose per day and used as a comparable unit for the rough estimation of drug use study [7, 8]. Rational prescription of drugs is a skill that is required based on knowledge of drugs, Pharmacoeconomics, pharmacovigilance and experience is mandatory. If the drugs were overused, they would increase incidence of toxic reactions, if under-used, therapeutic failure and Chances of developing resistant strains

to antibiotics, if misused will lead to unnecessary adverse drug effects and drug interactions [9-11]. In this study we can discuss the use of drugs for gastrointestinal and respiratory drugs.

MATERIALS AND METHODS

A record based observational study was conducted at Rajah Muthiah Medical College and Hospital [RMMCH], rural 1400-bed multispecialty, tertiary care teaching hospital, Annamalai University, Annamalai Nagar, Tamil Nadu, from the period of November 2018 to April 2019.

Sample Size

204 patients of geriatric age group of both genders who has crossed 60 years of age were included in the study. It is calculated as follows:

$$N = \frac{Z^2 \times P(1-P)}{d^2}$$

Inclusion Criteria

Patients of both gender who has crossed 60 years of age and who are admitted in the Department of Medicine, Surgery, Obstetrics & Gynaecology, DVL, ENT, Ophthalmology, Orthopaedics and Psychiatric.

Exclusion criteria

Patients unable to communicate i.e., Patients on ventilators or critically ill (Coma) patients requiring ICU admission and patients who are not willing to participate.

The DDD of these drugs was calculated according to the WHO ATC/DDD system based on DDD's/1000 inhabitants per day [12].

$$\text{Utilization in DDD: (Number of package used)} \times \\ \text{(Number of DDD in a package)}$$

DDDs/1000 inhabitants/day:

$$\frac{\text{(Utilization in DDDs)}}{\text{(No. of inhabitants) x (No. of days in the period of data collection)}} \times 1000$$

RESULT AND DISCUSSION

A total of 204 geriatric patients were included which was male predominant study consisting of Males 130 (63.7%) and Females 74(36.2%). Average age of geriatric patients was 66.84 years. About 65 (60.2%) of patients fallen at age group of 60-65 years and less patients in the age group of >80(1.9%). Other demographic data was literacy status that denotes 146 (71.5%) were illiterate in the study. living status that denotes 178 (87.2%) were with family and 26(12.7%) are alone. the last demographic data shows the social economical status were 176 (86.27%) with lower income, 18 (8.82%) with middle income population and 10 (4.90%) were higher income. The study monitored the pattern of co- morbidity which showed that most of the elderly patients on Drugs were with 1 co-morbidity (62%) followed by 2 co-morbidities (23%) and ≥ 3 co morbidities (15%) (Figure 1). The Infection patterns for which drugs were prescribed at

maximum with respiratory tract infections (52) 25.5% followed by (31) 15.21% with Gastrointestinal infection.

A total of 352 disease conditions were prevalent in geriatric patients. Diseases related to cardiovascular system (67;32.84%) were the most common cause for attending the hospital followed surgical diseases (47;23.03%), Oncological diseases (2;0.98%) were the least most frequently encountered (Table 2).

The most frequently prescribed Gastro-intestinal drugs were B complex,

Ranitidine, Pantoprazole followed by Ascorbic acid (vit C), Calcium +D3, Human insulin, Domperidone, Ondansetron, Metformin and Thiamine (vitB1) (Table 3).

The most frequently prescribed Respiratory drugs were pheniramine, Levocetirizine, Cetirizine Followed by Doxofylline, Promethazine, Ambroxol, Montelukast, Dexchlorpheniramine, xylometazoline And Salbutamol (Table 4).

Table 1: Demographic data of patient

PARAMETER		PERCENTAGE (N=204)
GENDER	MALE	130(63.7%)
	FEMALE	74(36.2%)
AGE	60-65	123(60.2%)
	66-70	37(18.1%)
	71-75	24(11.7%)
	75-80	16(7.8%)
	<81	4(1.9%)
Literacy	Illiterate	146(71.5%)
	Literate	58(28.4%)
Living status	With family	178(87.2%)
	Alone	26(12.7%)
Social Economical status	Lower	176(86.27%)
	Middle	18(8.82%)
	higher	10(4.90%)

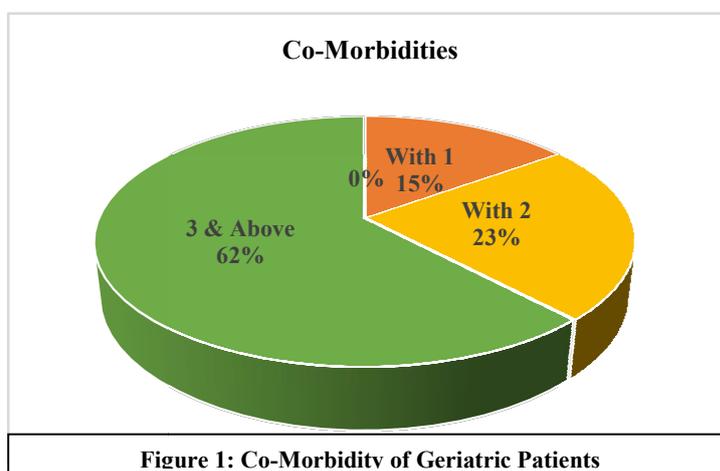


Figure 1: Co-Morbidity of Geriatric Patients

Table 2: Disease Conditions Prevalent in Geriatric Patients

S. No.	DISEASE CONDITIONS	No. of Diseases	Percentage
1	CARDIOVASCULAR DISEASES	67	32.84%
2	SURGICAL DISEASES	47	23.03%
3	INFECTIOUS DISEASES	36	17.64%
4	MUSCULOSKELETAL DISEASES	35	17.15%
5	ENDOCRINAL DISEASE	34	16.66%
6	RESPIRATORY DISEASE	30	14.70%
7	OCULAR DISEASES	24	11.76%
8	DERMATOLOGICAL DISEASES	19	9.31%
9	ENT DISEASES	19	9.31%
10	PSYCHIATRIC DISEASES	13	6.37%
11	OTHERS	13	6.37%
12	CNS DISEASES	8	3.92%
13	GYNAECOLOGICAL DISEASES	5	2.45%
14	ONCOLOGICAL DISEASES	2	0.98%
	Total	352	

Table 3: Ten Most Frequently Prescribed Drugs and ATC/DDD Codes of Gastrointestinal Drugs

ATC code	Drug	WHO DDD	DDD	DDDs/1000 inhabitants/day
A11EA	B complex	1tab	517	14.0795
A02BA02	Ranitidine	0.3g	448.33	12.2094
A02BC02	Pantoprazole	40mg	322	8.769
A11GA01	Ascorbic Acid (vit C)	0.2g	116.5	3.1727
A11JB	Calcium + D3	1tab	98	2.6688
A10AB01	Human insulin	40UI	90.74	2.4712
A03FA03	Domperidone	30mg	89	2.4237
A04AA01	Ondansetron	16mg	48.75	1.3276
A10BA02	Metformin	2g	40.25	1.0961
A11DA01	Thiamine (vit B1)	50mg	40	1.0893

Table 4: Ten Most Frequently Prescribed Drugs and ATC/DDD Codes of Respiratory Drugs

ATC code	Drug	WHO DDD	DDD	DDDs/1000 inhabitants/day
R06AB05	Pheniramine	75mg	158.66	4.3208
R06AE09	Levocetirizine	5mg	67	1.8246
R06AE07	Cetirizine	10mg	48	1.3072
R03DA11	Doxofylline	0.8g	36	0.9804
R06AD02	Promethazine	25mg	25.2	0.6863
R05CB06	Ambroxol	0.12g	18.5	0.5038
R03DC03	Montelukast	10mg	14.8	0.4031
R06AB02	Dexchlorpheniramine	6mg	12	0.3268
R01AA07	Xylometazoline	0.8mg	3.75	0.1021
R03CC02	Salbutamol	12 mg	1	0.0272

Defined Daily Dose

Defined Daily Dose is the criteria used to compare utilization of drug at International level. We used this parameter to study drug use based on dose. We calculated DDD for the drugs, which prescribed to study participants. We have calculated DDD separately for each category of drugs.

Based on ATC, DDD is calculated for Gastrointestinal drugs (A indicates Alimentary tract and Metabolism) were B complex (A11EA), Ranitidine (A02BA02), Pantoprazole (A02BC02) followed by Ascorbic acid (vit C) (A11GA01), Calcium +D3(A11JB), Human insulin(A10BA01), Domperidone (A03FA03), Ondansetron

(A04AA01), Metformin (A10BA02) And Thiamine (vitB1) (A11DA01).

From the study we mentioned that B Complex (A11EA) comes under vitamins and takes first place, followed by Ranitidine (A02BA02) and pantoprazole (A02BC02) comes under acid related drugs and takes second and third respectively. As the result shown in the similar studies [13-15].

Drugs like Ascorbic acid (vit C) (A11GA01), Calcium +D3 (A11JB), Thiamine (vitB1) (A11DA01) are also comes under vitamins. Diabetic Drugs like Human insulin (A10BA01), Metformin (A10BA02) Functional gastrointestinal disorder drug Domperidone (A03FA03) and Anti emetic drug Ondansetron (A04AA01) takes top ten places in gastrointestinal drugs.

Based on ATC, DDD is calculated for Respiratory Drugs (R indicates Respiratory system) were pheniramine (R06AB05), Levocetirizine (R06AE09), Cetirizine (R06AE07), comes under anti histamines and takes top three places followed by Doxofylline (R03DA11), Montelukast (R03DC03), Salbutamol (R03CC02) come under Obstructive airway diseases and Promethazine (R06AD02), Dexchlorpheniramine (R06AB02) also comes under Anti histamines, Ambroxol (R05CB06) placed under cough and cold preparation

drugs, Xylometazoline (R01AA07) placed under Nasal preparation and some results are similar in the study Beg MA *et al* and Avula N *et al* [16,17].

We calculated DDD for geriatric patients and more importance were given to Gastrointestinal and respiratory diseases. Sample size of the study is small and study period is six months. These can be considered as limitations of our study but nevertheless, the study findings cannot be considered any less important.

The ATC/ DDD system can also help in evaluation of long-term trends in drug use for assessing the impact of certain events on drug use and for providing denominator data in investigations of drug safety [18].

Drug utilization studies are conducted to monitor and evaluate prescribing pattern. They also recommend reforms and improvements in prescribing practices and promoting rational prescribing practices [19].

Studies on drug use pattern are an important tool for the identification and improvisation of rational drug therapy. Rational prescribing optimizes benefits, safety and maximizes utilization of resources. International agencies like WHO and International Network for the rational use of drugs (INRUD) have evolved standard drug use indicators [20].

CONCLUSION

Drug utilization studies ultimately help in improving the quality of healthcare given to the geriatric patients and help in improving rational use of medicines. We should to join with physician, nurses, technicians and others health care providers to improve the quality of life of the patient.

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