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Medication reconciliation practices of Clinical Pharmacist focusing on lifestyle diseases in atertiary care hospital in Calicut

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ABSTRACT:Introduction: Medication reconciliation is critical in ensuring safe and effective patient care. It is the process of comparing medications a patient is taking with newly ordered medications in order to resolve discrepancies or potential problems. **Objectives:** Main objectives of the study is to identify and categorize medication discrepancies, to assess and categorize medications that are prone to medication discrepancies and to investigate the demographics of patients prone to medication discrepancies in prescriptions of patients with lifestyle diseases.**Method:** A retrospective observational study was carried out for the period of 6 months (January 2021 to June 2021). The past medication history and present medication orders from the case sheets was listed and compared . Presents of any discrepancies like unnecessary therapy, medication omission, wrong frequency, wrong dose, wrong medication, wrong route, duplication therapy or entry was checked and recorded.**Result:**A total of 120 case sheets of patient were taken, among which 311 discrepancies were observed in 98(81.67%) case sheets. In 311 discrepancies, 271(87.14%) were intentional and 40(12.86%) were unintentional. The most common discrepancy was medication omission 194(62.38%) followed by wrong frequency 56(18.01). Cardiovascular medications were the most frequent drug class with discrepancy 155(59.85%). The discrepancy were majorly seen with mean age of 69.89 year and most of them were male 65(54.17%).**Conclusion:** Medication discrepancies upon hospital admission are highly common. Clinical pharmacist have a greater role in medication reconciliation for preventing medication errors.

KEYWORDS : Medication reconciliation, Medication discrepancies, Patient safety, Admission, Discharge, Clinical pharmacist, Lifestyle disease.

I. INTRODUCTION

According to the World Health Organization (WHO), medication errors cause at least one death every day and injure approximately 1.3 million people annually in the United States of America alone. Medication errors can affect individuals' health and well-being and ultimately, health systems, if medicines are taken or administered incorrectly or if their use is insufficiently monitored.[1]

Medicine's reconciliation is critical in ensuring safe and effective patient care. The WHO defines medicines reconciliation as "the formal process in which healthcare professionals' partner with patients to ensure accurate and complete medication information transfer at interfaces of care''. As defined by the Joint Commission, Medication reconciliation is: "the process of comparing the medications a patient is taking (and should be taking) with newly ordered medications" in order to resolve discrepancies or potential problems. Medication reconciliation is a mandatory role for all clinical pharmacists, as they are the safe guard against medication errors. Medication reconciliation is one of the key elements for effective communication between clinical pharmacists and physicians. Medication reconciliation is a model for inter-professional collaborative care for patients that are crucial for patient safety[2].

Patients and their healthcare providers are in need to access a correct list of prescribed and not prescribed drugs, supplements, and/or herbal formularies when required for safe and effective clinical care. Currently, Healthcare Information

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Systems are not providing a proper access to the patients' medications lists. Medication reconciliation is a well-positioned process that guides the healthcare providers to have a comprehensive view on patients' medications lists to minimize the medication discrepancies and devastating outcomes[3].

Adverse drug events and medication discrepancies continue to be a patient safety challenge for patient and healthcare professionals. Medication discrepancies are known to occur at transitions of care where patients often receive new medications or have changes made to their existing medications. Although these changes may be intentional, unintended changes can also occur. This may be as a result of poor communication between healthcare professionals or between healthcare professionals and patients/carers.[4] A discrepancy is any difference between reconciled medication information and what a patient actually takes.[5]The goal of medication reconciliation is to obtain and maintain accurate and complete medication information for a patient and use this information within and across the continuum of care to ensure safe and effective use of medication[6].

Medication discrepancies have a significant impact on patient outcomes and both the joint commission (TJC) and the American society of health system pharmacists. Approximately half of all hospital related medication errors and 20% of all ADEs have been attributed to poor communications at the transitions and interfaces of care.[6]These medication discrepancies have potential to cause patient harm (i.e., potential adverse during events, or PADEs). ADEs associated with medication discrepancies can prolong hospital stays and in post discharge period, may lead to emergency room visits, hospital readmissions, and utilization of other healthcare resources[6].

Avoidable hospital readmissions have persisted despite the introduction of numerous health care services originally designed to improve the hospital discharge process for newly discharged patients. In many ways the new models of advanced discharge planning and transitional care seek to restore the continuity in care that was once provided by primary care or other community – based physicians. In inpatient care unit, there are several situations where medication reconciliation is needed. Patient's lack of knowledge of their medications, physician and nurse workflows and lack of integration of patient health record across the continuum of care contribute to a lack of a complete medication reconciliation, which in turn creates the potential for error[7].

The steps in medication reconciliation are seemingly straight of patient. For a newly hospitalized patient, the steps include obtaining and verifying the patient's medication history, documenting the patient's medication history, writing orders for the hospital medication regimen, and creating a medication administration record. At discharge, the steps include determining the post discharge medication regimen, developing discharge instructions for the patient for home medications, educating the patient, and transmitting the medication list to the follow-up physician. For patients in ambulatory settings, the main steps include documenting a complete list of the current medications and then updating the list whenever medications are added or changed[8].

Lifestyle diseases are ailments that are primarily based on the day-to-day habits of people. Habits that detract people from activity and push them towards a sedentary routine can cause a number of health issues that can lead to chronic non-communicable diseases (NCD) that can have near life-threatening consequences. NCDs are chronic in nature and cannot be communicated from one person to another. They are a result of a combination of factors including genetics, physiology, environment and behaviors[9].

II. AIM AND OBJECTIVES

Aim of this study is to determine the medication discrepancies in the prescriptions of the patients admitted with lifestyle diseases through medication reconciliation process.

Objectives of the study includes identify and categorize medication discrepancies in prescriptions of patients with lifestyle diseases, To assess and categorize the medications that are prone to medication discrepancies in lifestyle diseases and to investigate the demographics of the patients prone to medication discrepancies.

III. METHODS AND MATERIALS

Study design, site and period:

This study was designed as retrospective observational study performed at PVS Hospital (P) Ltd, is a 350 bedded multi-specialty care hospital in Calicut from the period of January 2021 to June 2021. Patients with lifestyle diseases were study subjects.

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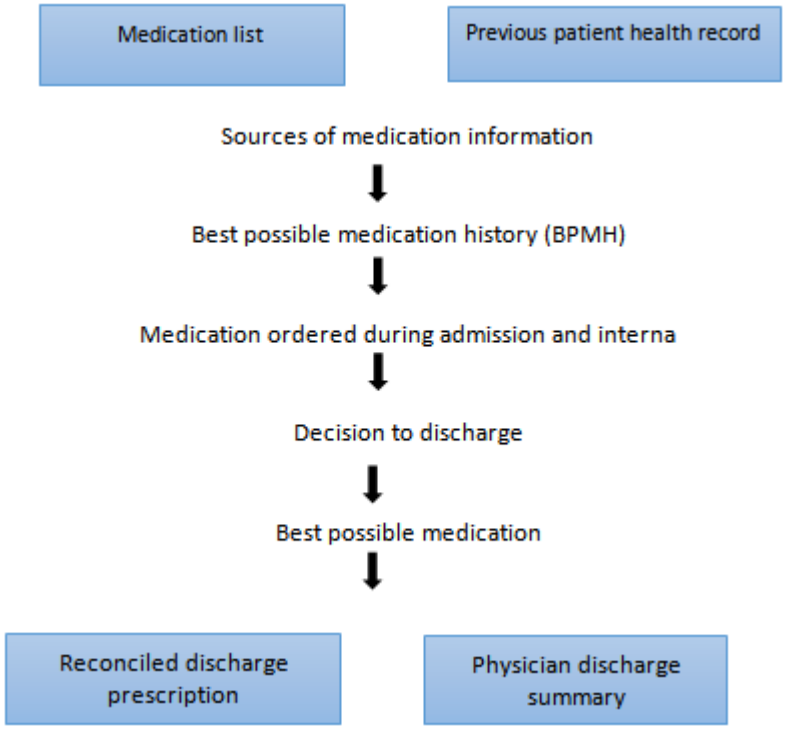
Study criteria:
Inclusion criteria: Lifestyle diseased patients having past medication history records with age greater than or equal to 18 years.
Exclusion criteria: Patients with communicable diseases or acute disease and pregnant women.

Study material:
- Case sheets of patients admitted in the hospital for last 2 years.
- The international standard operating predure for medication reconciliation developed by world health organization (WHO)[10].
- Data collection form prepared for the study.

Study procedure:
- The case sheet of the patients admitted with lifestyle diseases with at least one past medication history were taken.
- From the case sheets, past medication history and present medication orders were listed and compared. Presence of any discrepancies like unnecessary therapy, medication omission, wrong frequency, wrong dose, wrong medication, wrong route, duplicate therapy or entry, wrong drugwere checked and recorded.[26] The presence of drug interactions in the study were checked and categorized as major, moderate and minor interactions.
- In case of discharge the reconciliation were done by comparing admission and discharge medication list. Information including patient demographic characteristics like age and gender, comorbid conditions, past and present medications will be documented.Written discharge instructions were also examined for instructions regarding the medication differences and compared with detailed discharge summaries. Any inconsistencies between these two documents were recorded as discrepancies.[26]
- Intentional medication discrepancies in which the prescribers have made an intentional choice to add, change or stop a medication but this choice is not clearly documented in the patient's medical record, will be identified and recorded.Unintentional medication discrepancies in which the prescribers unintentionally changed, added or omitted a medication the patient was taking prior to admission, were also identified and recorded.



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IV. RESULTS

Over the 6 month study period, total of 120 case sheets of patients who met the inclusion criterion were analyzed for discrepancies. Among 120, 98 (81.67%) were identified with discrepancies and no discrepancy is observed in 22(18.33%) case sheets. The Data were abstracted using medication reconciliation form as a tool among them a total of 311 discrepancies were observed in 120 case sheets.

A) Mostly observed discrepancy category

In our study, we classified the medication discrepancies in to two categories, intentional and unintentional discrepancies. Among 311 discrepancies observed, 271 (87.14%) were intentional and the remaining 40 (12.86%) were unintentional discrepancies.

Table 1. Category of discrepancy

Discrepancy category	Frequency	Percentage
Intentional	271	87.14%
Unintentional	40	12.86%

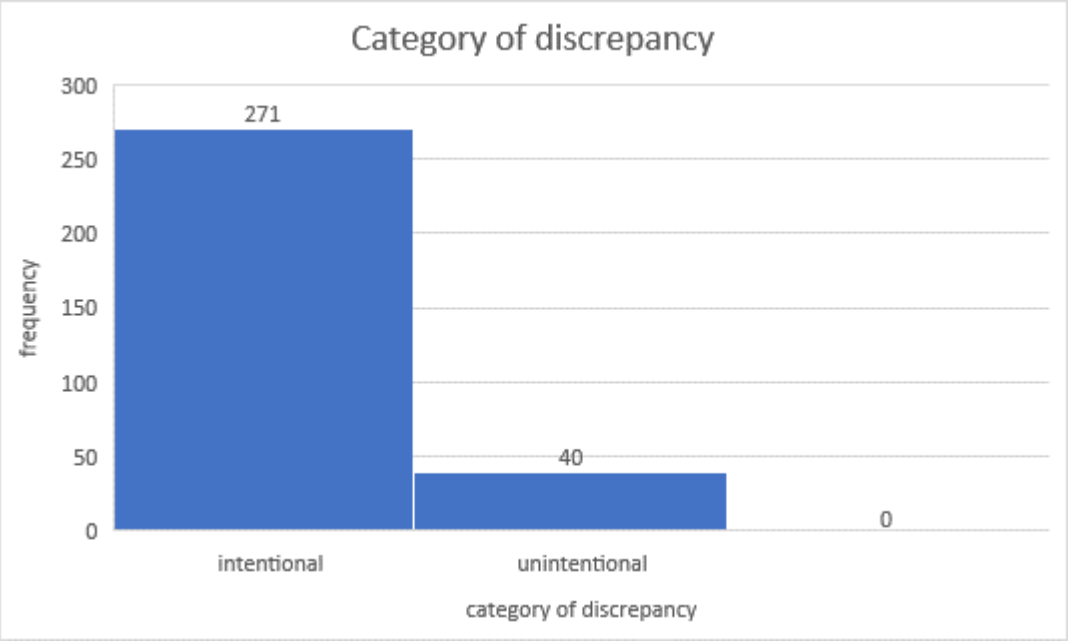

Figure 1. Category of discrepancy

B)Types of discrepancy

Among 311 discrepancies, the most common was medication omission 194(62.38%), followed by wrong frequency 56(18.01%), 40(12.86%) were wrong dose, 11(3.54%) were wrong route, 9 (2.89%) were duplicate therapy, 1(0.32%) was wrong drug.

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Table 2. Type of medication discrepancy

Type	Frequency	Percentage
Medication omission	194	62.38%
Wrong frequency	56	18.01%
Wrong dose	40	12.86%
Wrong route	11	3.54%
Duplicate therapy	9	2.89%
Wrong drug	1	0.32%

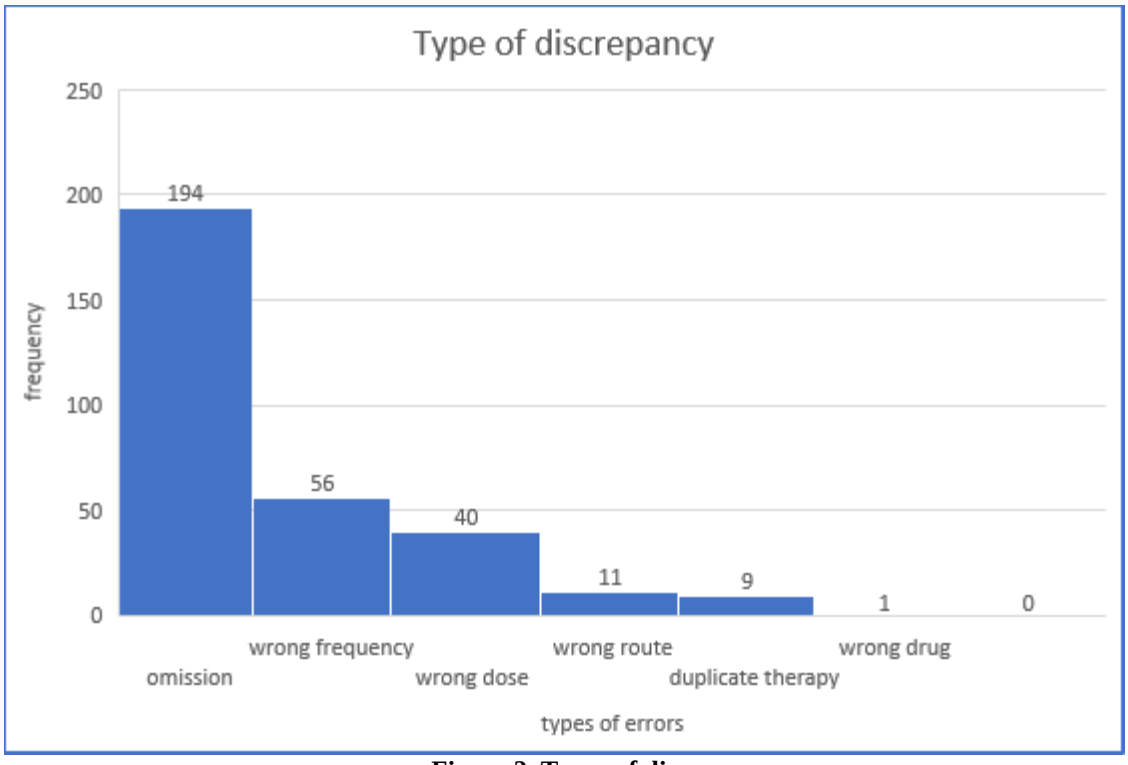

Figure 2. Types of discrepancy

C)Most frequent categories of medications reconciled

We analyzed the case sheets of patients with lifestyle diseases and classified the prescribed drugs in to different categories based on its action on different organ systems. The most frequent class of drugs reconciled were cardiovascular drugs 155 (59.85%). Followed by 59 (22.78%) endocrine drugs, 30(11.58%) respiratory drugs, 9 (3.47%) gastrointestinal drugs, other 6 (2.32%) drugs were also reconciled.

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Table 3. Category of medication reconciled

Category of drug	Frequency	Percentage
Cardiovascular drugs	155	59.85%
Endocrine drugs	59	22.78%
Respiratory drugs	30	11.58%
Gastrointestinal drugs	9	3.47%
Others	6	2.32%

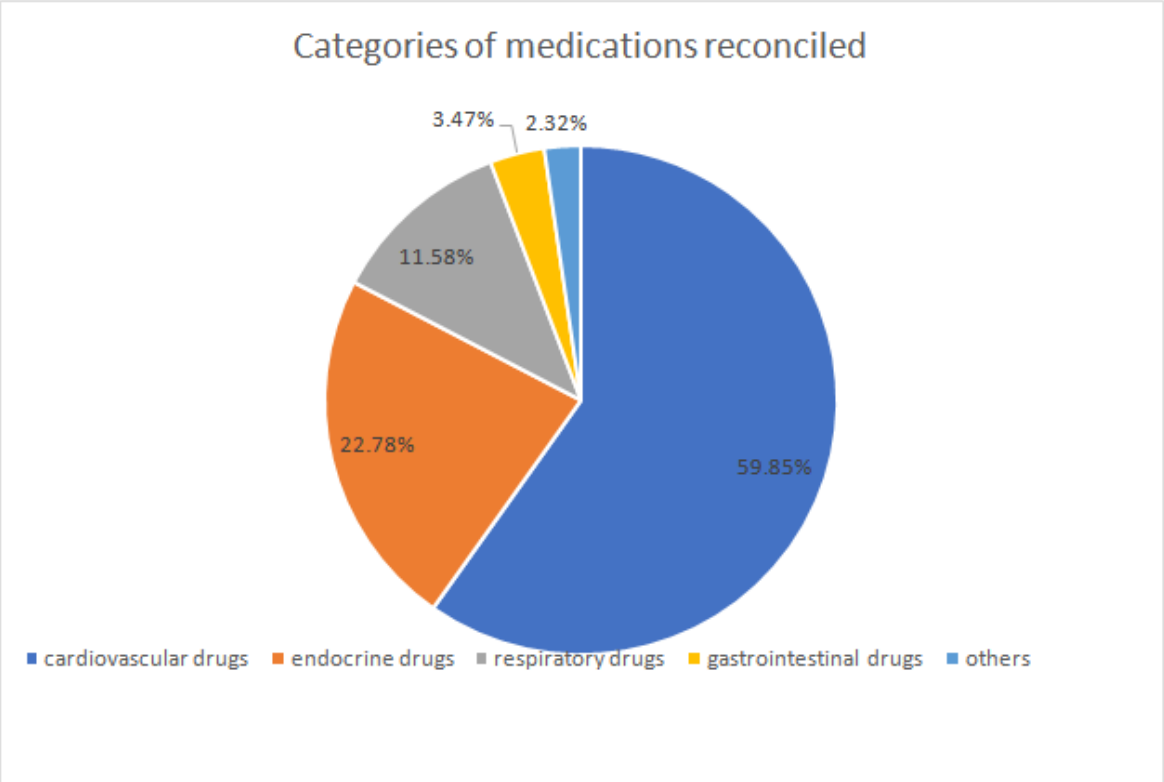

Figure 3. Categories of medications reconciled

D)Most reconciled area of patient care

In our study we focused on two areas of patient care, admission and discharge. Among 311 discrepancies, 211(67.85%) were observed during admission and remaining 100(32.15%) discrepancies were observed during discharge of the patient.

Area of patient care	Frequency	Percentage
Admission	211	67.85%

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Discharge	100	32.15%

Table 4. Most reconciled area of patient care

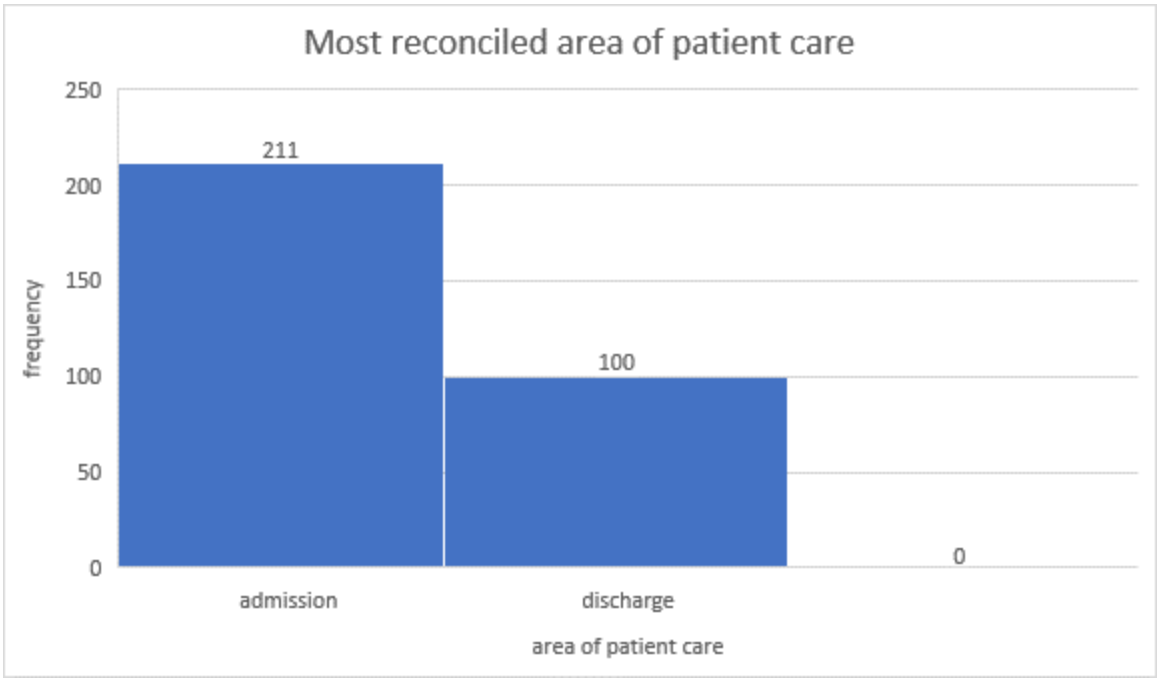

Figure 4. Most reconciled area of patient care

E)Association between Demographics and level of discrepancies

Here we considered the demographic characters like age and gender. Both the genders were included in the study. We classified the patients in to two age groups, below 65 years and above or equal to 65 years.

Assessment between age and level of discrepancies

Among the 98 patients with discrepancies, 29 (29.59%) patients were below 65 years of age and 69(70.41%) were equal to or above 65 years of age. The discrepancies were majorly seen with mean age of 69.89 years and in age groups above or equal to 65 years, shown in **Table 5**.

Assessment of relation between gender and level of discrepancies

Among 98 patients with discrepancies, 65 (54.17%) were male and 55(45.83%) were female, shown in **Table 5.**

Assessment of relation between age and level of discrepancies		
Age groups	Frequency	Percentage
<65 Yrs.	29	29.59 %
≥65 Yrs.	69	70.41 %
Mean age	69.89 yrs.	

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Assessment of relation between gender and level of discrepancies		
Male	52	53.06 %
Female	46	46.94 %

Table 5.Association between demographics and level of discrepancies

No of discrepancies per prescription

In our study we strictly analyzed 120 prescriptions and identified the number of discrepancies existing per prescription. Majority of prescriptions 75(62.5%) had more than one discrepancy, 23 (19.17%) prescriptions had at least one discrepancy and no discrepancy is seen in remaining 22 (18.33%) prescriptions.

No of discrepancies per prescription	Frequency	Percentage
At least one discrepancy	23	19.17%
More than one discrepancy	75	62.5%
No discrepancy	22	18.33%

Table 6. No of discrepancies per prescription

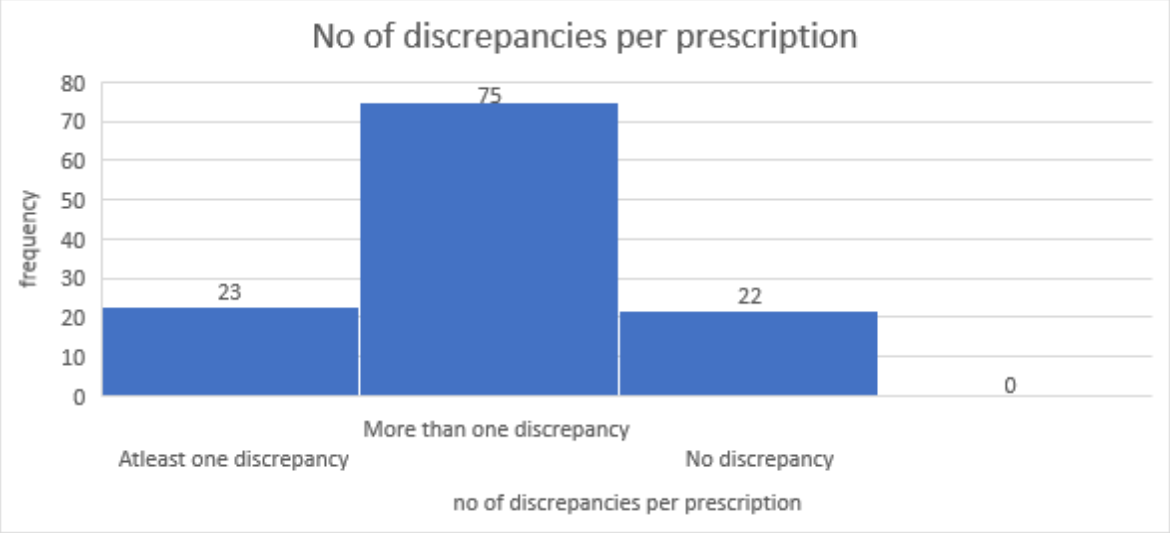

Figure 5. No of discrepancies per prescription

No of unintended discrepancies per prescription

Among 98 prescriptions with discrepancies, majority of prescriptions 76 (77.56%) had no unintended discrepancies, 11(11.22%) prescriptions had at least one unintended discrepancy and remaining 11(11.22%) had more than one unintended discrepancy.

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No of unintended discrepancies per prescription	Frequency	Percentage
At least one unintended discrepancy	11	11.22%
More than one unintended discrepancy	11	11.22%
No unintended discrepancy	76	77.56%

Table 7. No of unintended discrepancies per prescription

F)Drug interactions observed in the prescriptions

As a part of the study, we checked the drug interactions existing in the prescriptions. Drug interactions were checked using drugs.com and clinirex interaction checker. Based on severity we assessed and categorized the drug interactions as major, moderate and minor interactions. Total 34 drug interactions are observed in the study. Out of 34, 1 (2.94%) interaction was found to be major, 28 (82.35%) interactions were moderate and remaining 5 (14.71%) interactions were minor. The prescriptions of cardiovascular disease had a relatively high risk of drug interactions.

Table. 8. Category of drug interaction

Category of drug interaction	Frequency	Percentage
Major	1	2.94%
Moderate	28	82.35%
Minor	5	14.71%

V. DISCUSSION

The objective of the study was to evaluate medication discrepancy at admission and discharge.[6] The activities of medication reconciliation aim to prevent discrepancies and potential medication related problems.[2] Medication reconciliation requires multiple comparisons between different pieces of information, including medications on the best possible medication history (BPMH), medications prescribed in the hospital (adjusted, new, discontinued), unchanged home medications, and medications to be started at discharge.[6]

Discrepancies in medication history may impair the effectiveness and safety of drug therapy.[6] The most common discrepancy was medication omission. Furthermore, an increasing number of drugs were a significant risk factor for the presence as well as the number of medication discrepancies. In our study, out of 120 (62.5%) had more than one discrepancy and (19.17%) had at least one discrepancy[6]. Majority of the discrepancies was seen in the area of admission (67.85%) than discharge (32.15%).Our study demonstrated that cardiovascular drugs were the most frequent medications involved in the discrepancy. Hence continuing medical education and updates should be given on cardiovascular drugs and disease[6].

In our study out of 311 discrepancies, (87.14%) were intentional, that is, prescriptions are made by the clinicians on the basis of their evaluation of the patient's current clinical status but without explicit motivation or documentation of the underlying reasons. And the remaining (12.86%) were unintentional discrepancies[11]. Out of 98 prescriptions with discrepancies, majority (77.56%) prescriptions had no unintended discrepancies, (11.22%) prescriptions had at least one unintended discrepancy and remaining 11(11.22%) had more than one unintended discrepancy. Our study demonstrated that age groups above or equal to 65 years (70.41%) or with mean age 69.89 years were more prone to medication discrepancies and most of them were males.

As a part of our study, we checked the drug interactions existing in the case sheets of patients. Initially we categorized the drug interactions as major, moderate and minor interactions based on severity. A total of 34 drugs

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interactions were observed. Out of these 2.94% were major, 82.35% were moderate and remaining 14.71% were minor interactions. The prescriptions for patients with cardiovascular disease with comorbid conditions led to the greatest number of drug interactions, followed by cardiovascular disease (without comorbid conditions). In order to minimize the drug interactions observed, we can adjust the dose and frequency or alternative drugs can be given. The possible methods for reducing the risk of drug interactions include improving the knowledge of health care providers, providing information on patient risk factors, increased use of pharmacogenetic information, more attention to drug administration risk factors, and improving patient education on drug interactions[12].

VI. CONCLUSION

The study highlighted the importance of clinical pharmacists in conducting medication reconciliation to prevent medication errors. Medication discrepancies upon hospital admission are highly common and majority of them are intentional. the discrepancies are mostly seen in age groups above or equal to 65 or with mean age 69.89 years and majority of them are males. Cardiovascular drugs were the frequent class of medications involved in discrepancy. About 311 medication discrepancies are observed and mostly were due to medication omission. One major drug interaction is observed in the study. Understanding the type , category and frequency of discrepancies and group of patients at risk of medication discrepancy can empower clinicians to better understanding of ways to prevent them.[6] Medication reconciliation is a mandatory role for all clinical pharmacists , as they are the safeguard against medication errors and it is one of the key elements for effective communication between clinical pharmacists and clinicians.[2] Hence pharmacists collaborating with other health care providers will further improve patient safety and medication reconciliation process[6].

REFERENCES

[1]. Hung M., Ezeudens V C., Pinto G. S. Medicine's reconciliation: A toolkit for pharmacists. International Pharmaceutical Federation (FIP). 2021: 26-27. https://www.fip.org/file/4949

[2]. Sonallah H., Ibrahim T., Sattar D. A., Ahmed D, Izham M. Clinical Pharmacist-Led Medication Reconciliation Initiative at a Newly Established Hospital in Qatar: A Preliminary Report. Int Arch Nurs Health Care. 2017; 3(4): 1-5.

[3]. Al Ahmad M. M., Majed I., Sikh N., Al Ahmad K. The impact of community-pharmacist-led medication reconciliation process: Pharmacist-patient-centered medication reconciliation. J Pharm Bioallied Sci. 2020 Apr-Jun;12(2): 177-82.

[4]. Al manasreh E., Moles R., Chen T. F. The medication reconciliation process and classification of discrepancies: a systematic review. Br J Clin Pharmacol. 2016 Sep; 82(3): 645-58.

[5]. Mogaka B., Clary D., Hong C., Farris C., Perez S. Medication reconciliation in the emergency department performed by pharmacists. Proc (BaylUniv Med Cent). 2018 Sep 24; 31(4): 436-38.

[6]. Shilpa R., Neena P. E. M., Thayub M., Ramya M., Singh D. S., Cherian K. M., Medication Reconciliation During Discharge to Improve the Transitional Care in a Tertiary Care Hospital. J Pharm Health Sci Res (JPHSR). 2020; 1(1): 47-53.

[7]. Felek M., Berha A. B., Shibeshi W. Reconciliation of Medication Discrepancies at Hospital Discharge for Inpatients in Medical Ward of st.Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia. Ann Clin Lab Res. 2015, 3:4.

[8]. Jane H. Barnsteiner. Medication Reconciliation-Patient Safety and Quality: An Evidence-Based Handbook for Nurses. 2008; (2): 459-60.

[9]. S. A Tabish. Lifestyle Diseases: Consequences, Characteristics, Causes and Control. Journal of Cardiology & Current Research. 2017; 9(3): 1-4.

[10]. The High 5s Project Standard Operating Protocol - Assuring Medication Accuracy at Transitions in Care: Medication Reconciliation.

[11]. https://www.who.int/patientsafety/implementation/solutions/high5s/High5_InterimReport.pdf

[12]. Chiarelli M. T., Antoniazzi S., Cotesi L., Pasina L., Novella A., Venturini F., Nobili A., Mannucci P. M. adhoc

[13]. Deprescribing Study Group. Pharmacist–driven medication recognition/ reconciliation in older medical patients, Eur J Intern Med.2021 Jan;83:39-44.

[14]. Chiarelli M. T., Antoniazzi S., Cotesi L., Pasina L., Novella A., Venturini F., Nobili A., Mannucci P. M. adhoc Deprescribing Study Group. Pharmacist–driven medication recognition/ reconciliation in older medical patients, Eur J Intern Med.2021 Jan;83:39-44.