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RESEARCH ARTICLE

SUBCUTANEOUS MEDICATION ADMINISTRATION PRACTICES OF STAFF NURSES

***Arti Devi**

Nursing tutor (Medical Surgical Nursing), Shri Mata Vaishno Devi College of Nursing, Kakryal, Katra, Jammu and Kashmir 182320, India

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ABSTRACT

Introduction: The word error in medicine is used as a label for nearly all of the problems harming patients. Errors in medical field are of tenly make a mark as human errors in healthcare services. The purpose of this study is to assess the subcutaneous medication administration errors done by intensive care unit nurses and to evaluate the effectiveness of event based teaching programme. **Methodology:** In this experimental study, 74 subcutaneous medication administration events in medical ICU of MMIMS & R Hospital, Mullana, Ambala were observed. Event based sampling technique was used to collect the sample. The data was collected by using checklist for assessing the subcutaneous medication administration practices. Reliability of the observational checklist was determined by using inter rater reliability test and it was0.82. Data analysis were performed by descriptive statistics and inferential statistics. SPSS-17 software was used and *P* values less than 0.05 were considered significant. **Result:** During before administering the medication the post implementation practice scores mean percentage (48.71) was higher than pre-implementation practice scores (60), during administering the post-implementation practice scores mean percentage (55.57) was higher than pre-implementation scores (46.71) and after administration it was found that the post implementation practice scores (48.97) was higher than pre-implementation practice scores (40.04). **Discussion:** The result shows that there was improvement in medication administration practices after implementation of event based teaching programme which was calculated at 0.05 level of significance. So, it is concluded that the Event Based Teaching Programme was effective to improve the practices of subcutaneous medication administration by staff nurses.

****Corresponding author***

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INTRODUCTION

The frequency along with magnitude involving avoidable adverse patient events not properly known until 1990s. As soon as multiple nations reported staggering volumes connected with patients harmed & killed from medical errors. Recognizing The idea healthcare errors impact 1 with every 10 patients Concerning the world, the World Health corporation calls patient security a good endemic concern. Patient safety measures have emerged like a distinct healthcare discipline supported via a good immature yet developing scientific framework. There is really a significant trans-disciplinary body connected with theoretical & also research literature It informs your current science associated with patient safety. The resulting patient safety measures knowledge continually informs improvement efforts these kinds of as: applying lessons learned via company as well as industry, adopting innovative technologies, educating companies & consumers, enhancing error reporting systems, or developing new economic incentives [i].

Patient safety measures are usually a fundamental rule connected with health care. Every point on the technique associated with care-giving includes the certain degree associated with inherent harm. Patient protection is invaded coming from adverse events. The items will certainly resulting in disorders inside practice, products, techniques or perhaps systems. Patient safety improvements necessitate the complex system-wide effort, associated with a wide amount connected with steps throughout performance improvement, environmental stability as well as risk management, similar to infection control, safe and sound use of medicines, products safety, secure clinical practice & also safe and sound environment involving care [ii]. The safety of patient is a major global public health issue. In past years, countries have increasingly recognized the importance of maintaining safety of patient. In 2002, the members of WHO was agreed on a World Health Assembly resolution on safety of patient [iii]. Errors in medical field are of tenly make a mark as human errors in healthcare services. Whether the label is medical error or human error, one definition used for it in

medicine says that the medical error occurred when any health-care personnel select an unsuitable way of doing care or executing an improperly method of care [iv].

Medication errors are unintentional errors in the prescribing, dispensing, administration or monitoring of a medicine while under the control of a healthcare professional, patient or consumer[v]: Nurses have an important role in preventing the medication errors by evidence based practices and by ensuring that they have the knowledge about the correct steps of medication administration. It includes the anatomy and physiology, pharmacology and legal issues. Nurses should maintain medication charts and the charts must be completed accurately because they are legal documents. The medication charts should be written in the physician's own handwriting and include: patient's first name, surname, medical record number (MRN), ward/clinic is used and it must be with every medication chart and signed by the physician. And every registered nurse is accountable for the correct methods/steps of medication administration. During the administration of medication the nurse should follows the five "rights" of administration: Right drug, Right route, Right patient, Right dose, Right time and after administration of medication the nurse should monitor the patient for the side effects or adverse effects of medications [vi]. According to the data of Food and Drug Administration (FDA, 2009) in the United States, 1.3 million injuries occur due to medication error (wrong drug, the wrong dose, the wrong timing of administration, or the wrong route) each year [vii]. According to National Patient Safety Agency (NPSA), patient safety is a process which involves assessment, analysis and prevention of risks and incidents, including medication errors etc. The medication errors put a direct impact on patient's health and health professionals involved. They interfere with patient's safety and results in actual or severe harm to patient's health. In one year NPSA (2009) reported, 72,482 medication errors out of which 14,111 caused harm to patient's health and 37 results in death [viii]. A comparative study done in selected wards (medicine, surgery, obstetrics and gynecology, pediatrics and ENT departments) of a teaching institution's tertiary care hospital of Srikot, Garhwal, Uttarakhand to assess the medication errors in 100 outdoor patients of medicine department and 500 indoor patients over the five months. The findings reveals maximum errors were observed in the indoor patients of the surgery department accounting for 44 medication errors followed by medicine ward 32 medication errors and in gynecology ward 25 medication errors out of 500 cases due to inadequate practices of medication administration during the study period. To prevent the medication errors reconciliation is one strategy. Reconciliation of medications is a process of making a list of a patient's current medications and also the admission, discharge list and discharge orders to reduce the risk of occurrence of medication errors [ix].

MATERIALS AND METHODS

The methodology of research indicates the general pattern for organizing the procedure for gathering valid and reliable data for an investigation. In this present study a "Quantitative research approach" was used. The research design selected for this study was "Quasi experimental – pre-test post- test design". Event based teaching programme was independent variable, Medication administration practices and occurrence of medication errors was dependent variable and Time/ shift of medication administration, staff nurses and patient ratio or interference while doing procedure was situational variables. The present study was conducted at MMIMS&R Hospital, Mullana. And the accessible population was staff nurses working in Medical ICU of MMIMS&R hospital. Event sampling technique was used to select the sample of 74 events of medication administration. The events of medication administration only by the staff nurses in medical ICU, planned/ scheduled medication administration and medication administration by S.O.S./Stat. were included and Events of the medication administration through other routes i.e. Intravenous, orally, Intramuscular Route, Intradermal, Nasogastric, Sublingual etc. were excluded. Observational checklist was used to assess the occurrence of medication errors and to observe the medication administration practice. Content validity of the tool was made and necessary modifications were made according to the expert's opinion and tool was finalized.

The inter-rater reliability was done for observational checklist for oral route with researcher assistance. Inter rater reliability was found to be 0.86 for subcutaneous route checklist. Ethical approval to conduct the study was obtained from the institutional ethical committee of MM University, Mullana, Ambala, Haryana and as well as from medical superintendent and nursing superintendent of MMIMS&R Hospital Mullana. Written informed consent was obtained from the study subjects regarding their willingness to participate in the research project. Pre-implementation observation was done for 1-17 days during that period 44 medication administration events of subcutaneous route were observed. Event Based Teaching Programme was implemented on 18-19day. After 5 days of implementation Post- Implementation observation was done for 24-31 days during this period 30 medication administration events of subcutaneous route were observed. During this period of data collection, researcher spent 2-4 minutes for subcutaneous administration of medication, 8-12 minutes for observing the medication administration practices for each event with the use of checklist for subcutaneous route. According to the objectives the data was organized, tabulated. The data was analyzed by using both descriptive and inferential statistics i.e. frequency and percentage distribution, mean, median, standard deviation, Unpaired t – test and ANOVA.

RESULTS

Situational variables description: Situational variables were Time/ shift of medication administration (morning, evening, night), staff nurses and patient ratio (1:1, 1:2, 1:3, 1:4 and 1:5) and interference while doing procedure (yes or no). Table 1 depicts the range, mean percentage, median and standard deviation of pre-implementation, implementation and post-implementation practice score of medication administration through subcutaneous route. Here, the post implementation mean percentage (62.12) was found higher than pre-implementation (52.56) and post implementation (19.56) and for pre-implementation, post-implementation practice score range was 18-25 and 17-35 respectively. Table 2depicts the area-wise mean percentage, mean difference , standard error and "t" value of pre-implementation and post implementation practice score of medication administration through subcutaneous route**.** Here the pre-implementation practice score were compared with post implementation practice score according to areas i.e. before administration, during administration and after administration respectively.

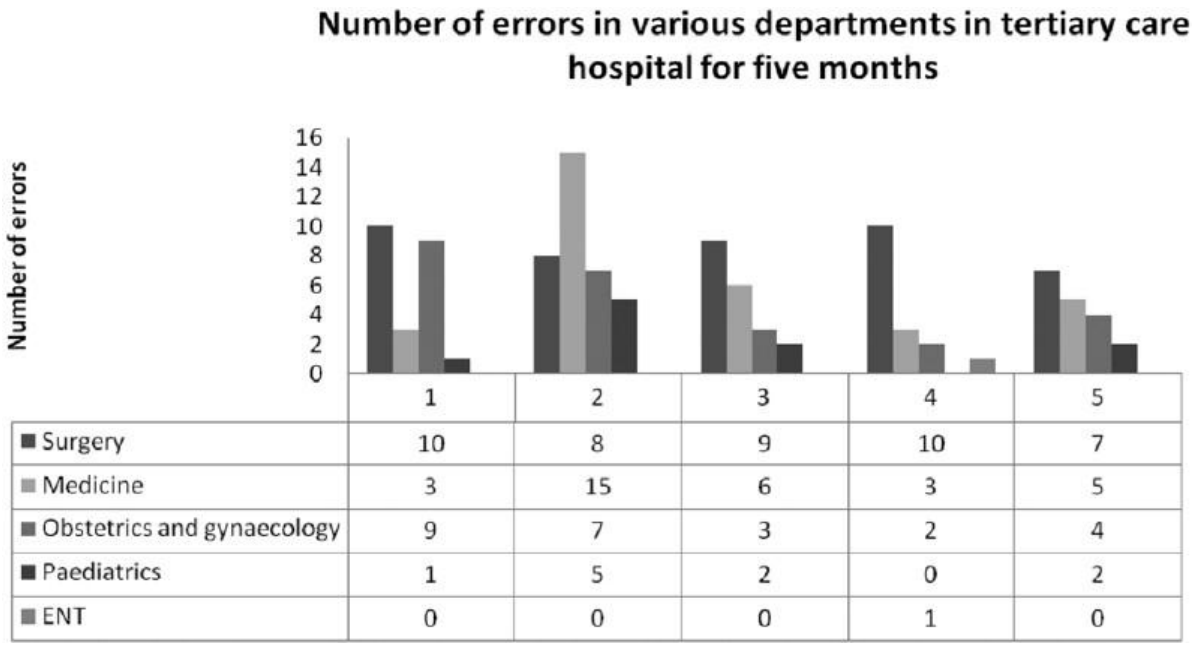

Figure No. 1. Bar diagram showing the number of errors in various departments in tertiary care hospitals for five months

Table 1 Range, mean percentage, mean difference, median and standard deviation of pre-implementation and post-implementation practice score of medication administration through subcutaneous route

N=74

Subcutaneous route	n	Range of score	Mean percentage ±Sd	Median
Pre-test	44	18-25	52.56±1.996	20
Post-test	30	17-35	62.12±6.306	25

N=74
Maximum score: 39
Minimum score: 0

Table 2. Area-wise mean percentage, mean difference, standard error and "t" value of pre-implementation and post-implementation practice score of medication administration through subcutaneous route

N=74

Area	Pre implementation mean percentage	Post implementation mean percentage	M_D	SE_{MD}	df	t	p
Before Administration	48.71	60	11.29	0.535	72	4.98	0.001*
During Administration	46.17	55.57	9.4	0.431	72	1.77	0.001*
After Administration	40.04	48.97	8.93	0.400	72	0.74	0.230^{NS}

't' (72)=1.98 (p<0.05)

*Significant at 0.05 level
^{NS}-Non-significant at 0.05 level

Table 3. Mean percentage, mean difference, standard error of mean difference and "t" value for shift-wise comparison of mean pre-implementation, post implementation practice score of medication administration through subcutaneous route

N=74

Shift	Shift	Mean %	M_D	SE_{MD}	df	t	p
Pre implementation (n=44)	Morning Evening	51.28 52.62	1.34	0.637	35	2.11	0.001*
	Morning Night	51.28 51.47	0.19	0.799	26	0.23	0.409^{NS}
	Evening Night	52.62 51.47	1.15	0.865	21	1.77	0.001*
Post implementation (n=30)	Morning Evening	53.48 58.01	4.53	2.681	19	1.69	0.001*
	Morning Night	53.48 56.56	3.08	1.900	15	0.61	0.275^{NS}
	Evening Night	58.01 56.56	1.45	3.083	16	0.85	0.204^{NS}

't'(35)=2.021
't'(26)=2.056
't'(21)=2.080
't'(19)=2.093
't'(15)=2.131
't'(16)=2.12

*Significant at 0.05 level
^{NS}-Non-significant at 0.05 level

Table 4. Area-wise mean percentage, mean difference, standard error of mean difference and "t" value for shift-wise comparison of mean pre-implementation practice score of medication administration through subcutaneous route

N=44

Area	Shift	Pre implementation mean percentage	M_D	SE_{MD}	df	t	p
Before administration	Morning	46.17	0.270	0.201	35	0.26	0.398^{NS}
	Evening	46.22					
	Morning	46.17	0.190	0.225	26	0.58	0.283^{NS}
	Night	46.36					
	Evening	46.22	0.140	0.304	21	0.17	0.433^{NS}
	Night	46.36					
During administration	Morning	43.41	0.503	0.290	35	1.73	0.046^{NS}
	Evening	43.94					
	Morning	43.41	0.095	0.389	26	0.24	0.406^{NS}
	Night	43.50					
	Evening	43.94	0.440	0.355	21	1.68	0.053^{NS}
	Night	43.50					
After administration	Morning	37.12	0.709	0.430	35	1.83	0.037^{NS}
	Evening	37.82					
	Morning	37.12	0.095	0.476	26	0.20	0.421^{NS}
	Night	37.21					
	Evening	37.82	0.610	0.650	21	1.36	0.094^{NS}
	Night	37.21					

't'(35)=2.021
't'(26)=2.056
't'(21)=2.080

^{NS}-Non-significant at 0.05 level

Table 5. Area-wise mean percentage, mean difference , standard error of mean difference and "t" value for shift-wise comparison of mean post implementation – I practice score of medication administration through intravenous route

N=30

Area	Shift	Post implementation mean percentage	M_D	SE_{MD}	df	t	p
Before administration	Morning	60.27	2.355	1.167	19	2.01	0.029^{NS}
	Evening	62.62					
	Morning	60.27	1.220	1.961	15	0.58	0.285^{NS}
	Night	61.49					
	Evening	62.62	1.130	1.441	16	0.81	0.214^{NS}
	Night	61.49					
During administration	Morning	56.37	1.345	0.963	19	1.39	0.090^{NS}
	Evening	57.71					
	Morning	56.37	1.186	1.396	15	0.85	0.204^{NS}
	Night	57.55					
	Evening	57.71	0.161	1.027	16	0.81	0.214^{NS}
	Night	57.55					
After administration	Morning	49.97	0.836	0.751	19	1.11	0.140^{NS}
	Evening	50.80					
	Morning	49.97	0.200	0.780	15	0.25	0.402^{NS}
	Night	50.17					
	Evening	50.80	0.636	0.893	16	0.71	0.243^{NS}
	Night	50.17					

't'(19)=2.093,
't'(15)=2.131
't'(16)=2.12

^{NS}-Non-significant at 0.05 level

Table 6. Area-wise mean percentage, mean difference, standard error of mean difference and "t" value for shift-wise comparison of mean pre-implementation practice score of medication administration through subcutaneous route

N=44

Area	Shift	Pre implementation mean percentage	M_D	SE_{MD}	df	t	p
Before administration	Morning	46.17	0.270	0.201	35	0.26	0.398^{NS}
	Evening	46.22					
	Morning	46.17	0.190	0.225	26	0.58	0.283^{NS}
	Night	46.36					
	Evening	46.22	0.140	0.304	21	0.17	0.433^{NS}
	Night	46.36					
During administration	Morning	43.41	0.503	0.290	35	1.73	0.046^{NS}
	Evening	43.94					
	Morning	43.41	0.095	0.389	26	0.24	0.406^{NS}
	Night	43.50					
	Evening	43.94	0.440	0.355	21	1.68	0.053^{NS}
	Night	43.50					
After administration	Morning	37.12	0.709	0.430	35	1.83	0.037^{NS}
	Evening	37.82					
	Morning	37.12	0.095	0.476	26	0.20	0.421^{NS}
	Night	37.21					
	Evening	37.82	0.610	0.650	21	1.36	0.094^{NS}
	Night	37.21					

't'(35)=2.021
't'(26)=2.056
't'(21)=2.080

^{NS}-Non-significant at 0.05 level

Table 7. Area-wise mean percentage, mean difference, standard error of mean difference and "t" value for shift-wise comparison of mean post implementation – I practice score of medication administration through intravenous route

N=30

Area	Shift	Post implementation mean percentage	M_D	SE_{MD}	df	t	p
Before administration	Morning	60.27	2.355	1.167	19	2.01	0.029^{NS}
	Evening	62.62					
	Morning	60.27	1.220	1.961	15	0.58	0.285^{NS}
	Night	61.49					
	Evening	62.62	1.130	1.441	16	0.81	0.214^{NS}
	Night	61.49					
During administration	Morning	56.37	1.345	0.963	19	1.39	0.090^{NS}
	Evening	57.71					
	Morning	56.37	1.186	1.396	15	0.85	0.204^{NS}
	Night	57.55					
	Evening	57.71	0.161	1.027	16	0.81	0.214^{NS}
	Night	57.55					
After administration	Morning	49.97	0.836	0.751	19	1.11	0.140^{NS}
	Evening	50.80					
	Morning	49.97	0.200	0.780	15	0.25	0.402^{NS}
	Night	50.17					
	Evening	50.80	0.636	0.893	16	0.71	0.243^{NS}
	Night	50.17					

't'(19)=2.093,
't'(15)=2.131
't'(16)=2.12

^{NS}-Non-significant at 0.05 level

In before administering the medication the post implementation practice score mean percentage (48.71) was higher than pre-implementation practice score (60) and calculated "t" value was 4.98 which was found statistically significant at 0.05 level and during administering the post-implementation practice score mean percentage (55.57) was higher than pre-implementation score (46.71) and calculated "t" value was 1.77 which was found statistically significant on 0.05 level. After administration it was found that the post implementation practice score (48.97) was higher than pre-implementation practice score (40.04) and calculated "t" value was 0.74 which was found statistically non -significant at 0.05 level. Table 3 depicts that there is significant difference in pre-implementation and post – implementation in morning, evening and night shift in all three areas that are before administration, during administration and after administration. This indicates that Event based teaching programme was effective in improving the medication administration practice of subcutaneous medications by staff nurses. Table 4 depicts the area-wise mean percentage, mean difference, standard error of mean difference and "t" value for shift-wise comparison of mean pre-implementation practice score of medication administration through subcutaneous route**.**

The mean was calculated in terms of mean percentage. Here the pre-implementation was compared area wise i.e. before administering, during administration and after administration in morning, evening and night shift respectively. In before administration the morning, evening and night shifts was compared respectively. In before administration, on comparison of morning and evening it was found that mean percentage of evening shift (46.22) was higher than morning shift (46.17) and the calculated "t" value was 0.26 which was found statistically non-significant at 0.05 value and the mean percentage of night shift (46.36) was higher than morning shift (46.17) and calculated "t" value was 0.58 which was found statistically non-significant at 0.05 level and, the mean percentage of night shift (46.22) was higher than evening shift (46.36) and the calculated "t" value was 0.17 which was found statistically non-significant at 0.05 level. The data further shows that during the mean percentage of evening shift (43.94) was higher than morning shift (43.41) and the calculated "t" value was 1.73 which was found statistically non-significant at 0.05 level the mean percentage of night shift (43.50) is higher than morning shift (43.41) and calculated "t" value was 0.24 which was found statistically non-significant at 0.05 level and mean percentage of evening shift (43.94) was higher than night shift (43.50) and the calculated "t" value was 1.68 which was found statistically non-significant at 0.05 level. The data further reveals that after administration the mean percentage of evening shift (37.12) was higher than morning shift (37.82) and the calculated "t" value was 1.83 which was found statistically non-significant at 0.05 level and mean percentage of night shift (37.21) is higher than morning shift (37.12) and calculated "t" value was 0.20 which was found statistically non-significant at 0.05 level and mean percentage of evening shift (37.82) was higher than night shift (37.21) and the calculated "t" value was 1.36 which was found statistically non-significant at 0.05 level. Table 5depictsmean percentage; mean difference, standard error of mean difference and "t" value for shift-wise comparison of mean pre-implementation practice score of medication administration through subcutaneous route. Table 6depicts area-wise mean percentage, mean difference, standard error of mean difference and "t" value for shift-wise comparison of mean pre-implementation practice score of medication administration through subcutaneous route**.** The mean was calculated in terms of mean percentage. Here the pre-implementation was compared area wise i.e. before administering, during administration and after administration in morning, evening and night shift respectively. Table 7depicts area-wise mean percentage, mean difference, standard error of mean difference and "t" value for shift-wise comparison of mean percentage of post implementation practice score of medication administration through subcutaneous route**.** The mean was calculated in terms of mean percentage. Here the post implementation practice score was compared area wise i.e. before administering, during administration and after administration in morning, evening and night shift respectively.

DISCUSSION

The present study indicated that staff nurses had performed poor practices regarding subcutaneous administration of

medication in Medical I.C.U. and it was reduced after implementation of event based teaching programme. The findings of study reveals that mean post implementation phase score (24.50) was higher than mean pre implementation phase score (20.50). These findings are consistent with the findings of the study conducted by Raja LRG Fazlinee D, Syed Z. (2009) to find out the medication administration practices of nurses in UKMNC were found to have mean post test score (45.38) was higher than mean pre-test score (34.46) during administering the subcutaneous injections. The findings also suggests that nurses need to update their practices and skills and as well as pharmacological knowledge of administering the subcutaneous medications [x]. The present study indicated that in subcutaneous route the post-implementation phase mean score (24.23) was higher than pre-implementation phase mean score (20.50). These findings are consistent with the findings of study conducted by Rozario J.M (2000) to assess the knowledge and practices of nurses in administering the drugs in critical care units among 45 samples by using questionnaire. The study suggests the continuous drug training programme to improve the knowledge of nurses [xi].

Conclusion

The following conclusions were drawn from the study i.e. the Event Based Teaching Programme was an effective strategy in improving the medication administration practice of staff nurses.

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