Observational Analysis of Medication Related Errors by Clinical Pharmacists in a South Indian Hospital

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ABSTRACT

Present work was done to evaluate the occurrence of medication errors in general ward of Maharaja institute of medical sciences to assess the role of clinical pharmacist in error management. The study was conducted for 9 months and Data was acquired from inpatients of general medicine dept by using standard case report form through direct patient interview. The collected data was analysed to identify medication errors by using drug information tools such as Micromedex, drug interaction checker and reputed journals and statistical interpretations were done. 400 prescriptions were analyzed and in that 300 prescriptions were presented with medication errors. 202 were found to be Prescribing errors, 111 Administration errors, 45 were dispensing errors, Monitoring errors were 123. Interaction errors (81.18%), prescription in small letters (34.65%), wrong frequency of administration error (32.43%) and wrong time administration of medicine (85.58%), Dispensing wrong quantity of drug (95.5%) were the major medication errors that were observed. Medication errors have been occurring frequently in the general medicine department out of which prescribing errors were more common. Clinical Pharmacist could act as an affective medical staff by performing consciousness and teaching programmes to medical professionals and by maintaining positive collaboration with other health care providers for patients.

INTRODUCTION

The goal of drug therapy is the gaining of defined therapeutic outcomes that improve a patient’s quality of life. The consequences that result from such risks are defined as adverse drug events, and it includes adverse drug reaction and medication errors (Basarkar, 2015).

Medication error is defined as any preventable event that inappropriate may cause or lead to medication use or patient harm while the medication is in the control of a health care professional, patient (Aronson, 2009).

Pharmaceutical care is the best option for getting positive outcomes which ultimately increases the quality of life of patients. Medication errors are a well-known problem in hospitals (Shah and Solanki, 2013). The important problem in hospitals are medication errors (Tank et al., 2016; Velo and Minuz, 2009).

Types of Medication Errors

The Medication procedure includes five steps, which provides for prescribing, transcription,
verification, dispensing, administering, monitoring, reporting (American Society of Hospital Pharmacist, 1993). Administration errors contain dose deletion, inexact administration, wrong time, compliance error. Dispensing errors are incorrect drug, improper strength and Incorrect formulation (Fitzgerald, 2009). The problem of Medication Errors is interdisciplinary, and Medication Errors may happen due to nil understanding, inferior presentation and faults in the process (Zellmer, 1990).

Role of Clinical Pharmacist in Prevention of Medication Error

The pharmacist is an expert who knows to provide counselling to patients with mild diseases and for chronic illness patients on accepted preservation treatment options (Strand et al., 1990). A trained Pharmacist can do Drug Utilization Evaluation to prevent medication-related problems. Proper teamwork from all medical staff can cease the prevalence of Medication errors. (Parthasarathi et al., 2004).

Objectives

1. To identify all types of medication errors which may damage a patient’s health.
2. To find the rate and types of medication errors.
3. To assess the role of clinical pharmacist in minimising the flaws in prescriptions.

MATERIALS AND METHODS

Study site

Maharaja Institute of Medical Sciences, Vizianagaram, Andhra Pradesh. This study was done for nine months in a 700 bedded hospital. In-patients of the general ward were taken. Conceived and breastfeeding females and kids are excluded.

Data assemblage

Data were collected from the patients through a structured case report form which contains all the necessary data for interpretation.

Ethics approval

Ethical approval was acquired from Institutional Ethical Review Board of Hospital before commencement of work. Informed consent was taken from participants.

Statistical investigations

Statistical investigations were done by descriptive statistics. Student’s t test –two tailed was used to analyse the level of significance in assessing the prescription errors.
Table 1: Number of drugs prescribed in categories

| Category          | Total no. of classified drugs | Percentage | P value  |
|-------------------|-------------------------------|------------|----------|
| Generic drugs     | 1308                          | 52.6%      | 0.0327*  |
| Brand drugs       | 1180                          | 47.4%      |          |

Table 2: Prescribing errors

| Sl.No | Type of Error                        | Number of errors | Percentage |
|-------|--------------------------------------|------------------|------------|
| 1     | Dose/ Strength Error                  | 44               | 21.78%     |
| 2     | Duplication Error                     | 18               | 8.91%      |
| 3     | Frequency Error                       | 36               | 17.8%      |
| 4     | Generic/ Brand name error             | 0                | 0          |
| 5     | Unnecessary Drug                      | 0                | 0          |
| 6     | Timing Error                          | 0                | 0          |
| 7     | Duration Error                        | 0                | 0          |
| 8     | Interaction Error                     | 164              | 81.18%     |
| 9     | Omission Error                        | 0                | 0          |
| 10    | Contraindication Error                | 2                | 0.99%      |
| 11    | Wrong Route                           | 1                | 0.49%      |
| 12    | Incorrect Drug                        | 2                | 0.99%      |
| 13    | Prescription in small letters         | 70               | 34.65%     |
| 14    | Prescribing drugs in relation to allergy status | 0 | 0 |
| 15    | Lack of clear direction to administration of drugs | 18 | 8.91% |
| 16    | Indication not mentioned              | 0                | 0          |

Table 3: Severity assessment of Medication errors

| Sl.no | Extent of severity | Number | Percentage | P value  |
|-------|--------------------|--------|------------|----------|
| 1     | No error           | 104    | 34.7%      | 0.0433*  |
| 2     | Error but no harm  | 153    | 51%        |          |
| 3     | Error but harm     | 43     | 14.3%      |          |
| 4     | Error death        | 0      | 0          |          |

RESULTS AND DISCUSSION

Medication errors have important implications for patient safety. A medication error can take place...
Table 4: Level of severity according to NCC MERP scale Probability of level of severity is 0.043, (P VALUE) which is significant

| Category   | Description of category                                      | Count | Percentage |
|------------|-------------------------------------------------------------|-------|------------|
| **No error**|                                                             |       |            |
| A          | Circumstances or events that have the capacity to cause error| 104   | 34.7%      |
| **Error, no harm**|                                                     |       |            |
| B          | An error occurred, but the medication did not reach the patient| 3     | 1%         |
| C          | An error occurred that reached the patient but did not cause patient harm | 43    | 14.3%      |
| **Error, harm**|                                                           |       |            |
| D          | An error occurred that resulted in the need for increased patient monitoring but no patient harm | 107   | 35.7%      |
| E          | An error occurred that resulted in the need for treatment or intervention and caused temporary patient harm | 34    | 11.3%      |
| F          | An error occurred that resulted in initial or prolonged hospitalization and caused temporary patient harm | 8     | 2.7%       |
| G          | An error occurred that resulted in permanent patient harm   | 1     | 0.3%       |
| H          | An error occurred that resulted in a near-death event (e.g., anaphylaxis, cardiac arrest) | 0     | 0%         |
| **Error, death**|                                                      |       |            |
| I          | An error occurred that resulted in patient death            | 0     | 0%         |

Figure 7: Number of Essential and Non-essential drugs prescribed in percentage

Out of 400 prescriptions, a total of 300 prescriptions having medication errors were considered. 28(9.3%) were in the age of 71-80 years, 43 (14.3%) were in the age group of 61-70 years; 62(20.6%) were in the age group of 51-60 years; 56(18.75) were in the age group of 41-50 years; 50(16.75) were in the age group of 31-40 years; 34 (11.3%) were in the age group of 21-30 years; and 1(0.33%) were in the age group of 11-20 years. Majority of patients are females 190 (63.3%), 110(36.7%) were males [Figure 2], it is contrary with the research by Karna et al. They mentioned the domination of males (77.4%) over females (22.6%) in medication errors is clearly visible.
Figure 9: Graph representing Percentage of drugs prescribed in different routes

Figure 10: Graph representing number of Medication Errors

Figure 11: Graph representing Percentage of prescribing errors

Figure 12: Graph representing percentage of Administration errors

Figure 13: Percentage of dispensing errors

Figure 14: Graph representing percentage of Monitoring errors

Figure 15: Graphical representation of level of severity

Figure 16: Percentage of severity according to NCC MERP scale
the age group of 31-40 years; 35(11.7%) were in the age group of 21-30 years; 26(8.7%) were in the age group of 11-20 years [Figure 1].

A total of 300 prescriptions having medication errors in that infectious diseases were highly prevalent, and dermal disorders were least prevalent [Figure 3].

Number of prescriptions which contained 6-10 drugs per prescription were high in number [Figure 4]. This is in support of research done by Narneakhil et al., who concluded that 6-10 drugs per prescription were high 54(55.7%).

The medication errors in our study were mostly seen in the age group of 40-60 years (39.3%) [Table 1] and [Figure 1]. This is in opposing of research by Dabaghzadeshg et al., who stated that errors were more commonly seen in the age group of 50-70(36.7%). While considering an average number of drugs prescribed per prescription, 189 prescriptions were prescribed with an average of 6 to 10 drugs. [Figure 4] and 46 prescriptions were prescribed with an average of <5 drugs and [Figure 5].

58.6% of NSAIDS drugs were prescribed (176 prescriptions out of 300 prescriptions) and 81% of antimicrobial agents (243 prescriptions out of 300) [Figure 6]. The overall count of essential drugs and nonessential drugs are 2202(88.50%), 286(11.49%) respectively [Figure 7]. 52.6% of generic drugs and 47.4% of branded drugs were prescribed [Table 1] and [Figure 8]. Percentage of drugs administered through the oral route, parenteral route and topical route was 54.54%, 45.21%, 0.24% respectively [Figure 9].

400 prescriptions were checked and of these 300 prescriptions were having medication errors. 202 were Prescribing errors [Table 2] and [Figure 11] out of this [dose or strength errors 44(21.78%), duplication errors 18(8.91%), frequency errors 36(17.8%), interaction errors 164(81.18%), contraindication errors 2(0.99%), prescription in small letters 70(34.65%), lack of clear direction to administration errors 18(8.91%)] 111 were found to be Administration errors [Figure 12], out of this [wrong time of administration 95(85.58%), omission errors 1(0.90%), wrong frequency 36(32.43%), wrong drug 1(0.90%), improper dose or quantity 43(38.73%)] 45 were found to be dispensing errors [Figure 13] out of this [wrong drug or form selected 2(4.44%), wrong quantity errors 43 (95.5%)]; Monitoring errors were 123 [Figure 14] in that [monitoring requested but not done 73 (59.34%), monitoring not requested 41(33.33%), results not available 47 (38.2%)].

In our study among 202 prescribing errors, interaction error 164(81.18%) is the most leading error which is in contrary with research done by Nikitha et al., who stated that duplication error was the most leading error in their study. Prescribing errors appeared in the highest number [Figure 10], which is opposing the work of Patel et al. Who stated that administration errors are higher than others. Not giving importance to the medication chart after drug administration at peak hour may be the reason for documentation. Nursing staff are to be appropriately educated to control administration errors.

We have also considered the extent of severity of medication errors. 51% of errors were found to be errors which might not cause any harm followed by 31% of cases with no mistake and 14.3% of cases with error and causing harm. [Table 3] and [Figure 15].

According to NCC MERP risk assessment of medication errors out of 300 prescriptions. 104[34.6%] were category-A related; 3 [1%] category- B; 43 [14.3%] category- C; 107[35.6%] category- D; 34 [11.3%] category-E; 8[2.3%] category-F1 [0.3%] category-G (an error occurred that resulted in permanent patient harm) [Table 4] and [Figure 16]; which is in contrast with the study carried out by Armin Eisa -Zaei et al., where category- B errors were more identified. In our study probability of level of severity is 0.043, (P VALUE) which is significant.

Areas of concern

1. More number of poly pharmacy containing prescriptions
2. A higher percentage of branded drugs in prescriptions
3. A significant percentage of incorrect doses, frequency errors, drug-drug interaction errors, wrong time, wrong quantity and lack of monitoring in required cases related errors were observed in the analysed prescriptions.

Some encouraging findings

1. The highest percentage of drugs in accordance with the essential drug list
2. Nil percentage of dispensing and expired medication-related errors
3. Nil percentage of wrong strength errors were observed in the analysed prescriptions.

Limitations
1. The present study was done in a single hospital, and more number of hospitals are to be included for accuracy.

2. Several prescriptions were confirmed to 300 due to time-related factors, patient-related factors.

3. The study was confined to only the general medicine department.

CONCLUSION

Medication errors cause significant damage to patients safety. They create lengthy stay in the hospital, burdensome treatment; disability also increases the mortality, morbidity rates. In this study, after thorough data interpretations, we found that Medication errors have frequently been occurring in the general medicine department, out of which prescribing errors were more. The high prevalence of prescribing errors might be due to high inflow of patients to the hospitals, which eventually increasing burden on physicians and also due to improper knowledge of physicians. The present study also shows the occurrence of medication errors at each stage of medication use, along with the severity assessment of medication errors. Clinical pharmacist as an essential member of health care system could play a significant role in identifying, rectifying and modifying the medication errors which are necessary for emerging pharmacy practice education in India and thus assure the patient safety by rendering his services like directing consciousness and training sessions to nursing staff and by maintaining positive collaboration with health care providers in identifying medication errors.

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Conflict of Interest

Authors declare No Conflict of Interest.

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