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A PROSPECTIVE OBSERVATIONAL STUDY OF MEDICATION ERROR AMONG ASTHMA PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: The objective of this study is to evaluate the common medication error (ME), in Asthma Patients and its causes, category, and severity by using suitable questionnaire.

Methods: A prospective observational study was carried out for 6 months in a Respiratory department at a private hospital in Erode. Demographic data, clinical history, and complete prescription were noted.

Results: A total of 557 Asthma cases were collected, among that 354 MEs were identified in which male patients were 341 (61.2%) and females 216(38.7%). The number of MEs occurred due to physician was 59 (10.5%), due to nurses was 99 (17.7%), and combined was 34 (6.1%). Incomplete prescription was the main type of error that we found. About 195 (35.0%) of the error was identified and informed to the staff and no specific action was needed for 35.0% of

errors. In our study, we found that majority of 149 (26.7%) errors were categorized under category B, but there was no harm to the patient.

Conclusion: The present study concluded that most of the patients admitted in the respiratory department would experience MEs. Clinical pharmacist can play a major role in the early detection and prevention of MEs and thus can improve the quality of care to the patients.

Keywords: Medication Error, Drug related Problems, Asthma, and Patient's Safety, Prospective study

INTRODUCTION

Asthma is a chronic respiratory disease it affects more than 300 million individuals all over the world is a serious health and socioeconomic issue. It is considered to be an inflammatory airway disease, which leads to airway hyper responsiveness, obstruction, hyper production of mucus and remodeling of airway walls ^[1]. Bronchial asthma is a recurrent but reversible obstruction of the airways. Studies have shown that the prevalence of asthma is in the range of 1% to 20% of the population in any country ^[2]. Over the last 25 years, the increase in asthma prevalence is likely due to changes in our environment or lifestyle because modifications in our genetic makeup to occur, it would take more than several generations ^[3]. Worldwide, asthma cases are increasing at a rate of 50 per cent every decade, and according to the World Health Organization, by the year 2020, asthma, along with chronic obstructive pulmonary disease (COPD) will become the third

leading cause of death. An estimated 300 million people in the world currently have asthma and there may be an additional 100 million persons with asthma by 2025^[4]. According to National Family Health Survey 2 (NFHS-2) report, the estimated prevalence of asthma in India is 2468 per 100,000 persons. Due to increasing population, predicted increase in the prevalence of asthma will result in a marked increase in the number of asthmatics^[5] Medication error (ME) is defined as “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient. Such events may be related to the professional practice, health-care products, procedures, and systems including prescribing, order communication, product labeling, packaging, compounding, dispensing, distribution, administration, education, monitoring, and use” [6,7]. ME in Asthma patients, especially

in long-term care facilities, is often trained in self-administration of medications to increase their self-care and to improve their compliance. However, asthma patients are extraordinarily at risk of medication mistakes as they are prescribed with complex medication regimen, may be non-compliant, and resist medicinal administration or even be violent. Medication administration to psychiatric inpatients is a demanding situation when compared with other inpatients. Evidences from a plethora of resources throw light onto a range of adverse drug events (ADEs) which are due to MEs from asthmatic drugs MEs might also occur at any level of prescribing, documenting, or management. Furthermore, MEs also contribute to morbidity, mortality, and extended fitness care prices. Mistakes can happen in all stages of care technique from diagnosis to drug management [8,9]. Blunders arise as a result of two types of failure; the right action does not proceed as meant (an error of execution) or the unique meant action is not accurate (errors of planning). ADEs and MEs are spotted as a crucial and extensive trouble in modern health [10]. This increases the number of drugs per prescription which may lead to ME and DDIs. Hence, monitoring of DDIs and rationality plus ME would be an essential

element of high quality of medical care. The data about these are lacking in our hospital, hence the present study was carried out with the objectives to determine demography about MEs, DDIs, and rationality of prescriptions.

MATERIALS AND METHODS:

Study design

The study was a Prospective observational study

Study population

The study included a total of 557 asthma patients who had undergone treatment

Study period

The study was conducted between October 2018 to March 2018. For a period of 6 months

Study criteria

Inclusion criteria

Patients diagnosed with asthma with both sex
Age range between 16 years -75 years
Patients currently on anti-asthmatic medications were Included in the study.

Exclusion criteria

Patients below 16 years of age, Pregnant and lactating females Patients, Asthmatic patients who suffered from other diseases such as hypertension, diabetes, heart Problems, bronchitis, chronic obstructive pulmonary disease (COPD), peptic ulcer, diabetes mellitus or any other co-morbidities were excluded.

Study Procedure:

After obtaining the consent of the institutional ethics committee and Human ethics committee, patients

With Bronchial Asthma receiving treatment with anti-asthmatic drugs at out-patient department of Medicine were explained about the study purpose in their local language. Written informed consent was obtained from those who are willing to participate in the study.

RESULTS

In our study a total of 557 asthma were selected in that 342 (60.2%) were male's and 226 (39.7%) were belong to female patients shown in the Table: 1 demographic profile in Figure:1

Patient distribution based Gender

Our study shows that the age wise distribution of the patients. Most of the patients were in the age group of 61-70(38.5%) years followed by 51-60 (27.1%) years. Incidence was more in older age as shown in Table: 2 and Figure 2. A total of 557 prescriptions 2785 medications prescribed. Average number of drugs per day for a patient was 5.5 majority of the patients received two to five drugs.

According to table 3 our study result shows the most of the people are illiterate 198 (35.5%) Higher Secondary 114(20.4%) and

secondary 95 (17.0%) 89 Primary (15.9%) followed by Graduate 61(10.9%) was the least one is illiterate in our study most of them are illiterate and higher secondary level as shown in Table 3.

According to our study in table 4 smoker patients are 218(39.1%), and alcoholic 146 (26.25) and tobacco 56(10.0%), both 96(17.2%) and 41 Patients (7.3%) not taking anything.

In our study according to table:5 most of the patients have suffered from Mild Intermitant asthma 242(43.4%) and Mild persistent 162(29.0%) and Moderate presistant asthma Table 6 shows the Prescribing Pattern of anti-asthmatic drugs shows Beta 2 agonist was the most commonly prescribed antiasthmatic drug followed by Corticosteroids and Methylxanthine. The pattern of drug prescription for treating asthma at the study showed Methylxanthine are the highest prescribed class of medications (32.6 %) followed by short acting β 2-agonist (SABA) (28.9%), corticosteroids (6.0 %) ,Anti-histamines(14.2%) leukotriene modifiers (7.4 %) and Anticholinergics (10.4%) s shown in Table 6.

According to table 7 in our study most of the errors is Prescribing errors 354(63.2%) Admistrating errors 152(27.2%) followed by

dispensing errors 51(9.1%) and no error occur in transcribing error.

According to table:8 different stages of medication error occur in mostly incomplete prescription error 269 (48.2%), followed by wrong dose error 71(12.7%), and wrong dosage error 65(11.5%) and wrong time error 56 (10.0%),and wrong frequency 41(7.1%) wrong duration 32(5.7%).

According to table:9 in our study most of the error made by the informed staff 218(39.1%)

and followed by no action needed 146(26.2%),and changed the correct drug frequency 98(17.5%) and communication process improved 95(17.0%).

According to table:10 the severity assessment of medication error can be classified most of them was No error Category **B** 321(57.6%) ,Category **A** 99(17.7%), Category **C** 95(17.0%)and Category **D** only 42(7.5%) and Error harm was 0 and Error death also 0.

Table: 1 Sex wise distribution:

SEX	NUMBER OF PATIENTS	PERCENTAGE
MALES	341	61.2%
FEMALES	216	38.7%
TOTAL	557	99.9%

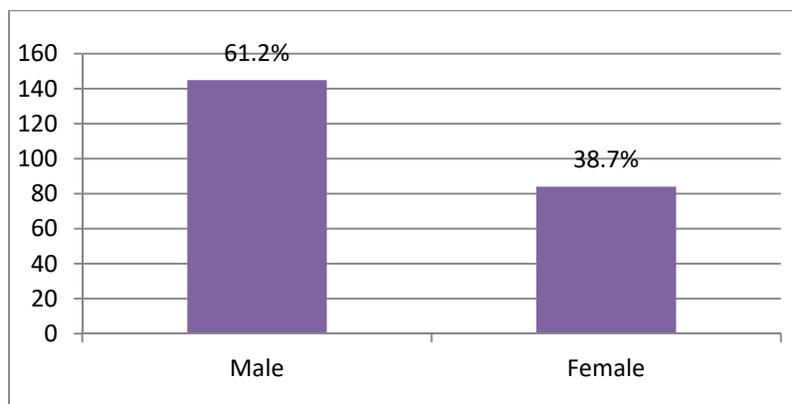


Figure 1

Table: 2 Age Distribution of the Patients

AGE GROUP	NUMBER OF PATIENTS	PERCENTAGE (n=557)
17-30Yrs	18	3.2
31-40yrs	58	10.4
41-50yrs	115	20.6
51-60yrs	151	27.1
61-70yrs	215	38.5
Total	557	100

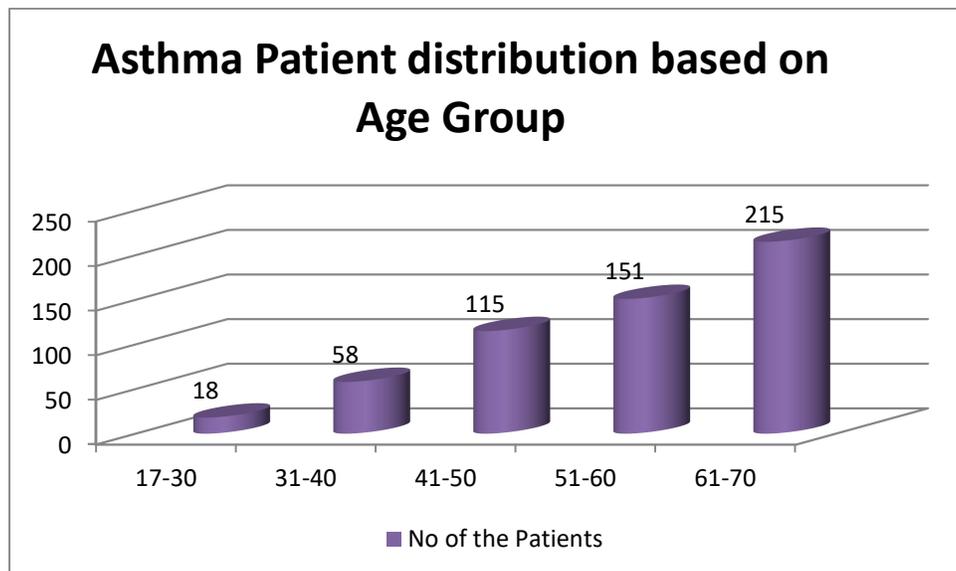


Figure 2

Table 3: Educational status of the Patients

Educational status	NUMBER OF PATIENTS	PERCENTAGE (n=557)
Illiterate	198	35.5
Primary	89	15.9
Secondary	95	17.0
Higher secondary	114	20.4
Graduate	61	10.9
Total	557	100

Table 4: Social habit

Social habits	No of patients	Percentage(n=57)
Smoker	218	39.1
Alcoholic	146	26.2
Tobacco	56	10.0
Both	96	17.2
None	41	7.3
Total	557	100

Table: 5 Types of asthma

Types of asthma	NUMBER OF PATIENTS	PERCENTAGE (n=557)
Mild Presistant	162	29.0
Moderate Presistant	97	17.4
Mild Interminant	242	43.4
Severe	56	10.0
Total	557	100

Table 6: Prescribing Pattern Of Anti-Asthmatic Drugs

Anti-asthmatic drugs	Number of Prescription	Percentage(n=557)
Methyl xanthaine	284	50.9%
Beta 2 agonist	107	19.2%
Corticosteroids	59	10.5%
Leukotriene modifiifceers	71	12.7%
Anti-Histamines	36	6.4%
Total	557	100

Table 7: Types of errors in different stages of the medication process

Types of Medication Error	Number of Prescription	Percentage(n=557)
Incomplete prescription	269	48.2
Wrong time error	56	10.0
Wrong dose error	71	12.7
Omission error	23	4.1
Wrong dosage error	65	11.6
Wrong frequency	41	7.1
Wrong duration	32	5.7
Monitoring error	0	0
Total	557	100

Table 8: Types of Medication Error Observed in Different stages asthma Patients

Stages of Medication Errors	Number of Prescription	Percentage(n=557)
Prescribing	354	63.5
Dispensing	51	9.1
Admistrating	152	27.2
Transcribing	0	6.8
Total	557	100

Table: 9 Types of study Interventions

Types of Interventions	Number of Interventions	Percentage(n=557)
Informed staff who made error	218	39.1
No action needed	146	26.2
Changed correct drug,frequency	98	17.5
Communication process improved	95	17.0
Total	557	100

Table 10: Severity level assessment of Medication errors

Level of severity	Category	No of Patients	Percentagen=557)
No Error	Category A	99	17.7
	Category B	321	57.6
	Category C	95	17.0
	Category D	42	7.5
Error harm	Category E	0	
	Category F	0	
	Category G	0	
	Category H	0	
Error death	Category I	0	
Total		557	100

DISCUSSION

MEs are the serious problems in health care and can be a source of significant morbidity and mortality in health-care settings. MEs are probably the most common type of patient safety incidents worldwide and may cause harm to the patients, distress to medical staff, and cost to the health-care system. An average of one or more MEs occurs per hospitalized patient per day [11].

In our study total of 557 Asthma cases Prescriptions were collected, from hospital from 6 months among that 354 MEs were identified in which male patients were 341 (61.2%) and females 216(38.7%).. (Table 1). Another study done by the Pshychiatric patients conducted by Ahmed *et al.*, (2015)[12] and showed that, of 264 patients, 180 were male patients and 84 female patients. In this study, more number of patients affected with MEs was males than females [. Another study conducted by Anandhasayanam *et al.*, (2016) showed that the error cited was 269 in relation to both categories of male and female patients. In male patients, 80.3% prescription errors were present and in female (19.7%) [13]. Similar findings were obtained from the study conducted by Akhil *et al.*, (2017) which revealed that the MEs were more in males than in females [14].

The demographic reports of the present study showed that higher incidence of MEs in male patients 347(61.2%) ranges from 61 to 70 years (27.1%)of age followed by 51–60years 11 (20.6%)and 31–40 years58 (10.4%) and the least one is 17-30 years(3.2%)as shown in Table 2). Our study findings were slight difference with the previous study conducted by Rebeca (2012) from Massachusetts board of registration in pharmacy which showed that a higher incidence of MEs in patients ranged between 31 and 40 years of age [15].

In our study We observed that the education status most of the patients admitted in the hospitals was illiterate 198 (35.5%), which was followed by a Higher secondary level 114 (20.4%), primary level 89 (15.9%), and graduates 61 (10.9%) (Table 3) [16]. Similar results were obtained from the study conducted by Yvonne *et al.*, (2002), and in their study, educational status showed that 62% were illiterates, while 36.7% had primary or secondary education and only 0.43% were graduates.

In a study conducted by Samiya *et al.*, (2016), any initiative to reduce the prescription error rate must involve knowledge of why, where, and when these errors occur. Inadequate knowledge of pharmacology will obviously predispose to poor prescribing, but environmental

factors such as time, pressures, staff shortages, and fatigue can also be the contributory causes [17].

Our study showed that more number of errors occurred due to prescription 354 (63.5%) followed by administration errors 152 (27.2%). Benjamin *et al.*, (2003) conducted the study about the distribution. errors, among that more number of errors was under administration 66% which was followed by prescription errors 11% and dispensing errors 1%, and our study findings were inconsistent with this study [18]. Previous study by Ann *et al.*, (2013) reported that prescribing errors were most observed error than dispensing and administration errors. This result is related with our study report [19].

According to our study, we found that the more number of MEs occurred due to physician was 332 (59.6%), due to nurses was 109 (19.5%), and both the physician and nurses combined was 116 (20.8. %).

Since most of the prescriptions were incomplete and with illegible handwriting, physicians were more responsible for the occurrence of MEs followed by nurses and both the physicians and nurses. Similar results were obtained from the study conducted by Anandhasayanam *et al.*, (2016) and Elden *et al.*, [20, 21] (2014)

who reported that most of the MEs were occurred due to physicians.

From this study, we found that the more number of MEs were due to incomplete prescriptions 269(48.2%), followed by wrong dose error 71 (12.1%), wrong dosage error 65(11.6%), omission error 23 (4.1%), and wrong frequency 41 (7.1%) wrong duration 32(.7%) Similar findings were obtained from the study conducted by Nair and Srivastava (2012)[22] who reported that more number of errors were due to frequency missing/dose missing (30%), followed by wrong drug (20%) and others (10%). Karin *et al.*, (2016) [23] reported that majority of errors were due to incorrect dose 41%, wrong patient 13%, omission of drug 12%. (Table 8).

Our study concluded that more number of errors happened due to lack of knowledge or heavy workload 62 (53.4%), illegible prescriptions 32 (27.5%), and miscommunication 20 (17.24%). Similar results obtained from a study conducted by

Arife *et al.*, (2015) [24] reported that most of the MEs are due to increased workload (49.7%), inadequate number of staff (36.5%),

About 218 (39.1%) errors we found were informed to the staff, no further action was needed for 146 (26.2%) errors and 98 (17.5%) errors were due to wrong

drug/frequency which was changed to correct frequency and correct drug. In a study conducted by Rahbi *et al.*, (2014) [25] only 688 interventions were due to prescribing errors, of which 40.5% interventions were done in changing the medication order of clarifying the medicine. 14.9% of the interventions were related to administrative issues, and 8.7% of the interventions were related to the selection of medications as well as errors due to ignorance of history of patients (Table 9).

Our study determined that majority of errors were coming under category B, but there is no harm to the patient. The National Coordinating Council for ME reporting and prevention proposed ME index was used to assess the severity of ME. Ganeshan *et al.* (2015) [5] reported that, among 69 MEs, 8 (11.59%) were under category of no error which is subcategory A, 60 (86.95%) errors were under the category error, and no harm which comes under subcategory B, and they stated that this was because of the carelessness of the health-care professional working in the department (Table 10) [4]

Due to the heavy work load of the health care professionals there is always a disability or the occurrence of errors due to rectifiable mistakes by different health care professionals at different circumstances, and

making necessary interventions can well reduce the incident of medication errors clinical pharmacist play a major role in the early detection and prevention of medication errors and thus improve the quality of life of the patients.

CONCLUSION

The present study concluded that mostly all the patients admitted in the psychiatry department would experience MEs. Most of the errors were found to be under category B (error occurred but it did not reach the patient) and category A (events have the capacity to cause error) according to NCC MERP classification. The study reveals that majority of the patients exposed at least one types of medication error Azithromycin is the top ranking prescribed drug and medication error happened as well. This study also showed that medication Errors occur that there were multiple factors responsible for MEs including incomplete prescriptions (inappropriate use of decimal), illegible handwriting, heavy workload, lack of patient education, and short supply of medicines. The study was highlighted to pay attention to prescription writing and reduce the practice of inappropriate prescription through the provision of appropriate unbiased information to health professional.

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