



A study to assess the effectiveness of structure teaching programme on knowledge regarding preventive management of mechanical ventilator associated pneumonia among IInd Year G.N.M. Nursing Students In Selected Nursing Schools, Dharwad

¹ Haramalkar Prathamesh Deelip, ² Awathare Swati and ³ Rhoda Jesuraj

¹ 2nd Year M. Sc. Nursing, Department of Medical Surgical Nursing, Shreeya College of Nursing, Dharwad, Karnataka, India

² Professor and HOD, Department of Medical Surgical Nursing, Shreeya College of Nursing, Dharwad, Karnataka, India

³ Professor, Principal and HOD, Department of Obstetrics and Gynaecology of Shreeya College of Nursing, Dharwad, Karnataka, India

Corresponding Author: Haramalkar Prathamesh Deelip

DOI: <https://doi.org/10.33545/nursing.2024.v7.i2.C.415>

Abstract

Background: Ventilator-associated pneumonia (VAP) is considered the most common nosocomial infection in the intensive care unit (ICU) and is also a major threat to the recovery of patients receiving mechanical ventilation. It is usually caused by aspiration of contaminated secretions or stomach contents and may be bacterial, viral and fungal. Reduction in the incidence rate of VAP ultimately decreases the associated burden of illness. The Institute for Healthcare Improvement (IHI) recommended the practice of bundles, simple sets of evidence-based practices that, when performed collectively and reliably, have been proven to improve patient outcomes. This pre-experimental study aimed to evaluate the effectiveness of structure teaching programme on Knowledge Regarding Preventive Management of Mechanical Ventilator Associated Pneumonia among IInd Year G.N.M. Nursing Students in Selected Nursing Schools, Dharwad.

Methods: A quantitative approach with one group pre-test & post-test design was adopted for the study. The samples from the selected nursing schools, Dharwad were selected using non probability purposive sampling technique. The sample consists of 50 students. The tools used for data collection were structured Knowledge questionnaire and structure teaching programme was developed. The data analysis was done by using both descriptive and inferential statistics.

Results: The mean percentage of post-test knowledge score (86.45%) was higher than the mean percentage of pre-test knowledge score (43.45%). The calculated 't' value is 26.785 for knowledge. It shows a significant difference between mean pre-test and post-test knowledge scores. There was significant association found between Age, gender, religion and language understand with post-test knowledge score. No significant association between other sociodemographic variables and post-test knowledge scores. The main findings of pre-test indicate that IInd year. G.N.M. nursing students had below average level of knowledge about Preventive management of mechanical ventilator associated pneumonia.

The effectiveness of structure teaching programme was tested in terms of differences between pre-test and post-test scores and the findings showed that it was statistically significant at 0.001 level of significance. The findings of the study proved that structure teaching programme is an effective teaching strategy in improving the knowledge of the IInd year G.N.M. nursing students regarding preventive management of mechanical ventilator associated pneumonia. Thus, the structure teaching programme given by the investigator helped the IInd year G.N.M. nursing students to improve their knowledge.

Conclusion: The knowledge of IInd year G.N.M. nursing students was inadequate (43.45%) before administration of structure teaching programme. Knowledge of IInd year G.N.M. nursing students was (86.45%) after administration of structure teaching programme. There is significance difference between mean pre-test and post-test knowledge score of IInd year G.N.M. nursing students with the enhancement of mean score (43%) regarding preventive management of mechanical ventilator associated pneumonia. Structure teaching programme is also helpful in improving the knowledge of participants and it is proved to be one of the effective teaching methods.

Keywords: Mechanical ventilator associated pneumonia, preventive management of mechanical ventilator associated pneumonia

Introduction

Ventilator-associated pneumonia (VAP) is considered the most common nosocomial infection in the intensive care unit (ICU) and is also a major threat to the recovery of patients receiving mechanical ventilation. It is developing within 48 to 72 hours after the intubation of the tracheal tube. It is usually caused by aspiration of contaminated secretions or stomach contents and may be bacterial, viral

and fungal. Ventilator-associated pneumonia (VAP) is also associated with considerable morbidity, including prolonged ICU length of stay, prolonged mechanical ventilation, and increased costs of hospitalization. VAP can prolong the patient's length of stay in hospital and thereby the financial burden. Hence early detection of problems and initiation of prompt management are the important responsibilities of staff nurses. Staff nurses and nursing students should be

adequately educated about pneumonia and its prevention. Reduction in the incidence rate of VAP ultimately decreases the associated burden of illness. The Institute for Healthcare Improvement (IHI) recommended the practice of bundles, simple sets of evidence-based practices that, when performed collectively and reliably, have been proven to improve patient outcomes. Centers for Disease control and Prevention (CDC), 2003 guidelines for the prevention of VAP recommends hand washing, elevation of head end of bed, suctioning of subglottic secretions, and use of hand gloves and implementation of comprehensive oral hygiene programme. The guidelines specify that an antiseptic agent be used as part of the oral care programme and oral chlorhexidine gluconate rinse is solely recommended for adults undergoing cardiac surgery

Methods

The investigator adopted the conceptual framework used in the study was based on the General System Model by Von Ludwing Bertalanffy (1969). This theory includes 3 important components i.e. input, Throughput, and Output. The research design selected for the study was quantitative approach with one group pre-test & post-test design. The independent variable was structured teaching programme regarding prevention of ventilator associated pneumonia and dependent variables were Knowledge of students on preventive management of mechanical ventilator associated pneumonia.

The sample of this study comprised of 50 students of IInd year G.N.M. Nursing students. Purposive sampling technique was used to draw the sample for the study. The tool developed and used for the data collection was structured knowledge questionnaire. The reliability of the tool was established by Split Half Karl Pearson’s correlation formula (Raw score method). The reliability co-efficient of half test ($r_{1/2}$) is found to be 0.735. The reliability of the tool is computed by using $r_1 = 2r_{1/2}/1+r_{1/2}$ and is found to be -0.847.

Pilot study was conducted from 02/06/2023 to 12/06/2023 as a part of the major study, tool proved to be comprehensive, feasible and acceptable.

Data collection procedure: Data was collected from 19/06/2023 to 31/07/2023 after obtaining administrative permission from selected nursing schools Dharwad. The

investigator personally explained the participants the need and assured them of the confidentiality of their responses.

The pre-test was administered followed by an administration of structure teaching programme, data of pre- test was analyzed and post-test was administered 7 days after the administration of structure teaching programme by using the same questionnaire used in the pre-test.

Plan of data analysis

It was planned to use both descriptive and inferential statistics for analysis of the data.

- Frequency and percentage distribution was used to analyze the selected demographic variables.
- Percentage, mean, median and standard deviation was computed to analyze the knowledge scores.
- Paired ‘t’ test was used to analyze pretest – Post Test Mean knowledge score differences
- Chi square was used to analyze association between pretest knowledge scores and socio demographic variables.

Result

Organization of Findings

The analysis of the data is organized and presented underfollowing sections:

Section A: Socio-Demographic characteristics of the participants.

Section B: Distribution of level of knowledge on Preventive management of Mechanical ventilator associated pneumonia in pre-test and post-test.

Section C: Comparison of pre-test and post-test knowledge on Preventive management of Mechanical ventilator associated pneumonia among IInd year G.N.M. Nursing students.

Section D: Association of socio demographic variables with the post-test level of knowledge on Preventive management of Mechanical ventilator associated pneumonia among IInd year G.N.M. Nursing students.

Section A: Socio-Demographic characteristics of the participants

Table 1: Frequency and Percentage distribution of the socio-demographic variables of Respondance, N=50

S. No.	Variable	f	%
Age of students			
1	18-20	46	92
	21-25	04	08
	26-30	00	00
	31-40	00	00
Total	50	100	
Gender			
2	Male	14	28
	Female	36	72
Total	50	100	
Religion			
3	Hindu	33	66
	Muslim	07	14
	Christian	10	20
	Other	00	00

Total	50	100	
Marital status			
4	Married	01	02
	Unmarried	49	98
	Widow	00	00
	Divorce	00	00
	Separated	00	00
Total	50	100	
Type of residential area			
5	Urban	35	70
	Rural	15	30
Total	50	100	
Type of Family			
6	Joint	06	12
	Nuclear	44	88
Total	50	100	
Previous knowledge about prevention of mechanical ventilator associated pneumonia			
7	Yes	49	98
	No	01	02
Total	50	100	
Source of information			
8	Media	04	08
	Books	46	92
	Relatives	00	00
	Friends	00	00
Total	50	100	
Language understand			
9	English	33	66
	Hindi	07	14
	Kannada	10	20
	Other	00	00
Total	50	100	

Section B: Analysis of Pre-test and Post-test knowledge level

Table 2: Classifications of respondents by Pre-test and Post- test knowledge scores on Preventive management of mechanical ventilator associated pneumonia, N=50

S. No.	Level of knowledge	Category	Pre test		Post test	
			No	%	No	%
1.	Inadequate knowledge	≤ 50%	33	66	00	00
2.	Average Knowledge	51%-75%	17	34	01	02
3.	Adequate knowledge	> 75%	00	00	49	98
Total			50	100	50	100

Section C

Table 3: Comparison of Pre-test and Post-test Knowledge score on Preventive management of mechanical ventilator associated pneumonia, N=50

Aspect	Ma x. Score	Respondents Knowledge				Pa ire d 't' Value	p-Value
		Mea n	SD	Me an (%)	SD (%)		
Pre- test	30	17.38	3.948	43.4 5	22.71	26.785*	0.00001
Post- test	30	34.58	2.011	86.4 5	5.81		
Enhancement	30	7.2	1.937	43	16.9		

Section D

Table 4: Association between Demographic variables and Post-test Knowledge Score on Preventive Management of mechanical ventilator associated pneumonia, N=50

Demographic variables	Category	Samples	Knowledge Level				χ^2 Value	P Value
			A		AA			
			N	%	N	%		
Age	18-20	46	00	00	46	100	11.735 (df=1)	$p < 0.05$ (0.000613) S*
	21-25	04	01	25	03	75		
	26-30	00	00	00	00	00		
	31-40	00	00	00	00	00		
Gender	Male	14	01	07.1	13	92.8	2.624 (df=1)	$p < 0.05$ (0.1052) S*
	Female	36	00	00	36	100		
Religion	Hindu	33	00	00	33	100	6.268 (df=2)	$p < 0.05$ (0.044) S*
	Muslim	07	01	14.2	06	85.7		
	Christian	10	00	00	10	100		
	Other	00	00	00	00	00		
Marital status	Married	01	00	00	01	100	0.210 (df=1)	$p < 0.05$ (0.646) NS*
	Unmarried	49	01	02.1	48	97.9		
	Widow	00	00	00	00	00		
	Divorce	00	00	00	00	00		
	Separated	00	00	00	00	00		
Type of residential area	Urban	35	01	02.8	34	97.1	0.437 (df=1)	$p < 0.05$ (0.508) NS*
	Rural	15	00	00	15	100		
Type of Family	Joint	06	00	00	06	100	0.139 (df=1)	$p < 0.05$ (0.709) NS*
	Nuclear	44	01	02.2	43	97.7		
Previous knowledge	Yes	49	01	02	48	97.9	0.210 (df=1)	$p < 0.05$ (0.646) NS*
	No	01	00	00	01	100		
Source of information	Media	04	00	00	04	100	0.089 (df=1)	$p < 0.05$ (0.766) NS*
	Books	46	01	02.2	45	97.8		
	Relatives	00	00	00	00	00		
	Friends	00	00	00	00	00		
Language understand	English	33	00	00	33	100	6.268 (df=2)	$p < 0.05$ (0.044) S*
	Hindi	07	01	14.2	06	85.7		
	Kannada	10	00	00	10	100		
	Other	00	00	00	00	00		

Discussion

In the present study the frequency and percentage distribution of demographic variables of participants revealed that Majority of the subjects 92% were between the age group of 18 - 20 years and 08% were between 21 - 25 years and No one between the age group 26 – 30 and 31 - 40 respectively. Regarding Gender, majority of the subjects 72% were Females and 28% were Males.

Whereas majority of the subjects 66% belongs to Hindu Religion, 14% were Muslim, 20% belongs to Christian religion. When come to marital status 98% were Unmarried and 2% were married and none of them are Widow, Divorce and separated. Respondent’s type of residential area, majority of the Respondents 70% were Residing in Urban area and 30% were living in rural area. The type of family of Respondents is 88% having nuclear family and 12% having joint family.

Majority Respondents 98% had a previous knowledge about preventive management of mechanical ventilator associated pneumonia and 02% not having previous knowledge about preventive management of mechanical ventilator associated pneumonia. Source of Information regarding preventive management of mechanical ventilator associated pneumonia from books is 92% whereas 08% respondents received information from media. Majority of the subjects 66% were understand English language, 20% understand Kannada language and 14% respondents understand the Hindi

language.

Major findings of the study

The major findings of the study are summarized as follows:

Findings related to respondents demographic variables:

- Majority of the subjects 92% were between the age group of 18-20 years and 08% were between 21-25 years and No one between the age group 26-30 and 31 - 40 respectively.
- Regarding Gender, majority of the subjects 72% were Females and 28% were Males.
- Whereas majority of the subjects 66% belongs to Hindu Religion, 14% were Muslim, 20% belongs to Christian religion.
- When come to marital status 98% were Unmarried and 2% were married and none of them are Widow, Divorce and separated.
- Respondent’s type of residential area, majority of the Respondents 70% were Residing in Urban area and 30% were living in rural area.
- The type of family of Respondents is 88% having nuclear family and 12% having joint family.
- Majority Respondents 98% had a previous knowledge about preventive management of mechanical ventilator associated pneumonia and 02% not having previous knowledge about preventive management of

mechanical ventilator associated pneumonia.

- Source of Information regarding preventive management of mechanical ventilator associated pneumonia from books is 92% whereas 08% respondents received information from media.
- Majority of the subjects 66% were understand English language, 20% understand Kannada language and 14% respondents understand the Hindi language.

Findings related to effectiveness of structured teaching programme

Using a structured knowledge questionnaire was used to assess the knowledge, regarding preventive management of mechanical ventilator associated pneumonia IInd year G.N.M. Nursing students before and after imparting the structure teaching programme findings reveals that; Most of respondents 66% had inadequate knowledge, 34% of them had Average knowledge and only 0% had adequate knowledge in pre-test. But in post-test majority of respondents 98% had adequate knowledge and only 2% of them had average knowledge. The mean pre-test knowledge score of respondents was 43.45% and that of post-test was 86.45% with the enhancement of 43%. The mean knowledge score of despondence in post-test 34.48%, the mean knowledge score of despondence pre- test is 17.38% and post-test is 34.48%.

Findings related to association between post-test levels of knowledge scores with selected demographic variables of IInd Year G.N.M. Nursing students.

Chi-square values were computed to find the association between post-test level of knowledge and selected socio-demographic variables viz; Age, Gender, Religion, Marital status, type of Residential area, Type of family, Previous knowledge, source of knowledge and language understand attended by structure teaching programme on preventive management of mechanical ventilator associated pneumonia.

Socio-demographic variables with post-test knowledge score

- Shows that the obtained values ($\chi^2 = 11.735$) is more than table value ($\chi^2 = 0.000613$). This implies there is significant association between the knowledge scores and Age of respondent.
- Shows that the obtained values ($\chi^2 = 2.624$) is more than table value ($\chi^2 = 0.1052$). This implies there is significant association between the knowledge scores and Gender of respondent.
- Shows that the obtained values ($\chi^2 = 6.268$) is more than table value ($\chi^2 = 0.044$). This implies there is significant association between the knowledge scores and Religion of respondent.
- Shows that the obtained values ($\chi^2 = 0.210$) is less than table value ($\chi^2 = 0.646$). This implies there is no significant association between the knowledge scores and marital status of respondent.
- Shows that the obtained values ($\chi^2 = 0.437$) is less than table value ($\chi^2 = 0.508$). This implies there is no significant association between the knowledge scores and type of residential area of respondent.
- Shows that the obtained values ($\chi^2 = 0.139$) is less than

table value ($\chi^2 = 0.709$). This implies there is no significant association between the knowledge scores and type of family of respondent.

- Shows that the obtained values ($\chi^2 = 0.210$) is less than table value ($\chi^2 = 0.646$). This implies there is no significant association between the knowledge scores and previous knowledge of respondent.
- Shows that the obtained values ($\chi^2 = 0.089$) is less than table value ($\chi^2 = 0.766$). This implies there is no significant association between the knowledge scores and Source of information of respondent.
- Shows that the obtained values ($\chi^2 = 6.268$) is less than table value ($\chi^2 = 0.044$). This implies there is significant association between the knowledge scores and language understand of respondent.

These findings indicated that except for Age, Gender, religion and language understand with post-test Knowledge score, χ^2 values of all other socio-demographic variables were less than the table value at 0.05 levels of significance. Therefore, the null hypothesis is rejected. Variables with regard to marital status, type of residential area, type of family, previous knowledge and source of information research hypothesis is accepted at 0.05 levels of significance.

Conclusion

The knowledge of IInd year G.N.M. nursing students was inadequate (43.45%) before administration of structure teaching programme.

Knowledge of IInd year G.N.M. nursing students was (86.45%) after administration of structure teaching programme.

There is significance difference between mean pre-test and post-test knowledge score of IInd year G.N.M. nursing students with the enhancement of mean score (43%) regarding preventive management of mechanical ventilator associated pneumonia.

Structure teaching programme is also helpful in improving the knowledge of participants and it is proved to be one of the effective teaching methods

References

1. Basavanhappa BT. Respiratory Nursing. In: Medical-Surgical Nursing, 2nd ed. New Delhi: Jaypee Brothers Medical Publishers; c2009. p. 285.
2. Patwa A, Shah A. Anatomy and physiology of respiratory system relevant to anaesthesia. Indian J Anaesth. 2015 Sep;59(9):533-541. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4613399/>
3. Heyland DK, Cook DJ, Griffith L, Keenan SP, Brun-Buisson C. The attributable morbidity and mortality of ventilator-associated pneumonia in the critically ill patient. Am J Respir Crit Care Med. 1999;159(4):1249-1256.
4. Chawla R. Epidemiology, etiology, and diagnosis of hospital-acquired pneumonia and ventilator-associated pneumonia in Asian countries. Am J Infect Control. 2008, 36(4)
5. Fernandez-Barat L, Torres A. Biofilms in ventilator-associated pneumonia. Future Microbiol.

- 2016;11(11):1599-1610.
6. Perkins SD, Woeltje KF, Angenent LT. Endotracheal tube biofilm inoculation of oral flora and subsequent colonization of opportunistic pathogens. *Int J Med Microbiol.* 2010;300(7):503-511.
 7. Kalil AC, Metersky ML, Klompas M, Muscedere J, Sweeney DA, Palmer LB, *et al.* Management of adults with hospital-acquired and ventilator-associated pneumonia: 2016 clinical practice guidelines by the Infectious Diseases Society of America and the American Thoracic Society. *Clin Infect Dis.* 2016, 63(5)
 8. Martin-Loeches I, Deja M, Koulenti D, Dimopoulos G, Marsh B, Torres A, *et al.* Potentially resistant microorganisms in intubated patients with hospital-acquired pneumonia: The interaction of ecology, shock and risk factors. *Intensive Care Med.* 2013;39(4):672-681.
 9. Chawla R. Epidemiology, etiology and diagnosis of hospital-acquired pneumonia and ventilator-associated pneumonia in Asian countries. *Am J Infect Control?* 2008;36(4):93-100.
 10. Kharel S, Bist A, Mishra SK. Ventilator-associated pneumonia among ICU patients in WHO Southeast Asian region: A systematic review. *PLoS ONE.* 2021, 16(3)
 11. Gadani H, Vyas A, Kar AK. A study of ventilator-associated pneumonia: Incidence, outcome, risk factors and measures to be taken for prevention. *Indian J Anaesth.* 2010;54(6):535-40. DOI: 10.4103/0019-5049.72643. PMID: 21224971; PMCID: PMC3016574.
 12. N S, SM, Hedge D, Vikram V, Kumar PM. Incidence, microbiological profile and outcome of ventilator-associated events in a tertiary care hospital in Bangalore, Karnataka, India. *Trop J Pathol Microbiol* [Internet]. 2020 Feb 29 [cited 2022 Aug 29];6(2):130-138. Available from: <https://pathology.medresearch.in/index.php/jopm/article/view/420>
 13. Bishwas A, Hemavathi Shenoy P. Microbial profile of ventilator-associated pneumonia in a medical intensive care unit of a tertiary care hospital in Bangalore. *J Evol Med Dent Sci.* 2020;9(19):1539-1543.
 14. Golia S, Sangeetha KT, Vasudha CL. Microbial profile of early and late onset ventilator-associated pneumonia in the intensive care unit of a tertiary care hospital in Bangalore, India. *J Clin Diagn Res.* 2013 Nov;7(11):2462-2466.
 15. Bankanie V, Outwater AH, Wan L, Yinglan L. Assessment of knowledge and compliance to evidence-based guidelines for VAP prevention among ICU nurses in Tanzania. *BMC Nurs.* 2021;20(1):1-2.

Creative Commons (CC) License

This is an open-access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to Cite This Article?

Haramalkar PD, Awathare S, Jesuraj R. A Study To Assess The Effectiveness Of Structure Teaching Programme On Knowledge Regarding Preventive Management Of Mechanical Ventilator Associated Pneumonia Among IInd Year G.N.M. Nursing Students In Selected Nursing Schools, Dharwad. *International Journal of Advance Research in Nursing.* 2024;7(2):xx-xx