IOSR Journal Of Pharmacy And Biological Sciences (IOSR-JPBS)
e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 16, Issue 1 Ser. II (Jan. – Feb. 2021), PP 16-28
www.Iosrjournals.Org

Evaluation of Clinical Pharmacy Services Provided By Clinical Pharmacist in the Inpatient General Medicine Department of A Tertiary Care Hospital

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Abstract
Background: *To evaluate whether the clinical pharmacy services are needed to an tertiary care hospital and is a clinical pharmacist a worthy person in healthcare system or not.*
Aim: *To provide and evaluate the clinical pharmacy services provided by clinical pharmacist in the inpatient Gen. Med. Dept from that to improve better patient care and patient quality of life.*
Objectives: *To identify and rectify the drug related problems with the suggestions of physicians, evaluate drug interventional services, provide drug information services and evaluate them through the feedback given by other HCP 's, analyse its benefits in optimizing quality and safety use of medicines.*
Materials and Methods: *The present Prospective and Retrospective observational study with subjects involved from inpatient General Medicine department at Government General Hospital. Kurnool. The subjects are selected on the basis of inclusion and exclusion criteria. Statistical analysis include MS Excel and graphs, simple percentage.*
Results: *According to the professional status of the requesters analysed, physicians have asked 8% of queries, P.G interns have asked 54%, nurses have asked 18% and the others have asked about 20%. In total of 50 queries which were analysed, 44% of queries were related to drugs, 46% were related to disease, 6% about ADRs and 4% others.*
Conclusion: *Clinical pharmacist tend to have effective communication, counselling with patient in achieving successful outcome of treatment a pharmacist intervention with physician is helpful in reducing cost and minimizing ADR. This study provide evidence that value of Clinical pharmacist services as critical member of healthcare team who can effectively provide patient care and achieve positive clinical outcome. This study concludes that innating Clinical pharmacist services in patient care can help to identify, resolve and prevent the DRPs in hospital there by improve patient outcome the study stress the importance of Clinical pharmacist in health care system and impeccable role in patient care.*
Key Words: *Clinical pharmacist, ADR, DRP.*

Date of Submission: 23-01-2021 Date of Acceptance: 07-02-2021

I. Introduction

Pharmaceutical Care and Clinical Pharmacy: The term pharmaceutical care defines the care a patient requires to assure safe and rational drug use. Pharmaceutical care has ultimately been accepted widely in the pharmacy and medical profession. It has the patient has central focus and pharmacist directly interacting with patient and doctor to care for the patient medication needs. Pharmaceutical care is that the pharmacist take direct responsibility for the quality of patient care and provides a strong frame work for specific clinical pharmacy activities towards the goal of enhancing patient care.

Clinical Pharmacy Services: Clinical pharmacy is defined as those services provided by pharmacist in an attempt to promote rational drug therapy that is safe and cost effective. These services include:

- Medication history assessment.
- Medication order review.
- Clinical review.
- ADR monitoring.
- Patient medication education.

- Participation in ward rounds.
- Selection of drug therapy.

Drug Information Services: It is the service that encompasses the activities of specially trained individuals to provide accurate, unbiased, factual information, primarily in response to patient-oriented drug problems received from various members of the health care team. There are many types of drug information requests which may relate to therapeutics, ADR's, dosage and administration, drug interaction, drug use in pregnancy and lactation, drug pharmacokinetics, poisoning and toxicity and drug availability.
Drug Related Problems: Drug-Related Problem (DRPs) is defined as 'an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes. An actual problem has resulted in clinical manifestations like adverse drug reaction or therapy failure due to incorrect dosage. A potential problem is not manifest, but if left unresolved, it may lead to drug-related harm.
Adverse drug reaction: A response to a drug that is noxious and unintended and occurs at doses normally used in man for the prophylaxis, diagnosis, or therapy of disease or for modification of physiological function. Adverse drug reactions are identified by chart review, ward round participation are collected by using Naranjo's scale assessing the Naranjo's score by using the questions of assessment scale.

Drug Interactions: There are two types of interactions
1.Pharmacokinetic interactions

- Drug absorption
- Interaction altering drug distribution
- Interactions affecting metabolism
- Interaction affecting renal excretion

2. Pharmacodynamic interactions: Pharmacological synergism and pharmacological antagonism

Medication Error: Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems, including prescribing, order communication, product labelling, packaging, and nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use.

Pharmacy Intervention: A pharmacy intervention is defined as any action by pharmacist that directly results in a change in patient management or therapy. Intervention by pharmacist can be done in three ways namely
Active campaigns
Passive intervention
Reactive intervention

II. Methods And Materials

The present Prospective and Retrospective observational study with subjects involved from inpatient General Medicine department at Government General Hospital. Kurnool. The subjects are selected on the basis of inclusion and exclusion criteria. Statistical analysis include MS Excel and graphs, simple percentage.

SAMPLE SIZE:

- Drug information services – 50
- Drug related problems - 100 (ADRs, DIs, and ME)
- Interventions - 50

STUDY MATERIALS:

- Drug Information Form
- Pharmacist Intervention Form
- Adverse Drug Reaction Form
- Drug Interaction Form
- Medication Error Form

Inclusion criteria:

- Patients admitted in the Inpatient General Medicine Dept. at Government General Hospital, Kurnool.
- Patients receiving atleast one or two medications.
- Either gender is considered.
- Patients suffering from drug related problems.

Exclusion criteria:

- Patients who are receiving drugs other than allopathic medication.
- Out patients are excluded from the study.
  Newly diagnosed patients with no other diseases/disorders are excluded.

III. Results

Drug Information Service

According to the professional status of the requesters analysed, physicians have asked 8% of queries, P.G interns have asked 54%, nurses have asked 18% and the others have asked about 20% which is represented in table 1 and figure 1.

Profession	Number	Percentage
physician	4	8
nurses	9	18
PG intern	27	54
others	10	20
TOTAL	50	100

Table No.1 Professional Status of Requester

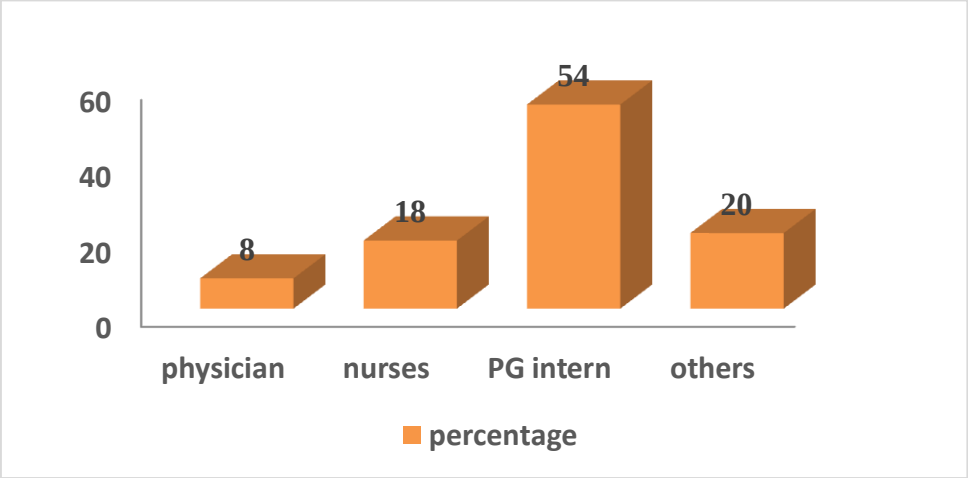

Figure No.1 Professional Status of Requestor

In total of 50 queries which were analysed, 44% of queries were related to drugs, 46% were related to disease, 6% about ADRs and 4% others which is represented in table 2 and figure 2.

Type of query	Number	Percentage
Drug	22	44
Disease	23	46
ADR	3	6
Others	2	4
TOTAL	50	100

Table No.2 Type of Query

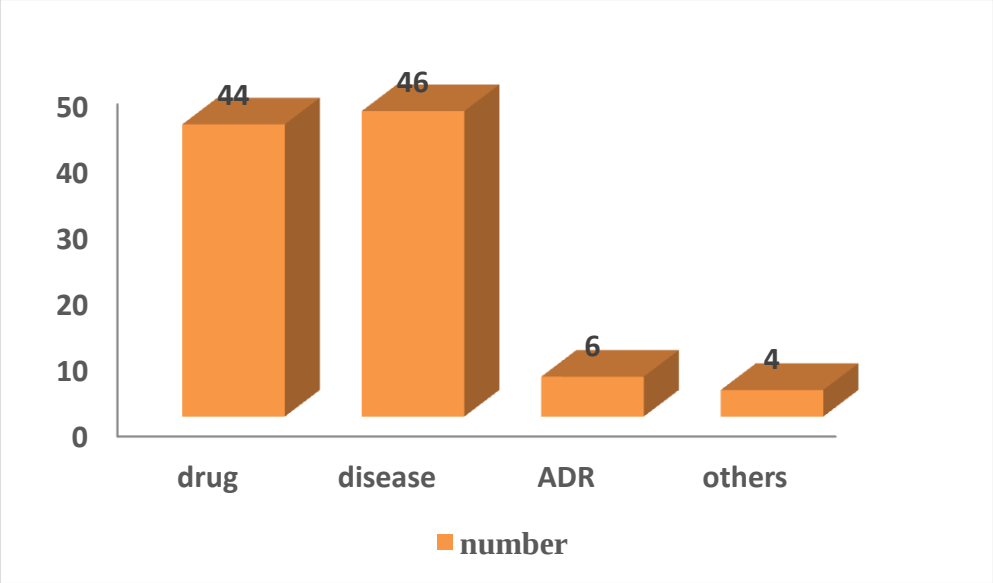

Figure No.2 Type of Query

Feed-back collected from the requesters have analysed, 46% of requester were appreciated the response with good followed by 40%, satisfactory and 14% needs improvement which is represented in table 3 and figure 3.

Feed back	Number	Percentage
Need improvement	7	14
Satisfactory	20	40
Good	23	46
TOTAL	50	100

Table No.3 Feed Back for Response

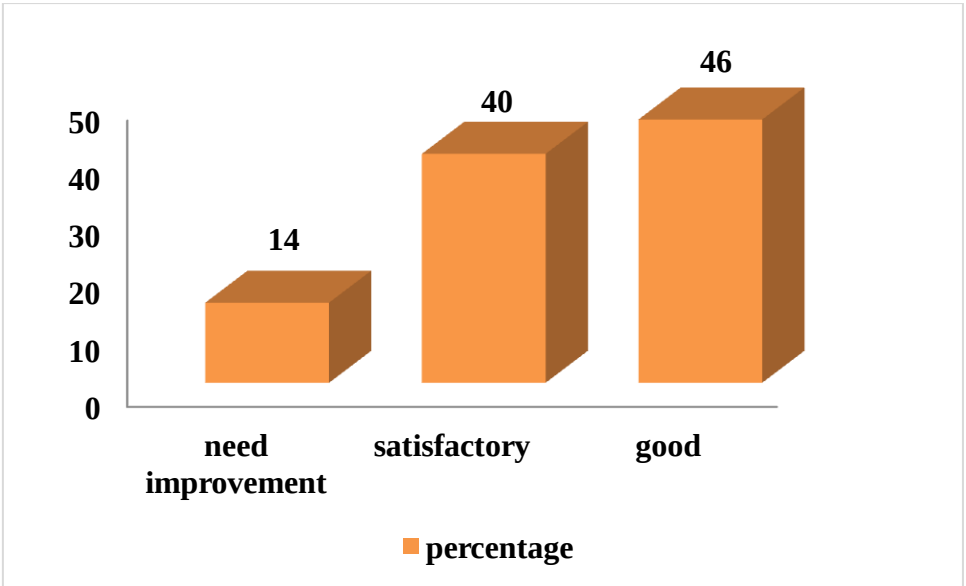

Figure No.3 Feed Back for Response

Adverse Drug Reactions

A total of 43 adverse drug reactions were identified and recorded and analysed the data considering the age in which 33.2% of adverse drug reactions were seen in 20-30 years of age where as 27.9% in 41-50 years, 16.3% in both 31-40 and 51-60 years of age and 7% were seen in 61-70 years which is represented in table 4 and figure 4.

AGE	NUMBER	PERCENTAGE
20-30	14	33.2
31-40	7	16.3
41-50	12	27.9
51-60	7	16.3
61-70	3	7
TOTAL	43	100

Table No.4 Age distribution of Patients with ADRs

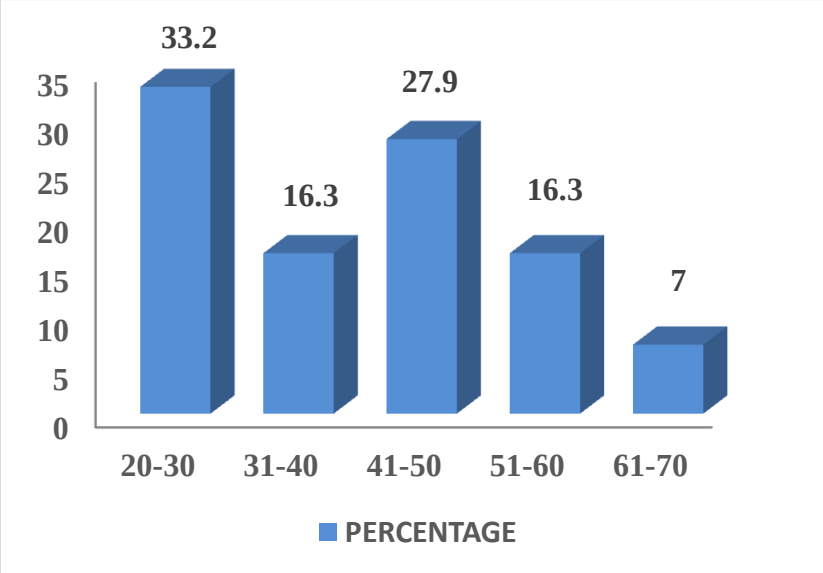

Figure No.4 Age distribution of Patients with ADRs.

By categorising the patients into male and female, in that 65.1% of adverse drug reactions were seen in female patients, where as 34.9% were seen in male patients which is represented in table 5 and figure 5.

Gender	Number	Percentage
Male	15	34.9
Female	28	65.1
Others	0	0
TOTAL	43	100

Table No.5 Gender distribution of Patients with ADRs

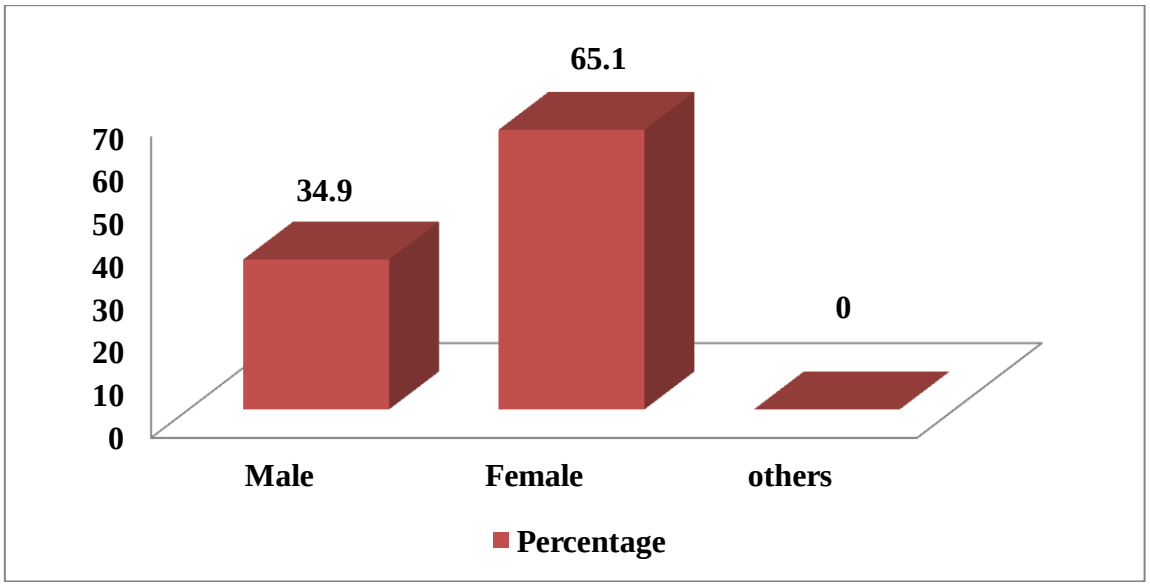

Figure No.5 Gender distribution of Patients with ADRs

As different drugs are used from different categories, data is analysed based on the category of drug in which 27.9% of ADRs were observed by antibiotics, 13.9% NSAIDs, 4.6% statins, 9.3% of anti-epileptics, 11.6% anticoagulants, 7% anti-hypertensive's and 25.6% others which is represented in table 6 and figure 6.

Class of Drug	Number	Percentage
Antibiotics	12	27.9
NSAIDS	6	13.9
Statins	2	4.6
Anti epileptics	4	9.3
Anti hypertensives	3	7
Anti coagulants	5	11.6
Others	11	25.6
TOTAL	43	100

Table No.6 Category of Drug showing ADR

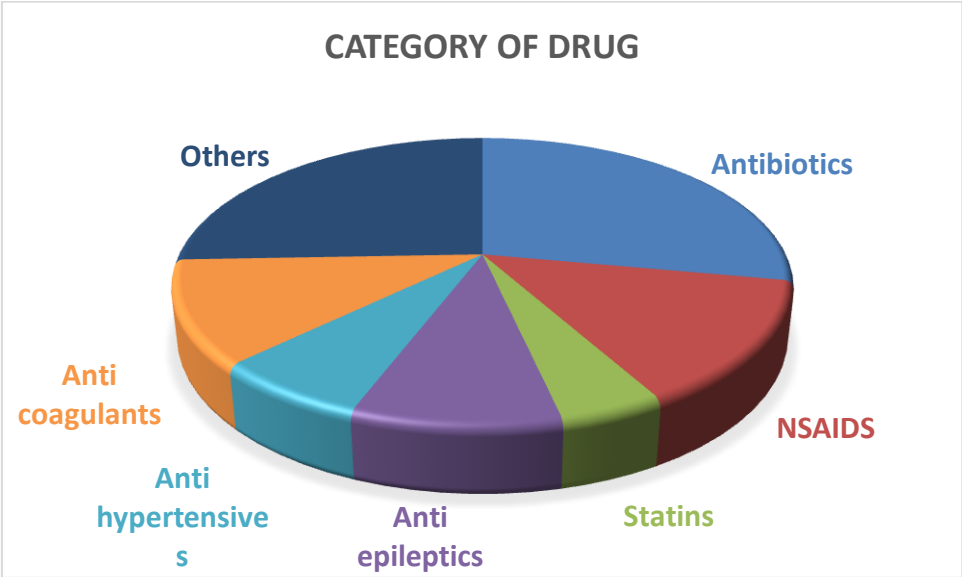

Figure No.6 Category of Drug showing ADR

Significance of ADRs based on severity were analysed, majority of ADRs were moderate with 46.5%, major 32.5% and minor 20.9% which is represented in table 7 and figure 7.

Severity	Number	Percentage
Minor	9	20.9
Moderate	20	46.5
Major	14	32.5
TOTAL	43	100

Table No.7 Severity of ADR.

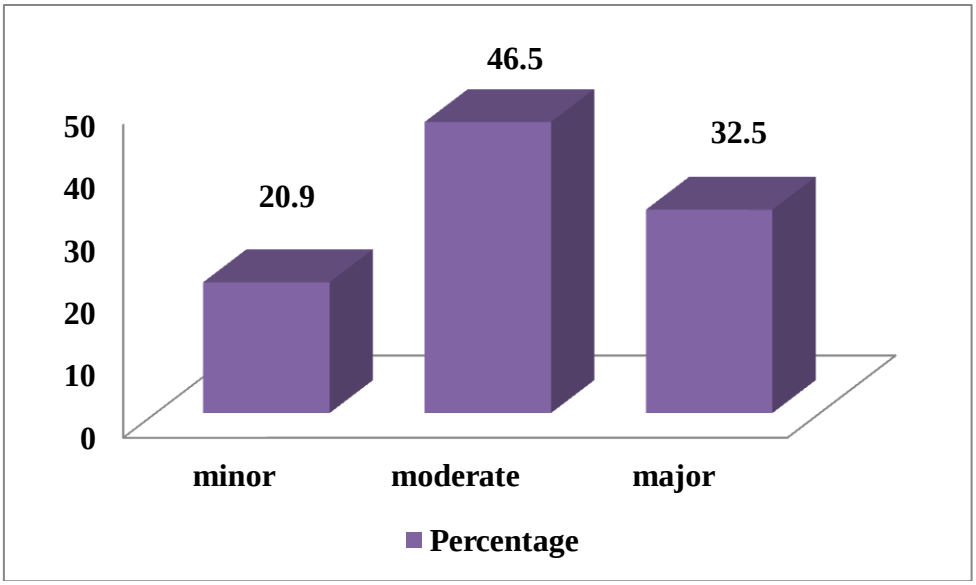

Figure No.7 Severity of ADR

Drug Interactions: In the data of 73 interactions, that are classified as per type of interaction, majority of the interaction are pharmacokinetic with 53.4% followed by pharmacodynamics 46.6% which is represented in table 8 and figure 8.

Type of interaction	Number	Percentage
Pharmacokinetic	39	53.4
Pharmacodynamic	34	46.6
Drug-food	0	0
TOTAL	73	100

Table No.8 Type of Drug Interaction

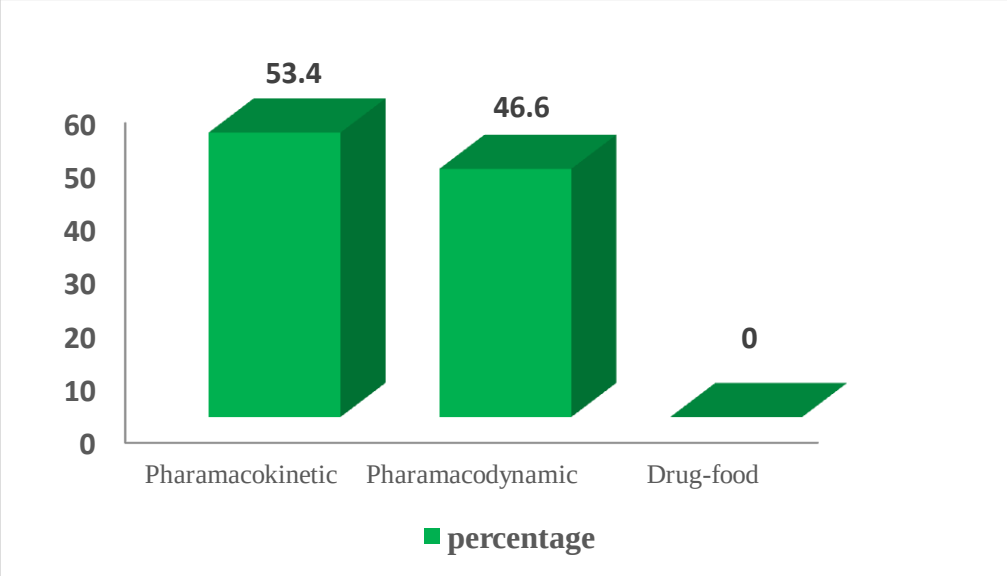

Figure No.8 Type of Drug Interaction

In the data of 73 drug interactions, 146 drugs are involved, in which the drugs are analysed as per category of it, 23.3% of interactions are shown by antibiotics, followed by 21.2% anti hypertensives, 8.2% anti platelets, 12.23% diuretics, 5.5% statins, 3.4% anti coagulants, 2.7% minerals and vitamins, 2.7% PPIs, 7.5% anti epileptics, 1.4% antacids, 0.7% benzodiazepines,3.4% corticosteroids, 1.4% anti emetics and 6.2% others which is represented in table 9 and figure 9.

Category of Drug	Number	Percentage
Antibiotics	34	23.3
Anti Hypertensive	31	21.2
Anti Platelets	12	8.2
Diuretics	18	12.3
Statins	8	5.5
Anti Coagulants	5	3.4
Vitamins & Minerals	4	2.7
Proton Pump Inhibitors	4	2.7
Anti Epileptics	11	7.5
Antacids	2	1.4
Benzodiazepines	1	0.7
Corticosteroids	5	3.4
Anti Emetics	2	1.4
Others	9	6.2
TOTAL	146	100

Table No.9 Category of Drug showing Interaction

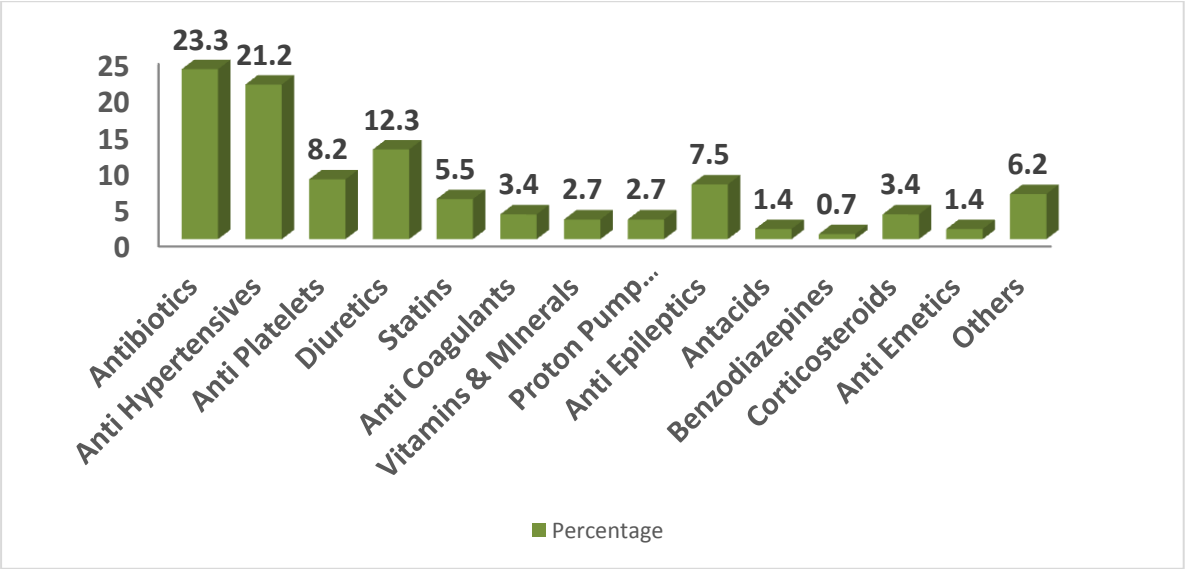

Figure No.9 Category of Drug showing Interaction

Data is analysed as per severity of drug interaction, 56.2% of interactions were moderate followed by 30.1% major and 13.7% minor which is represented in table 10 and figure-10.

Severity	number	Percentage
Minor	10	13.7
Moderate	41	56.2
Major	22	30.1
TOTAL	73	100

Table No.10 Severity of Drug Interaction

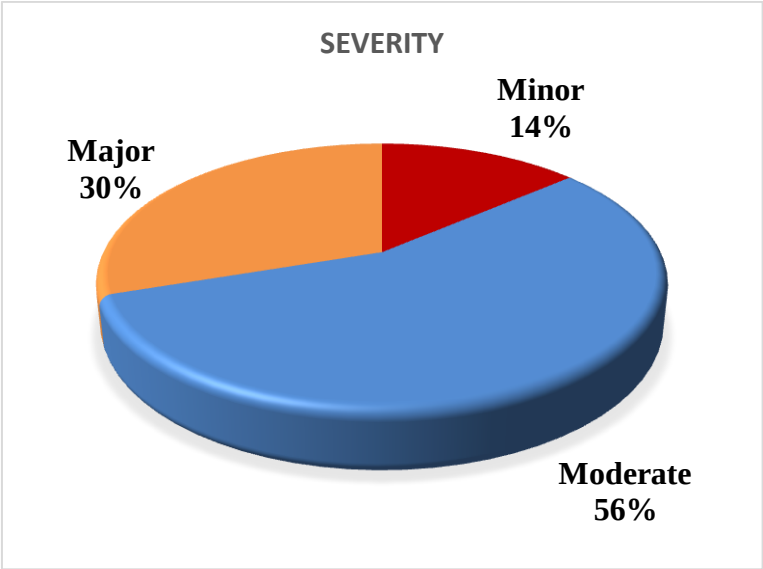

Figure No.10 Severity of Drug Interaction

Type of error	number	percentage
Omission	5	29.4
Wrong route	2	11.8
Prescribing	6	35.3
Compliance	1	5.9
Dispensing	1	5.9
Wrong dose	1	5.9
Wrong drug	1	5.9
TOTAL	17	100

Table No.11 Type of Medication Error

Medication Errors

Among the different types of errors the data is analysed based on its type, 29.4% were omission errors, 35.3% were prescribing errors, 11.8% were wrong route errors followed by 5.9% for compliance, dispensing, wrong dose and wrong drug errors which is represented in table 11 and figure 11.

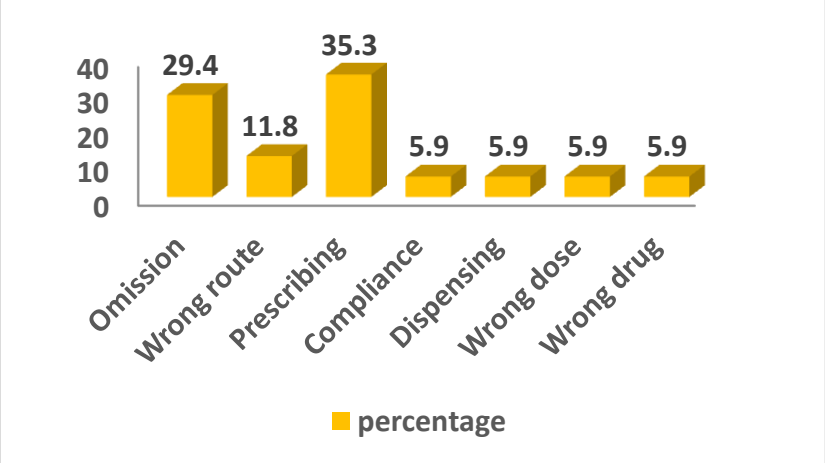

Figure No.11 Type of Medication Error

The professional status involved in the error are analysed, in that 76.5% doctors, 23.5% nurses which is represented in table 12 and figure 12.

Profession	number	percentage
Doctor	13	76.5
Nurse	4	23.5
others	0	0
TOTAL	17	100

Table No.12 Profession involved in Medication Error

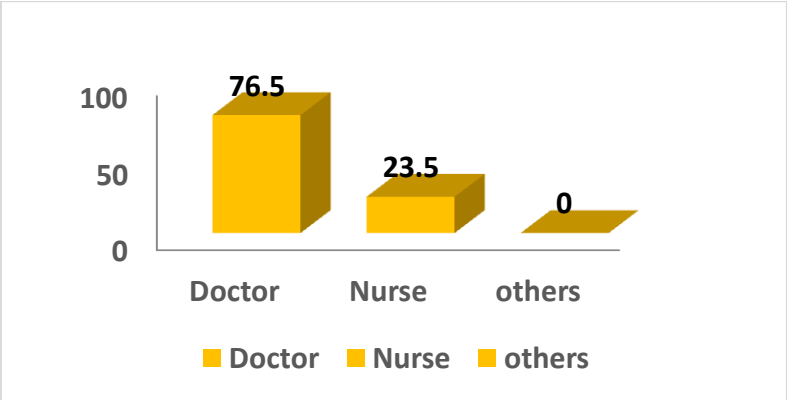

Figure No.12 Profession involved in Medication Error

Out of all identified errors, 70.6% of errors reached the patient and 29.4% errors haven't reached the patients.

Drug Interventional Services

Interventions classified during study based on significance of interventions, in that 35.8% of interventions were major, followed by 51% moderate and 13.2% minor which is represented in table 13 and figure 13.

Significance	Number	Percentage
Minor	7	13.2
Moderate	27	51
Major	19	35.8
TOTAL	53	100

Table No.13 Significance of Drug Intervention

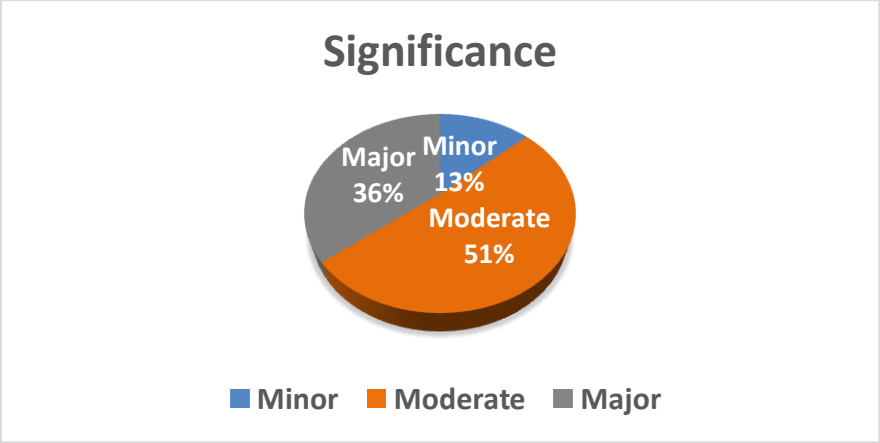

Figure No.13 Significance of Drug Intervention

In the case of professional status involved in the intervention, 57.4% were committed by physicians, 36.2% were committed by patients, 2.1% committed by nurse, 4.2% were committed by local RMP/others which is represented in table 14 and figure 14.

Profession	Number	Percentage
Physician	27	57.4
Patient	17	36.2
Nurse	1	2.1
RMP/Others	2	4.2
TOTAL	47	100

Table No.14 Profession involved in Drug Intervention

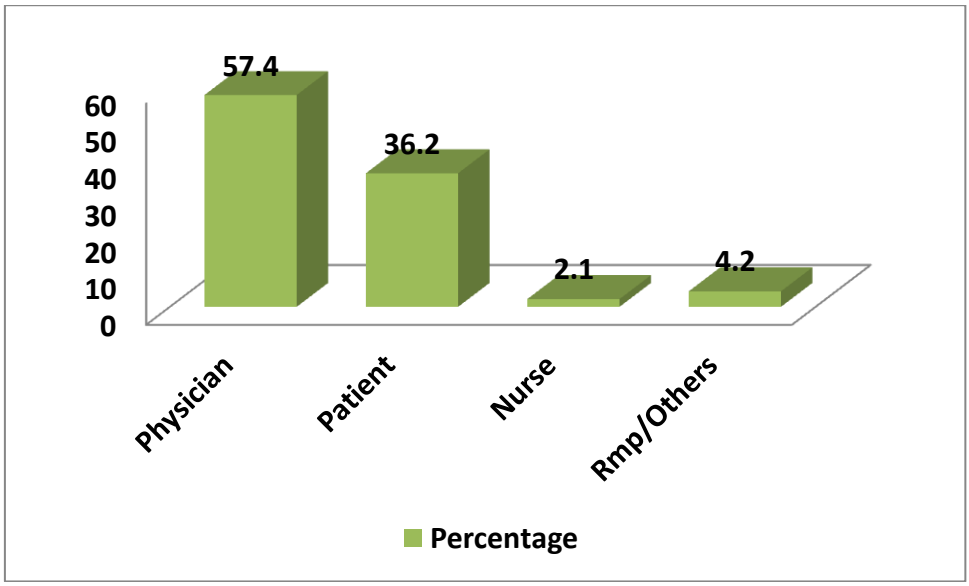

Figure No.14 Profession involved in Drug Intervention

In the evaluation of interventions, 45% of interventions are accepted, 20% are not rectified as prescribers justified the reason for them, 55% of interventions are not accepted as an error. The reason for not acceptance is may be those are based on literature but it is not an error to apply same in all situations and patients which is represented in table 15 and figure 15.

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Acceptance	Number	Percentage
Yes	24	45.3
No	29	54.7
Unknown	0	0
TOTAL	53	100

Table No.15 Acceptance rate of Drug Intervention

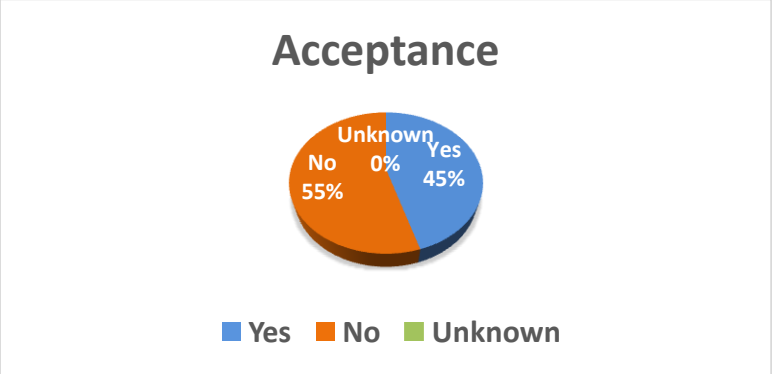

Figure No.15 Acceptance rate of Drug Intervention

IV. Discussion

Clinical pharmacy services improve patient care **in** hospital, pharmaceutical care delivered by clinical pharmacists is likely to have improved appropriateness of prescribing. Clinical pharmacists are key to ensure safe use of medicines in current system.

Some suggestions to improve DIC to provide information about recently approved drugs. There is need to bring greater awareness about DIC. DIS can help to detect and prevent ADR, ME and promote rational use of drugs. Awareness for utilisation of DIS is effective tool for better patient care. This study will help, understand the potential areas for improvement of DIS and ways in which DIS in our country can contribute to positive patient outcomes.

Clinical pharmacist improves pharmaceutical care in hospital carried out the study and assessed the clinical pharmacist-initiated changes in patient drug therapy and prevention of Drug Related Problems in medicine IP department.

- 43% of DRPs were ADRs
- 40% of DRPs were Drug Interactions
- 17% of DRPs were Medication Errors

Pharmaceutical care delivered by clinical pharmacist is likely to have improved appropriateness of prescribing and have beneficial outcomes.

In data of Pharmacist Interventions the reason for not acceptance is may be those are based on literature but it is not an error to apply same in all situations and patients. The way of communication between the physician/prescriber and pharmacist affects the acceptance rates. It is expected that lack of awareness about clinical pharmacy services influence rejection of intervention. Interventions based on ADR and DI contributes 49%.

V. Conclusion

Clinical pharmacist services are integral part of health care sector have effective role in patient care. They tend to have effective communication, counselling with patient in achieving successful outcome of treatment a pharmacist intervention with physician is helpful in reducing cost and minimizing ADR. Introduction of clinical pharmacy services is justified by the need to improve appropriateness of prescribing. This study provide evidence that value of Clinical pharmacist services as critical member of healthcare team who can effectively provide patient care and achieve positive clinical outcome. Clinical pharmacist services should be encouraged to engage in direct patient care services where their impact on health care system is not appreciated. Clinical pharmacist services are unique in health care team and also aware of costs of drugs they offer an new approach in reducing costs. This study concludes that innating Clinical pharmacist services in patient care can help to identify, resolve and prevent the DRPs in hospital there by improve patient outcome the study stress the importance of Clinical pharmacist in health care system and impeccable role in patient care.

Acknowledgement

It is a proud and privileged honour for us to express our heartful thanks and gratefulness to all individuals who lend a hand for us directly or indirectly throughout this project work. It is the immense pleasure to express our gratitude and deepest appreciation to our institutional guide Dr. Sayyed Basheer, PharmD, Assistant Professor, Department of Pharmacy Practice, to our hospital guide Dr. K. Narasimhulu M.D(General Medicine)., DTCD, Professor and HOD, Department of Medicine, Government General Hospital, our Honourable Chairman Dr.K.V.Subba Reddy, Correspondent K. Vijayalakshmi, Dr. KVSR Institute of Pharmacy, we pay our obeisance to GOD, the almighty to have bestowed upon us the good health, courage, inspiration, zeal and the light throughout our dissertation work.

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Chenamaraju Rohith Siri Subramanyam, et. al. "Evaluation of Clinical Pharmacy Services Provided By Clinical Pharmacist in the Inpatient General Medicine Department of A Tertiary Care Hospital." *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)*, 16(1), (2021): pp. 16-28.