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Original Article

Study on Drug Utilisation in Medicine Department Under National Health Scheme of Ayushman Bharath Arogya Karnataka in Tertiary Care Teaching Hospital

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ABSTRACT

Background Information: India being the developing country the progress of diseases is a challenge to healthcare system with a dense population and the available healthcare services may be expensive to a group of society and hence all citizens may not be a beneficiary of an advanced health care system. To overcome the loopholes of the entire available scheme in a state it was merged into an ABARK scheme. **Materials and Methods:** It's a prospective observational study of 550 patients, to assess and analyse Drug Utilization in Medicine Department under National Health Insurance Scheme of Ayushman Bharat Arogya Karnataka (ABARK). **Results:** Out of 550 patients 52% of our study population had more than one comorbid condition, highest being the cardiovascular disease. Drugs were mostly prescribed in monotherapy (78.06%) and only 21.14% were prescribed in combination of drugs. Among the 5980 drugs prescribed, the highest category were Multivitamins (18.32%) followed by Antimicrobials (18.1%) and the least prescribed were CNS Agent (2.55%). Drugs prescribed by generic name were 35.39% and brand name was 64.61%. Average number of drugs per prescription is 10.87. About 61.47% of drug prescribed from WHO EML list and 74.01% was prescribed from NLEM list. Highest dosage form prescribed were injectables (46.1%) followed by tablets (35.1%) and least prescribed was Mouth gargle (0.03%). The ABARK awareness survey shows moderate awareness among the study population. **Conclusion:** Rational prescribing is seen due to majority of drug prescribed in accordance with WHO EML and NLEM list. Certain degree of polypharmacy was seen, as the average drug per prescription was high.

Keywords: ABARK, General Medicine, Prescription, DUE, WHO EML, NLEM.

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INTRODUCTION

ABARK health insurance policy sponsored by a state or central Government, the aim of such schemes is to improve the healthcare facilities in different group of society by offering affordable health insurance to the common man.[1,2] AYUSHMAN BHARAT AROGYA KARNATAKA holds an umbrella of scheme under it since PMJAY has the significance of world's largest health insurance coverage scheme and the current ongoing scheme. Research on drug utilisation studies in hospital inpatients is an excellent tool for assessing trends, efficacy and cost-effectiveness of medications.[3,4] The drug utilisation throughout sundry nations and even within health care facilities in one country, occasionally varies probably at various times even within the same institute, since illness archetype have changed over a period of time. Therefore, it is vital that the existing hospital drug policies be critically assessed by periodic investigations of the pattern of medication use in different hospital settings or community groups. As patients with a wide spectrum of acute illnesses admits in the general medicine department, it is an essential platform for conducting medication use studies.[5] A DUE is drug or illness specific (indications, dose, drug interactions, etc.) and it offers insights on the following elements of the usage and prescription of drugs such as pattern of use where it includes the amount, characteristics and trends of the use of medicines and expenses throughout time, quality of use where it compares current use with national prescription standards or local medicine forms, determinants of use and it include characteristics of users (e.g. socio-demographic and drug-related behaviours) affecting therapy choices and pharmacological features (e.g. therapeutic and affordability characteristics)and outcome of use which are health outcomes and economic implications (i.e. benefits, bad impacts).[6] The major causes for lack of optimum healthcare in India include various issues such as poverty, the use of different health systems, medication advertising and prescription selling,

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rivalry on the medical and pharmaceutical marketplace and restricted access to information about drugs.[7] DUP involves a general examination of the prescription and medication data of the patient before, during and after the delivery of medicine to guarantee optimal medication decisions and favourable patient results and it is crucial for the healthcare system to be able to understand, explain and improve the prescription management of drugs.[8] WHO's EML will provide Drug list, that helps in health care system in, Rational and evidence-based prescribing.[9,10] Hence this study is important to analyze the rational usage of drugs and benefits oriented to public under this scheme and its loopholes.

OBJECTIVES OF STUDY

Primary Objective

1. To assess and analyse Drug Utilization in medicine department under National Health Insurance scheme of Ayushman Bharat Arogya Karnataka (ABARK).

Secondary Objective

1. To evaluate the drug utilisation pattern for rational drug use, by prescription analysis by utilizing WHO EML and NLEM list.
2. To survey the ABARK awareness and to know the patient satisfaction.

MATERIALS AND METHODS

Study Site

The study was conducted at Krishna Rajendra (KR) Hospital, Mysuru. KR Hospital is a tertiary referral centre and teaching hospital attached to the Mysuru Medical College and Research Institute (MMC-RI), Mysuru, Karnataka. It has total bed capacity of 1330 beds approximately. Out of which 335 beds are under General Medicines.

Study Procedure

The prospective observational study of 6 months duration (Feb to Aug 2021) was designed to evaluate drug utilisation pattern in 550 patients of General Medicine department of KR hospital, Tertiary care teaching hospital. It has total bed capacity of 1330 beds approximately. Out of which 335 beds are under General Medicines, by obtaining the ethical clearance from MMCRI. Patients who met the study protocol were explained with our study purpose and objective in well understandable manner. After obtaining the informed consent the necessary information according to the Data collection form and questionnaire the required data were collected from patient case records, Prescription charts, Discharge summaries, Medical Record Section, Interview with patient. The obtained data were evaluated in relation to the number of drugs belonging to specific class, category, WHO list, NLEM list, Dosage form, Individual or Combination formulation were taken into consideration for assessing the drug prescribing pattern. Assessment of ABARK awareness was obtained from the semi structured questionnaire. The scores obtained by the patient's response were assessed by the suitable scales (Poor, Moderate and High) to analyse the awareness of our study population. A descriptive statistic was presented in terms of frequency and percentage for our numerical data value. Quantitative variables were presented by numbers, mean, Microsoft Word and Excel; to generate graphs, tables etc.

RESULTS

Out of 550 study participants, 216 (39.27%) were females and 334 (60.73%) were males. The most of the study participants were from 46 to 60 years (36.2%) followed by 61 to 75years (26.9%). Multiple co-morbidities were found among the study participants. Majority of 207(37.64%) patients had cardiovascular related complications followed by 184 (33.45%) patients had endocrine disorder, Pulmonary (31.82%), Renal (20%), Anaemia (19.45%), CNS (16.91%) disorders respectively.

As per Tables 1 and 2, the average number of medications per prescription is 10.87. The majority of the medications administered were in brand names (64.61%), rather than in generic names (35.39%). Compared to combination therapy (21.14%), monotherapy (78.06%) was preferable. The percentage of drugs that were prescribed according to WHO EML list and NLEM list were 61.47% and 74.01% respectively.

Drug Utilisation Pattern

Among the Class of Cardiovascular Agent, Antihypertensive (94.50%) were most prescribed type of drug followed by Antiarrhythmic (2.79%), Hypotension (2.26%), CHF (2.12%) and Antianginal (1.33%).

The most prescribed antimicrobials were of the class antibiotic (88.78%) followed by antiparasitic (5.30%), antiviral (4%) and antifungal (2.30%).

Among the Class of CNS agents, Antiepileptics (46.05%) were the most prescribed type of drug followed by Antipsychotic (28.29%) and Anxiolytic (19.08%), the least prescribed drug was Anti-Alzheimer (1.32%).

Among the classes of Endocrine agent, majority patients were given Antidiabetic (88.3%) followed by Antithyroid (30.61%). Majority were administered by Insulin (89.05%) followed by OHA 29 (10.95%).

Among the classes of Electrolytes, majority patients were prescribed Normal saline (47.42%) and DNS (12.82%) was least prescribed.

Among the classes of drugs acting on blood, majority patients were prescribed Antihyperlipidemic (33.71%) and Immunoglobulin (0.45%) was least prescribed.

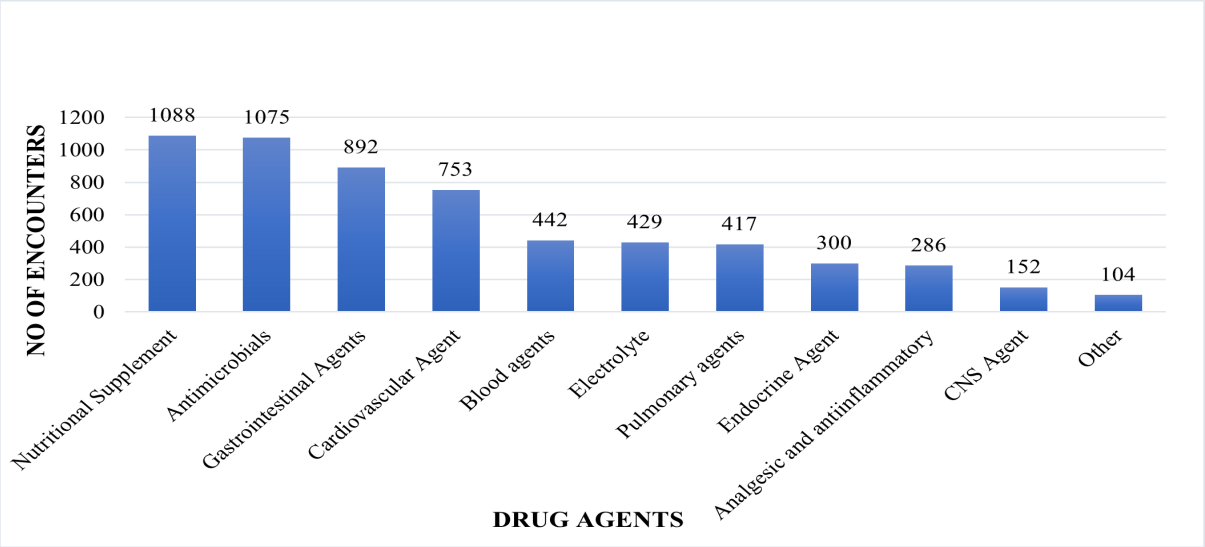

Figure 1: Total drug agents encountered in the study.

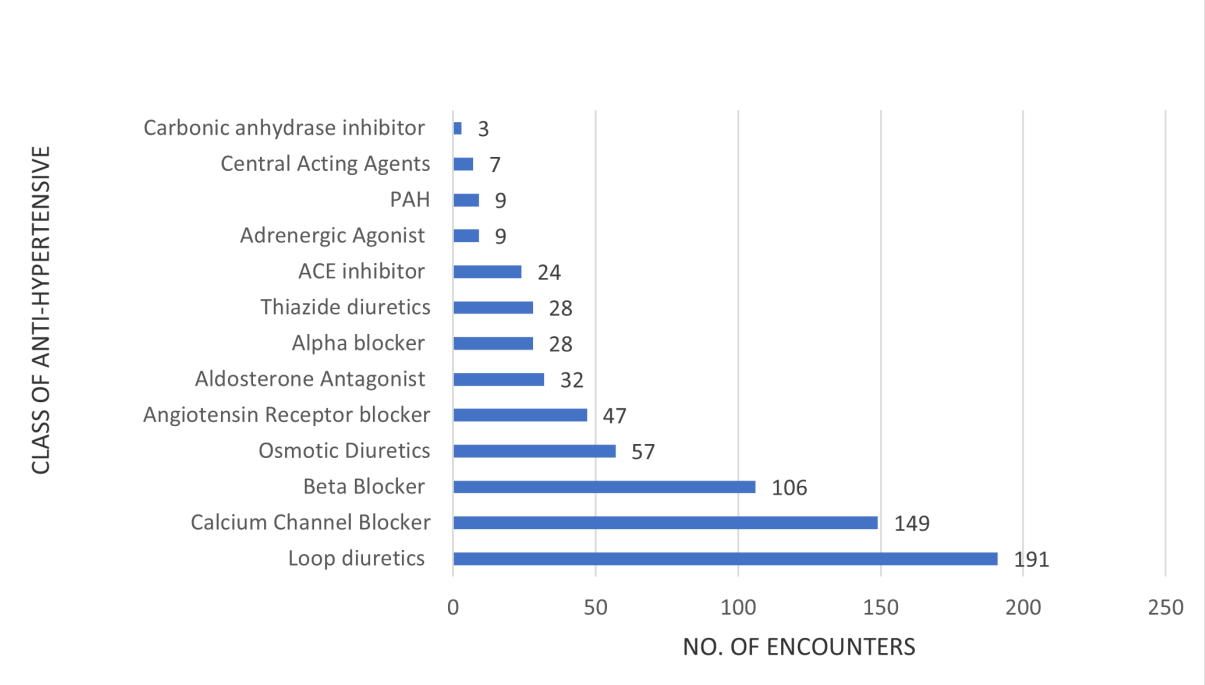

Figure 2: Various Classes of Anti-hypertensives encountered in the study.

Among the classes of drugs acting on pulmonary system, majority patients were prescribed Corticosteroid (49.4%) and Anti-TB (3.59%) was least prescribed.

Among the class of Analgesic and anti-inflammatory, Analgesic (13.9%) was least prescribed.

Among the other drug agent prescribed, majority patients were prescribed Hepatoprotective (75%) and Antigout (1.92%) was least prescribed.

Among the classes of gastrointestinal agents, majority patients were given PPI (47.42%) followed by antiemetic (30.61%), Laxative (12.78%), Probiotic (4.26%), H2 Receptor (3.03%) and Antidiarrheal (0.45%) respectively.

Among the total drug agents prescribed, Nutritional Supplements (18.32%) were the most prescribed, followed by Antimicrobials (35.1%) and Gastrointestinal Agents (5.1%), while the least prescribed was CNS Agent (2.55%), as shown in Figure 1.

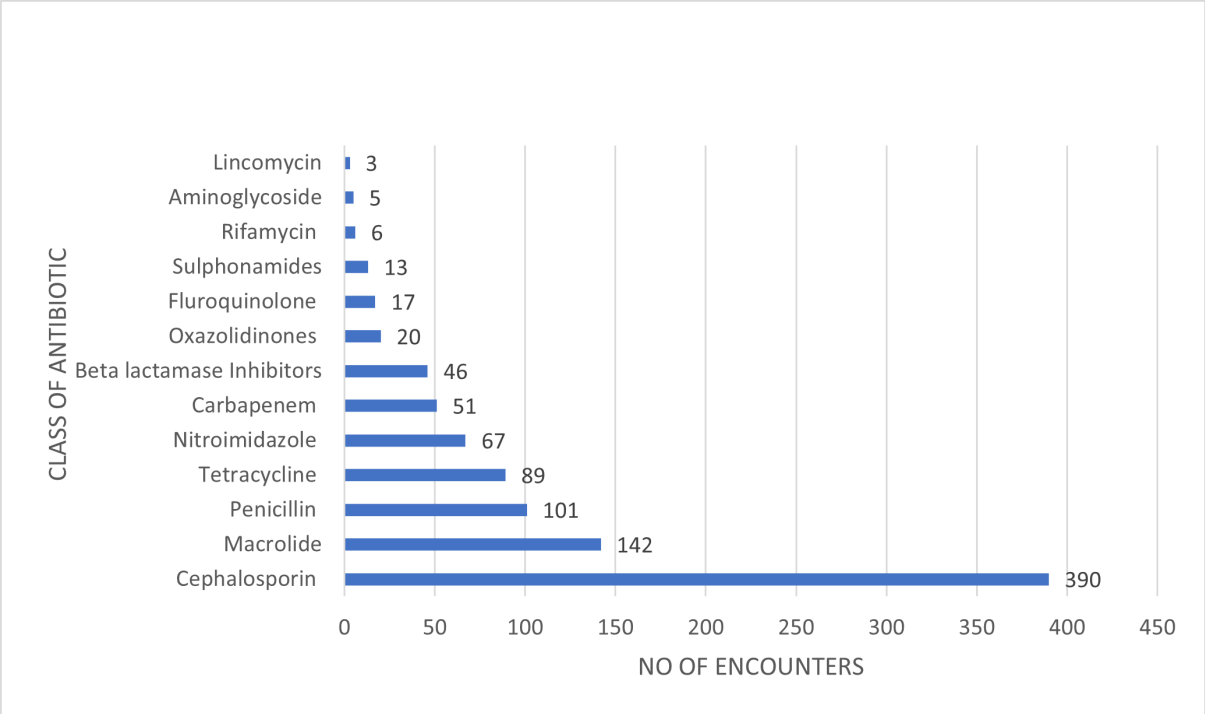

Figure 3: Various classes of Antibiotics encountered in the study.

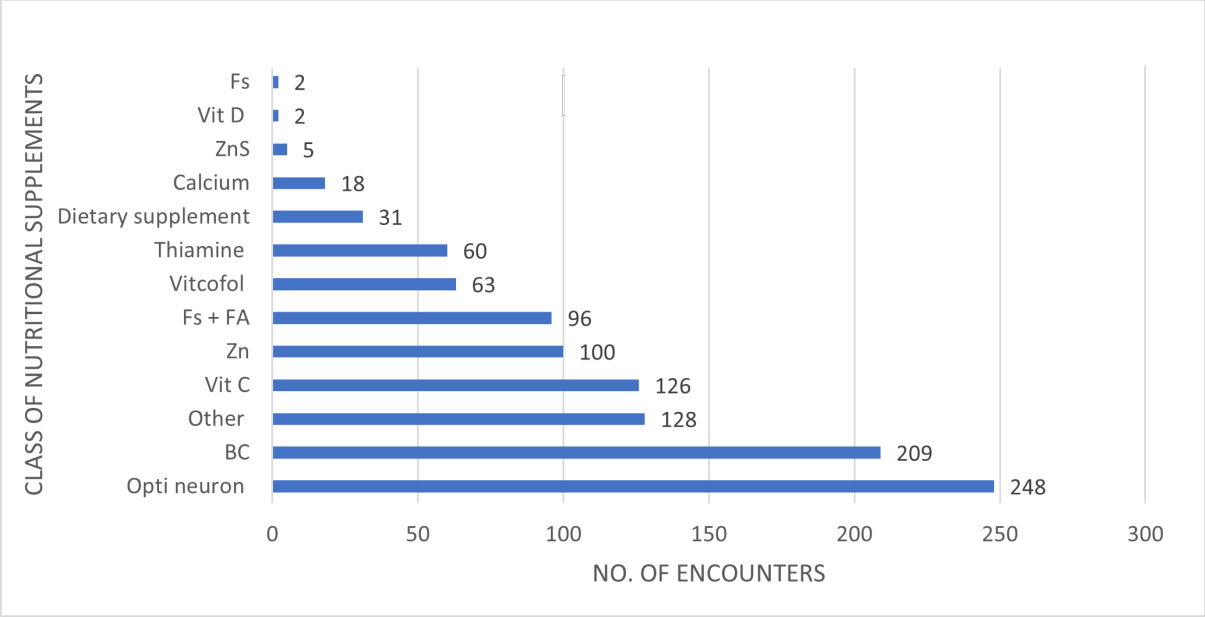

Figure 4: Class of Nutritional Supplements encountered in the study.

According to Figure 2, loop diuretics (27.68%) were the most commonly prescribed kind of antihypertensive medicine, followed by calcium channels (21.59%) and beta blockers (15.36%), while carbonic anhydrase inhibitors (0.43%) were the least prescribed.

In Figure 3, Cephalosporin (41.05%) is the most commonly prescribed antibiotic class, followed by Macrolide (14.95%) and Penicillin (10.63%). Lincomycin (0.32%) is the least prescribed medication.

Figure 4 demonstrates that Optineuron (22.79%) was the most commonly recommended nutritional supplement, followed by BC (19.2%), while Ferrous sulphate (0.18%) was the least.

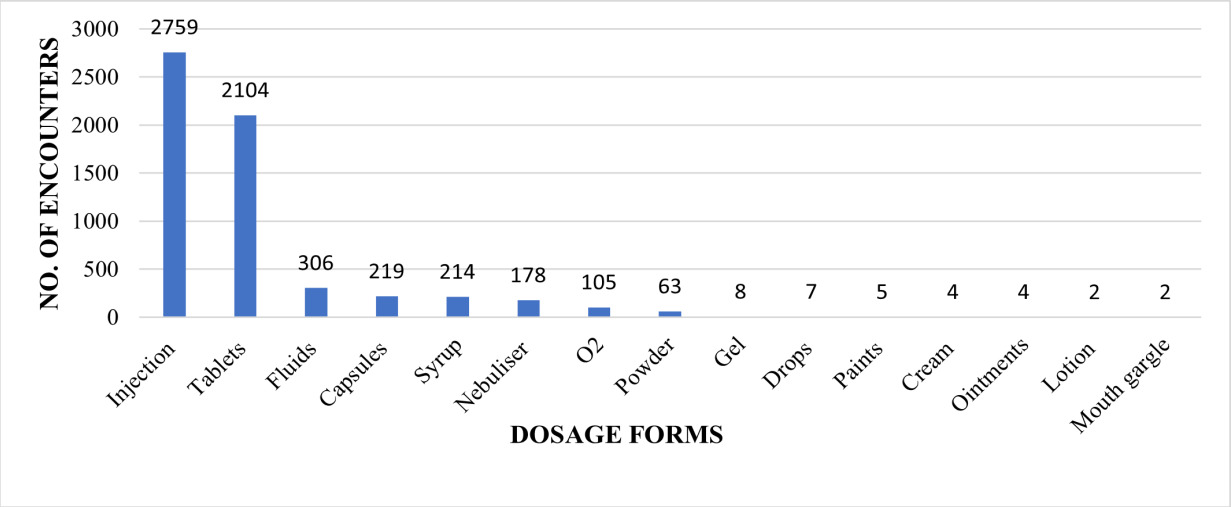

Figure 5: Various Dosage form encountered in the study.

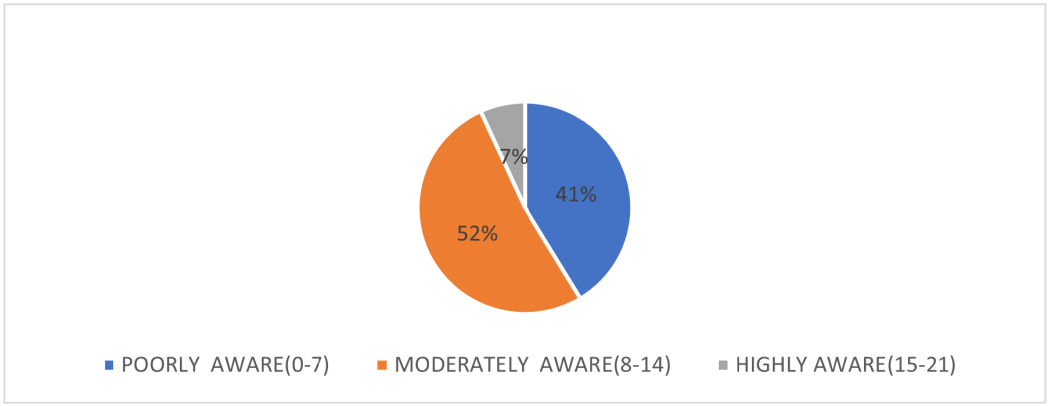

Figure 6: ABARK awareness survey.

As seen in Figure 5, the most commonly prescribed dosage forms were injections (46.1%), followed by tablets (35.1%) and fluids (5.1%). Mouth gargles (0.03%) were the least commonly administered.

The Abark awareness survey revealed moderate awareness among approximately half of the patients and their attendants, as seen in Figure 6.

DISCUSSION

This study which focused on the drug utilisation pattern of the 550 cases carried out in the medicine department of a tertiary care teaching hospital concluded that the common comorbid for which the patients were hospitalised the highest were cardiovascular disease (37.64) followed by endocrine disorder (33.45) and pulmonary disorder (31.82). The majority of the patients (36.2%) were in the age group of 46 to 60 years followed by the age group 61-75 years (26.9). The age group with least number of patients (3.6%) is above 75 years. 52% of our study population had a prevalence of more than one comorbid condition. Similar study was conducted by Pradeep Battula *et al.*[11] and M Praveen Kumar *et al.*[12] with 140 and 300 study population respectively, these studies varied in accordance with our study with male patient being the highest in contrast to 60% of females and 40% of males in our study.

Prescription analysis of our study population considered the average number of drugs per prescription to measure the degree of polypharmacy, percentage of drugs prescribed by generic name and brand name, percentage of drug prescribed from WHO list and NLEM list to measure the degree to which practices conform to national drug policy. Our study has a greater number of drugs per prescription (10.8%) due to a greater number of study populations (550) when compared with Praveen Kumar et al. study (9.3%)

The average number of drugs per prescription is high and denotes polypharmacy. Similar observation was done in studies of Pradeep Battula *et al.* and M Praveen Kumar *et al.* with total of 1379 drugs and 2799 drugs respectively. Our study showed 78.06% of monotherapy and 21.14% of combination therapy in

Table 1: Drug utilization pattern in general medicine.

Sl. No.	System	Category	Class	Drugs prescribed
1	Cardiovascular	Anti-hypertensive	Loop diuretics (*n*=191).	Furosemide (*n*=91).
			Calcium Channel (*n*=149).	Amlodipine (*n*=97).
			Beta Blocker (*n*=106).	Propranolol (*n*=23).
2	CNS	Anti-epileptic	Anticonvulsant (*n*=70).	Phenytoin (*n*=42), Levetiracetam (*n*=17), Sodium valproate (*n*=9), Carbamazepine (*n*=8).
		Anti-psychotic	Atypical antipsychotic (*n*=43).	Levosulpiride (*n*=6) Prochlorperazine (*n*=2), Risperidone (*n*=2).
3	Gastroenterology		PPI (*n*=423).	Pantoprazole (*n*=313), Omeprazole (*n*=4).
			Antiemetic (*n*=273).	Ondansetron (*n*=276).
4	Endocrine	Anti-diabetic	Insulin (*n*=236).	Plain insulin(*n*=132) H Mixtard (*n*=101) Basalog (*n*=30).
			OHA (*n*=29).	Metformin (*n*=37), Glebenclamide (*n*=2).
		Thyroid and Antithyroid	Hypothyroid (*n*=25).	Thyroxine Sodium (*n*=32).
			Hyperthyroid (*n*=10).	Carbimazole (*n*=2).
5	Antimicrobials	Anti-biotic	Cephalosporin (*n*=390)	Ceftriaxone (*n*=390)
			Macrolide (*n*=142)	Azithromycin (*n*=122)
		Anti-parasitic	Anthelminthics (*n*=43).	Ivermectin (*n*=17), Albendazole (*n*=35).
		Anti-viral	Neuraminidase (*n*=39).	Remdesivir (*n*=17), Oseltamivir (*n*=22).
		Anti-fungal	Azole (*n*=25).	Fluconazole (*n*=5)
6	Multivitamins		Water soluble vitamins (*n*=248).	Optineuron (*n*=256), B Complex (*n*=397).
			Fat soluble vitamin (*n*=2).	Vit D (*n*=3).
7	Electrolytes		Crystalloid fluid (*n*=210).	Normal Saline (*n*=208), Ringer Lactate (*n*=63).
8	Pulmonary		Corticosteroids (*n*=206).	Dexamethasone (*n*=54), Methyl prednisolone (*n*=10), Budesonide (*n*=105).
			Antiasthamtic (*n*=124).	Salbutamol (*n*=172), Ipratropium bromide (*n*=137).
			Cough Suppressant (*n*=45).	Acetylcysteine (*n*=35).
9	Blood	Anti-hyperlipidaemic	Statin (*n*=149).	Atorvastatin (*n*=51).
		Anti-platelet	Antiplatelet (*n*=135).	Aspirin (*n*=135).
		Anti-coagulant	LMWH (*n*=90).	Heparin (*n*=45), Enoxaparin sodium (*n*=35).
10	Analgesic and Anti-inflammatory	Anti-pyretic	Antipyretic (*n*=159).	Acetaminophen (*n*=159).
		NSAID	COX 2 inhibitor (*n*=87).	Diclofenac (*n*=5), Mefenamic acid (*n*=25).
		Analgesic	Opiate analgesic (*n*=40).	Tramadol (*n*=25).
11	Other		Hepato-protective (*n*=70).	Silymarin (*n*=26).

Table 2: Prescription Analysis.

Prescription catalogue	Frequency (n)	Percentage (%)
Total number of prescriptions analysed.	550	
Total number of medications prescribed.	5980	
Average number of medications per prescription.	10.87(1-11)	
Medication prescribed by generic name.	2116	35.39
Medication prescribed by brand name.	3864	64.61
Medication given as monotherapy.	4668	78.06
Medication given as combination therapy.	1302	21.14
Medication prescribed from WHO EML list.	3676	61.47%
Medication prescribed from NLEM list.	4426	74.01%

similar result to Pradeep Battula *et al*. with 90% of monotherapy and 10% of combination therapy.

The majority of drugs were prescribed in brand name 64.16% and 35.39% in generic name, in contrast to Pradeep Battula *et al*. study results showing 60.26% of generic drugs and 39.74% of brand drug, is similar to M Praveen Kumar study results showing highest drugs were prescribed in brand name (86.39%) and 13.61% of generic name.

The majority of prescribing pattern were adherent to EML bearing 74.01% from NLEM and 61.47% from WHO EML. Pradeep Battula study had similar inference 86.14% from NLEM and 67.22% from WHO EML. Among the 5980 drugs prescribed, the highest category were nutritional supplements (18.32%) followed by Antimicrobials (18.1%), Gastrointestinal Agents (15.02%), Cardiovascular Agent (12.68%) and the least prescribed were CNS Agent (2.55%).

There were higher rates of number of (46.1%) injectables followed by Tablets (35.1%), Fluids (5.1%) and least prescribed dosage form was Mouth gargle (0.03%). The drug prescribing pattern of our study followed the below pattern; The frequently prescribed drug among the multivitamins were water soluble vitamins like Optineuron and B complex, Fat soluble vitamins like Vitamin D. Most prescribed antimicrobials were Ceftriaxone and Azithromycin antibiotics. Pantoprazole and Ondansetron were most prescribed gastrointestinal agents. Furosemide and Amlodipine were the most prescribed Antihypertensives. Insulins and Thyroxines were likely prescribed endocrine agents. Crystalloid fluids like NS and RL were most prescribed electrolytes. Dexamethasone, Salbutamol, Acetylcysteine was the most prescribed pulmonary agent. Atorvastatin, Aspirin and Heparin were the most prescribed blood acting agents. Diclofenac, Acetaminophen and tramadol were the likely prescribed Anti-inflammatory and analgesic. The most prescribed drugs were as per the drug policy and also indicates the polypharmacy with the least combination of drug prescription.

CONCLUSION

In this study with 550 study population, it was observed that female was 216 and males were 334. Maximum numbers of patients belong to the age group 46-60 yrs. A total of 5980 drugs were prescribed. The average number of drugs was 10 (1-11). The generated data gives an idea on the disease pattern, Drug use pattern. This indicates a certain degree of polypharmacy, which refers to prescription of too many medications for individual patient with more than one comorbid condition. Encounter of drug with monotherapy and brand name was highest. Rational prescribing is seen due to majority of drug prescribed in accordance in WHO and NLEM list. Injectables were the most likely encountered dosage form. Nutritional supplements were the most prescribed drug category and greater than 52% of study population had multiple co morbidity with cardiovascular disease has the highest.

Under the medicine department the ABARK awareness status was moderate (51.3%) and gain the much awareness from the healthcare workers. It indicates the much-needed awareness and appropriate implementation of the scheme to improve the quality of healthcare under the scheme.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

ABARK: Ayushman Bharath Arogya Karnataka; **CNS:** Central Nervous System; **WHO:** World Health Organisation; **EML:** Essential Medicine List; **NLEM:** National List of Essential Medicine; **DUE:** Drug Utilisation Evaluation; **PMJAY:** Pradhan Mantri Jan Arogya Yojana; **KR Hospital:** Krishna Rajendra Hospital; **MMC-RI:** Mysuru Medical College and Research

Institute; **DUP:** Drug Utilisation/Use Pattern; **OHA:** Oral hypoglycaemic agents; **DNS:** Dextrose and Normal saline; **PPI:** Proton pump inhibitor; **LMWH:** Low Molecular weight Heparin; **NSAID:** Non-Steroidal Anti-Inflammatory drugs; **COX:** Cyclooxygenase; **ORS:** Oral rehydration solution; **ACE:** Angiotensin Converting Enzyme.

SUMMARY

Drug utilization research is important in clinical practice because it serves as the foundation for implementing changes to drug dispensing standards at the local and national level. This study signifies the need to prevent polypharmacy and abide to National drug policy for prescription. Appropriate implementation of the scheme and awareness is needed to improve the quality of drug utilisation. Clinical Pharmacist must encourage the generic name prescribing of drugs with fixed dose combination which leads to a greater rational drug use.

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