Effect of Information Booklet on Care of Patients Under Mechanical Ventilator Among Staff Nurses Serving in Tertiary Care Hospitals, Maharashtra

Mr. Kunal Aniruddha Sanap[1], Ms. Jayshree M. Sherekar[2]
[1] *M.Sc. Nursing Student II year, Dr. Panjabrao Deshmukh Nursing Institute, Amravati, Maharashtra*
[2] *Assistant Professor and Research Guide, Dr. Panjabrao Deshmukh Nursing Institute, Amravati, Maharashtra*

***Abstract*—Background of the study: Caring for the patient on mechanical ventilation has become an integral part of nursing care in the critical care unit. Mechanical ventilation is a critical intervention in managing patients with respiratory failure, and its effectiveness significantly influences survival rates across the globe. Globally, studies indicate that the mortality rate among patients on mechanical ventilation is around 30-40%, depending on the severity of their illness. In India, survival rates among mechanically ventilated patients vary considerably due to differences in healthcare infrastructure, the quality of ICU care, and regional disparities in the availability of trained personnel, with mortality rates reported to range from approximately 30% to 50%. Aim: To determine the effect of an information booklet on knowledge regarding care of patients under mechanical ventilator among staff nurses serving in tertiary care hospitals, Maharashtra. Objectives: 1) To assess the knowledge on care of patients under Mechanical ventilator among staff nurses belonged to experimental and control group before intervention. 2) To assess the effect of information booklet on care of patients under Mechanical ventilator among staff nurses between pre-test and post-test knowledge scores in control and experimental group. Methodology: A quantitative approach and quasi experimental design were used to carry out this study. The staff nurses were selected by convenient sampling technique where data was collected by using self-administered questionnaire. The analysis was done by using descriptive and inferential statistics. Results: In the demographic distribution, the highest proportion of staff nurses were in the age group of 21–30 years in the experimental group (62.5%) and 31–40 years in the control group (66.3%). Females constituted the majority in both groups (experimental: 91.3%; control: 88.8%). Regarding educational qualifications, 62.5% in the experimental group held a Diploma in Nursing, whereas in the control group, 48.8% held a Bachelor's Degree in Nursing. A higher proportion of nurses had ≤ 3 years of experience in the experimental group (52.5%) and 4–6 years of experience in the control group (52.5%). A statistically significant improvement was observed between the pre-test and post-test knowledge scores in the experimental group ($t = 24.23$, $p = 0.0001$; $p < 0.05$), demonstrating that the information booklet was effective in improving knowledge. Furthermore, no statistically significant association was found between baseline knowledge scores and demographic variables such as gender or years of experience. Conclusion: Analysis of data showed that there is significant difference between pretest and posttest knowledge score. Hence, an information booklet has significantly brought out their improvement in the knowledge on care of patients under mechanical ventilator among staff nurses.**

***Index Terms*—Care of patients, Information booklet, Knowledge score, Mechanical ventilator, Staff nurses**

I. INTRODUCTION

A mechanical ventilator is one of the core components of supportive therapy for critically ill patients and is often lifesaving. A mechanical ventilator is a machine that is essential to support patients' breathing when they are unable to ventilate and oxygenate on their own due to a critical illness or surgery. Patients are connected to a ventilator by a hollow tube that goes from their mouth to their trachea, thereby providing the function of respiratory muscles.[1] More than half of the patients in the ICU are ventilated the first 24 hours after ICU admission, comprised of individuals who have acute respiratory failure, compromised lung function, difficulty in breathing, or failure to protect

their airway.[2] The care of mechanically ventilated patients is at the core of nurses clinical practice in the intensive care unit. In a wide variety of settings, nurses are increasingly likely to care for patients on mechanical ventilator.[3] Critical illness is a life-threatening event that disturbs the full system of an individual. Critical illness affects their physical, psychological, sociocultural and spiritual level. In nursing, the nurses serve as a catalyst by making complex, timely decisions and judgments to promote life processes.[4] The nursing management of the mechanically ventilated patient is challenging on many levels, from the acquisition of highly technical skills and expert knowledge on invasive monitoring, to the implementation of interventions to care for the patient. Each critically ill patient brings the clinical rationale for mechanical ventilation and additional complexities associated with their illness. It is recognised that the reason for mechanical ventilation and patient admission impacts patient assessment and management.[5]

II. OBJECTIVES

The objectives of study are;

1. To assess the knowledge on care of patients under Mechanical ventilator among staff nurses belonged to experimental and control group before intervention.
2. To assess the effect of information booklet on care of patients under Mechanical ventilator among staff nurses between pre-test and post-test knowledge scores in control and experimental group.

III. MATERIALS AND METHODS

A quantitative approach was adopted and a non-randomised control group design was used for this study. The study was carried out in selected tertiary care hospitals of Maharashtra. The settings were chosen based on accessibility, administrative support, and an adequate sample size. A convenient sampling technique was used to select 160 staff nurses (80 in the control group and 80 in the experimental group) serving in tertiary care hospitals of Maharashtra. Written permission was obtained from concerned authorities, and consent was taken from participants. Pre-test knowledge was assessed for both groups using a structured questionnaire on the care of mechanically ventilated patients. The information booklet was then administered to the experimental group. After the 7 days, the post-test was taken and the data was analysed using SPSS software. Statistical Analysis: The data was analysed using descriptive and inferential statistics. Demographic variables and knowledge scores were analysed using frequency, percentage, mean, mean percentage, and standard deviation. Inferential analysis was performed using a paired 't' test to evaluate pre-test and post-test knowledge scores within groups, one-way ANOVA to compare knowledge scores between the experimental and control groups, and a chi-square test to determine the association between post-test knowledge scores and selected demographic variables.

IV. RESULTS

Table 1: Percentages wise distribution of staff nurses according to their demographic characteristics.

n = 160

Demographic Variables	Experimental Group (n = 80)	Control Group (n = 80)
Age in years		
21-30 yrs	50(62.5%)	21(26.3%)
31-40 yrs	30(37.5%)	53(66.3%)
41-50 yrs	0(0%)	6(7.5%)
≥51 yrs	0(0%)	0(0%)
Gender		
Male	7(8.8%)	9(11.3%)
Female	73(91.3%)	71(88.8%)
Professional Qualification		

Diploma in Nursing	50(62.5%)	16(20%)
Degree in Nursing	20(25%)	39(48.8%)
Post Diploma Certificate courses in nursing	10(12.5%)	25(31.3%)
Post Graduation in nursing	0(0%)	0(0%)
Years of experience		
≤3 yrs	42(52.5%)	21(26.3%)
4-6 yrs	30(37.5%)	42(52.5%)
7-9 yrs	8(10%)	16(20%)
≥10 yrs	0(0%)	1(1.3%)

Table 2: Significance of difference between knowledge score in pretest and posttest of staff nurses of Experimental Group.

n = 80

Test	Mean	SD	Mean Difference	t-value	p-value
Pretest	11.15	2.90	11.03±4.07	24.23	0.0001 S, p<0.05
Posttest	22.18	3.40			

The table presents a comparison of the pretest and posttest knowledge scores of staff nurses regarding the care of patients receiving mechanical ventilation in tertiary care hospitals, Maharashtra. The mean, standard deviation, and mean difference were calculated, and a paired 't' test was applied at the 5% level of significance. For 79 degrees of freedom (n = 80 − 1), the tabulated 't' value was 1.98. The calculated 't' value (24.23) was significantly higher than the tabulated value at the 5% level of significance. This indicates a statistically significant difference between pretest and posttest knowledge scores. Therefore, it can be inferred that the information booklet on the care of patients under mechanical ventilation was effective in improving the knowledge of staff nurses serving in tertiary care hospitals, Maharashtra. Hence, the research hypothesis (H_1) was accepted.

Table 3: Significance of difference between knowledge score in pretest and posttest of staff nurses of control group.

n = 80

Test	Mean	SD	Mean Difference	t-value	p-value
Pretest	9.23	2.50	0.40±2.07	1.72	0.089 NS, p>0.05
Posttest	9.63	2.29			

This table shows the comparison of pretest and posttest knowledge scores of staff nurses regarding care of patients under mechanical ventilator serving in tertiary care hospitals, Maharashtra. Mean, standard deviation and mean difference values was compared, and paired 't' test is applied at 5% level of significance. The tabulated value for n = 80-1 i.e. 79 degrees of freedom was 1.98. The calculated 't' value i.e. 1.72 are much less than the tabulated value at 5% level of significance for overall knowledge score of staff nurses which is statistically not acceptable level of significance. Hence it was statistically interpreted that the Information Booklet on knowledge regarding care of patients under mechanical ventilator among staff nurses serving in tertiary care hospitals, Maharashtra was not effective. H_1 was rejected.

Table 4: Comparison of mean difference between knowledge score in pretest and posttest of staff nurses of the Experimental and Control Groups.

n = 160

Group	Mean	SD	t-value	p-value
Experimental Group	11.03	4.07	20.80	0.0001 S, p<0.05
Control Group	0.40	2.07		

This table presents a comparison of the mean differences in pretest and posttest knowledge scores of staff nurses regarding the care of patients on mechanical ventilation in tertiary care hospitals, Maharashtra, across the experimental and control groups. Mean, standard deviation, and mean difference values are compared, and an unpaired t-test is applied at the 5% level of significance. The tabulated value for n = 80 + 80 − 2, i.e., 158 degrees of freedom, was 1.96. The calculated t-value (20.80) was significantly higher than the tabulated value at the 5% level of significance for the overall knowledge score of staff nurses, indicating statistical significance. Hence, it could be interpreted that the information booklet on the care of patients on mechanical ventilation among staff nurses in tertiary care hospitals in Maharashtra was effective in the experimental group. Thus, H_2 was accepted.

V. DISCUSSION

The present study was undertaken to assess the effect of an information booklet on the care of patients under mechanical ventilators among staff nurses serving in tertiary care hospitals, Maharashtra. The study revealed that in the control group, the highest percentage of staff nurses (66.3%) belonged to the age group of 31– 40 years, whereas in the experimental group, the majority (62.5%) were in the age group of 21– 30 years. Females constituted the vast majority in both the experimental (91.30%) and control (88.80%) groups. Regarding educational qualifications, a higher percentage of staff nurses held a diploma in nursing in the experimental group (62.5%), whereas in the control group, 48.8% possessed a degree in nursing. In terms of clinical experience, the majority of staff nurses had ≤ 3 years of experience in the experimental group (52.5%) and 4 – 6 years of experience in the control group (52.5%). Prior to the intervention, the baseline knowledge scores of staff nurses in both groups were lower and fairly similar. Following the administration of the information booklet, the post-test knowledge score percentage in the experimental group significantly increased from 37.16% to 73.95%, whereas the pre-test and post-test knowledge score percentages remained more or less similar in the control group. Similarly, the mean knowledge score in the experimental group showed a substantial increase from 11.15 ± 2.90 in the pre-test to 22.18 ± 3.40 in the post-test, while the control group showed minimal change. This difference in the experimental group was found to be statistically highly significant ($t = 24.23$, $p < 0.05$), compared to the control group ($t = 1.72$). Thus, it is concluded that the information booklet was highly effective in enhancing the knowledge scores of staff nurses regarding the care of mechanically ventilated patients. The study further concluded that there was a statistically significant association ($p < 0.05$) between post-test knowledge scores and demographic variables such as age and professional qualification in the experimental group. However, no significant association ($p > 0.05$) was found between post-test knowledge scores and variables such as gender and years of experience.

VI. CONCLUSION

After the detailed analysis, this study leads to the following conclusion. The staff nurses serving in tertiary care hospitals did not possess optimal baseline knowledge regarding the care of patients under mechanical ventilators. There was a significant increase in the knowledge of staff nurses in the experimental group after the introduction of the information booklet, whereas the control group scores remained unchanged. Thus, it was concluded that the information booklet on care of patients under mechanical ventilators as a self-learning strategy was found to be highly effective. Except for age and professional qualification, demographic variables did not play a major role in influencing the post-test

knowledge scores. Hence, based on the above-cited findings, it was concluded undoubtedly that the self-learning written material developed by the investigator in the form of an information booklet helped the staff nurses significantly improve their knowledge on caring for mechanically ventilated patients.

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