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Evaluation of Knowledge on Medication Administration, Medication Error and Their Reporting among Nurses in A Tertiary Care Teaching Hospital

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Abstract
Medication errors are prevalent in hospital settings, compromising patient safety and healthcare quality. To improve patient outcomes, these errors must be minimized. India's regulatory system for controlling medication errors is still inadequate, necessitating the establishment of a more robust regulatory framework. This study aims to Identify the level of knowledge, attitudes kills regarding medication administration and Assess awareness of the medication error reporting system also to determine the most significant contributing factors to medication errors and their relationship with knowledge. Conducted over two months (May to June 2020), this cross-sectional study took place at a rural tertiary care teaching hospital. It focused on staff nurses working in departments such as Medicine, Surgery, ICU, Emergency Medicine, PediatricsObstetrics and Gynecology. Among the 100 participants, the majority demonstrated good knowledge of medication errors. Notably, 92% correctly identified oral medication routes and the administration route for GTN. Additionally, 89% correctly identified an antimicrobial drug and properly administered an IV antibiotic. However, while 72% of respondents understood what constitutes a medication error, 28% lacked this crucial knowledge, revealing significant gaps in knowledge and awareness related to medication errors. While the results indicate a strong foundational knowledge of medication administration among healthcare professionals, there are significant gaps in awareness and understanding of medication errors and their prevention. Addressing these gaps through targeted education, improved protocolist supportive reporting environment is essential to enhancing patient safety and reducing the incidence of medication errors.

INTRODUCTION

Medication error is a globally prevalent problem which may lead to various disorders like therapeutic failure, adverse drug effects, prolonged hospital stay as well as disability and even death. Medication error is third most leading cause of death in US[1]. It has serious direct and indirect result and usually the consequences of breakdown in a healthcare system[2]. Not only death or disability, it causes emotional impact to the patient. Medication error can be of any cause, factors such as Prescription's error, transmission of prescription, labelling, packing, setting up, distribution , monitoring as well as wrong use[3,4]. Awareness among the healthcare professional regarding the medication errors may be the major factor in the establishment of successful regulatory system[5].

In India, studies done in Uttarkhand and Karnataka have documented ME rate to be as high as 25.7% and 15.34%, respectively, in hospitalized patients[6]. Unfortunately, most of the MEs remain undetected, if clinical significance or outcome does not adversely affect the patient. While some of the MEs also result into serious morbidity or mortality and have a significant economic impact on the patient and health care system. The Institute of Medicine estimated costs due to medical errors in the US of was approximately $37.6 billion/year. About $17 billion of it are associated with preventable errors[7]. Overall, MEs increase morbidity, mortality economic burden to health care system.

Nurses plays a major role in patient welfare. Medication administration is a part of nurse responsibility in order to make sure that patient get the correct medication as prescribed[6]. So the nurses should be well equipped with skill and knowledge needed for error free medication.

Medication errors are prevalent in the hospital settings. To ensure the patient safety and provide better health care, medication errors should be curbed. India is still failing in the regulatory system for the control of medication errors[5]. It is necessary to establish regulatory setup to reduce the medication errors. It is obvious that medication errors are a pervasive problem, but in the majority of cases, the problem is preventable by creating awareness and training of healthcare providers.

Hence, this study of assessing the awareness of medication errors among nurses was attempted to analyze the knowledge needed for error free medication and to provide better healthcare.

MATERIALS AND METHODS

This cross-sectional study was conducted at a rural tertiary care teaching hospital over a period of two months, from May to June 2020. The study focused on staff nurses working in various departments, including Medicine, Surgery, ICU, Emergency Medicine, PediatricsObstetrics and Gynecology. Using purposive sampling, a total of 100 registered nurses who had at least three months of work experience and were directly involved in patient care were selected. Nurses in higher administrative positions or those unwilling to participate were excluded from the study.

Data collection involved administering a pre-tested questionnaire comprising 22 questions about Medication Administration Errors (MAE). The questionnaire was divided into three sections: socio-demographic data, knowledge regarding medication administrationfactors associated with medication errors. Nurses who agreed to participate provided voluntary informed consent and were interviewed individually using the questionnaire.

For data analysis, responses were entered into the pre-prepared questionnaire and analyzed using SPSS software. Descriptive statistics were used for non-discrete variablescategorical data were summarized as means and standard deviations. The chi-square test was employed to determine the significance of the results, with a p-value of less than 0.05 considered statistically significant.

RESULTS AND DISCUSSIONS

Out of total 100 participants, it was found that among staff nurses, 28% have less than 4 years of experience, 54% have between 5 and 10 years of experience18% have more than 10 years of experience.

Knowledge: Of the total 100 participants, the survey on medication administration demonstrated a high level of knowledge among respondents. Specifically, 92% correctly identified an oral medication route89% were able to pinpoint which drug is an antimicrobial. Additionally, 90% knew how to properly administer an IV antibiotic four times per day. Knowledge of the route of administration for GTN was also high, with 92% responding correctly. Furthermore, 78% accurately calculated the dosage for N-Acetyl Cysteine 5g IV. Finally, 76% of respondents were aware of the preferred site for a Scopalamine transdermal patch.

The results of the survey on medication errors indicate varying levels of awareness and understanding among participants. For the question Do you know about medication error 72% of respondents answered correctly, demonstrating a high level of awareness, while 28% answered incorrectly. Similarly, 56% of respondents correctly acknowledged their awareness of the various categories of medication errors, compared to 44% who did not.

Understanding the relevance of the term medication error was less common, with only 48% of respondents demonstrating understanding, while 52% did not. Knowledge about interventions to prevent

medication errors was even lower, with just 33% of participants aware of these interventions67% unaware. Furthermore, only 31% of respondents knew about the various interventions to prevent medication errors, leaving 69% uninformed. When it came to awareness on how to proceed if medication errors occur, only 26% of participants knew the correct procedures, whereas 74% did not. Only 18% of respondents intervened to rectify a medication error by using suitable measures, leaving a significant 82% who did not take corrective action.

Fear of legal consequences influenced the decision to inform about a medication error for 45% of respondents, while 55% were not deterred by this fear. Additionally, being too busy prevented 18% from reporting a medication error, while 82% did not report for other reasons. A lack of knowledge on whom to inform was a barrier for 22% of respondents, whereas 78% did not face this issue. Interestingly, only 16% of respondents agreed that awareness quantification of medication errors should be recommended particularly for the pediatric population due to the higher risk of dosing errors, while 84% disagreed. Finally, awareness of the reporting system and how to report medication errors was low, with only 26% of participants aware of ita significant 74% unaware.

The bar chart illustrates the various factors that contribute to medication errors. The most significant factor, cited by 63% of respondents, is a heavy workload. This is followed by complicated orders, which contribute to 22% of medication errors. New staff accounts for 7% of errors, while unfamiliar medication is responsible for 8%. Notably, personal neglect does not contribute to medication errors, with 0% of respondents indicating this as a factor.

The study present a comprehensive picture of both the knowledge levels and the challenges faced by healthcare professionals regarding medication administration and medication errors. The high percentages of correct responses in the medication administration section reflect a robust understanding among respondents. Specifically, 92% correctly identified oral medication routesa similar percentage understood the route for GTN administration. The correct identification of an antimicrobial drug by 89% of respondents and the proper administration of an IV antibiotic four times per day by 90% highlight a strong grasp of fundamental medication practices[9].

However, the results also reveal significant gaps in knowledge and awareness related to medication errors. Although 72% of respondents demonstrated awareness of what constitutes a medication error, this leaves a notable 28% who lack this crucial understanding. The lower percentages of respondents aware of the various categories of medication errors (56%) and the relevance of the term (48%) indicate that more education and training are needed in these areas. This gap in understanding is further emphasized by the fact that only 33% of respondents are knowledgeable about interventions to prevent medication errorsan even smaller percentage (31%) are aware of the specific interventions available[10].

The survey also sheds light on the procedural knowledge deficits among healthcare professionals. Only 26% of respondents knew how to proceed if a medication error occurreda mere 18% had intervened to rectify an error using suitable measures[8]. These figures are alarming and underscore the need for improved training and protocols to ensure prompt and effective responses to medication errors.

Fear of legal consequences was a significant deterrent for 45% of respondents in reporting medication errors, while 55% were not influenced by this fear. Additionally, 18% did not report errors due to being too busy22% were unsure whom to inform. These findings suggest that systemic and cultural changes are necessary to foster a more supportive environment for reporting and addressing medication errors.

The lack of awareness about the reporting system and how to report medication errors is another critical issue, with only 26% of respondents aware of the reporting procedures. This lack of awareness, combined with the fear of legal repercussions and uncertainty about reporting protocols, significantly hinders effective error management and prevention strategies. Interestingly, only 16% of respondents agreed that awareness quantification of medication errors should be recommended, particularly for the

Figure 1: Attitude questionnaire Scoring

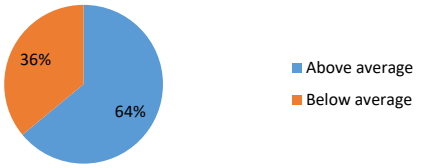

Fig. 1: Attitude questionnaire scoring

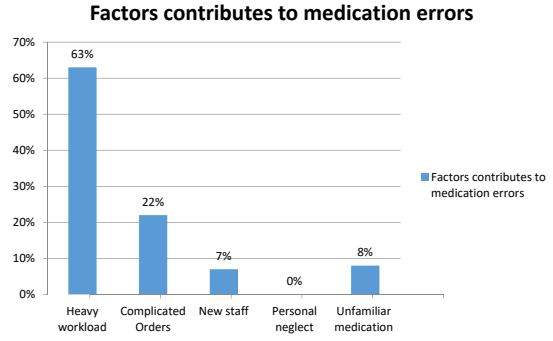

Fig. 2: Factors contributes to medications errore

Attitude:

Statement	Correct answer	Wrong answer
Do you know about medication error?	72 (72%)	28 (28%)
Are you aware of the various categories of medication errors?	56 (56%)	44 (44%)
Do you understand the relevance of the term medication error?	48 (48%)	52 (52%)
Do you know that there exist various interventions to prevent medication error?	33 (33%)	67 (67%)
Are you aware of the various interventions to prevent medication errors?	31 (31%)	69 (69%)
Are you aware how to proceed if medication errors occur?	26 (26%)	74 (74%)
After noticing a medication error did you intervene to rectify by using suitable measures?	18 (18%)	82 (82%)
If you noticed a medication error, did you not inform due to fear of any legal consequences	45 (45%)	55 (55%)
After noticing the medication error, did you not inform as you were too busy?	18 (18%)	82 (82%)
After noticing the medication error, did you not inform as you did not know whom to inform?	22 (22%)	78 (78%)
Should awareness quantification of medication error particularly to pediatric population be recommended as dosing error are particularly more common in their age group?	16 (16%)	84 (84%)
Are you aware of reporting system and how to report?	26 (26%)	74 (74%)

pediatric population[11,12], despite the higher risk of dosing errors in this group. This indicates a need for increased focus on the unique vulnerabilities of pediatric patients in medication error prevention efforts.

The survey also identified several key factors contributing to medication errors. A heavy workload was the most significant factor, cited by 63% of respondents. This finding aligns with existing literature that highlights the impact of workload and staffing levels on medication safety[5]. Complicated orders were identified as a contributing factor by 22% of respondents, while unfamiliar medication and new staff were cited by 8% and 7%, respectively. Notably, personal neglect was not considered a contributing factor by any respondents, suggesting that systemic issues rather than individual negligence are the primary drivers of medication errors.

CONCLUSION

In conclusion, as the results indicate a strong foundational knowledge of medication administration among healthcare professionals, there are significant gaps in awareness and understanding of medication errors and their prevention. Addressing these gaps through targeted education, improved protocols supportive reporting environment is essential to enhance patient safety and reduce the incidence of medication errors.

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