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EFFECTIVENESS OF "DO NOT INTERRUPT" BUNDLED INTERVENTION ON OCCURRENCE OF INTERRUPTIONS TO REDUCE MEDICATION ERRORS IN PAEDIATRIC UNITS OF SELECTED HOSPITAL OF AMBALA

Nursing

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ABSTRACT

AIM: The study aims to investigate the effectiveness of "Do not interrupt" bundled intervention on occurrence of interruptions.
MATERIAL & METHODS: This research uses a Quantitative Research Approach with Quasi Experimental (one group pre test - post test design) at MMIMS&R, hospital, Mullana, Ambala.
RESULTS: The computed Mann-Whitney U test value between pre and post intervention occurrence of interruptions (U=6.051,p=0.00) and Medication Errors χ=4.890, p=0.00) was found to be statistically significant at 0.05 level of significance. But no correlation found between occurrence of interruptions and medication errors [r=0.148(p=0.06)].
CONCLUSION: "Do not interrupt" bundled intervention is an effective strategy to reduce interruptions and medication Errors, but no correlation found between occurrence of interruptions and medication errors

KEYWORDS

Effectiveness, Do not Interrupt, Interruptions, Medication errors.

BACKGROUND

The medication process in any hospital setting includes mainly the five phases depending upon the hospital policy: medication prescription, preparation, dispensing, administration and monitoring.The administration of a medicine is complex, common and crucial clinical procedure.[1]

In pediatric population most frequent route of medication administration is intravenous route.[2] Pediatric patients are special population who need special care. Pediatric medicine is not just "miniaturized" adult medicine. Apart from the obvious body surface area that exists in between both the children and adults there are number of aspects that come into play. For the reason that children are still physically developing so there are multiple growth and developmental issues which need to be considered.[3]

Every stage of this multifaceted process poses great risk for medication errors. Although medication errors may occur at any phase of the medication process, the medication administration phase is of particular interest because it presents the last prospect for an error to be intercepted before reaching the patient.

Approximately 1.3 million people are harmed annually in the United States following "medication errors".[4]Annually 7000 mortalities have been reported due to medication errors. In India, the medication errors and medication related problems are mainly due to irrational use of medications.[5] Hence medications need to be administered carefully and with precision.

MATERIALAND METHODS:

"Quasi Experimental (One Group Pretest-Posttest) Design" The study was conducted in Pediatric Units (PICU, Paediatric Surgery Ward and Paediatric Medicine Ward) of Maharishi Markansdeshwar Institute of Medical Sciences and Research, Hospital, Mullana, Ambala, Haryana and the population comprised of Medication Administration Events [oral, intravenous, inhalation route of medication administration]. Total 291 medication administration events (157 events in intravenous route, 102 oral route and 32 inhalation route) were observed in selected Paediatric Units. The sample was selected through Event sampling technique. Medication administration at one time, through one route is considered as one event. Tool comprised of **Section I:** Modified MADOS-P to assess the occurrence of interruption during Medication Administration events. **Section II:** Structured Observation Checklist to assess medication errors during Medication Administration events.

Content validity of both the tool was established by 9 experts. The percentage of agreement was found to be 0.8 by Cohen's Kappa. The acceptable range was 0.6%-1.0%. Thus the tool was found to be reliable.

Pre-Intervention Phase (1st day to 16th day) (135 Events) Total 89 events were observed pre intervention and 46 in evening shift simultaneously.

Intervention (17th to 23rd day) "Do not Interrupt" bundled intervention was implemented in PICU, Paediatric Medicine Ward and Pediatric Surgery Ward. Flex which were mounted on walls, Pamphlet were distributed to nurses, Yellow badge were given to staff nurses who were involved in medication administration, Information sessions (to nursing students and other personnel).

Post-Intervention Phase (24thday- 36thday) (156 Events) Total 115 events were observed post intervention. 41 events were observed in evening simultaneously.

Statistical Analysis: SPSS version 20.0 was used to analyze the data. Level of significance for the present study was taken as p value $\leq$0.05.

SKEWNESS AND KURTOSIS TEST

The normality of data was checked by skewness and kurtosis. The data was not normally distributed and assumption of normality was not fulfilled. Hence, non parametric test were applied for analysis of data.

Descriptive statistics:

- **Frequency and percentage distribution** was used to describe occurrence of interruptions.

Inferential statistics:

- **Mann Whitney U Test** was used to assess the effectiveness of "Do not interrupt" bundled intervention on occurrence of interruptions And Medication Errors during medication administration events.

- **Chi square** was used to assess item wise effectiveness of "Do not interrupt" bundled intervention on occurrence of interruptions during medication administration events.

Table 1 Frequency and Percentage Distribution of Interruptions and Medication Errors During Medication Administration Events Before and After Implementation of "Do Not Interrupt" Bundled Intervention

N=291

No of Events	No of Events	Interruptions f (%)	Errors f (%)
Pre Intervention	135	126 (69.23)	1183(54.14)
Post Intervention	156	56(30.76)	1002(45.85)

In Preintervention (69.23%) of interruptions and (54.14%) of medication errors were observed from 135 medication administration events while in post intervention (30.76%) of interruptions and (45.85%) of medication errors were observed from 156 medication administration events.

Table 2 Chi Square Showing Comparison of Frequency and Percentage Distribution of Sources of Interruption During Medication Administration Events Before And After Implementation of "Do Not Interrupt" Bundled Intervention

[N=291]

S. NO	Sources of Interruptions	Pre n=135 f %	Post n=156 f %	χ^2	df	P value
1.	Physician Yes No	 05(3.70) 130(96.29)	 - 156(100)	5.879	1	0.01*
2.	Other Nurse present in unit Yes No	 18(13.33) 117(86.66)	 11(7.05) 145(92.94)	3.183	1	0.07 NS
3.	Other Personnel Yes No	 11(8.14) 124(91.85)	 05(1.28) 151(98.71)	3.403	1	0.06 NS
4.	Phone call Yes No	 03(2.22) 132(97.77)	 02(1.28) 154(98.71)	3.79	1	0.53 NS
5.	Other patient's parent/Patient's parent Yes No	 21(15.55) 114(84.44)	 06(4.44) 150(96.15)	11.78	1	0.00***
6.	Other patient Verbal Communication[VC]/Crying out [C] Yes No	 15(11.11) 120(88.88)	 04(2.56) 152(97.43)	8.663	1	0.00***
7.	Visitor Yes No	 3(2.22) 132(97.77)	 4(2.56) 152(97.43)	0.036	1	0.84 NS
8.	Missing Medication Yes No	 15(11.11) 120(88.88)	 8(5.12) 148(94.82)	3.539	1	.059 NS
9.	Not Clear prescription [NC]or wrong dose or medication [W] Yes No	 02(1.48) 133(98.51)	 0 156(100)	2.327	1	0.12 NS
10.	Emergency situation Yes No	 05(3.70) 130(96.29)	 2(1.28) 154(98.71)	1.805	1	0.17 NS
11.	External conversation Yes No	 1(0.74) 134(99.25)	 0 156(100)	1.160	1	0.28 NS
12.	External Noise Yes No	 - 135(100)	 - 156(100)			
13.	Nursing Students Yes No	 16(11.85) 119(88.14)	 11(7.05) 145(92.94)	1.981	1	0.15 NS
14.	Monitor Yes No	 134(99.25) 1(0.74)	 156(100) -	1.160	1	0.28 NS
15.	Alarm Yes No	 - 135(100)	 - 156(100)			
16.	Other[specify] Yes No	 123(91.11) 12(8.88)	 150(96.15) -	3.644	1	0.16

NS -not significant (p>0.05) ***- significant (p≤0.05)**

There is a significant difference in sources of interruptions caused by physician (0%), other patient's parent/Patient's parent (2.06%) and other patient Verbal Communication [VC]/Crying out [C](1.37%) after implementation of "Do not interrupt" bundled intervention at 0.05 level of significance.

Table 4 Spearman's Rho Correlation Between Interruption and Medication Errors

Correlations between interruptions and errors	Group	Errors r(p value)
Interruptions	Pre intervention	0.019(0.83)
	Post intervention	0.148(0.06)

It shows that there was no correlation between interruptions and medication errors during medication administration events.

DISCUSSION

The present study aims to evaluate the effectiveness of "Do not interrupt" bundled intervention on occurrence of interruptions in paediatric units of selected hospitals of Mullana, Ambala".

In present study, findings indicated that occurrence of interruptions decreased significantly from pre intervention (69.23) to post intervention (30.76). These findings are consistent with the findings of **Kyle Anthony et al.**[6]on the impact of a No Interruption Zone on medication safety in intensive care units where the percentage of interruptions was 31.8% and after the implementation of NIZ (No Interruption Zone), the percentage was 18.8%.

The findings also presented that the number of percentage of errors/event were decreased from pre intervention 39.83/135 to post intervention 33.73/156 after implementation of "Do not interrupt bundled intervention". These findings were consistent with the findings of the study conducted by **Niemann D. Bertsche A, et al.**[8] (2015) on a prospective three step intervention study to prevent medication errors in drug handling in paediatric care and the study concluded that medication errors decreased to 116 errors/441 processes from 527 errors/581 processes after incorporation of handouts, training course and reference book provision.

In present studies the findings presented that the most prominent sources of interruptions were physician (3.70%) and other patient's parent patient parents (15.55%) working in the unit. The findings of the study are consistent with the findings of the descriptive study conducted by **Suzan et al**.[9]in the pediatric ward to assess the frequency and causes of interruptions during different phases of preparation and administration of pediatric medications by using observation form during the preparation and administration of pediatric medications. Most common sources of interruption were mothers (22.2%) and physicians (17.8%).

CONCLUSION

"Do not interrupt" bundled intervention is effective in reducing interruptions thus errors during medication administration events but no correlation found between interruptions and events.

Reduction during medication administration could be a result of direct observation of the researcher (Hawthorne effect).. No control group hence, exposes it to the risk of biasness.

Based on the findings of the study following recommendations are made:The study can be replicated on large sample to validate and generalize its findings.The similar multi-centric study can be

conducted in government, corporate, private, non teaching and teaching hospitals.A randomized control trial can be conducted to assess the effective of "Do not interrupt" bundled intervention in paediatric wards.

It was apparent that interruptions do occur in the paediatric units regardless of punctilious incidence rate. Meticulous efforts should be made to train and educate all levels of staff nurses, particularly those dealing with pediatric patients.Medication administration methods should be modified to include standard protocol during medication administration. Induction program should be organized regularly by continuous nursing education cell of an institution for the staff nurses regarding evidence based medication administration.

Conflict of Interest
There is no conflict of interest.

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Self Funding

Ethical Consideration
Formal administrative approval was obtained from the Institutional Ethical Committee of MMIMS & R, Hospital, Mullana, Ambala to conduct the final study. Permission for pilot study was taken from Civil Surgeon of Ambala District, Haryana. Permission for final study was taken from Medical Superintendent MMIMS&R, Hospital, Mullana, Ambala, and Haryana.

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