ABSTRACT

OBJECTIVES: To assess the frequency and contributing factors for medicine return from wards to the Pharmacy Department and its effects on medication errors.

STUDY DESIGN: A Retrospective Cohort Study

PLACE AND DURATION: The study was conducted from 1st January 2014 to 31st March 2014 in a tertiary care hospital of Karachi.

METHODOLOGY: In this study, 10 medicines were chosen by non-probability sampling methods which are part of nursing floor stock and have highest prescribing and return rates from wards to pharmacy. All the antibiotics, refrigerated medicines, extemporaneous compounding’s (sterile or non-sterile) and those dispensed at OPD pharmacy setting were excluded. Beside medicine return data, reported error medicine data was also taken.

RESULTS: 60% of the medicines return from wards to the pharmacy was of injectable dosage form, followed by oral dosage form i.e., 30%. The major contributing factors for the return of medicines from wards to pharmacy were discharge of patients (39.1%), discontinuation of medicine (20.9%), and deactivation of medicine order (8.4%). The operating room pharmacy received highest number of medicine return, i.e., 34.2%, followed by Medicine pharmacy, i.e. 27%. Similarly the highest numbers of reported medicine errors were observed in operating room pharmacy and medicine ward pharmacy, i.e. 35.8% and 24.6% respectively

CONCLUSION: The medicine return is proportionate to the medication error. Both the medicine return and medication errors can be controlled by upgrading nursing floor stock medicines list and also by improving the medication management system.

KEY WORDS: Medicines, Factors, Wards, Errors, Pharmacies, Hospital

INTRODUCTION

Medicine return is a type of reverse logistic that has significantly made its position in health and pharmaceutical industry. It is often associated with many complexities and in most of the cases occurs because of imbalance between the medicine need and demands. Within the hospital setting, medicines return from the patient sites to the hospital pharmacy unnecessary disrupt and divert the normal functions and operations of Pharmacy and thereby increases the burden in routine pharmacy activities. This can ultimately potentiate the risk of medication error.

Heavy work load is the most common contributing factor for medication error, as reported by the nurses in a focus group discussion of a qualitative research. Statistically heavy work load contribute to 37.5% of errors. Similarly, a retrospective study conducted by J. Phillips reveals that the medication error accounts for 44% because of performance deficit. Moreover, another study also report that increase work load to pharmacist, less number of staff and various technologies that assist in order processing also increases the risk for medication dispensing errors.

The pharmacist working in hospital setting have multiple responsibilities and this include dispensing of medicine, promotion of rational prescribing, monitoring of patient compliance, medicine education and also in the procurement of medicines. Medicines return from the wards to the pharmacies adversely affect the services of pharmacy and is often associated with medication errors. This medicines return from wards to pharmacy usually occurs because of irrational prescribing and uncontrolled dispensing practices. For controlling the medicine return, assessing the burden of selected medicine return and its reasons is essential. Therefore, knowing about the frequency and contributing factors of medicine return would aid in formulation of new medicine management system.
prescribing and dispensing policies in hospital and this will ultimately reduce the pharmacy work load and medication dispensing errors.

METHODOLOGY

This is a retrospective cohort study that was carried out in Department of Pharmacy in collaboration with Department of Nursing, Aga Khan University Hospital Karachi, Pakistan from 1st January 2014 to 31st March 2014. In this study, last quarter data about the medicine orders and errors (reported incident report) from each pharmacy unit was collected.

A medicine search from the hospital pharmacy system was carried out, in order to know about the consumption and refund of all the medicines used in the last quarter of 2013. All the medicines which are part of nurses’ floor stock medication were included. Therefore, 10 medicines were chosen by non-probability purposive sampling technique, because of their highest numbers of order request and return as per the last quarter medicine consumption search report. All the antibiotics, refrigerated items and any medicine orders that were either processed or return from the OPD Pharmacy setting were excluded. In addition, all the sterile and non-sterile extemporaneous preparations were also excluded from the study. The reason for excluding extemporaneous preparations was because of Extemporaneous preparations are patient specific. Short shelf-life and No refund policy for extemporaneous preparation.

For the collection of data, the Rx numbers (i.e. Prescription number) of the targeted medicines that were refunded from the wards to the inpatient pharmacies were used. The Rx numbers served as basic indicator for tracing the medicine profile of patients.

The medicine profiles of the patient were traced by using EMR (Electronic Medical Record) software. The EMR is used frequently by nurses, when they have to check and administer medicines. There are different options that are visible to both EMR and Pharmacy system screen and these are AC (Activated), DAC (Deactivated order) and DC (Discontinued). A nurse can only administer medicine to patient when the medicine Rx appear AC. Otherwise a nurse have to return medicine to the pharmacy from the wards and the reasons could be: BSO (Bed to Bed Shifting), CDF (Conversion of Dosage form), DAC (Deactivated order), DC (Discontinued), DIS (Discharge Patient), DM (Dose Missed), NP (No Pain – but not entered in PRN), PRN (As per needed), and WSO (Ward to Ward Shifting Order). Therefore during this tenure 730 prescriptions number (Rx) of 10 selected medicines were reviewed by using Pharmacy system and EMR software.

In order to observe the effect of medicine return on the services of pharmacy, 3 months reported errors (incident) report of all the inpatient pharmacies was used. Both the medicine return and reported errors reports were considered as main variable of this study. All the variables were presented in the form of percentage and frequency by using SPSS 19.0.

The study was approved by the Management of Department of Pharmacy Services, The Aga Khan University Hospital Karachi.

RESULTS

In this study, 2382 Rx of medicines were received in pharmacies from different wards for return, but 10 medicines were chosen, that contribute to 31% of overall medicine return. The 10 medicines which were chosen for this study were Paracetamol Injection 1000 mg / 100 ml vial, Ipratropium bromide 500 mcg / 2 ml for nebulization, Metronidazole 400 mg tablet, Metoclopramide 10 mg tablets, Metoclopramide 10 mg / 2 ml ampule, Ketorolac 30 mg / ml ampule, Tramadol 100 mg / 2 ml ampule, Furosemide 20 mg / 2 ml ampule, Dexamethasone 4 mg / vial, and Lactulose syrup 120 ml / bottle.

TABLE - I: MEDICINE RETURN CONTRIBUTION FROM WARDS TO PHARMACY: (N=740)

<table>
<thead>
<tr>
<th>S. No</th>
<th>Medicine Name</th>
<th>Dosage Form</th>
<th>Return Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Paracetamol 1000 mg / 100 ml</td>
<td>Injectable bottle</td>
<td>43.1% (n = 319)</td>
</tr>
<tr>
<td>2</td>
<td>Ipratropium bromide 500 mcg / 2 ml</td>
<td>Vial</td>
<td>20% (n = 148)</td>
</tr>
<tr>
<td>3</td>
<td>Metoclopramide 10 mg</td>
<td>Tablets</td>
<td>9% (n = 67)</td>
</tr>
<tr>
<td>4</td>
<td>Lactulose 120 ml</td>
<td>Syrup bottle</td>
<td>7.8% (n = 58)</td>
</tr>
<tr>
<td>5</td>
<td>Ketorolac 30 mg / ml</td>
<td>Ampule</td>
<td>5% (n = 37)</td>
</tr>
<tr>
<td>6</td>
<td>Furosemide 20 mg / 2 ml</td>
<td>Ampule</td>
<td>4.8% (n = 36)</td>
</tr>
<tr>
<td>7</td>
<td>Dexamethasone 4 mg / ml</td>
<td>Vial</td>
<td>4.7% (n = 35)</td>
</tr>
<tr>
<td>8</td>
<td>Metronidazole 400 mg</td>
<td>Tablets</td>
<td>3.7% (n = 28)</td>
</tr>
<tr>
<td>9</td>
<td>Metoclopramide 10 mg / 2 ml</td>
<td>Ampule</td>
<td>0.8% (n = 6)</td>
</tr>
<tr>
<td>10</td>
<td>Tramadol 100 mg / 2 ml</td>
<td>Ampule</td>
<td>0.8% (n = 6)</td>
</tr>
</tbody>
</table>

The above data indicate that Paracetamol injection has highest frequency of refund i.e. (43.1%, n =319) followed by Ipratropium bromide for nebulization (11.8%, n= 148). However among the selected medicine minimum medicine refund was observed in Metoclopramide 10 mg ampules and Tramadol 100 mg ampules i.e. (0.8%, n=6) for each.
There are different reasons for the reverse logistics from the wards to the pharmacies. Among these reasons, it is the discharge of the patient that caused high medicine return from the wards to the pharmacy. The result of this study indicates that there are total 81 reported medication received in inpatient pharmacy. This contributes to 84.3% errors in all the OPD and inpatient pharmacies. Among inpatient pharmacies, highest number of errors were reported in operating room pharmacy i.e. 35.8%(n=29) followed by medicine ward pharmacies i.e. 24.6%. However, the numbers of errors reported in surgery and pediatric pharmacy is equal i.e. 19.7%(n=16). Regarding medicines return highest number of medicine return was receive in operating room pharmacy 34.2%(n=253) followed by medicine pharmacy 27%(n=200) and surgery pharmacy 22.8%(n=169).

**DISCUSSION**

In this study 10 medicines were chosen, which had highest return rate from the wards to the hospital pharmacies. The return rate contributed by these medicines was 31%. Out of ten medicines chosen, there were 60% injectable medicines while 40% were of oral and nebulization dosage form. However, in Hospital setting of China, tablets which are the oral dosage form largely contribute to the medicine return from wards to the pharmacies. Similarly, a study conducted in this New Zealand reveal also indicate that it is the oral dosage form of medicines i.e. tablets, capsules and liquids that largely contribute to return in pharmacies. Since in this study, only 10 medicines were studied and because of which it cannot be concluded that in Pakistan, the injectable dosage form largely contributes to return from wards to the pharmacy. The change in the physician prescribing practices could be a reason for the return of different dosage form medicine in Pakistan, China and New Zealand.

The results of this study reveal that it is the patient discharge (39.1%), medicine discontinuation (20.5%), and patient shifting (8.5%) either from one bed to another bed or from one ward to another ward that contribute heavily to the medicine return from wards to the pharmacy. Different studies that were conducted in China and Sweden regarding investigating reasons for medicine return also represents similar reasons for the medicine return. The discharge of patients either due to patient death or because of patient treatment and discontinuation of medicine either because of change in the treatment plan or because of no further need of medicines collectively contributes to 68.3% (n=506) medicine return according to the results of this study. A study conducted in Sweden revealed that patient discharge and medication discontinuation collectively contribute to 75% of medicine return from wards to pharmacies. The difference in the proportionate contribution of patient discharge and medicine discontinuation could be because of different data collection approach, because in this study the data is collected retrospectively and in the study conducted in Sweden the data was collected via semi-structure interview method.

A directly proportional relationship between the medicine return and medication error has been observed in this study. The operating room pharmacy receives highest number of medicine return and the number of reported medicine errors in operating room pharmacy is also high. However the medicine ward pharmacy receives second highest quantity of medicine return and it rank second in medication error. Therefore it is evident that the medicine returns increases the likelihood of medication errors in pharmacy. Different studies also suggest that increase workload to the pharmacist increases the risk for medication errors. There is dire need revise and upgrade the medication list of medicines stocked in the nursing floor unit. This will not only reduce the medicine return to pharmacy, but also reduce the
workload of pharmacist, nurses and physician. This study was carried out in only 10 medicines that has high return rate. The result of this study can't be generalized for whole year, because the consumption of certain medicines changes according to season. In order to generalize the result of this study, it is necessary to retrospectively collect a year data so that the pharmacist and other health managers would have clear idea about the medicine consumption and medicine return rate. This will help them in better decision making regarding the control of medicine return from wards to the pharmacies.

CONCLUSION

The medicine return is proportionate to the medication error. Both the medicine return and medication errors can be controlled by upgrading nursing floor stock medicines list and also by improving the medication management system.

Author Contribution:
Khaliq A: Writing introduction, Result analysis and Interpretation part.
Hashmi SYA: Conceived idea, Designed methodology, Data collection.
Sultana J: Discussion writing. Data Collection.

Disclaimer: None.
Conflict of Interest: None.
Source of Funding: None.

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