

Assessment and Monitoring the Benefits and Harmful Effects of Drug Utilisation in Indian Health Care System by Clinical Pharmacist.

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Abstract

Studies on drug use in the Indian healthcare system have a strong emphasis on grasping and assessing prescription patterns, drug use, dispensing, and developing solutions to improve the system's quality. A study on drug use was conducted in the Akash Institute of Medical Sciences and Research Center, Bengaluru. In a prospective study, data from 142 individuals were examined; the bulk of these patients, 59 patients (41.54%), are in the 45–65 age range, and 85 (59.85%) of them are male, while 57 (40.14%) are female. According to research of 142 patients, drug-drug interactions were relatively more common than medication and prescription error. The study demonstrates that drugs are used in safe and effective manner to enhance patient health status. This study also includes drug usage accountability and creates standards for responsible use of drugs.

Keywords: *Drug Utilization Study, Prospective study, Prescribing patterns, Medication errors and drug- drug interactions.*

Introduction

Drug utilisation research is a set of analytical and descriptive techniques for quantifying, comprehending, and assessing the processes of prescribing, dispensing, and consuming medications. It also includes the evaluation of potential interventions to improve the efficiency of these processes.[1] Drug usage is intended to strive to achieve proper therapeutic decision making and acquire a beneficial outcome for the patient. Drug use will help ensure that drugs are utilized appropriately. If the treatment is believed to be ineffective, it will be necessary to intervene with providers or patients to optimise medicine. In addition to playing a crucial role for clinical pharmacists, the WHO views drug use as occurring in four stages across society that is Marketing, distribution, prescription, and usage. [2] In 1996, at a meeting in Lake Balaton, the independent European Drug Utilisation Research Group (Euro-DRUG) was formally established. According to Euro-DRUG, drug utilisation research should not only provide data on drug sales but also facilitate investigation of issues pertaining to the safe and effective use of medications, such as:

- Why are drugs prescribed?
- Who prescribes drugs and for whom?
- Do patients correctly take their medications?
- Which medications come with benefits and risks? [3]

The panel believed that a drug usage review needed to be examined and supported by reliable data before it could be implemented.

The taskforce considered that drug utilisation review should be evaluated and need valid evidence to put into effect.

In community pharmacy setting, Federal law (OBRA-90) requires drug utilisation review for patients receiving medications through Medicaid, then drug utilisation review was common in society.[4] Recognizing that Medicaid recipients faced similar risks in the

1980s, Congress provided for the ambulatory drug utilisation review under the Omnibus Budget Reconciliation Act of 1990. It set up three relevant goals for a drug utilisation review program. They are as follows:

- ✓ Reducing hospitalizations due to adverse drug events.
- ✓ Preventing and detecting fraud and abuse.
- ✓ Supporting evidence-based prescribing through communication with others through academic details (i.e, face-to-face educational outreach by authoritative professionals in the non-profit sector).[5]

Value of DUR programs in managed care

From a few hundred thousand to millions of patients, managed health care organizations and pharmacy benefit management firms (PBMs) are in charge of overseeing pharmaceutical use. These organizations, understanding, interpretation, and improvement of the prescribing, administration, and usage of drugs are significantly aided by Drug utilization review(DUR) programs. This is frequently done by giving prescribers feedback on their performance and prescribing practices in comparison to pre-set criteria or treatment regimens using DUR programs. [6] Prescribers might contrast their method of treating specific diseases with that of their peers using DUR information. By creating benchmarks through these comparisons, prescribers can be encouraged to alter their prescribing practices in an effort to provide better treatment. By reporting prescriber adherence rates, for instance, many health plans use DUR to urge prescribers to use more generic medications and to adhere to treatment recommendations made by national organizations like the National Institutes of Health or the American Heart Association. [7]

DUR data also helps PBMs and managed health care organizations create training initiatives to boost patient compliance, formulary adherence, and sane prescribing. Clinical pharmacists may conduct these training initiatives through face-to-face interactions with prescribers and patients, calls, letters, newsletters, educational symposiums, and more.[8]

Role of clinical pharmacist in DUR

- Program development, supervision and coordination.
- Training for healthcare workers.
- Promotion of the objectives and aims.
- The creation and evaluation of audit criteria.
- Locate areas where quality can be improved.
- Takes part in initiatives to enhance:
 - Patient outcomes.
 - Program quality.
- Encourages the use of drugs responsibly in order to lower total healthcare expenditures and increase access to care.
- Upholds moral and professional obligations [9]

Significance of this Study

- Evaluating the use of drugs.
- Tracking the Health Benefits of Drugs.
- Recognizing the Negative Effects of Drugs.
- Improving the patient's condition and getting the treatment they want.
- Talking with the patient about the condition
- During participation in the ward-round process, we recognized drug-drug interactions, drug-food interactions, and medication errors while keeping an eye on the prescriptions. Therefore, we carried out this study to lessen errors and enhance quality of life.[10]

Why we need this study?

- To improvise, and to get the desired and rational treatment in the general medical department.
- To learn a great deal about the various drugs, their positive and negative effects [11]

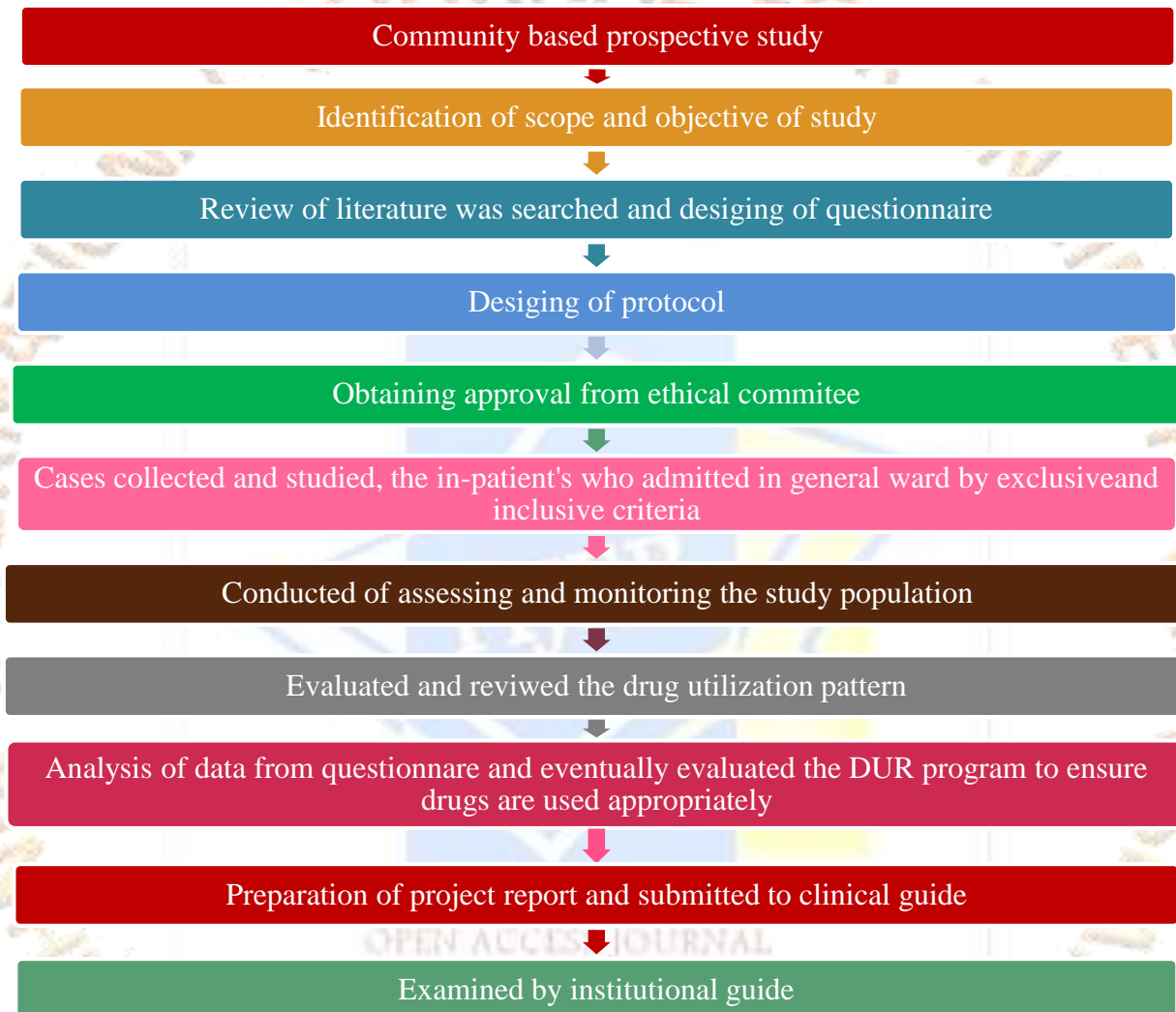
Materials and methods

The study was conducted when in the patients participated in the six-month, prospective, non-interventional trial, which ran from July 2022 to December 2022. The information was acquired from the Akash Institute of Medical Sciences and Research Centre, Devanahalli Bengaluru, in-patient department. Utilizing patient data collection forms, patient case sheets, laboratory data, and prescription records, the investigation was undertaken.

Inclusion criteria: All patients who were over 18 years old and regardless of gender were included.

Exclusion criteria: Patients who were pregnant, had a psychological illness, or who were unwilling to participate in the study were eliminated. All patients who complied with the study's requirements were included.

STUDY DESIGN FLOW CHART

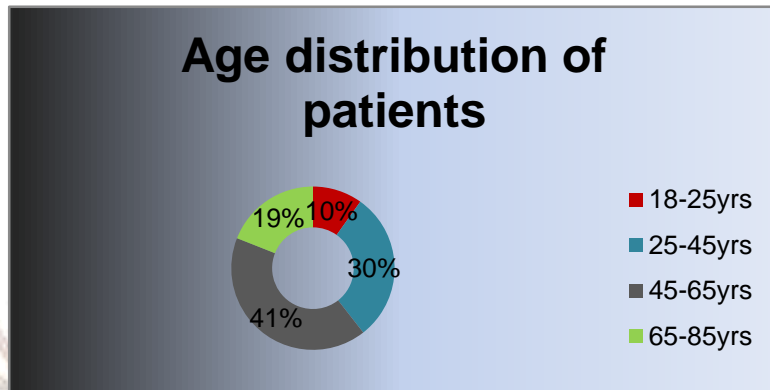


RESULTS

1)Age distribution of patients

- In age-wise distribution, among 142 patients the percentage of 45-65 years range (41.54%) was found to the greater extent.

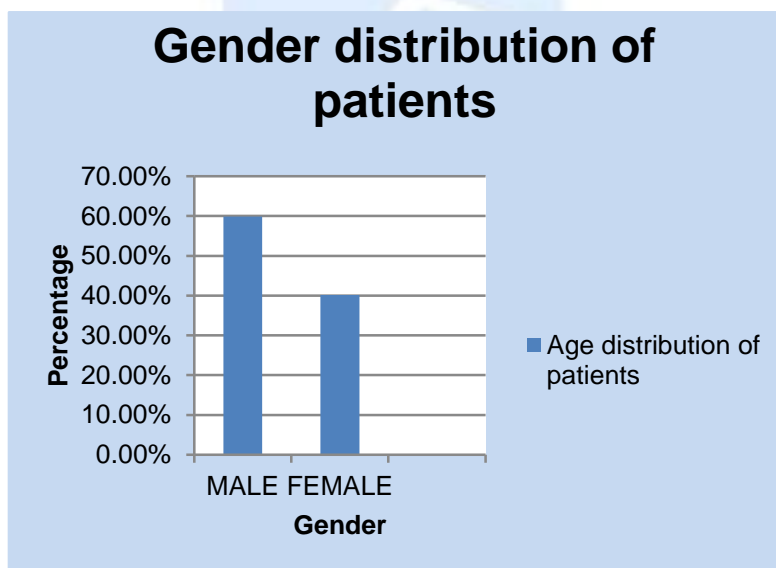
FIGURE 1: Age distribution of patient



2)Gender-wise distribution:

142 patients were enrolled into the study, among those 85(59.85%) is male, and 57(40.14%) is female.

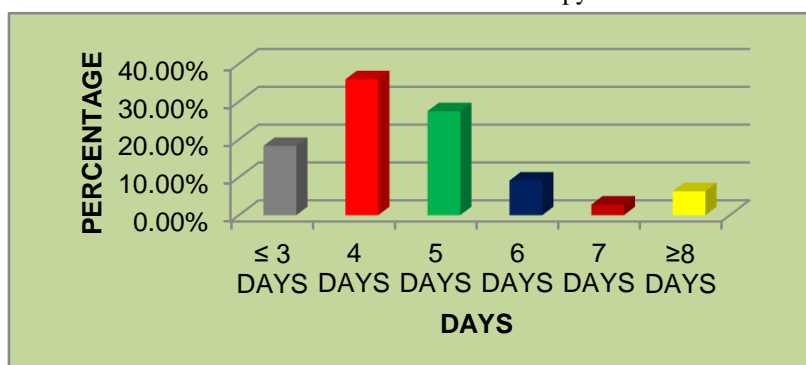
FIGURE 2: Gender distribution of patients.



3)Duration of therapy:

- Duration of therapy, among 142 patients 31 patients were treated and discharged within 2 days (21.83%), 51 patients were treated and discharged within 4 days, (35.91%),38 patients were treated and discharged within 5 days (26.76%),13 patients were treated and discharged within 6 days, (9.15%),4 patients were treated and discharged within 7 days (2.81%),5 patients were treated and discharged more than 8 days(3.52%).

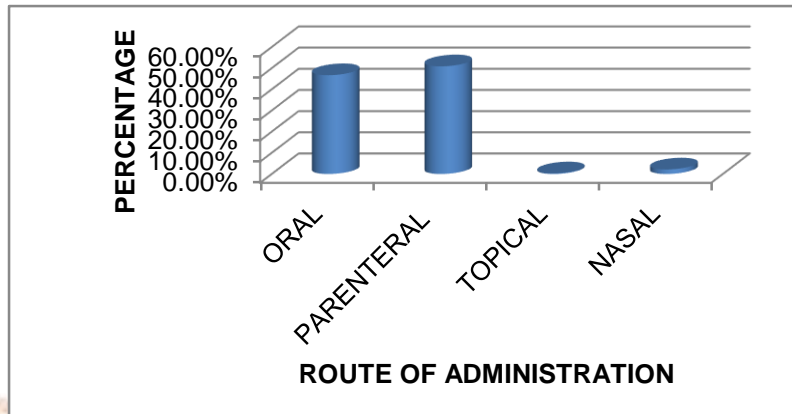
FIGURE 3: Duration of therapy



4)Route of administration

- In route of administration among those 1028 drugs, 480 drugs were prescribed orally (46.69%),523 drugs were prescribed parenterally (50.87%), 3 drugs were prescribed topically (0.29%) and 22 drug were prescribed in nasal route (2.14%).

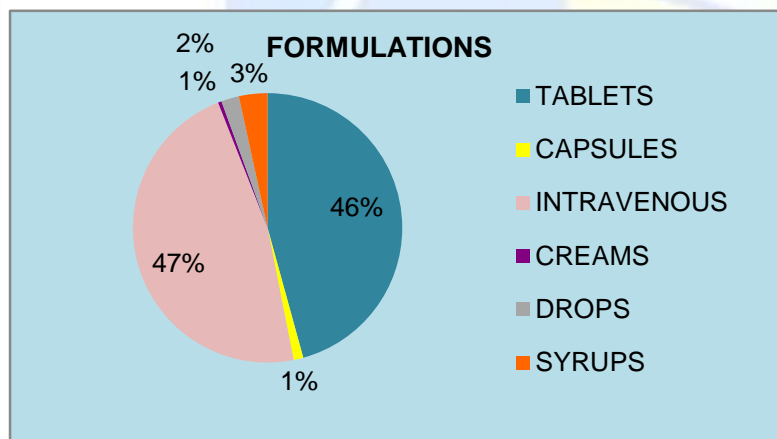
FIGURE 4: Route of administration



5)Formulations Prescribed

- Among 934 drugs, formulations of tablets were prescribed to 427 patients (45.71%). Capsules were prescribed to 11 patients (1.17%). Intravenous were prescribed to 440 patients (47.10%). Creams were prescribed to 4 patients (0.428%). Drops were prescribed to 20 patients (2.14%). Syrups were prescribed to 32 patients (3.42%).

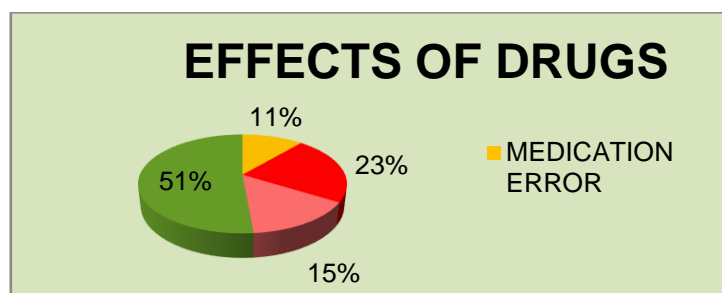
FIGURE 5: Formulations prescribed.



6)Various harmful effects found in the in-patient department.

- On analysis of 142 patients, it represents that Drug-Drug interactions was comparatively more than Medication errors, Drug-Drug interactions with medication error i.e., 22.5%, 11.2% ,14.78% respectively and there are 73 cases with no harmful effects.

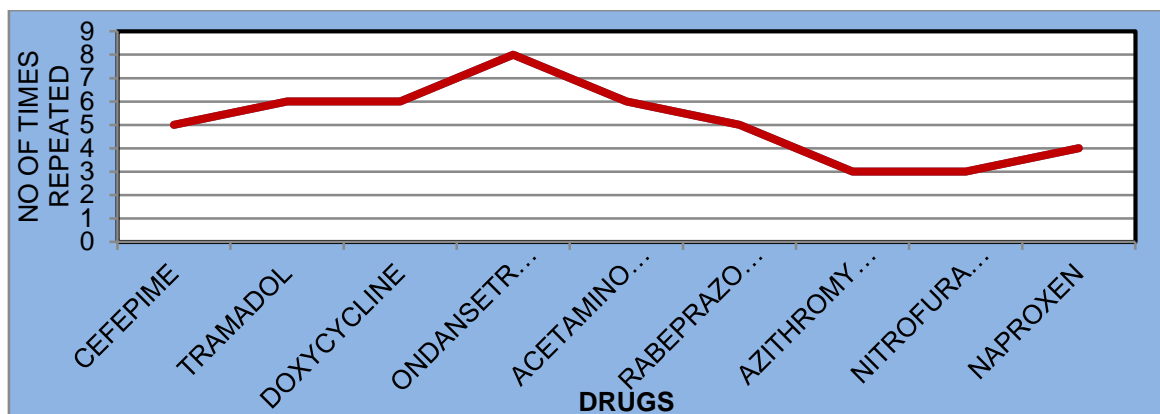
FIGURE 6: Effects of drug



7)Drugs that have most drug - drug interactions

Among the drug-drug interactions, the highest number of interactions were found using the drug Ondansetron (8 times) followed by Tramadol, Doxycycline, Acetaminophen. (6 times).

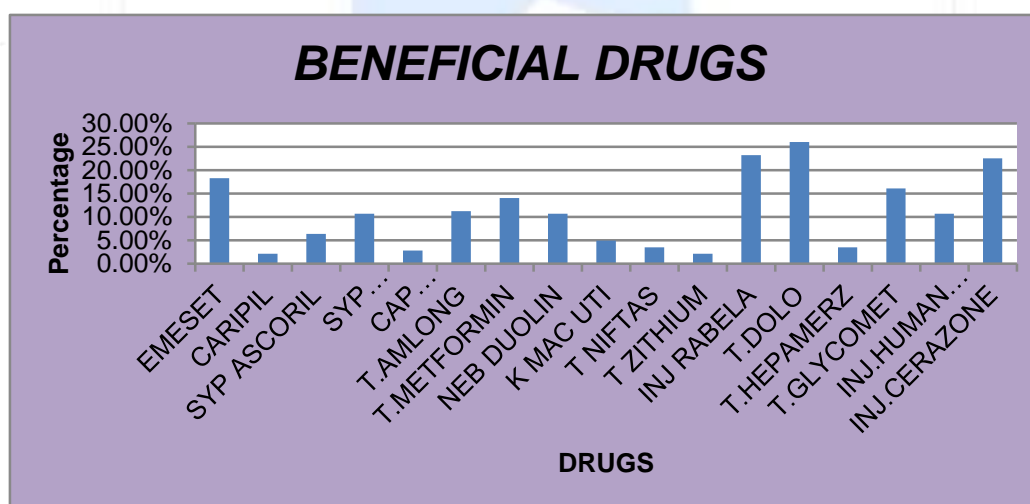
FIGURE 7: Distribution of Drug-Drug interactions



8)Medication errors found in the study:

The major group of medication error in the study was prescription error, (48.64%) followed by other medication error (such as drug duplication, unauthorized medication error etc) and the subjects with omission error were least (2.7%).

FIGURE 9: Beneficial drugs



9)Commonly prescribed beneficial drugs in the study

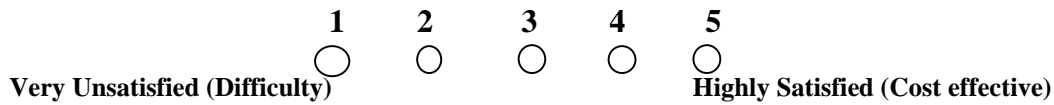
The major prescribed drug is found to be Tab Dolo (Acetaminophen (26.05%) in the study.

10) Study cost analysis of drugs in the patients.

TABLE 1: Cost analysis of drugs in patients

SL NO	CATEGORY	RATINGS	NO OF SUBJECTS	PERCENTAGE
1.	ECONOMICAL (HIGHLY SATISFIED)	☆☆☆☆	3	2.11%
2.	MODERATELY SATISFIED	☆☆☆☆	23	16.19%
3.	SATISFIED	☆☆☆☆	61	42.95%
4.	MODERATELY UNSATISFIED	☆☆☆☆	49	34.50%
5.	UNSATISFIED	☆☆	6	4.22%
TOTAL			142	100%

Is cost of the drug is concern to you?



- Among 142 cases, 42.95% subjects were satisfied, 34.50% subjects were moderately unsatisfied, 16.19% subjects were moderately satisfied, 4.22% subjects were very unsatisfied and 2.11% subjects were highly satisfied.

FIGURE 10: Cost analysis of drug in patients.



Discussion

In this study, clinical pharmacists were used to examine and monitor the positive and negative consequences of drug use on the Indian healthcare system. We carried out a prospective, non-interventional trial that lasted for a total of six months. The findings of our investigation indicate that, based on the inclusion and exclusion criteria, 142 patients were enrolled in the study. In the study, men are often more prone to illness. According to the severity of the patient, the severity increases as therapy time increases and decreases, respectively. Drugs given intravenously are more effective than those given orally. The end result demonstrates that parenteral (IV) delivery was the primary method of our study's formulations. The study analysed the harmful effects of medications on 142 patients, finding that drug-drug interactions were more common than medication errors. The major group of errors was prescription errors (46.64%), followed by other errors like drug duplication and unauthorized medication errors. The study found that Ondansetron was the most frequently used drug. Tab Dolo (Acetaminophen) was the most prescribed drug (26.05%), with most patients finding it beneficial. The cost-effectiveness of drugs was found to be most economically satisfied (42.95%). The research concluded that drug related omission errors and significant errors in prescriptions and prescribed medicines were the most frequent prescription errors. This study analysed the harmful effects of medication on patients found the drug-drug interactions were common than medication errors [12]. The study provided an explanation of prescription auditing and prescribing practices in hospital settings and suggested standard treatment guidelines to encourage prudent use.[13] The evaluation study revealed that patient care procedures and patterns for prescribing medications were unsuitable, and it came to the conclusion that medical and pharmacy schools should improve their teaching of rational drug use.[14] The study identified and examined problems associated with prescribing, dispensing, monitoring and assessing medication use.[15]

Conclusion

The study highlights the importance of clinical pharmacist in healthcare systems, as they interact directly with physicians and patients to ensure appropriate medication prescriptions, prevent drug interactions, and reduce medication errors. They also promote appropriate drug use to reduce healthcare costs and improve patient care quality. The study found that drug-drug interactions were more common than prescription errors, with ondansetron being most common, Pharmacist interventions are suggested to physicians while monitoring case sheets.

REFERENCES

- [1] Referred from the book 'Drug utilization Research Methods and applications', written and copyright by John Wiley and sons, Ltd – part 1; introduction to drug utilization research (page:1-12) & part 2; study designs in drug utilization research (page:13-28).
- [2] Referred from the book 'A Guide for Pharmacist's', 5th edition. Chapter 15-Medication Misadventures-1 of Adverse drug interactions written by Zara Risoldi, Darren Hein, Philip J. Gregory - pg no 741.
- [3] American society of health –system pharmacist. Suggested definitions and relationships among medication adventures, medication errors, adverse drug events and adverse drug reactions. Am J Health syst pharm. 1998;55:165-6.
- [4] Kanishk Kala, Rupinder Kaur Sodhi, Upendra Kumar Jain.; Reviewed article from journal of drug delivery and therapeutics. 15 Nov 2018-Pg no-87-ISSN-(2250-1177)
- [5] Hee-Young Iee, Hyesuk choi, Eunheeji : Reviewed article from Korean Journal of clinical pharmacy-Mar(8) 2019-Vol-29-Pg no 9.
- [6] P Maheshwari, Praveen D,V. Ravichandra.; Reviewed article from international journal of frontiers in science and technology (IJSFT)- received on 20/03/2013 and accepted on 04/04/2014, Jan –mar 2014, Vol 2-issue -1-ISSN, 2321-0494 and pg.no -57.
- [7] Jean – pierre Gregorire, Jocelyre Moisan, Louise Potvin, Isabesele Chabot , Rene verreault, Alain Milton ;; Reviewed article from BMC Health services Research published on 14 march 2006 pg.no -1.
- [8] Jubaraj sangha, Dwijen Chowdhury, Hemanga Hazarika , Harshita Krishnatreyya ; Reviewed article from the international journal of pharmacy practice and drug research [IJPPDR]/8(1), 2018-pg no 34 -39, ISSN – 2249 -7633.
- [9] Catherine C peng, Peter A Glaamanqn , INY R. Marks, Curtis Fowler, Brenda Castialone.; Reviewed article from journal of managed care pharmacy 9(6), 513-522, and 2003.
- [10] Thomas R Fulda, Alanlyles, Mark C Pugh , Dale B Christensen .; Reviewed article from journal of managed care pharmacy 10(5), 433-441, 2004.
- [11] S. Biswal, P Mishra , S. Malhotra , G D Puri, Pandhi ; Reviewed article from the Journal of clinical pharmacology 46(8) Pg no- 945-951, 2006.
- [12] Shrestha R, Prajapati S. Assessment of prescription pattern and prescription error in outpatient Department at Tertiary Care District Hospital, Central Nepal. Journal of pharmaceutical policy and practice. 2019 Dec; 12(1):1-9.
- [13] Abidi A, Gupta S, Kansal S, Ramgopal R. Prescription auditing and drug utilization pattern in a tertiary care teaching hospital of western UP. Int J Basic Clin Pharmacol. 2012 Dec; 1(3):184-90.
- [14] Enato EF, Chima IE. Evaluation of drug utilization patterns and patient care practices. West Afr J Pharm. 2011 Mar 13; 22(1):36-41.
- [15] Lee D, Bergman U. Studies of drug utilization. Pharmacoepidemiology. 2012 Feb 17:377-401.