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Research Article

Clinical Value of Comprehensive Nursing Intervention in Prevention of Ventilator-associated Pneumonia

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Abstract

Objective: To investigate the clinical value of comprehensive nursing intervention in prevention of ventilator-associated pneumonia (VAP).

Methods: From June 2018 to December 2019, a total of 116 patients who received mechanical ventilation were selected as research participants, and they were divided into control group (n=58) and observation group (n=58) according to the random number table method. In the observation group, patients were treated with comprehensive nursing, while patients in the control group were treated with conventional nursing. The mechanical ventilation time, hospitalization time, VAP incidence, psychological status, quality of life and nursing satisfaction of patients were compared in the two groups.

Results: The mechanical ventilation and hospitalization time of patients in the observation group were less than those of patients in the control group, and the difference was statistically significant (P<0.05). The incidence of VAP was 3.44% in the observation group, which was lower than that in the control group (13.79%), and the difference was statistically significant (P<0.05). The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) scores of patients in the two groups before intervention were not of statistically significant difference (P>0.05). After intervention, the SAS and SDS scores decreased in the two groups, and the scores in the observation group were significantly lower than those in the control group (P<0.05). The quality of life scores before intervention between the two groups were not statistically significant (P>0.05). After intervention, the quality of life scores in the observation group were higher than those in the control group, and the difference was statistically significant (P<0.05). The nursing satisfaction rate in the observation group was 94.87%, which was significantly higher than that in the control group (81.03%) (P<0.05).

Conclusion: Comprehensive nursing intervention can shorten the time of mechanical ventilation and hospitalization, prevent the occurrence of VAP, alleviate the negative emotions of patients, and improve their quality of life as well as nursing satisfaction.

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Keywords: comprehensive care, prevention, ventilator-associated pneumonia, clinical value

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1 INTRODUCTION

Mechanical ventilation is one of the main rescue methods for respiratory failure, during which some patients often have some complications and ventilator-associated pneumonia (VAP) is one most common case[1,2]. VAP refers to pneumonia that develops after receiving mechanical ventilation treatment for 48 hours or within 48 hours after cessation of mechanical ventilation in the absence of pulmonary infection[3]. Patients with VAP complications may have difficulty in weaning, which prolongs hospital stay, seriously affects the quality of life and even threatens the life safety[4,5]. Therefore, it is vital to find an effective nursing method to prevent VAP during mechanical ventilation. This study aimed to explore the clinical value of comprehensive nursing intervention in the prevention of VAP, so as to provide a clinical reference for the prevention of VAP. The results are reported as follows.

2 MATERIALS AND METHODS

2.1 General Material

From June 2018 to December 2019, a total of 116 patients admitted to our hospital for the treatment of mechanical ventilation were selected as study participants. This study was approved by the hospital's Ethics Committee. According to the random number table method, the patients were divided into control group (n=58) and observation group (n=58). The general materials in the two groups were compared, and the difference was not statistically significant (P>0.05). See Table 1.

2.2 Methods

2.2.1 Control Group

In the control group, patients were treated with conventional nursing intervention, including conventional sputum suction nursing, posture nursing, psychological care and environmental nursing.

2.2.2 Observation Group

In the observation group, patients were treated with comprehensive nursing intervention on the basis of the control group. (1) Cognitive and psychological nursing: Patients on mechanical ventilation often had negative emotions such as anxiety and insecurity due to insufficient knowledge of mechanical ventilation. Nursing staff carries out detailed disease education for patients, explaining the purpose of the treatment and possible adverse reactions and making adequate psychological preparation for patients[6]. Patients were encouraged to actively face the disease and establish the confidence of treatment. (2) Environment and posture nursing: The indoor environment were kept ventilated, clean, and quiet with regular bacterial disinfection, while the temperature and humidity of the ward were controlled for a comfortable environment. According to patients' condition, they were helped to be in a comfortable position with the head, neck and shoulders at the same level. To ensure the comfort of patients, they could tilt the head back and turn over regularly with help[7]. (3) Strengthening the nursing of respiratory tract: To ensure the airway patency of patients, the airway temperature and humidity of the patients were kept at an appropriate level, and the ventilator parameters were then adjusted according to their specific conditions. The correct way of spitting was explained to the patients, and the patients were assisted to turn over their bodies[8]. (4) Ventilator duct nursing: The ventilator pipes were replaced and the ventilators were cleaned in time to avoid cross-infection; The threaded pipe of the ventilator was changed every week, the condensed water in the respiratory pipe was cleaned in time, and antibiotics were used rationally; Intermittent weaning and early withdrawal of sedatives could reduce the incidence of VAP[9]. And (5) Nutritional support: According to the patients' situation, appropriate diet plans were made; Nasal feeding was applied in patients who could not eat independently.

2.3 Observation Indexes

(1) Mechanical ventilation time and hospitalization time; (2) Incidence of VAP. (3) Psychological status: The self-rating anxiety scale (SAS)[10] was used for the evaluation, among which the severe anxiety score was >69, the moderate anxiety score was 60-69, the mild anxiety score was 50-59, and the normal score was <50. (2) Self-rating depression scale (SDS)[11] was used for scoring, among which severe depression score was >72 points, moderate depression score was 63-72 points, mild depression score was 53-62 points, and normal status score was <53 points. (4) Quality of life: The SF-36 scale[12] was used for evaluation, including psychology, emotion, body and society. The total score for each item was 100 points. The mean value of the four items was used to represent the quality of life. (5) Nursing satisfaction: Nursing satisfaction was evaluated according to the questionnaire designed by the nursing personnel. There were 8 items in total with five levels ranging from "very satisfied" to "very dissatisfied". The satisfaction rate = (very satisfied + satisfied + average)/number of cases ×100%.

2.4 Statistical Analysis

SPSS23.0 was used to process the collected data. The quantitative data that were consistent with normal distribution were expressed by mean±SD. The qualitative data were expressed as n(%). The rank-sum test was

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Table 1. Comparison of General Material

Group	*n*	Gender		Average Age (years old)
		Male	Female	
Observation group	58	32	26	50.89±8.41
Control group	58	31	27	50.32±8.66
$(\chi^2/t$		0.035		0.360
P		0.853		0.720

Table 2. Comparison of Mechanical Ventilation and Hospitalization Time (mean±SD)

Group	*n*	Mechanical Ventilation Time	Hospitalization Time
Observation group	58	15.34±4.15	17.46±5.69
Control group	58	23.65±5.71	25.34±6.77
t		8.966	6.876
P		<0.001	<0.001

Table 3. Comparison of VAP Incidence (*n*)

Group	*n*	With VAP	Without VAP	VAP Incidence
Observation group	58	2	56	3.44
Control group	58	8	50	13.79
$(\chi^2$				3.940
P				0.047

Table 4. Comparison of SAS and SDS Scores (mean±SD, score)

Group	*n*	SAS		SDS	
		Before Intervention	After Intervention	Before Intervention	After Intervention
Observation group	58	61.52±6.32	44.15±4.81*	55.41±5.38	46.21±4.26*
Control group	58	61.37±6.15	57.41±5.17*	55.93±5.13	50.14±4.72*
t		0.130	14.301	0.533	4.707
P		0.897	<0.001	0.595	<0.001

Notes: *stands for comparison with the data before intervention, $P<0.05$.

performed for ordered qualitative data, while $(\chi^2$ test was used for the disordered data. The variance analysis was conducted for repeated measurement data. $P<0.05$ was considered significantly different.

3 RESULTS

3.1 Comparison of Mechanical Ventilation and Hospitalization Time

The time of mechanical ventilation and hospitalization in the observation group was less than that in the control group, and the difference was statistically significant ($P<0.05$). See Table 2.

3.2 Comparison of VAP Incidence

The VAP incidence in the observation group was 3.44%, which was lower than that in the control group (13.79%), and the difference was statistically significant ($P<0.05$). See Table 3 for details.

3.3 Comparison of Psychological Status

The SAS and SDS scores of the two groups before intervention were not of significant difference ($P>0.05$). After intervention, the SAS and SDS scores decreased in both groups, while the scores in the observation group were lower than those in the control group and the difference was statistically significant ($P<0.05$). See Table 4 for details.

3.4 Comparison of Quality of Life

The quality of life scores of the two groups before intervention were not of significant difference ($P>0.05$). After intervention, the score in the observation group was higher than that in the control group, and the difference was statistically significant ($P<0.05$). See Table 5 for details.

3.5 Comparison of Nursing Satisfaction

The nursing satisfaction in the observation group was 94.87%, which was higher than that in the control group (81.03%), and the difference was statistically significant ($P<0.05$). See Figure 1.

4 DISCUSSION

VAP is a common nosocomial infection, which is not

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Table 5. Comparison of Quality of Life (mean±SD, score)

Group	*n*	Before Intervention	After Intervention
Observation group	58	65.78±12.14	87.64±15.98*
Control group	58	66.88±12.32	73.65±15.72*
t		0.484	4.753
P		0.629	<0.001

Notes: *stands for comparison with the data before intervention, $P<0.05$.

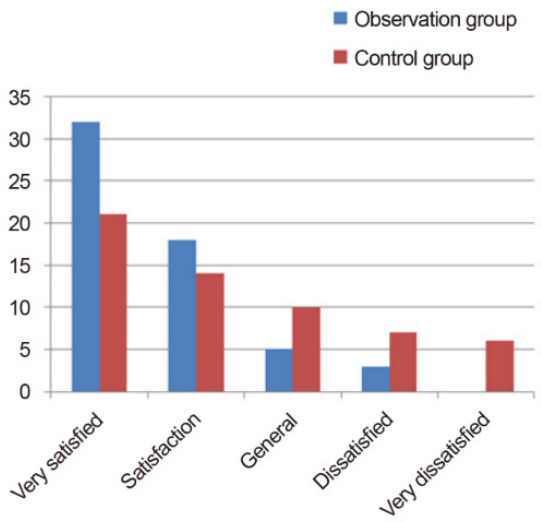

Figure 1. Comparison of Nursing Satisfaction Between the Two Groups.

only related to patients' own disease[13], but also related to factors of antibiotic use, artificial airway, mistaken aspiration and mechanical ventilation time[14,15]. Among them, mechanical ventilation is an important reason for the development of VAP in patients. The longer the time of mechanical ventilation, the higher the incidence of VAP, which has a negative impact on the prognosis of patients[16]. VAP has a high mortality rate, so it is important to take appropriate prevention measures.

Comprehensive nursing intervention is a new patient-centered nursing model, which can effectively improve patients' nursing services by utilizing various resources[17]. Cross-infection caused by foreign bacteria can be effectively avoided through environmental nursing in the wards[18]. After the patient's airway nursing, respiratory tract mucosal damage can be effectively avoided. Psychological nursing intervention can enhance patients' confidence in getting cured, improve patients' nursing and treatment compliance, and it is more conducive to the development of nursing work[19]. After ventilator tube nursing, the bacteria invasion can be effectively avoided in case of VAP. After comprehensive nursing, VAP can be prevented, mechanical ventilation and hospitalization time can be shortened, and patients' quality of life and nursing satisfaction can be improved[20]. The results of this study showed that the mechanical ventilation and hospitalization time in the observation group were less than those in the control group. The incidence of VAP in the observation group was 3.44%, which was lower than that in the control group (13.79%). The SAS and SDS scores in both groups were reduced after the intervention, and the scores in the observation group were lower than those in the control group. The nursing satisfaction in the observation group was 94.87%, which was higher than that in the control group (81.03%). The results showed that comprehensive nursing can effectively reduce mechanical ventilation time and hospitalization time, reduce the incidence of VAP, alleviate patients' negative emotions, and improve the quality of life as well as nursing satisfaction.

5 CONCLUSION

In conclusion, comprehensive nursing intervention can shorten mechanical ventilation time and hospitalization time, prevent the development of VAP, relieve patients' negative emotions, and enhance their quality of life and nursing satisfaction.

Acknowledgements
Not applicable.

Ethical Statement
The study was approved by the Ethics Committee of Shandong Dongying People's Hospital.

Conflicts of Interest
The authors declared no conflict of interest.

Data Availability
All data generated or analyzed during this study are included in this published article.

Author Contribution
Geng N designed this study and wrote the article; Liu C and Zhou Y collected the data and performed the statistical analysis; Zhao J revised the papers for important intellectual content; all authors approved the final version.

Abbreviation List

SAS, Self-rating anxiety scale
SDS, Self-rating depression scale
VAP, Ventilator-associated pneumonia

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