



Importance of clinical pharmacist activities in outpatient department in a tertiary care hospital - a prospective observational study

Abstract

Background: The clinical pharmacist's function is critical in justifying prescriptions by recognizing DRPs, patient counselling, MHIs, and developing pharmaceutical care plans to improve the patient's quality of life.

Objectives: Assessment of drug-related problems and initiation action plan, rationalization of prescription, to improve the standard of life of patients, to promote evidence-based medicine, minimize misuse or overuse, treatment failure, adverse effects.

Methods: A prospective observational investigation was conducted over 6 months in various tertiary care hospitals, a whole of 195 prescriptions were extracted from the patient and assessed.

Results: A whole of 195 cases were collected, 145 of which were irrational and 50 of which were rational. Among 145 irrational cases, Drug Duplication errors-3.44%, Drug Interactions-9.65%, Wrong Drug errors-20%, Incorrect strength- 42.75%, Inappropriate dosage form & contraindications 0%, No indication errors-0.63%, Overdose errors-4.82%, Under dose errors-1.37%, Dispensing errors-84.82%, Condition untreated-2.06%, Condition undertreated-0.68%, Wrong dose errors- 0.68%, Billing errors-12.41%, Transcription errors- 1.37%, Prescribing errors-4.13%, Major errors- 0.68%, Wrong route errors-0%.

Conclusion: The most recurrent issues caused by drugs are dispensing errors, incorrect strength and wrong drug errors. The key conclusion of the study is that the CP's job aids in the decrease of DRPs, which helps in the rationalization of prescriptions. As a result, clinical pharmacist plays a crucial part in the healthcare system.

Keywords: Clinical pharmacist • drug-related problems • patient counselling

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Introduction

Pharmacy has been a core specialty in the medical field for many years. Clinical pharmacy is defined by the American College of Clinical Pharmacy (ACCP) as "a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness, and disease prevention." This definition clearly indicates that the center of clinical pharmacy practice is the patient. Currently, clinical pharmacists are working closely with patients and participating in a multidisciplinary team to provide updated, evidence-based, medication-related recommendations in various settings [1,2]. Some of the clinical pharmacists' responsibilities may

include assessing patients, identifying drug therapy issues, evaluating drug therapy for safety and effectiveness, performing follow-up evaluations and drug monitoring, and prescribing medications in collaboration with other practitioners [3,4]. They collect information about patients' past and current medications and related health issues, as well as other related medication information such as allergies and Adverse Drug Reactions (ADRs).

Furthermore, they put in place a comprehensive care plan, independently or collaboratively with other health care members, which includes patient follow-up and medication monitoring parameters specific to each patient. Finally, they cumulatively assess and evaluate the safety, effectiveness, and affordability of each medication to identify any medication-related problems [3].

In 2010, the American Society of Health-System Pharmacists (ASHP) and the ASHP Foundation developed the ASHP's Practice Advancement Initiative (PAI), previously known as the Pharmacy Practice Model Initiative (PPMI), to assist pharmacy leaders and practitioners in the United States in developing more patient care skills and taking responsibility for medication-use outcomes. The main objectives of this initiative include

1. Creating a practice framework that will ensure all patients are provided safe, effective, efficient, accountable, and evidence-based care;
2. Identifying care-related services that a specific pharmacy department should consistently offer and work to increase demand for pharmacy services by patients, other health care providers, and stakeholders;
3. Identifying current and emerging technologies that will help implement practice advancement;
4. Developing a template for optimal pharmacy practice based on operational, practical, and measurable actions; and
5. Determining specific actions that should be taken to advance practice, including education, skills, and competencies for all pharmacy leaders, staff, and technicians [5].

Key Performance Indicators (KPIs) are a set of measures that are used to help an organization in assessing and achieving goals critical to its success. Two main criteria should be considered when developing a good KPI: relevance and measurability. In addition, "SMART" criteria have been used as a standard to develop a good KPI. These criteria suggest that a KPI should be specific, measurable, achievable, relevant, and timely [6].

Key performance indicators have been widely used to quantifiably measure the quality of health care services, including pharmaceutical services, offered to patients.2,6 Fernandes et al identified a 5-point set of criteria that should be fulfilled to produce a good Clinical Pharmacy Key Performance Indicator (cpKPI). These include

1. Reflection of desired quality practice,
2. Linkage to direct patient care,
3. Having evidence supporting an impact on a meaningful patient outcome,
4. Being pharmacy- or pharmacist-sensitive, and
5. Being feasible to measure [7].

Identifying a possible set of measurable cpKPIs has been attempted in 2 studies in different countries. Ng and Harrison surveyed key stakeholders in 21 District Health Boards in New Zealand to identify the relevance and measurability of 52 recommended cpKPIs. Relevance was defined as "the ability of a KPI to reflect the clinical pharmacy service or clinical pharmacist's impact on individual patient care," whereas measurability was defined as the ease of collecting KPI data within the organization. Of the 52 cpKPIs, 37 were ranked "relevant" (71.1%) or "extremely relevant" (11.5%), with an overall median Likert score for measurability of "easy" (5.8%) and "somewhat easy" (76.9%). 2 In Canada, Fernandes et al used a Modified Delphi Approach to develop cpKPIs. After 3 Delphi rounds, the following 8 cpKPIs were identified:

1. "Performing admission medication reconciliation,"
2. "Participating in interprofessional patient care rounds,"
3. "Completing pharmaceutical care plan,"
4. "Resolving drug therapy problems,"
5. "Providing in-person disease and medication education to patients,"
6. "Providing discharge patient medication education,"
7. "Performing discharge medication reconciliation," and
8. "Providing bundle, proactive patient care activities [7]."

Health care services in Saudi Arabia are predominantly provided by the public sector in that the government is responsible for most of the health care spending. With the difficult financial crises in the world at this time, moving toward privatization of the health care system in the country is inevitable. Therefore, there is a crucial need to justify the presence of clinical pharmacists and to prove their value and impact on direct patient care and minimizing medication costs. In addition, although several studies discussed the importance of implementing cpKPIs, there are still no nationally or internationally standardized sets of recommended cpKPIs to describe or quantify health care services offered by clinical pharmacists [1,2,7,8]. The aim of this study was to quantify clinical pharmacists' contributions to patient care in a tertiary care hospital using predefined cpKPIs. Both PAI and KPIs have been widely adapted and implemented by pharmacy departments all over the world. The selected cpKPIs were adapted from ACCP and ASHP-PAI.3,5 Initially, all cpKPIs were presented and reviewed during clinical pharmacy meetings. Clinical pharmacists were

encouraged to add any cpKPI that is not listed and would reflect their work. Furthermore, clinical pharmacists, across the hospital, were given a time frame to submit their feedback and suggestions. Upon reaching a consensus, the final version of the cpKPIs was endorsed by the pharmacy administration and then approved by the hospital leadership [9-12].

Methodology

It is a prospective observational study. This investigation was carried out in a tertiary care hospital in Hyderabad. It was conducted for 6 months and 195 cases were collected.

Selection of subjects

Inclusion criteria

- Patients of all ages
- Patients of all genders
- Patient with a wide range of illnesses
- Patients of OPD

Exclusion criteria

- Active COVID-19 patients
- Oncology department
- In patient dept
- Emergency dept

Collection of data

Data were collected from patient (MHI), OP prescriptions

Statistical analysis

Prevalence for Irrationality

Prevalence (%) = a number of cases with errors / total number of cases collected × 100 expected outcomes: Improving the quality of life of patients by rationalizing prescription

Limitations: Sample size, departments (Active Covid19, inpatient, oncology, emergency), study site and duration.

Ethical approval

The ethical committee approval has been accepted by the institution.

Inclusion criteria

- Male and female patients of all age groups.
- Subjects suspected of Dengue.
- Subjects with confirmed Dengue antigen.
- Subjects undergoing treatment for Dengue.

Exclusion criteria

- Subjects suspected of other vector-borne diseases.
- Subjects presenting co-morbid infections along with Dengue fever were excluded.
- Other causes for abnormalities found in platelets

count, WBC, Transaminases, and Albumin were not involved.

- Pregnant women were not considered for the study.

Data collection

- The information on reported Dengue cases was collected by using a predesigned proforma of patients.
- Demographics, clinical manifestations, and hematological, and biochemical parameters of the selected patients were collected.
- Serological reports of detected NS1 Ag, IgM, NS1Ag and IgM were collected directly from the serological laboratory and ELISA reports acquired from the Central laboratory in the hospital.

Results and discussion

The purpose of the research is to evaluate the importance of clinical pharmacist activities in outpatient departments in a tertiary care hospital. The study focuses on the prevalence of DRPs.

Prevalence of DRPs in outpatient department (TABLE 1)

The research contained a sum of 195 cases, 145 of which were irrational and 50 of which were rational.

Among 145 irrational cases, Drug Duplication errors-3.44%, Drug Interactions-9.65%, Wrong Drug errors-20%, Incorrect strength-42.75%, Inappropriate dosage form & contraindications 0, No indication errors-0.63%, Overdose errors-4.82%, Under dose errors-1.37%, Dispensing errors-84.82%, Condition untreated-2.06%, Condition undertreated-0.68%, Wrong dose errors-0.68%, Billing errors-12.41%, Transcription errors-1.37%, Prescribing errors-4.13%, Major error- 0.68%, Wrong route errors-0% (FIGURE 1a and 1b).

Prevalence of DRPs in various departments (TABLE 2)

Cases were collected from 12 departments for this report. A sum of 65 cases was attained from the general medicine department of which 17 cases were rational and 48 were irrational. Among irrational cases dispensing errors are the highest constituting 77.08% and drug duplication, no indication error, underdose error, wrong dose error, transcription error, major error, and condition untreated constitute 2.08%. Whereas contraindications, wrong route error, inappropriate dosage form, and condition undertreated constitute 0%

62 cases were obtained from the orthopedic department of which 14 cases were rational, 48 cases were irrational.

Among irrational cases dispensing errors are the highest constituting 81.25% and drug duplication, overdose error, transcription error, and prescribing error constitute 2.08% as contraindications, inappropriate dosage form, underdose, condition untreated, the condition under-treated, wrong dose error, wrong route error constitute 0%.

A sum of 14 cases was attained from the gynecology department of which 3 cases were rational, 11 cases were irrational. Among irrational cases dispensing errors are the highest constituting 81.81%, incorrect strength constitutes 54.54%, drug interactions constitute 18.8%, condition untreated and wrong drug errors constitute 9.09%.

A whole of 10 cases was attained from the ENT department of which 2 cases were rational & 8 cases were irrational. Among irrational cases dispensing errors were the highest constituting 137.5%, incorrect strength-62.5%, wrong drug errors-25%, and underdose errors-12.5%.

4 cases were attained from the chest and TB department of which 1 case was rational and 3 were irrational. Among irrational cases dispensing errors are the highest constituting 166.6%, incorrect strength errors-66.6%, drug interactions and billing errors constitute 33.3%.

A whole of 5 cases is attained from the Ophthalmology department, of which 3 cases were rational and 2 cases were irrational. Among irrational cases dispensing error is the highest constituting 100%, and incorrect strength is 50%.

A total of 12 cases were attained from the skin and VD department, of which 7 cases were rational, 5 cases were irrational. Among irrational cases dispensing errors, incorrect strength and drug duplication are the highest constituting 60%. Whereas drug interactions and conditions undertreated constitute 20%.

1 case was attained from the dental department, of which 1 case was irrational. Among irrational cases dispensing error is the highest constituting 100%.

16 cases were attained from the general surgery department of which 2 cases were rational and 14 cases were irrational. Among irrational cases dispensing errors are the highest constituting 85.7, wrong drug error-21.42%, drug interaction, incorrect strength & billing errors constitute 14.28%, and prescribing errors constitute 7.14%.

An overall of 4 cases was attained from the pediatrics department, of which 1 case was rational & 3 cases were irrational. Among irrational cases dispensing error was the highest constituting 66.66%. Whereas drug duplication and dispensing errors constitute 33.33%.

1 case was attained from the pulmonology department, of which 1 case was irrational. Among irrational cases

dispensing error is the highest constituting 100%.

1 case was attained from the nephrology department, of which 1 case is irrational. Among irrational cases, wrong drug error and incorrect strength error constitute 100%.

▪ Prevalence of DRPs in general medicine department (TABLE 3)

A sum of 65 cases was attained from the general medicine department of which 17 cases were rational and 48 were irrational. Among irrational cases dispensing errors are the highest constituting 77.08% (37 out of 48) and drug duplication, no indication error, underdose error, Wrong dose error, transcription error, major error, condition untreated constitutes 2.08% (1 out of 48). Prescribing errors and Drug interaction-6.25% (3/48), Wrong drug-22.91% (11/48), Incorrect strength-35.41% (17/48), Over dose-12.5% (6/48), Billing error- 10.41% (5/48) Whereas contraindications, wrong route error, inappropriate dosage form, condition undertreated constitutes 0% (FIGURE 2a and 2b).

▪ Prevalence of DRPs in orthopedics department (TABLE 4)

62 cases were attained from the orthopedic department of which 14 cases were rational and 48 cases were irrational. Among irrational cases dispensing errors are the highest constituting 81.25% (39 out of 48) and drug duplication, overdose error, transcription error, and prescribing error constitute 2.08% (1/48), Drug interactions-10.41% (5/48), wrong drug- 22.9% (11/48), incorrect strength-52.08% (25/48), billing error-20.83 (10/48).whereas contraindications, inappropriate dosage form, underdose, condition untreated, condition under-treated, wrong dose error, wrong route error constitute 0% (FIGURE 3a and 3b).

▪ Prevalence of DRPs in gynecology (TABLE 5)

An overall 14 cases were attained from the gynecology department of which 3 cases were rational and 11 cases were irrational. Among irrational cases dispensing errors being the highest constitutes 81.81% (9/11), incorrect strength constitutes 54.54% (6/11), drug interactions constitute 18.18% (2/11), condition untreated and wrong drug errors constitute 9.09% (1/11) (FIGURE 4a and 4b).

▪ Prevalence of DRPs in ENT (TABLE 6)

10 cases were acquired from the ENT department of which 2 cases were rational & 8 cases were irrational. Among irrational cases dispensing errors being the highest constitutes 137.5% (11/8), incorrect strength-62.5% (5/8), wrong drug errors-25% (2/8), underdose errors-12.5% (1/8) (FIGURE 5a and 5b).

▪ Prevalence of DRPs in chest & TB (TABLE 7)

4 cases were acquired from the chest and TB department of which 1 case was rational and 3 were irrational. Among irrational cases dispensing errors are the highest constituting 166.6% (5 out of 3), incorrect strength errors-66.6% (2/3), and drug interactions and billing errors constitute 33.3% (1/3) (FIGURE 6a and 6b).

▪ **Prevalence of DRPs in ophthalmology (TABLE 8)**

Overall, 5 cases were acquired from the Ophthalmology department, of which 3 cases were rational, 2 cases were irrational. Among irrational cases dispensing error is the highest constituting 100%(2/2), and incorrect strength is 50%(1/2) (FIGURE 7a and 7b).

▪ **Prevalence of DRPs in skin & VD (TABLE 9)**

12 cases were acquired from the skin and VD department, of which 7 cases were rational and 5 cases were irrational. Among irrational cases dispensing errors, Incorrect strength and drug duplication are the highest constituting 60% (3 out of 5). Whereas drug interactions and conditions undertreated constitute 20% (1/5) (FIGURE 8a and 8b).

▪ **Prevalence OF DRPs in dental department (TABLE 10)**

1 case was acquired from the dental department, of which 1 case was irrational. Among irrational cases dispensing error is the highest constituting 100% (1/1) (FIGURE 9a and 9b).

▪ **Prevalence of DRPs in general surgery (TABLE 11)**

16 cases were acquired from the general surgery department of which 2 cases were rational and 14 cases were irrational. Among irrational cases dispensing error being the highest constitute 85.7%(12 out of 14), wrong drug error-21.42%(3/14), drug interaction, incorrect strength & billing errors constitute

14.28%(2/14),prescribing errors constitute 7.14% (1/14) (FIGURE 10a and 10b).

▪ **Prevalence of DRPs in pediatrics (TABLE 12)**

4 cases were attained from the paediatrics department, of which 1 case was rational & 3 cases were irrational. Among irrational cases dispensing error is the highest constituting 66.66% (2 out of 3). Whereas drug duplication and dispensing errors constitute 33.33%(1/3) (FIGURE 11a and 11b).

▪ **Prevalence of DRPs in pulmonology (TABLE 13)**

1 case was attained from the pulmonology department, of which 1 case was irrational. Among irrational cases dispensing error is the highest constituting 100% (1/1) (FIGURE 12a and 12b).

▪ **Prevalence of DRPs in nephrology (TABLE 14)**

1 case was acquired from the nephrology department, of which 1 case is irrational. Among irrational cases, wrong drug error and incorrect strength error constitute 100% (1 out of 1) (FIGURE 13a and 13b).

▪ **Prevalence of DRPs made by health care professionals (TABLE 15)**

The above- mentioned prevalence of DRPs found in this study is categorized as reliant on errors made by using healthcare professionals.

The prevalence of DRPs made by physicians:

Drug Duplication-3.44%, Drug Interaction-9.65%, Wrong Drug-20%, Incorrect Strength- 42.75%, No Indication-0.68%, Overdose-4.82%, Underdose-1.37%, Prescribing Error-4.13%, Condition Untreated-2.06%, Condition Undertreated-%, Wrong Dose-0.68% (FIGURE 14a and 14b).

The prevalence of DRPs made by pharmacists:

Dispensing error-84.82%, Billing Error-12.41%, Major error-0.68% (FIGURE 15a and 15b).

DRUG-Related problems	Percentage of DRPS identified (%)
Drug Duplication	3.44
Drug Interaction	9.65
Wrong Drug	20
Incorrect Strength	42.75
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0.63
Overdose	4.82
Underdose	1.37

Dispensing Error	84.82
Condition Untreated	2.06
Condition Undertreated	0.68
Wrong Dose	0.68
Wrong Route	0
Billing Error	12.41
Transcription Error	1.37
Prescribing Error	4.13
Major Error	0.68

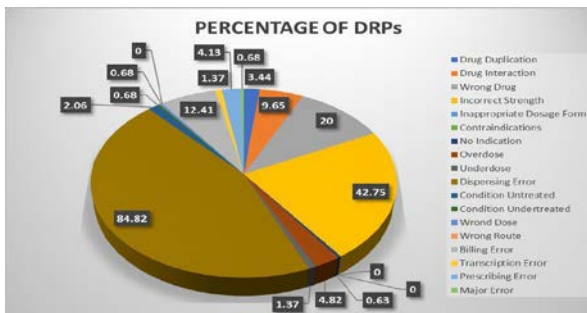


FIGURE 1a. Percentage of DRP's

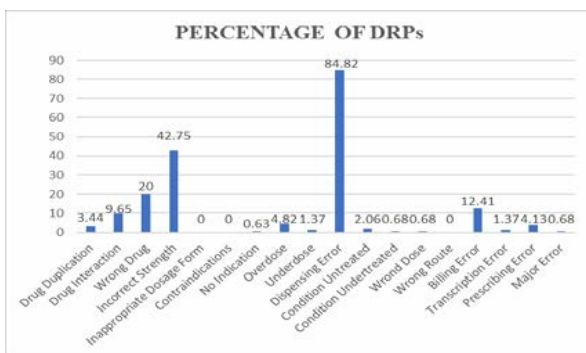


FIGURE 1b. Graphical representation of percentage of DRP's

Table 2. DRP Prevalence in Different Departments

Drug Related Problems	Percentage of DRPs in General Medicine (%)	Percentage of DRPs in Orthopedics (%)	Percentage of DRPs in Gynecology (%)	Percentage of DRPs in ENT (%)	Percentage of DRPs in Chest & TB in Ophthalmology (%)	Percentage of DRPs in Skin and VD (%)	Percentage of DRPs (%)	Percentage of DRPs in Dental (%)	Percentage of DRPs in General Surgery (%)	Percentage of DRPs in Paediatrics in Pulmonology (%)	Percentage of DRPs (%)	Percentage of DRPs in Nephrology (%)
Drug Duplication	2.08	2.08	0	0	0	0	60	0	0	33.33	0	0
Drug Interaction	6.25	10.41	18.8	0	33.3	0	20	0	14.28	0	0	100
Wrong Drug	22.91	22.9	9.09	25	0	0	0	0	21.42	0	0	100
Incorrect Strength	35.41	52.08	54.54	62.5	66.6	50	60	0	14.28	0	0	0
Inappropriate Dosage Form	0	0	0	0	0	0	0	0	0	0	0	0
Contraindications	0	0	0	0	0	0	0	0	0	0	0	0
No Indication	2.08	0	0	0	0	0	0	0	0	0	0	0

Overdose	12.5	2.08	0	0	0	0	0	0	0	0	0	0
Underdose	2.08	0	0	12.5	0	0	0	0	0	0	0	0
Dispensing Error	77.08	81.25	81.81	137.5	166.6	100	60	100	85.7	66.66	100	0
Condition Untreated	2.08	0	9.09	0	0	0	0	0	0	33.33	0	0
Condition Undertreated	0	0	0	0	0	0	20	0	0	0	0	0
Wrong Dose	2.08	0	0	0	0	0	0	0	0	0	0	0
Wrong Route	0	0	0	0	0	0	0	0	0	0	0	0
Billing Error	10.41	20.83	0	0	33.3	0	0	0	14.28	0	0	0
Transcription Error	2.08	2.08	0	0	0	0	0	0	0	0	0	0
Prescribing Error	6.25	2.08	0	0	0	0	0	0	7.14	0	0	0
Major Error	2.08	0	0	0	0	0	0	0	0	0	0	0

DRP	General Medicine
Drug Duplication	2.08
Drug Interaction	6.25
Wrong Drug	22.91
Incorrect Strength	35.41
Inappropriate Dosage Form	0
Contraindications	0
No Indication	2.08
Overdose	12.5
Underdose	2.08
Dispensing Error	77.08
Condition Untreated	2.08
Condition Undertreated	0
Wrong Dose	2.08
Wrong Route	0
Billing Error	10.41
Transcription Error	2.08
Prescribing Error	6.25
Major Error	2.08

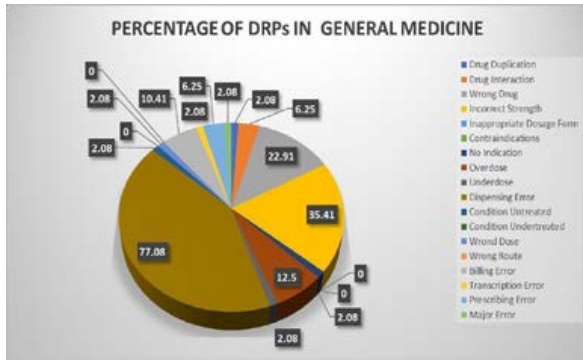


FIGURE 2a. percentage of DRPs in general medicine

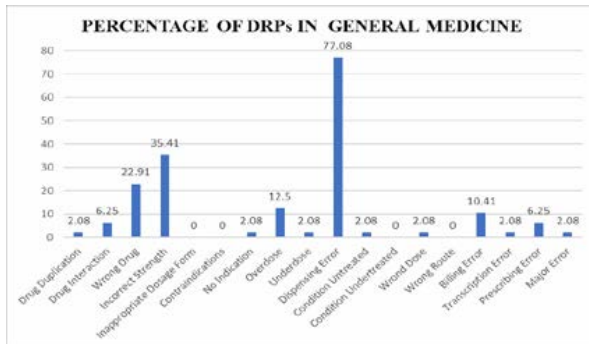


FIGURE 2b. Graphical representation of percentage of DRPs in general medicine

Table 4. DRP Prevalence in orthopaedics department	
DRP	ORTHOPEDECS
Drug Duplication	2.08
Drug Interaction	10.41
Wrong Drug	22.9
Incorrect Strength	52.08
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	2.08
Underdose	0
Dispensing Error	81.25
Condition Untreated	0
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	20.83
Transcription Error	2.08
Prescribing Error	2.08
Major Error	0

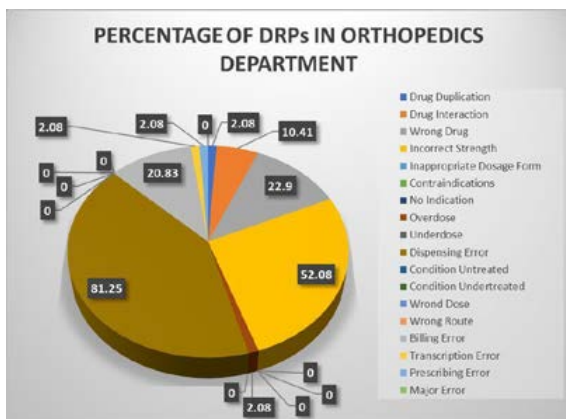


FIGURE 3a. Percentage of DRPs in orthopaedics department

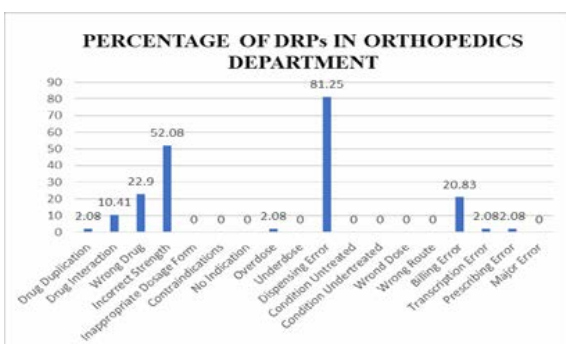


FIGURE 2b. Graphical representation of percentage of DRPs in orthopaedics department

DRP	GYNECOLOGY
Drug Duplication	0
Drug Interaction	18.8
Wrong Drug	9.09
Incorrect Strength	54.54
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	81.81
Condition Untreated	9.09
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	0
Transcription Error	0
Prescribing Error	0
Major Error	0

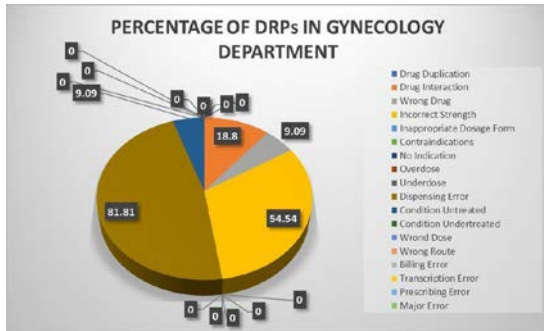


FIGURE 4a. Percentage of DRPs in gynecology department

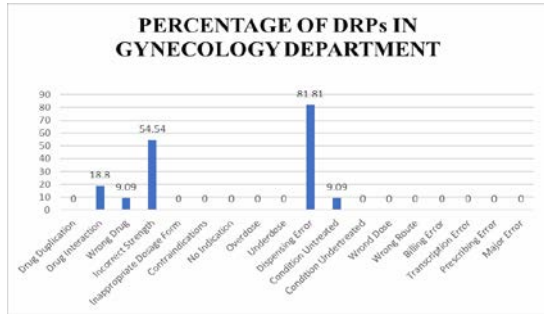


FIGURE 4b. Graphical representation of percentage of DRPs in gynecology department

DRP	ENT
Drug Duplication	0
Drug Interaction	0
Wrong Drug	25
Incorrect Strength	62.5
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	12.5
Dispensing Error	137.5
Condition Untreated	0
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	0
Transcription Error	0
Prescribing Error	0
Major Error	0

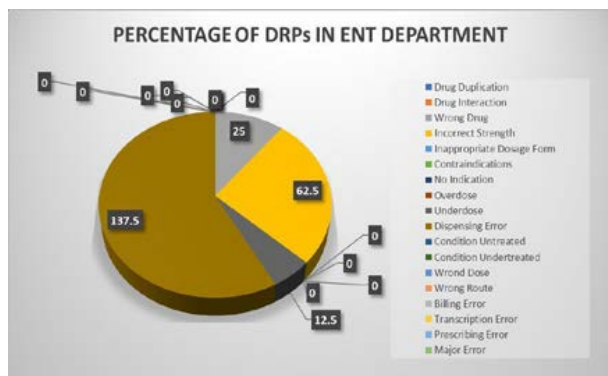


FIGURE 5a. Percentage of DRP's in ENT department

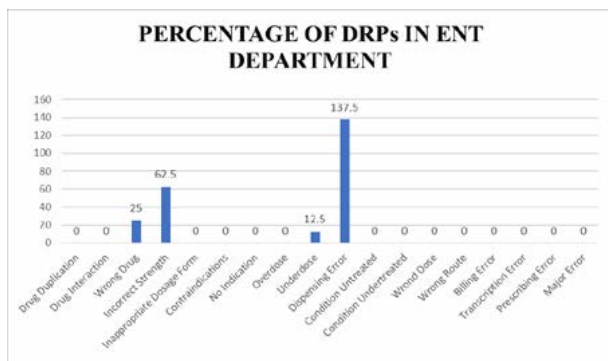


FIGURE 5b. Graphical representation of percentage of DRP's in ENT department

Table 7. DRP Prevalence in Chest and TB	
DRPs	CHEST AND TB DEPT
Drug Duplication	0
Drug Interaction	33.3
Wrong Drug	0
Incorrect Strength	66.6
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	166.6
Condition Untreated	0
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	33.3
Transcription Error	0
Prescribing Error	0
Major Error	0

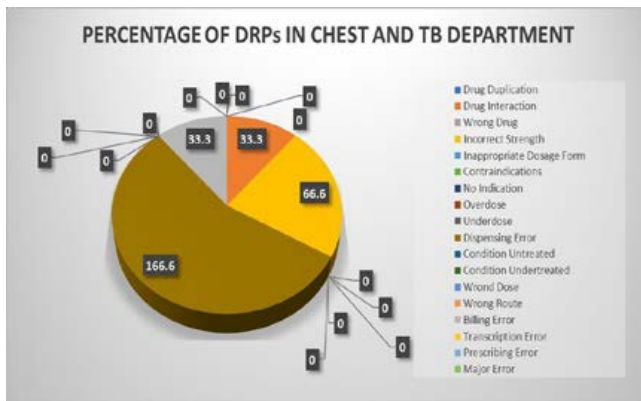


FIGURE 6a. Percentage of DRP's in Chest and TB

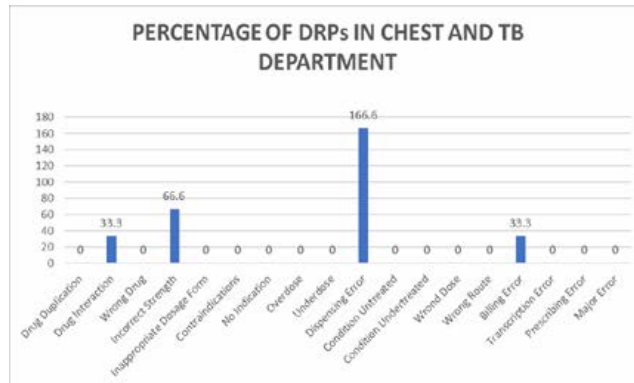


FIGURE 6b. Graphical representation of percentage of DRP's in Chest and TB

DRPs	OPHTHALMOLOGY
Drug Duplication	0
Drug Interaction	0
Wrong Drug	0
Incorrect Strength	50
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	100
Condition Untreated	0
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	0
Transcription Error	0
Prescribing Error	0
Major Error	0

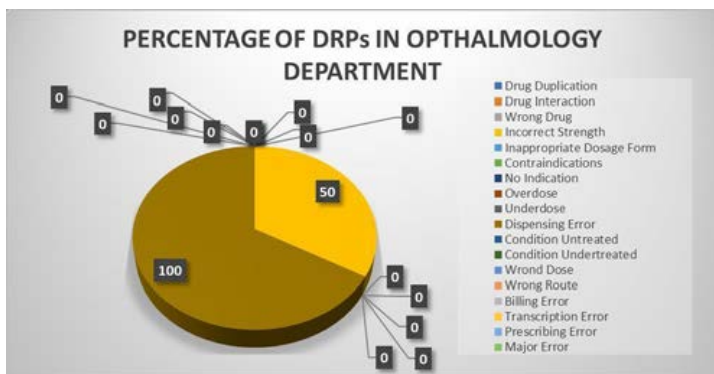


FIGURE 7a. Percentage of DRPs in ophthalmology department

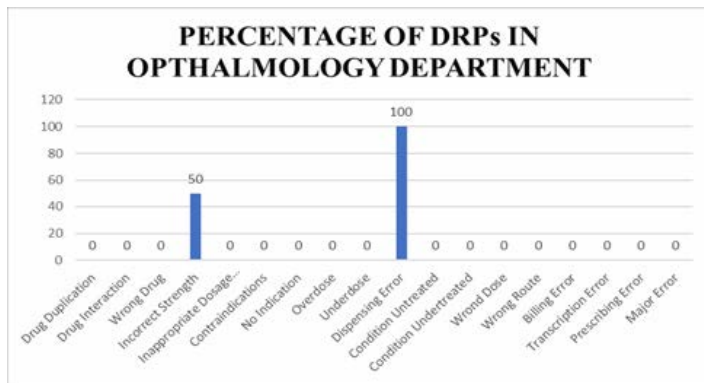


FIGURE 7b. Graphical representation of percentage of DRPs in ophthalmology department

Table 9. DRP Prevalence in Skin and VD Department	
DRPs	SKIN AND VD DEPT
Drug Duplication	60
Drug Interaction	20
Wrong Drug	0
Incorrect Strength	60
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	60
Condition Untreated	0
Condition Undertreated	20
Wrong Dose	0
Wrong Route	0
Billing Error	0
Transcription Error	0
Prescribing Error	0
Major Error	0

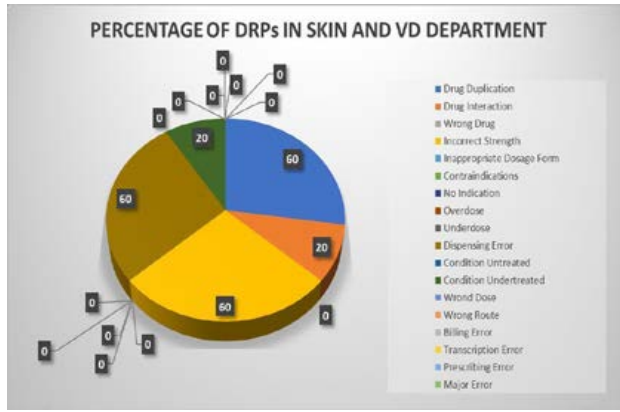


FIGURE 8a. Percentage of DRP's in skin and VD department

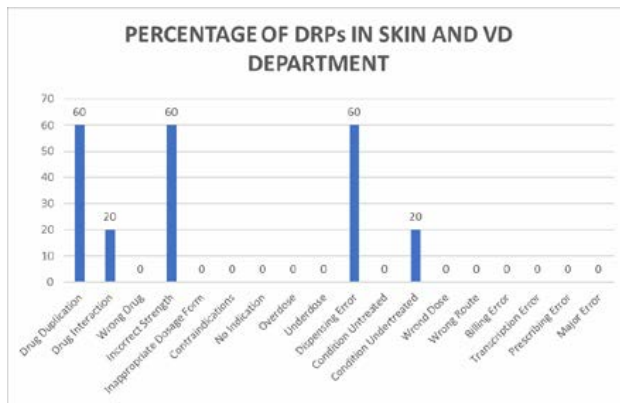


FIGURE 8b. Graphical representation of percentage of DRP's in skin and VD department

Table 10: Percentage Of DRPs in dental department	
DRPs	DENTAL
Drug Duplication	0
Drug Interaction	0
Wrong Drug	0
Incorrect Strength	0
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	100
Condition Untreated	0
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	0
Transcription Error	0
Prescribing Error	0
Major Error	0

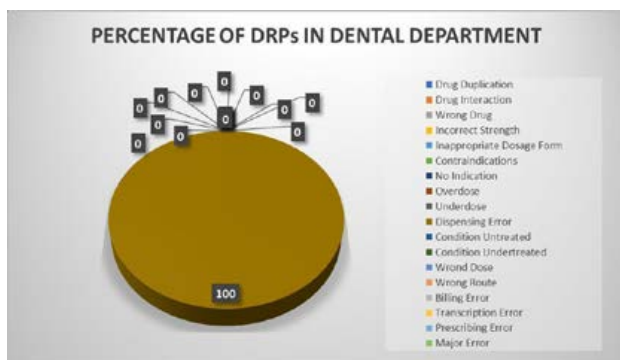


FIGURE 9a. Percentage of DRPs in dental department

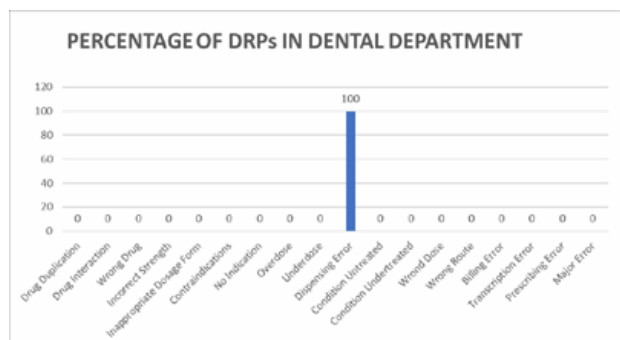


FIGURE 9b. Graphical representation of percentage of DRPs in dental department

Table 11. percentage of DRPs in general surgery	
DRPs	General Surgery
Drug Duplication	0
Drug Interaction	14.28
Wrong Drug	21.42
Incorrect Strength	14.28
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	85.7
Condition Untreated	0
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	14.28
Transcription Error	0
Prescribing Error	7.14
Major Error	0

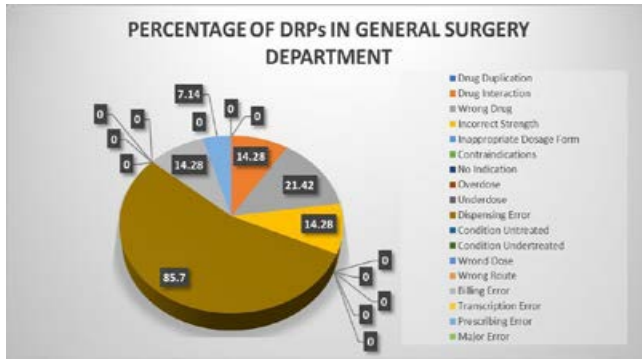


FIGURE 10a. Percentage of DRPs in general surgery

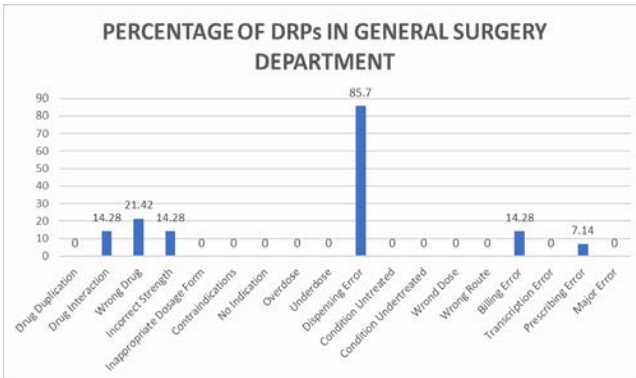


FIGURE 10b. Graphical representation of percentage of DRPs in general surgery

Category	Percentage
Drug Duplication	33.33
Drug Interaction	0
Wrong Drug	0
Incorrect Strength	0
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	66.66
Condition Untreated	33.33
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	0
Transcription Error	0
Prescribing Error	0
Major Error	0

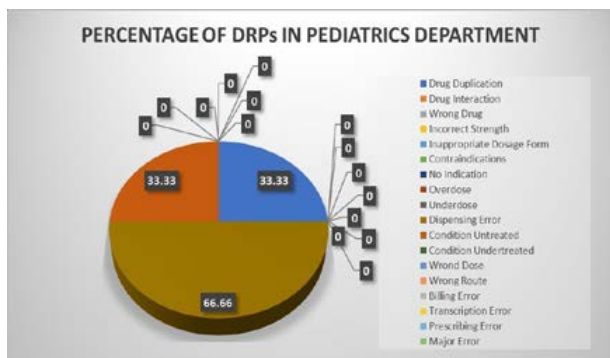


FIGURE 11a. Percentage of DRP's in pediatrics

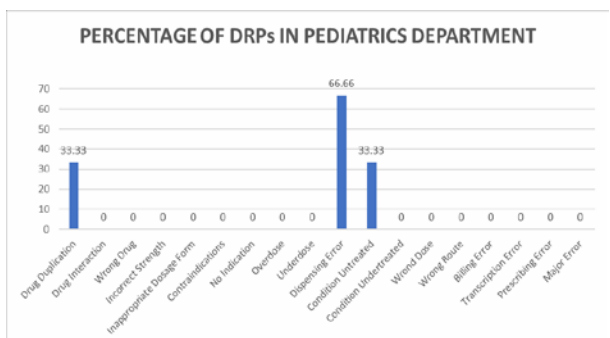


FIGURE 11b. Graphical representation of percentage of DRP's in pediatrics

DRPS	Pulmonology
Drug Duplication	0
Drug Interaction	0
Wrong Drug	0
Incorrect Strength	0
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	100
Condition Untreated	0
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	0
Transcription Error	0
Prescribing Error	0
Major Error	0

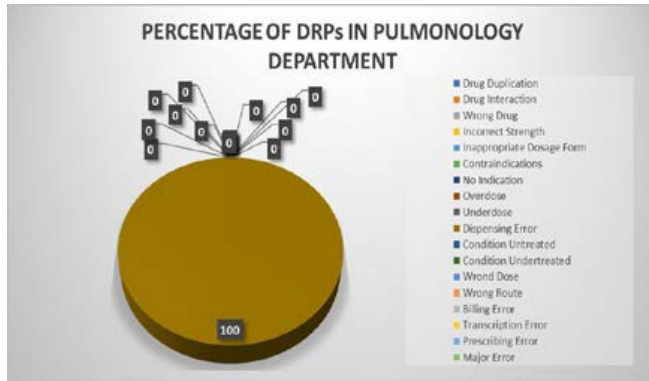


FIGURE 12a. Percentage of DRP's in pulmonology

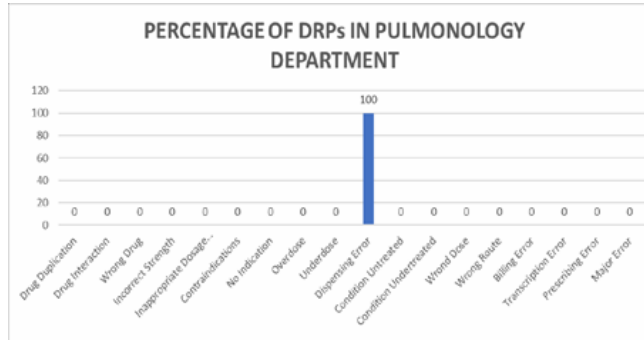


FIGURE 12b Graphical representation of percentage of DRP's in pulmonology

Table 14. Percentage of DRP's in nephrology department	
DRPS	Nephrology
Drug Duplication	0
Drug Interaction	0
Wrong Drug	100
Incorrect Strength	100
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0
Overdose	0
Underdose	0
Dispensing Error	0
Condition Untreated	0
Condition Undertreated	0
Wrong Dose	0
Wrong Route	0
Billing Error	0
Transcription Error	0
Prescribing Error	0
Major Error	0

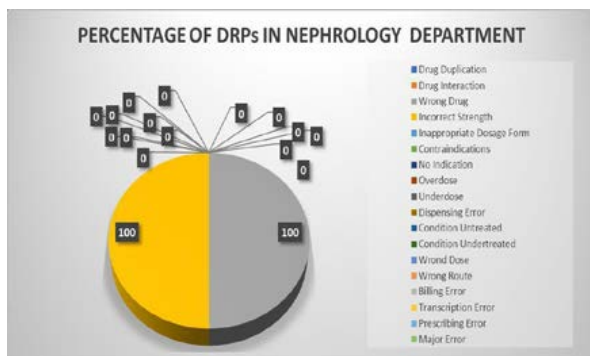


FIGURE 13a. Percentage of DRPs in nephrology department

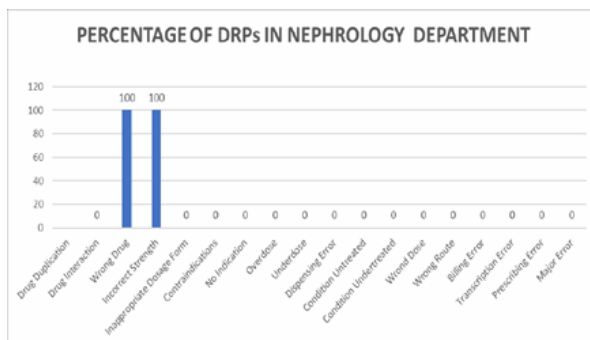


FIGURE 13b. Graphical representation of percentage of DRPs in nephrology department

Table 15. DRP prevalence made by healthcare professionals	
Physicians	
DRP	Percentages of DRPs (%)
Drug Duplication	3.44
Drug Interaction	9.65
Wrong Drug	20
Incorrect Strength	42.75
Inappropriate Dosage Form	0
Contraindications	0
No Indication	0.68
Overdose	4.82
Underdose	1.37
Prescribing Error	4.13
Condition Untreated	2.06
Condition Undertreated	0.68
Wrong Dose	0.68
Wrong Route	0
Pharmacist	
Dispensing error	84.82
Billing Error	12.41
Major error	0.68

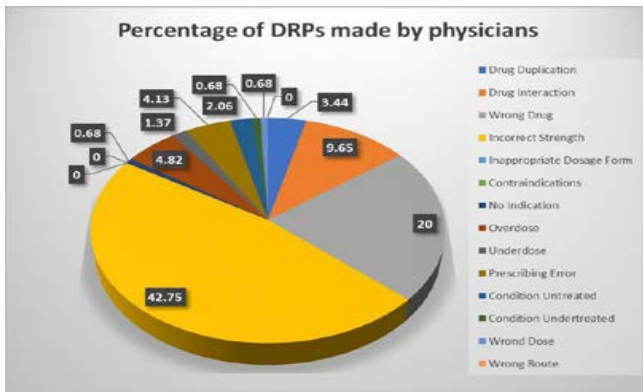


FIGURE 14a. Percentage of DRPs made by physicians

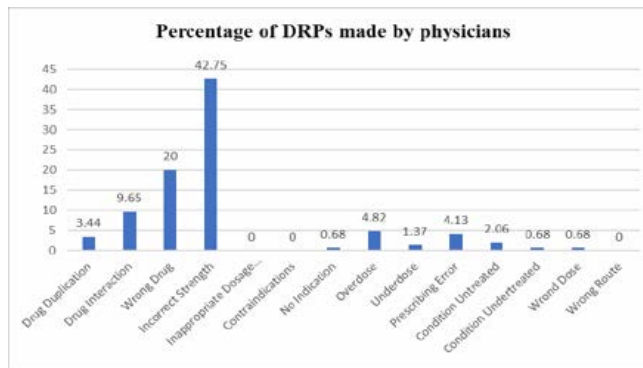


FIGURE 14b. Graphical representation of percentage of DRPs made by physicians

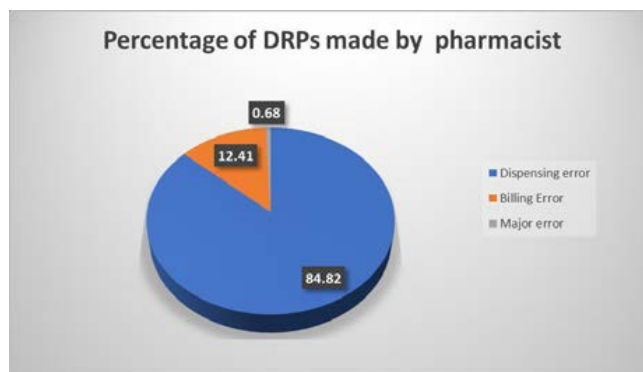


FIGURE 15a. Percentage of DRPs made by pharmacist

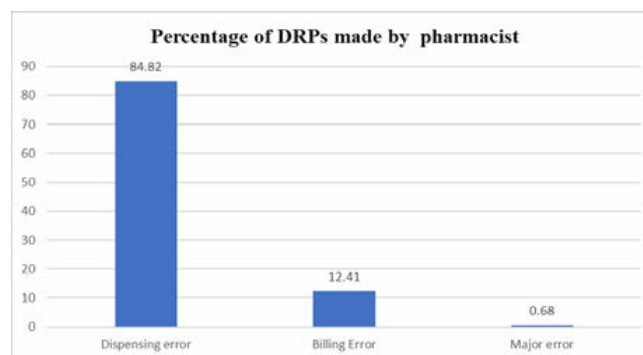


FIGURE 15b. Graphical representation of percentage of DRPs made by pharmacist

Conclusion

A Prospective observational study contained a sum of 195 cases, DRPs were identified and prevalence was calculated as per the OP department which includes General Medicine, Orthopedics, Gynecology, ENT, Chest and TB, Ophthalmology, Skin and VD, Dental, General

Surgery, Pediatrics, Pulmonology, Nephrology and health care professionals.

Prevalence of: The most prevalent issues relating to drugs are dispensing errors, incorrect strength, and wrong drug errors.

Dispensing errors were higher in all departments

accounting for 84.82%, excluding the nephrology department.

These dispensing errors include wrong drug errors and additional drug dispensing.

Incorrect strength errors account for 42.75% of all departments.

The key conclusion of the study is that the CP's job aids in the decrease of DRPs, which helps in the rationalization of prescriptions. As a result, clinical

pharmacist plays a crucial part in the healthcare system.

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None

Conflict of interest

The authors declare that there is no conflict of interest

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