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Research Article

EFFECTIVENESS OF SELF INSTRUCTIONAL MODULE ON KNOWLEDGE REGARDING VENTILATOR ASSOCIATED PNEUMONIA BUNDLE PRACTICES IN CHILDREN AMONG STAFF NURSES

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ABSTRACT

VAP is the second most common nosocomial infection after urinary tract infection in pediatric intensive care unit patients accounting for 20% of nosocomial infection in this population. VAP has been extensively studied in adults but there is great paucity of data of VAP in children especially in neonatal age.

“A pre experimental study to evaluate the effectiveness of Self Instructional Module (SIM) on knowledge regarding VAP Bundle Practices in children among staff nurses at selected Hospitals, Kolhapur.” was conducted by the researcher.

Objectives

1. To assess the knowledge regarding VAP Bundle Practices in children among staff nurses.
2. To prepare and provide SIM on VAP Bundle Practices in children to the staff nurses.
3. To evaluate the effectiveness of SIM on knowledge regarding VAP Bundle Practices in children among staff nurses.
4. To determine the association between pre-test knowledge scores with the selected socio-demographic variables of staff nurses.

Methods

A pre experimental, one group pre test & post test research design was used, which consisted a group of 60 samples that were selected by using non-probability, purposive sampling technique. Data was collected by using structured knowledge questionnaire regarding VAP Bundle Practices. A SIM was administered to the samples at the end of the pre test and a post test was conducted 7 days after pre test and from administration of SIM.

Results

The result shows that, out of 60 staff nurses, in pre test, majority of participants 49 (81.67%) had average knowledge and 11 participants (18.33%) had poor knowledge and none had good knowledge, where as in post test 45 (75%) participants had good knowledge, 15 (25%) participants had average knowledge and none had poor knowledge. The calculated paired 't' value ($t_{cal} = 19.56$) is greater than tabulated value ($t_{tab} = 2.00$). This indicates that the gain in knowledge score is statistically significant ($P < 0.05$). These the findings revealed that the SIM on VAP Bundle Practices in children was effective in increasing the knowledge regarding VAP Bundle Practices in children among staff nurses. There is significant association between pre test knowledge scores and selected socio-demographic variables like gender [$X^2_{cal} = 4.16$, $X^2_{tab} = 3.84$], source of knowledge on VAP Bundle Practice [$X^2_{cal} = 26.27$, $X^2_{tab} = 3.83$], total clinical experience as a nurse (in years) [$X^2_{cal} = 23.46$, $X^2_{tab} = 5.99$]. The calculated Chi-square values were higher than tabulated value. This indicates that there is significant association between pre test knowledge scores and selected socio-demographic variables ($P < 0.05$).

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INTRODUCTION

Intensive care units have come to represent the most frequently identifiable source of nosocomial infections within the hospital, with the infection rates and rate of antimicrobial resistance several fold greater than the general hospital settings. Ventilator-associated pneumonia (VAP) is defined as nosocomial pneumonia in mechanically ventilated patients that

develops more than 72 hours after initiation of mechanical ventilation (MV).¹

It is acknowledged that there is no universally accepted definition of VAP, but this should not be a reason to delay improvement. Indeed, simple interventions that encourage best practice can significantly reduce the rate of VAP and currently represent the optimum strategy for reducing morbidity and cost

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of this nosocomial infection.³ This VAP Bundle incorporates 6 key actions that are simple, cost effective to implement, and are frequently cited as the most evidenced-based interventions. Three of these care actions; oral hygiene, subglottic aspiration and tracheal tube cuff pressure monitoring are new additions to this current version of the care bundle. Oral hygiene with adequate strength antiseptics has been found to reduce the risk of VAP, as poor oral hygiene is associated with colonization's by potential pathogens and lead to secondary pulmonary infection.²

Incidence of Ventilator associated pneumonia (VAP)

Ventilator associated pneumonia (VAP) was first recognized around 1972, and by 2002 the Centers for Disease Control and Prevention (CDC) released guidelines designed to prevent VAP.

While VAP statistics vary from study to study, the following are some of the results:

1. In 2012, US hospitals reported an estimated 250,000 cases of healthcare-associated pneumonias-36,000 related to deaths, according to the CDC
2. The VAP death rate reported to be 30%, or between 27% and 43%. The incidence of VAP in 2007 was 22.8%.
3. In 2007, VAP account for 86% of all cases of nosocomial pneumonia.
4. In 2007, intubated patients had a 3-10 fold greater risk of catching pneumonia.
5. In 2014, the cost is estimated to be an additional \$40,000 per hospital admission per patient, and an estimated \$1.2 billion per year because of VAP.
6. By 2012, the number of VAP incidents dropped to 3,957.
7. With each day of mechanical ventilation and intubation, the crude VAP rate increased by 1% to 3% and the death risk increases from two-fold to 10-fold.

VAP prevention can reduce both the cost and morbidity associated with mechanical ventilation.⁴

MATERIALS AND METHODS

The purpose of the present study was to evaluate the effectiveness of SIM on knowledge regarding VAP Bundle Practices in children among staff nurses at selected Hospitals, Kolhapur.

A pre experimental, one group pre test post test research design was used for the present study, which consisted a group of 60 samples that were selected on the basis of the sampling criteria set for the study. Samples were selected by using non-probability, purposive sampling technique.

The content validity and reliability of the tool was done, which suggested that the tool was reliable. The pilot study was done on 12 samples and the feasibility of the study was established. It was found that the tool had no major flaws and was used for the final study. Data was collected by using structured knowledge questionnaire. A SIM was administered to the samples at the end of the pre test and post test was conducted 7 days after administration of SIM.

In order to fulfill the objectives and test the hypotheses, the data was tabulated and analyzed by using both descriptive and inferential statistics. The descriptive statistics used were frequency and percentage distribution of sample characteristics and computation of mean, median, mode, range and standard deviation of the pre test and post test knowledge scores. Inferential statistics were used Paired 't' test and chi-square test to evaluate effectiveness of SIM on knowledge regarding VAP Bundle Practices in children among staff nurses & to determine the association between pre-test knowledge scores with the selected socio-demographic variables of staff nurses respectively.

Hypotheses

All hypotheses were tested at 0.05 level of significance.

- H₁** - The mean post-test knowledge score is higher than the mean pre test knowledge score on VAP Bundle Practices in children among staff nurses.
- H₂** - There is an association between the pre-test knowledge scores on VAP Bundle Practices in children among staff nurses with their selected socio-demographic variables.

FINDINGS AND DISCUSSION

The collected data were coded, organized, analyzed and interpreted by using descriptive and inferential statistics. Tables, graphs and figures were used to explain the results.

The data was entered in a master sheet for tabulation and statistical processing. Analysis of data is organized and presented under the following heading:

Section I: Findings Related To Distribution of Demographic Data of Staff Nurses.

Table-I Frequency and percentage distribution of staff nurses according to their socio demographic variables.

		(n = 60)	
Sr. No.	Variables	f	%
1	Age in years		
	a)	20 – 29	39 65.00
	b)	30 – 39	19 31.66
	c)	40 – 49	1 1.67
	d)	50 – 59	1 1.67
2	Gender		
	a)	Female	52 86.67
	b)	Male	8 13.33
3	Qualification		
	a)	G.N.M.	50 83.34
	b)	B. Sc. Nursing	5 8.33
	c)	P. B. B. Sc. Nursing	5 8.33
4	Source of knowledge on VAP bundle practices		
	a)	Yes	
	b)	No	23 38.34
		If Yes, a) Conference	1 1.67
		b) In-service Education	1 1.67
	c) Workshop	16 26.66	
	d) Clinical Exposure	19 31.66	
5	Total clinical experience as a nurse (in years)		
	a)	0 – 10	46 76.66
	b)	10 – 20	11 18.34
	c)	20 – 30	3 5
6	Clinical experience in NICU/PICU (in years)		
	a)	0 – 10	57 95
	b)	10 – 20	3 5

Table I: Indicates that,

- Majority of the participants 39 (65%) belonged to the age group of 20-29 years, only 1 participant (1.67%) belonged to the age group of 40-49 and 1 participant (1.67%) belonged to the age group of 50-59 years.
- Majority of the participants 52 (86.67%) were female, and only 8(13.33%) were male.
- Majority of the participants 50 (83.34%) had GNM qualification, while 5 (8.33%) had B.Sc. Nursing qualification and 5 (8.33%) had P. B. B. Sc. Nursing qualification.
- Majority of participants 23 (38.34%) had not attended any educational program on VAP Bundle Practices, and only 1 (1.67%) had in-service education and 1 (1.67%) had attended conference on VAP Bundle Practices in children.
- Majority of participants 46 (76.66%) had 0-10 years of total clinical experience and only 3 participants (5%) had 20-30 years of total clinical experience.
- Majority of participants 57 (95%) were working in NICU/PICU since 0-10 years and only 3 participants (5%) since 10-20 years.

The result were similar & contrary to the findings of study done by Sonia Cherian who had assessed effect of education related to oral care practice on nurses knowledge, practice & Clinical outcome of mechanical ventilated patients in Dubai.⁵ The similar findings were, majority of participants (50%) belonged to age group below 36, majority of participants (90%) were female, & contrary findings were, majority of participants (86.7%) had bachelors qualification, majority of participants (53.3%) had 10-20 years of experience in nursing, majority of participants (46.7%) had 10-20 years of experience in ICU.

Section II: Findings Related To Distribution of Pre Test And Post Test Knowledge Scores of Staff Nurses Regarding VAP Bundle Practices In Children.

Table II Frequency and percentage distribution of pre test and post test knowledge scores of staff nurses on VAP Bundle Practices in children.

Knowledge scores	Pre test		Post test	
	f	%	f	%
Good (19 - 28)	00	00	45	75
Average (10 - 18)	49	81.67	15	25
Poor (0 - 9)	11	18.33	00	00

Table II: Indicates that,

In pre test majority of the participants 49 (81.67%) had average knowledge and 11 participants (18.33%) had poor knowledge and none of the participants had good knowledge, where as in post test 45 (75%) participants had good knowledge, 15 (25%) participants had average knowledge and none of the participant had poor knowledge.

The findings of study supported with the study done by Maherali SM, *et al.* at Karachi, Pakistan, with the aim to investigate the impact of a 5-hour teaching module on nurses' knowledge to practice evidence based guidelines for the prevention of VAP. The study finding reveals that the 5-hour teaching module significantly enhanced nurses' knowledge towards evidence based guidelines for the prevention of VAP.⁶

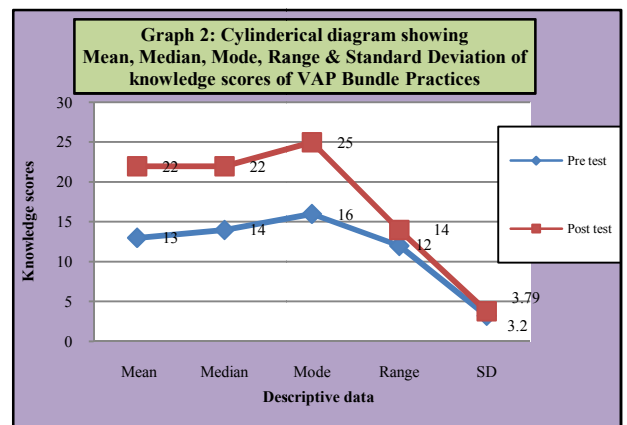
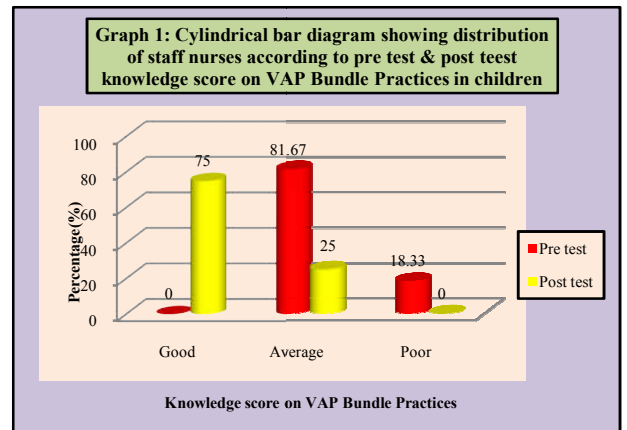
SECTION III: Findings Related To Mean, Median, Mode, Range & Standard Deviation of Pre Test And Post Test Knowledge Scores of Staff Nurses Regarding VAP Bundle Practices In Children.

Table III Mean, Median, Mode, Range and Standard Deviation of knowledge scores of VAP Bundle Practices in children among staff nurses regarding effectiveness of Self Instructional Module

Area Of Analysis	n = 60				
	Mean	Median	Mode	SD	Range
Pre test	13	14	16	3.20	12
Post test	22	22	25	3.79	14
Difference	9	8	9	0.59	2

Table III: Indicates that,

- The overall knowledge score of samples was increased by mean difference 9 units and median difference was 8 where as mode difference was 9.
- The variability around the mean of knowledge score distribution was 0.59.
- The range between the highest and lowest score was increased by 2 units after administering the SIM.



Testing of Hypotheses

H₁ - The mean post-test knowledge score is higher than the mean pre test knowledge score on VAP Bundle Practices in children among staff nurses at 0.05 level of significance.

Section IV: Findings Related to Data on Effectiveness of Sim on VAP Bundle Practices In Children Among Staff Nurses.

Table IV Effectiveness of SIM on knowledge regarding VAP Bundle Practices in children among staff nurses.

n = 60

Mean difference	Standard error difference (SED)	Paired 't' values		df
		Calculated	Tabulated	
9	0.46	19.56	2.00	59

*P<0.05

Table IV: Indicates that,

- The calculated paired 't' value ($t_{cal} = 19.56$) is greater than tabulated value ($t_{tab} = 2.00$). **Hence H_1 is accepted.** This indicates that the gain in knowledge score is statistically significant at P<0.05 level. i.e. **$H_1: \mu \neq \mu_0$.**
- Therefore the findings revealed that the SIM on VAP Bundle Practices in children was effective in increasing the knowledge regarding VAP Bundle Practices in children among staff nurses.

The findings of study was supported by the study done by Trovillion E, *et al.* which was conducted with the aim to assess the effect of an education program to reduce the occurrence of ventilator associated pneumonia, among ICU nurses at 5 ICU in urban teaching hospital. They concluded that educational intervention can dramatically decrease 57.6% (p<0.001) the incidence of ventilator associated pneumonia.⁷

The present study findings were in accordance with the previous study finding such as those reported by Tolentino-Delos Reyes, Ruppert SD, Shino among critical care nurses. The use of 30 min educational sessions on prevention techniques of VAP had found that the nurses performed more oral care on their intubated patients & performed better hand hygiene (P<0.05) & documented in their nursing record more thoroughly (P<0.05).⁸

H_2 - There is an association between the pre-test knowledge scores on VAP Bundle Practices in children among staff nurses with their selected socio-demographic variables at 0.05 level of significance.

Section V: Findings Related To Association Between Pre-Test Knowledge Scores With The Selected Socio-Demographic Variables.

Table V Association between pre-test knowledge score with demographic variables

n = 60

Sr. No.	Variables	Scores		Chi-square values		df
		Average	Poor	Calculated	Tabulated	
Gender						
1	1. Female	44	08	4.16*	3.84	1
	2. Male	05	03			
Source of knowledge on VAP bundle practices						
2	1. Yes	33	04	26.27*	3.84	1
	2. No	16	07			
Total clinical experience as a nurse (in years)						
3	1. 0 – 10	37	09	23.46*	5.99	2
	2. 10 – 20	09	02			
	3. 20 – 30	03	00			

Note: * indicates association

Variables like age in years, qualification and clinical experience in NICU/PICU had expected value less than 5 so, Chi-square cannot be calculated. (Polit, 2012)

Table V: Indicates that,

- There was significant association between pre test knowledge scores and selected socio-demographic variables like gender [$X^2_{cal} = 4.16$, $X^2_{tab} = 3.84$], source of knowledge on VAP Bundle Practice [$X^2_{cal} = 26.27$, $X^2_{tab} = 3.83$], Total clinical experience as a nurse (in years) [$X^2_{cal} = 23.46$, $X^2_{tab} = 5.99$]. The calculated Chi-square values were higher than tabulated value at 0.05 level of significance.
- **Hence H_2 is accepted.** This indicates that there is significant association between pre test knowledge scores and selected socio-demographic variables at 0.05 level of significance, i.e. **$H_2: \mu \neq \mu_0$.**

This finding of the study was contrary to the study done by Sonia which states that there is no association with their selected demographics variable.⁵ Another contrary study findings was found, which was conducted by Soh KL. *et al.* who states that no nurses demographic or work place characteristics was associated with nosocomial pneumonia knowledge.⁹

However, researcher found that there is lack of formal education on VAP Bundle Practices in children among staff nurses of PICU/NICU & their readiness to learn, have a positive impact on the study itself.

CONCLUSION

Therefore it was reasonably concluded that SIM on VAP Bundle Practices in children, introduced to staff nurses of selected hospitals was effective in increasing the knowledge regarding VAP Bundle Practices in children. These findings will be helpful in areas of Nursing research, Nursing education, Nursing administration and Nursing practice.

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