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Research Article

IMPACT OF CLINICAL PHARMACY SERVICES IN MEDICATION RECONCILIATION PROCESS BY PHARMACY STUDENTS

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ABSTRACT

Objective: The objective of the study is to perceive the impact of clinical pharmacy student services in health care system by identifying, rectifying medication discrepancies and drug related problems, also to measure the medication adherence level of patients.

Methods: This prospective interventional study was conducted in Vivekanandha medical care hospital, Elayampalayam. Patients admitted in the general medicine and cardiology units were included in the study. Various discrepancies were identified and rectified. Medication adherence level (MORISKY SCALE), adverse effects (NARANJO SCALE), medication errors (NCC MERP category) and drug interactions were measured.

Results: A total of 100 patients were included in the study. Error due to omission wrong frequency, wrong dose, and wrong formulations were identified. 31 drug interactions, 17 adverse drug reactions, and 386 errors were identified. Among the interventions made 30% were accepted by the physician.

Conclusion: Medication reconciliation conducted by clinical pharmacy students provides substantial benefit in patient care, by identifying and resolving significant drug related problems, resolving home and admission medication discrepancies and improve medication adherence level.

INTRODUCTION

Medication reconciliation is a systematic process in which healthcare providers work together with patients and their caregivers. By this process specific and comprehensive medication information are communicated consistently across transitions of care. (O.Fernades *et al,* 2017). Safe use of medications is of supreme importance because medication therapy is one of the most decisive factors in healthcare. (Vanessa Ann Irwin *et al,* 2017). During admission, at transfer and at discharge potential medication errors can occur, it leads to worse symptoms or death. (Alemayehu B *et al,* 2016). Due to inadequate reconciliation more than 40% of medication discrepancies can occur.(Jason Wesley *et al,*2014). Of these discrepancies about 20% are supposed to cause patient harm. Approximately 67% of patient's medication history recorded on admission has one or more error and about 30- 80% of patients were having discrepancies between medication ordered in hospital and patient's home medication (Action on patient safety, 2014).

The reconciliation process reduces the rate of medication errors in health care facilities and improves the quality of care (Medication Management Guideline, 2012). Medication reconciliation was conducted through four steps 1) obtaining best possible medication history (BPMH) 2) verifying and documenting history 3)Reconcile history with prescribed medications 4) Communication and documentation (Action on patient safety, 2014). These steps lead to identification of discrepancies between prescribed medication and the BPMH. The discrepancies can be divided into documented intentional, intentional and unintentional (Stephane Steurbaut *et al,* 2010). BPMH provides the core for medication reconciliation. It is a systematic process for interviewing the patient or care giver to acquire and justify patient's home medications (Olavo Fernandes *et al,* 2012). In fact timely identification and documentation of these discrepancies are crucial. This flawless pharmaceutical care can be conducted by well trained personnel (Ann Nickerson *et al,* 2005).

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MATERIALS AND METHODS

Study design and period

This was a Prospective, Interventional study carried out for a period of 6 months from January 2017 to June 2017

Study area

The study was conducted in the Department of General medicine and Cardiology units of Vivekanandha Medical Care Hospital, Elayampalayam, which is a 300 bedded tertiary care teaching hospital.

Study subjects

Total 142 patients were interviewed in the Department of General medicine and Cardiology units, from that 100 patients were selected as per the inclusion and exclusion criteria.

Data collection and analysis

A specially designed data entry form was used to collect patient medication information and Morisky medication adherence scale was used to assess the medication adherence. Error categorization was done by using National Coordinating Council for Medication Error Reporting and Prevention [NCC MERP]. Adverse drug reactions were categorized by using Naranjo scale. Drug- drug interactions were checked with the help of database MICROMEDEX. Data were entered into Microsoft Excel 2007 spreadsheets and results were analyzed using descriptive statistics. Results were expressed in Percentage.

RESULT

A total of 100 patients were selected for the study, among them 76 patients were from General Medicine and 24 patients were from cardiology units.

Gender Distribution

An overall gender distribution of the study population indicates predominant male population. Among 100 patients, male patients were 65% and female patients were 35%.

Adherence Level of Patients

According to Morisky 8 - Item Medication Adherence Scale, about 14% of study population is highly adherent to the drug therapy, 38% were moderately adherent and remaining 48% were having low adherence. (Table 1)

Table 1 Adherence level of patients

Sl.No	Adherence	Number	Percentage (%)
1	Poor	48	48
2	Good	38	38
3	Excellent	14	14

Identified Medication Discrepancies

Out of all discrepancies, error due to omission and wrong frequency were predominant in both deprtment. Followed by wrong dose (6.6%), wrong formulation (6.6%) in General medicine department. In cardiology unit wrong dose (7.4%), wrong formulation (5.9%). Compared to intentional discrepancies, unintentional discrepancies are more common in the study population. The intentional discrepancies occurred in 3% in both departments. (Table 2)

Table 2 Identified Medication Discrepancies

Department		General Medicine	Percentage (%)	Cardiology	Percentage (%)
Intentional	Documented	3	0.8	1	1.5
	Undocumented	8	2.2	1	1.5
Unintentional	Omission	133	35.3	37	54.4
	Wrong Dose	25	6.6	5	7.4
	Wrong Frequency	77	20.4	9	13.2
	Wrong Route	20	5.3	2	2.9
	Wrong Formulation	25	6.6	4	5.9
	Others	86	22.8	9	13.2

Assessment of Co-Morbid Conditions

The co-morbidities like Hypertension 23 (23%), Hypertension with Diabetes 18 (18%) and Diabetes Mellitus 10 (10%) were more predominant. Followed by Coronary artery disease 9 (9%), Chronic kidney disease/ Cerebrovascular accident/ Hypertension / Diabetes Mellitus 6 (6%), Hypertension / Diabetes Mellitus / Chronic kidney disease 5 (5%), Asthma 5 (5%) etc.

Error Categorization

Errors are identified and categorized with NCC MERP INDEX. Among 386 errors 356 came under error no harm, 18 under error harm and 12 under no error. (Table 3)

Table 3 Error Categorization

Type of Error	Category	No. of Error	Percentage (%)
No Error	Category A	12	3.10
Error , No Harm	Category B	170	44.04
	Category C	146	37.82
	Category D	40	10.36
	Category E	15	3.88
Error, Harm	Category F	3	0.77
	Category G	0	0
	Category H	0	0
Error, Death	Category I	0	0
Total		386	

Accepted Interventions

Through medication reconciliation 386 discrepancies were identified and among that 113 interventions were accepted. Most accepted intervention was wrong frequency (23%), it was corrected which would had caused harm to the patients. The errors which occurred and those which reached the patients were monitored closely. 10 monitoring parameters were monitored accordingly. (Table 4)

Table 4 Accepted interventions

Sl. No	Type of Discrepancy	No. of Interventions (n=113)	Percentage (%)
1	Discontinue Drug	12	10.61
2	Order Lab Test	3	2.65
3	Recommend A Drug Change	6	5.30
4	Decrease Dose	4	3.53
5	Increase Dose	3	2.65
6	Switch Off	9	7.96
7	Monitoring Parameters	10	8.84
8	Wrong Route	11	9.73
9	Wrong Dosing	6	5.30
10	Wrong Frequency	26	23.00
11	Wrong Dosing	6	5.30
12	Omission	5	4.42
13	Hold Drug	18	15.9

Identified Drug Interactions and Adverse Drug Reactions

In this study, 17 adverse drug reactions were monitored in which 16 were probable and 1 was possible with respect to Naranjo Adverse Drug Reaction Probability Scale.

By this process the correlation between medication adherence and number of medication were measured and it was found that there is no significant correlation between them. Drug interactions were also assessed.

DISCUSSION

Medication reconciliation is a formal and protocolized process was the patient's regular medication is compared to the medication prescribed after a transitional care or a transfer in the same care setting. The study comprised of 100 patients, out of which 33.3% were in the age group of > 65 years. The male patients (65%) were predominant than the female patients. The study was done mainly focusing on evaluation of medication adherence level, identification of drug related problems, identifying discrepancies, rectifying them.

In Jason Wesley Lancaster et al study as part of the medication reconciliation performed by the student pharmacists identified approximately 5 discrepancies per patient. In this study 3.86 discrepancies were identified per patient. Errors were identified and categorized with NCC MERP INDEX. Among 386 errors 356 came under error no harm, 18 under error harm and 12 under no error.

Rezende spalla et al conducted pharmacist based reconciliation during the period of six months in clinical units of a university hospital, and concluded that majority (80%) of medication errors were due to medication omission. In this study the error due to omission was predominant ie, 35.3% in general medicine and 54.4%in cardiology department, followed by wrong frequency 20% were in general medicine and 13% in cardiology.

In a review on medication reconciliation conducted by Patricia et al, out of the total 440 interventions, 77% were ultimately accepted. This study identified 386 discrepancies and among them 113 interventions was accepted.

Medication reconciliation was done by Magalha GF et al., in patients hospitalized in a cardiology unit and clinical pharmacists have taken medication histories and reconciled medications prescribed on admission with a list of drugs used prior to admission. Pharmacists verbally contacted the prescriber to recommend actions to resolve the discrepancies. The results revealed a high number of unintentional discrepancies and the pharmacist can play an important role by intervening and correcting medication errors at a hospital cardiology unit. In this study past and present medication histories was obtained and compared, discrepancies were identified and corrected.

Elin C lehnbom identified medication - related problems and adverse drug reactions in 17.2% to 94.0% of patients by Med Rec process. In this study 31 drug interactions and 17 adverse reactions were identified and reported.

The medication reconciliation process took an average of 45 minutes per patient according to Marlies M. E Ge ur et al study. It is more or less same as in this study. Some patients failed to bring their home medications while admitting in the hospital, it made difficult to obtain proper list of home medication. The past medical history obtained by the physician and the nurses were improper, it was rectified after interviewing the patient by the clinical pharmacy students.

The study was effective at obtaining medication and other allergy histories for patients admitted in the hospital, among 100 patients, 7 patients reported allergies.

CONCLUSION

This study demonstrated that impact of clinical pharmacy services in medication reconciliation was evident and pharmacy students play a significant role in hospitals to conduct medication reconciliation process. Medication discrepancies occurred commonly on hospital admission which may cause harm to the patients.

Through medication reconciliation omission of drugs and wrong frequencies was most common in general medicine and cardiology department. Identification and rectification of discrepancies and drug-related problems eventually helped to prevent harm to the patients.

Structured medication reconciliation may help to identify and prevent medication discrepancies during the hospital stay. Ultimately this may help to promote the effective and safe use of drugs in a hospital.

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