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A clinical audit to assess the pattern of medication error and impact of its corrective measures in a tertiary care hospital of eastern India

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Abstract
Medication error can lead to significant aftermath in a patient care system which can be numerous like increased adverse drug event rates, unanticipated economic burden, increased risk of mortality and morbidity. The clinical care world is blooming than ever before with a rapid and strategic planning of development of newer methods of health care management for a better patient care. The aim of the study was to identify and evaluate the failures of medication errors and its severity analysis in a Tertiary Care Hospital of Ranchi in India. The data for the present study was collected from medication error form, reported and updated daily by the authorised people, mainly clinical pharmacists. Data were collected in data collection form and raw data were transferred to electronic database for further detail analysis. From this study, it is evident that prescription error and medication errors can be reduced considerably by executing an audit and intervention of prescriptions and conducting clinical audits in a regular interval.

Keywords: medication error, clinical audit, clinical pharmacist, rational medication use, prescription audit

Introduction
The clinical care world is blooming than ever before with a rapid and strategic planning of development of newer methods of health care management for a better patient care. "A medication error is any preventable event that will cause or cause inappropriate medication use or patient damage whereas the medication is within the management of the health care skilled, patient, or consumer. Such events could also be associated with skilled observe, health care products, procedures, and systems, together with prescribing, order communication, product labelling, packaging, and nomenclature, combining, dispensing, distribution, administration, education, monitoring, and use" [1]. Medication error can lead to significant aftermath in a patient care system which can be numerous like increased adverse drug event rates, unanticipated economic burden, increased risk of mortality and morbidity. There are significant amount of studies that implicates the need of accelerated awareness towards the aftermath of medication errors and the need of preventive strategies and can help in the assessment of incidence, cost and preventive measures. Regardless of the rate or implication of medication error, it can be viewed as a serious cause of concern for both health care providers and Patient's. Thus the assessment of even the slightest error increases the credibility and reliability of patient's optimal health outcome measures.
A preset method of assessment of medication error can be done by clinical audit. Audits is one among the important aspects of clinical governance and continual service improvement in medicine. An audit assesses if a certain aspect of health care is aattaining a recognized standard [2].
Principles for the best practice in clinical audit, published by the National Institute for Health and Clinical Excellence (NICE) defines clinical audit is a process that has been defined as "a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change" [3].
The clinical audit is a systematic process of establishing better care for the patients through a set of stages that is meant to assess and improve patient care along with measure of risk of potential medication harm. The stages of audit Includes the planning for audit, which is followed by the selection of standard or criteria for audit. The next essential step is to measuring of performance may be done by data collection and analysis, drawing conclusions and presentation of results. This can be followed by making improvements and sustaining improvements in the audit.
Where plans have not been enforced, a speedy re-audit is usually recommended to make sure that changes have so improved observe and to determine whether or not any audit procedures are needed within the short term [3, 4].
It can be suggested for helping the quality and effectiveness of the healthcare along with the quality improvement in clinical setting it can be also used to measure the effectiveness and can be used to validate the medications against explicit criteria. Thus, uphold professorial standards and improve patient safety [4].

Aims and objective
To identify and evaluate the failures of medication errors and its severity analysis in a Tertiary Care Hospital

Study criteria
Inclusion Criteria
Medication error case sheet of patients admitted to the

hospital.

Exclusion criteria

OPD patient were not included for this research and also dialysis patient were omitted for this research.

Materials and Methods

The medication errors were analysed through a prospective observational study conducted over a period three months in a Tertiary Care Super speciality Hospital of Ranchi in India. The data for the present study was collected from medication error form, reported and updated daily by the authorised people, mainly clinical pharmacists. These clinical pharmacists are well trained in types of medication error and the process of reporting it. Data were collected in data collection form and raw data were transferred to electronic database for further detail analysis. Data collection from/ Case reporting form (Medication error form), Direct Observation, Daily review of medicine card by clinical Pharmacist. Daily audit of prescription and Medication administration record. A prospective cohort study was conducted by using the direct observational method.

Errors were expressed as actual numbers or in percentages. Data were structured in qualitative form. So, continuing with the descriptive analysis with help of median to find the number of differences in error rates between last six-month errors [2]. All statistical analysis was carried out using Microsoft Excel.

Medication Error Categorization based on harm scoring

The medication errors were then classified by type: Prescribing, dispatching, drug administration and indenting. As per the declaration of National Coordinating Council, the medication errors were categorized as per the importance of the errors [1].

Table 1: Categorization of Medication Error based on the harm score

No error	No Harm
Category A	Circumstances or events have the capacity to cause error.
Error	No Harm
Category B	Error occurred but it did not reach patient
Category C	Error occurred that reached the patient, but did not cause harm (includes errors of omission)
Category D	Error occurred that reached the patient and required monitoring to confirm that it resulted in no harm to the patient and/or required intervention to prevent harm.
Error	Harm
Category E	Error occurred that may have contributed to, or resulted in, temporary harm to the patient and required intervention.
Category F	Error occurred that may have contributed to, or resulted in, temporary harm to the patient and required initial or prolonged hospitalization.
Category G	Error occurred that may have contributed to, or resulted in, permanent harm to patient
Category H	Error occurred that required intervention necessary to sustain life
Error	Death
Category I	Error occurred that may have contribute to, or resulted in, patient death.

Result

Table 2

Sr No	Month	Total error	Rate of medication error reported
1	Aug-19	25	5.9
2	Sep-19	13	3.29
3	Oct-19	21	7.03
4	Nov-19	25	6.27
5	Dec-19	29	7.42
6	Jan-20	15	4.48

Table 02 shows, Rate of Incidence of Medication error found.

During last 6 Months, Calculation has done Based on NABH Standards;

Table 3

Month	Total error	Prescription error	Indenting error	Dispatching error	Administering error
Aug-19	25	3	8	7	7
Sep-19	13	3	5	3	2
Oct-19	25	6	4	9	6
Nov-19	25	17	0	1	7
Dec-19	29	6	7	10	6
Jan-20	15	4	3	6	2

Table 03 shows, detail classification of medication errors found during last six months. (Classification of medication.

Errors are 1. Prescription error, 2 indenting error, 3. Administering error and 4, dispatching error).

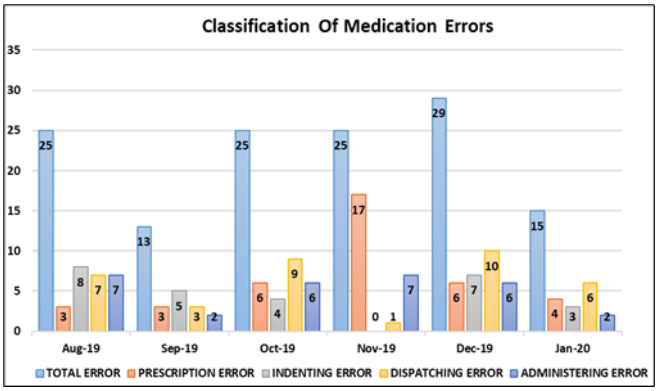

Fig 1: Graphical Representation of Table 2

Table 4

Month	A	B	C	D	E	F	G	H	I
Aug-19	0	9	16	0	0	0	0	0	0
Sep-19	2	3	8	0	0	0	0	0	0
Oct-19	0	9	15	1	0	0	0	0	0
Nov-19	3	8	14	0	0	0	0	0	0
Dec-19	0	5	23	1	0	0	0	0	0
Jan-20	0	7	8	0	0	0	0	0	0

Table 04 shows detail analysis of HARM Score Rating of Each and every error monitored, captured and reported during last six months. Though there was no error found which cause direct patient harm due to close monitoring, reporting and sensitizing of nurses during the audit.

Table 5

Sr. No	Month	No of near miss	Percentage of near miss found
1	Aug-19	9	36%
2	Sep-19	3	23%
3	Oct-19	9	36%
4	Nov-19	8	32%
5	Dec-19	5	17.24%
6	Jan-20	7	47%

Table 5 shows, percentage of Near miss found among total number of medication error reported. The data was subjected to further analysis using two-tailed paired t-test and the p value was found to be 0.0276 which shows a significance difference.

Discussion and Conclusion

From this study, it is evident that prescription error and medication errors can be reduced considerably by executing an audit and intervention of prescriptions and conducting clinical audits in a regular interval. Proper monitoring and capturing of medication error data has been initiated and the Staff has been counselled and sensitized regarding safe medication practices and proper reporting of medication errors. Similar study was conducted by Esposito, P. (2014) and they found out that clinical audit is an important tool which is needed to be used by the hospital healthcare professionals to improve the quality of care to the patients and developing health care and financing policies [5]. The percentage of Near miss and category C error was found to be in a gradual increasing pattern from Aug'19 to Jan'20 among total report of medication error, which indicates due to proper monitoring the error is being captured before reaching the patient. From last few months, the rate of error show decline trend compared to previous months.

Regular training on medication error has been conducted by Clinical Pharmacy Department, which improve the knowledge of monitoring, capturing, reporting and prevention of medication errors by the physicians, nurses and clinical pharmacist. It can be suggested for helping the quality and effectiveness of the healthcare along with the quality improvement in clinical setting it can be also used to measure the effectiveness and can be used to validate the medications against explicit criteria. Thus, uphold professorial standards and improve patient safety.

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