

Assessment of safe medication administration practice at a public hospital in Erbil City, Iraq

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Abstract

Background and objectives: Providing safe medication administration is a vital process in ensuring patients' safety and enhancing their quality of life. This study aimed to observe medication delivery in a public hospital in Erbil city to identify and examine the different steps of the medication administration process for quality assurance and safe drug administration.

Methods: A cross-sectional study of inpatients within different units of a public hospital in Erbil city was conducted through a quantitative and qualitative study. Data from the direct observation forms were collected and recorded via Microsoft Access using descriptive approach (frequencies and percentages) for analysis. The areas of concern in the study were: medication labeling, the five right of medication administration, the use of worksheets, identifying patients, double check medication, and the presence of disruptions at the time of medication administration.

Results: Data was collected from 72 observations for analysis. The quantitative data illustrates that 79% of medications were not labeled correctly, 83% failure of the use of two patient identifiers, 90% of medication administrations did not meet the "Five Rights" criteria. The use of worksheet was 82% during medication administration; failure to double-check the infusions counted for 71%, and 85% of medication administrations that were observed involved certain interruptions.

Conclusion: This study highlights the areas of enhancement that are significant to quality healthcare reform to ensure patients safety and providing medication management in a safe manner. The poor areas of practice were identified as labeling, patient identifiers, Five Rights, documentation, double check of infusion medications, and interruptions at the time of scheduled medication administration.

Keywords: Medication safety; Medication administration; Medication error; Patient wellbeing; Quality assurance.

Introduction

Providing safe medication administration is a vital process in ensuring patients' safety and enhancing their quality of life. This multifaceted system is multi-disciplinary concept involving nursing and pharmacy staff to safeguard the delivery of medication to the patients in an innocuous manner. Most often in this region, the evaluation of the medication error depends only on risk reports to initiate process improvement needs. However, alternative methods such as trigger tools and direct observation exist that can complement the current

knowledge without relying on the present single scheme mentality.¹ Since there are many steps in the medication administration process, the error is inevitable if the standard guideline is not followed. According to the study performed by Antonow (2000) found that 62% of medication errors were prevented at a dispensing stage but the probability of prevention declined in later phases of medication administration procedure.² Medication errors frequently attributed to nursing staff, in a study where 190 nursing administration errors surveyed, 57% were

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the result of “omission, incorrect infusion rate, and wrong time”¹. Nevertheless, the nursing staff is also the most likely healthcare practitioners to intercept the error before its occurrence. A study by Kopp illustrates 24 of the 110 (22%) possible adverse drug event caught by nursing personnel that accounts for 88% of error prevention.³ Medication errors are the most common issue in safety that transpires in the institutional settings.⁴ Publication by the Joint Commission regarding preventing pediatric medication errors indicates that one of the root causes are dosing errors mainly due to calculation dosing based on the weight, fractional dosing, and the decimal points.⁴ On the other hand, reports by direct observational studies detected different error rates. In a study by Buckley 2007, indicates that “the wrong dose” is the most common type of mistakes documented as being 26.2%, yet some other studies using comparable direct observation approaches display that the wrong dose occurs uncommonly with only 1.2%.⁵ A medication administration error described as a “deviation from prescriber’s medication order as written on a patient record, manufacturers’ preparation, administration instruction, or institutional policy and procedures” on medication administration.⁶ An observational study in rural, urban and teaching hospital that represented both electronic and paper-based prescription and documentation by Elganzouri et al. 2009 indicates nurses take an average of 15 minutes for each medication administration that includes preparation, retrieval, delivery, and documentation. Therefore, the study finds that the medication administration process is subject to interruptions.⁸ This study aimed to observe medication delivery and bring awareness and educational initiatives to the nursing staff members. Furthermore, the survey team anticipates to identify and examine the different steps of the medication process for further improvement for a healthier and safer medical practice in

our region.

Methods

The researcher organized a team of well-instructed medical students to take on a direct observation study of the medication administration process at a public hospital in Erbil city. There is no mention of the hospital or individual name as to respect the privacy of the institution and the personnel. The study aimed to observe medication delivery and bring awareness and educational initiatives to the nursing staff members. Furthermore, the survey team anticipates to identify and examine the different steps of the medication process for further improvement for a healthier and safer medical practice in our region. A direct observational study for the duration of 30-day between October 1st, 2016 and October 31st, 2016 took place at a public hospital in Erbil city. Four medical students assigned on a rotational basis for morning shifts (8:00am to 1:00pm) and evening shifts (3:00pm–11:00pm) in variable units to observe multiple medication administration to patients. For validity and reliability in obtaining the accurate results of the routine nursing practices without putting them under pressure as it may affect their normal behavior and skew the findings, the study was performed in a concealed manner. Furthermore, the method of the study was strictly confidential to protect the integrity, respect the autonomy, decision-making, and dignity of participants. During each shift, an observation questionnaire was initiated for data collection at the time of each medication administration. The questions designed as an audit form as required by Joint Commission on the standard patient safety reporting system based on factors recognized in medication administration errors.⁵ The surveyors were instructed to observe any safety meetings, paper or electronic medication charting, and secure medication cabinets especially for narcotic, analgesic, and emergency medications as

well as bedside medication cabinets for scheduled patient medications. As a reference for the surveyors leading observations, the medication administration defined according to the standard medication administration practice. The medication administration is described as preparing, giving and evaluating the effectiveness of drugs by qualified personnel to assure proper patient and medication identification, documentation of medication administration in medical record.⁹ The survey utilized a questionnaire consist of seventeen vital questions, shown in Table 2, that nurses must adhere to during medication administration. The observation form is designed to imitate the sequence of events during medication administration precisely. The form consists of "Yes, No, N/A (Not Applicable) and N/O (Not Observed) responses. The N/O response is for the situations where the surveyor is not able to observe the entire process of the medication administration. To get a most accurate result for the study, the nurses were not aware of the specific questions on the survey form. The students assigned to the investigation were to follow the nurses at the time of medication administration. During the shift, the students were to observe as many medication administration processes by the nurses as possible. The nurses' names were not recorded for privacy reasons, thereby, the precise number of nurses under observation cannot be determined.

Furthermore, participants did not require any consent as the observers were not involved in administering any medication, only to observe the routine nursing practices. The areas of concern for patient safety were the primary focus that contained within the six questions out of the seventeen on the observation form. The mentioned six questions were regarding the labeling medication, the five rights of medication administration, double check, two patient identifiers, use of worksheet, distraction and interruptions at the time of medication administration (Table 3). Data from the direct observation forms were collected and recorded via Microsoft Access using descriptive approach (frequencies and percentages) for analysis. The information collected to be used only for the intended purpose of this study.

Results

A total of 72 observations collected from all administered medications by the nurses in various units. In some instances, the nurses were observed numerous occasions administering medication to multiple patients. There was a total of 70 patients observed for medication administration by the nursing staff, and two patients were observed twice. Patient demographics range between the ages of 15 to 65 years old with the average age being 41 years, as illustrated in Table 1, 2.

Table 1: Participants' age group (N=72)

Age Group	No.	%
≤ 20	5	6.9
20-29	3	4.2
30-39	5	6.9
40-49	15	20.8
50-59	25	34.7
60-69	19	26.4
Total	72	(100)

Table 2: Medication administration observation form.

Questions	Yes (%)	No (%)	N/O (%)	N/A (%)	Comments
If there are precautions regarding infection control, did the nurse follow the rule?	10 (14)	55 (76)	3 (4)	4 (6)	
Did the nurse use appropriate hand washing before the administering medication?	5 (7)	57 (79)	10 (14)	—	
Did the nurse use gloves in preparing and administering medications?	22 (31)	50 (69)	—	—	
Did the nurse prepare the medications for only one patient at a time?	17 (24)	37 (51)	18 (25)	—	
Did the nurse swab port as part of hygiene before accessing IV line?	1 (1)	53 (74)	15 (21)	3 (4)	
Does the institution have an eMAR system? If yes, did the staff open the eMAR and compare the MAR with the medication before administration?	—	—	—	—	No eMAR System available
Was each medication labeled in the medication administration process?	11 (15)	57 (79)	2 (3)	2 (3)	
Medication was transported correctly by the nurse.	18 (25)	31 (43)	8 (11)	15 (21)	
Before administration of medication, two (2) patient identifiers used such as patient name, MR#, or birthdate and whether the patient has the identification band.	7 (10)	60 (83)	5 (7)	0 (0)	
At the patient's bedside medications are opened from the unit-dose container.	—	—	72 (100)	—	
Did the nurse explain to the patient about the drugs he/she is being given and their use?	20 (28)	42 (58)	10 (14)	—	
Did the nurse apply the five rights of medication administration? If no circle the unmet right.	0 (0)	65 (90)	7 (10)	—	Patient, Drug, Dose, Route, Time
Did the nurse document the medication given on the MAR after administration (immediate or delayed)?	—	—	—	—	No MAR system available, refer to the worksheet
Did the nurse utilize a worksheet to refer to medications for patient and schedule?	59 (82)	7 (10)	6 (8)	0 (0)	
Was a double-check completed for continuous infusions?	0 (0)	51 (71)	7 (10)	14 (19)	
Was there a distraction or interruption during preparation or administration? Was this avoidable or unavoidable?	61 (85)	11 (15)	0 (0)	—	
Did the nurse offer teaching or answer questions to the patients/parent when required?	23 (32)	38 (53)	11 (15)	—	

(N/A) Not Applicable; (N/O) Not Observed

The six key questions of the medication observation that concern with patients' safety and quality medical care are listed in Table 3.

Utilization of Medication Labeling

Question 7 seeks to find out if the medications were labeled in the process of medication administration. The standard practice for the pharmaceutical products in the institutions require labeling the medication if it is not administered immediately. The labeling consists of the name of the drug, dosage, and expiration date if not used within 24 hours. From the direct observation, 57/72 (79%) of medications were not labeled correctly. 11/72 (15%) observation had accurate labeling. 2/72 occasions (3%) the observer was not able to ascertain whether the medication was labeled, therefore, they were not observed. 2/72 observations (3%) the labeling were not applicable since the drug was utilized immediately (Table 3).

Use of Two Patient Identifier

The quantitative outcome as per question-9 indicates the frequency of the two (2)

patient identifier utilization before administration of medication at this institution. Under the standard for medication administration practice guideline, the patient's identity must be confirmed before any serious task including medication administration by using two different identifiers. The two identifiers are considered as any two of "patient's full name," "birth date," or "medical registration number (MRN)." The three mentioned identifiers are on the identifier band that must be on the patient at all times during their hospital stay. The nursing staff administering the medication under direct observation often failed to use two patient identifiers. One of the main reason for failure was the fact there were no patient bands to be identified. The nursing staff did not correctly identify 60/72 (83%) of the surveyed medication administration to the patients. 7/72 (10%) of patients identified by other means such as asking the patient or relatives to determine the name. 5/72 (7%) were not observed completely by the surveyor, and

Table 3: Medication administration observation form.

Questions	Yes (%)	No (%)	N/O (%)	N/A (%)	Comments
Was each medication labeled in the medication administration process?	11 (15)	57 (79)	2 (3)	2 (3)	
Before administration of medication, two (2) patient identifiers used such as patient name, MR#, or birth date and whether the patient has the identification band.	7 (10)	60 (83)	5 (7)	0 (0)	
Did the nurse apply the five rights of medication administration? If no circle the unmet right.	0 (0)	65 (90)	7 (10)	—	Patient, Drug, Dose, Route, Time
Did the nurse utilize a worksheet to refer to medications for patient and schedule?	7 (10)	59 (82)	6 (8)	0 (0)	
Was a double-check completed for continuous infusions?	0 (0)	51 (71)	7 (10)	14 (19)	
Was there a distraction or interruption during preparation or administration? Was this avoidable or unavoidable?	61 (85)	11 (15)	0 (0)	—	

(N/A) Not Applicable; (N/O) Not Observed

it cannot be confirmed if they were identified by any means. (Table 3)

Practicing the “Five Rights.”

The formation of Question 12 aimed at the Five Rights of Medication Administration that include the right patient, right medication, right dose, right route, and the right time as they need to be completed before administering any medication to the patient. Based on the direct observation reporting, none of the medication administration by the nursing staff met the five right criteria (0%). Direct observation of 65/72 (90%) the Five Rights were not achieved or partially met with an absence of a minimum one of the Five Rights. The most unmet right in the observation was reported as “Right Patient.” The not observed responses were 7/72 (10%) (Table 3).

Utilization of Worksheet

The use of personal worksheet was the purpose of Question 14 to determine the scheduled medication for the patients. The handmade worksheet is a firm way of keeping track of medication schedules. The use of worksheet is the method of choice in this institution as 59/72 (82%) of nurses followed the worksheet to administer medication. However, 7/72(10%) did not use the worksheet, and 6/72 (8%) were not observed. Therefore, the observers could not confirm whether the worksheet was used (Table 3).

Double-Checks for Continuous Infusion

Before the start, administer, or change of syringe or bag of continuous medication infusion, the nurse must have another staff nurse to double check to confirm the correctness of information on the infusion pump. Therefore, question 15 evaluates the performance of this standard practice by the nursing staff in the hospital under study. The result of direct observation of medication administration indicates nonexistence of such practice with 51/72 (71%) of all necessary infusions were not double-checked. In 14/72 (19%) of the observations, double checks were not required due to no change in dose or new

bags were not started. 7/72 (10%) of the observations the surveyor did not observe the double check.

Interruptions and Distractions During Medication Administration

It seems the distraction and interruption is a common issue in this institution during the medication administration process. 85% of observations had interruptions by the doctors, staff, and family members. As 15% of medication observed were distraction free.

Discussion

The study aimed at patient medication administration by direct observation of nursing staff during medication passing in one of the public hospitals of Erbil City in Kurdistan region of northern Iraq. The observers used an observation form containing seventeen questions with six questions identified as the key issues of the medication observation that concern with patients' safety and quality medical care. The key identifiable areas were: Medication Labeling, Patient Identifiers, Five rights of Medication Administration, Double check, and Interruptions/distractions.

Utilization of Medication Labeling

One of the areas of concern that the observer was to note if the nursing staff labeled the medication during the drug administration process. The standard practice for medication use in the institutions is labeling medication if it is not administered immediately. From the direct observation, the use of labeling was poor as 79% of medication were not labeled correctly and only 15% of drugs observation confirmed the correct labeling procedure. The finding becomes apparent that nursing staff does not practice based on the standard policy for medication administration. To prevent the medication error, for example, administering the wrong medication to the wrong patient, the medication containers, drugs and syringes must always be labeled. The popular system of medication administration to

assist in validating the “Five Rights” of drug administration that ensures receiving the Right Drug, Right Dose, Right Patient, Right Route and at the Right time, will enhance the accuracy of medication administration and prevent drug errors.

Use of Two Patient Identifier

Under the standard for medication administration practice guideline, the patient’s identity must be confirmed before any serious mission including medication administration by using two different identifiers. The two identifiers considered as any two of “patient’s full name,” “birth date,” or “medical registration number (MRN).” The three mentioned identifiers are on the identifier wristband that must always be with the patient during their hospital stay. However, none of the patients under observation had wristbands. 60 out of 72 patients as 83% of surveyed medication administration by the nursing staff were not being identified as per standard guideline. The main reason for identification failure was the lack of positive patient identifier (PPI) wristband. Only 10% of the patients identified by other means such as caregivers, and family members at the time of medication administration. To improve the process and prevent error, the electronic medical record, and the barcode system can improve the efficiency and safety of medication administration.

Practicing the “Five Rights”

The Five Rights of Medication Administration that include the “right patient, right medication, right dose, right route, and the right time” as they need to be completed before administering any medication to the patient. The practice of “Five Rights” was not practiced as per direct observational reporting, none of the medication administration by the nursing staff met the “Five Rights” criteria (0%). Direct observation of 65/72 (90%) the “Five Rights” were not achieved or partially met with an absence of a minimum one of the Five Rights. The “Right Patient” was the most unmet “right” in the reported observation. This result indicates that there

is either no practical guideline to use the “Five Rights of Medication Administration” or nurses could have mentally performed the steps in patient identification and the “Five Rights” process as indicated. In either situation, it is not clear that the standard practice is being implemented to prevent medication error.

Utilization of Worksheet

The practical use of personal worksheet aimed at determining the scheduled medication for the patients. The handmade worksheet is a firm way of keeping track of medication schedules. The use of worksheet is the method of choice in this institution as 59/72 (82%) of nurses followed the worksheet to administer medication. The institution does not have the electronic medical and medication record thereby the nurses and medical personnel utilize the worksheet to document their tasks and medication administration as a standardization practice in the region.

Double-Checks for Continuous Infusion

The result of direct observation of medicines administration indicates nonexistence of such practice with 51/72 (71%) of all required infusions were not double-checked. Before the start, administer, or change of syringe or bag of continuous medication infusion, the nurse must have another staff nurse to double check to confirm the correctness of information on the infusion pump. There are numerous contributing elements that perhaps resulted in the 51 observed occurrences. First, the nurse may have been too busy to check with another staff nurse that the double check is needed. Second, the nurse who agreed to perform the double check could have been side-tracked and busy with his/her patients and forgotten to carry out the double check. Third, lack of mandatory institutional guideline for a double check on high-alert medications. According to ISMP (The Institute for Safe Medication Practices), an independent double check is undervalued and misused and suggest that the check

should be only for the very high-risk and high alert medications.⁶

Interruptions and Distractions During Medication Administration

Interruptions sometimes could be avoidable or unavoidable that delays medication administration process. It seems the distractions and interruptions is a common issue in this institution during the medication administration process. 85% of observations had interruptions by the doctors, staff, and family members. During the observation, several instances caused delay or missed the scheduled medication administration such as change in patient's mental and health status, doctors performing an unexpected procedure on the patient during the scheduled medication administration, family members demanding their loved ones to be cared for as a priority, and shortage of nursing staff for the shift. Medical errors are commonly believed and viewed as a result of human error or defect in the system.¹⁰ A study by Kohn et al., 2000, indicates that the majority of mistakes do not arise from individual carelessness, but it is the result of flaws in the systems, methods, and situations that lead people to make errors or fail to avert them.¹¹ The aim is to implement a health system to make it difficult to do something wrong, and easier to do something right.¹¹ The study by Keer et al. 2013, illustrates that bar-code medication administration, computerized prescriber order entry, educational packets, and different drug distribution system revealed a decline in the rate of medication administration error.⁷

Limitation of the Study

The limitation of this study is that only one institution was surveyed, therefore, cannot assume all the hospitals in Erbil city have the same nursing practice. Furthermore, institutions policy in practice of medication administration may not depict the direct observational survey. Therefore, to obtain a more precise finding, future research should include a wider range of hospitals including public and private institutions in

Erbil city.

Conclusion

The research study performed by the direct observational method highlights numerous areas of enhancement that is vital to ensure the safe practice in the provision of medication and quality medical care. The direct observation by the surveyors identified the poor areas of practice based on the standard guideline for medication administration such as labeling, patient identifiers, Five Rights, documentation, double check of infusion medications, and interruptions at the time of scheduled medication administration. This study is a first step foundation in modifications toward quality nursing practice in safe medication administering. It is essential to recommend that training courses related to standard nursing guidelines to be offered for the institution by the ministry of health as well as the development of policies and procedures relating to the "Five Rights of Medication Administration" and double checking all high-alert medications. The author also recommends investing in eMAR (Electronic Medication Administration Record) and increasing the nursing staff on each shift to prevent and reduce medication error.

Competing interests

The author declares no competing interests.

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