

Analysis of Systematic Nursing Intervention on High-altitude Pulmonary Edema

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ABSTRACT Objective: To analyze the effect of a nursing intervention program in patients with high altitude pulmonary edema, and to provide a guideline for clinical nursing work. **Methods:** A total of 52 cases of patients suffering from high-altitude pulmonary edema were divided into two groups. The control group was given routine nursing intervention, while the experimental group was given a systematic nursing intervention. The disappearance of cyanosis and pulmonary rales in both groups of patients over time were compared and the Results were statistically analyzed. **Results:** In the experimental group, both cyanosis and pulmonary rales disappeared faster compared the routine group. The comparison between patients in both groups was significantly different ($p < 0.05$). The level of anxiety among patients of the experimental group is also significantly lower than the patients in the control group ($p < 0.05$). In both groups, the difference was not significant ($p > 0.05$) before treatment and the clinical symptom score of the experimental group was significantly lower than that in the control group ($p < 0.05$). **Conclusion:** It is effective to implement a systematic nursing intervention program in caring for patients with high-altitude pulmonary edema and it is suitable for clinical application.

KEYWORDS

High altitude
Pulmonary edema
Systematic nursing

1. Introduction

High altitude pulmonary edema is a condition that affects people who rapidly climb to an altitude of 3000 m above the sea level. It is a common cause of fatality in high-altitude region owing to hypoxia and other closely related conditions. An effective early response is the key to treat patients with high-altitude pulmonary edema, and nursing intervention is an indispensable part of the early rehabilitation of patients. Although conventional nursing methods can improve the symptoms of patients, the long-term effect can be severe and patient prognosis is poor [1]. Therefore, it is important to study the proactive and effective nursing methods in patients with high altitude pulmonary edema. In order to analyze the effect of nursing intervention in patients with high altitude pulmonary edema, the effect

of nursing intervention is presented and discussed. In our hospital, the implementation of nursing intervention system in patients with high altitude pulmonary edema had achieved good results.

2. Materials and methods

2.1. General information

A total of 52 cases of patients with high altitude pulmonary edema (admitted to our hospital from August 2013 to November 2014) form the basis of this study. The patients were randomly divided into two groups. In the control group, there were 26 patients including 19 males and 7 females (aged between 1155 years), with the average age being 37.95 ± 6.85 years old. The duration between the manifestation of symptoms to hospitalization was between 8h and 7 days, averaging at 3.62 ± 1.02 days. Meanwhile, in the experimental group, there were 26 patients including 20 males and 6 females (aged between 11–56 years), with the average age being 37.24 ± 6.97 years. The duration between the manifestation of symptoms to hospitalization was between 6h and 7 days, averaging at 3.71 ± 1.26 days. Patients and their families are fully aware of the treatment methods and nursing measures taken, and voluntarily signed the consent form. The differences in age and gender

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of the patients were not significant ($p > 0.05$) and the data are thus comparable.

2.2. Method

The control group received routine nursing intervention from the point of admission. Nurses regularly checked the oxygen level of patients, followed doctors' advice on drug prescription and dosage, observed patients' vital signs and implemented psychological care. According to the needs of patients, they were informed of the planned treatment process and given appropriate attention to improve the treatment compliance of patients [2].

In the experimental group, the patients were treated with systematic nursing intervention. According to our clinical experience, the quality of nursing service was improved with the implementation of a systematic nursing intervention program. Patient monitoring: The vital signs of the patients were closely monitored, paying attention to whether the hypoxia affects the central nervous system of the patients, such as coma, pupil dilation, etc. Oxygen: Patients used a closed-mask oxygen inhalation system (with the humidification bottle containing 20% alcohol); inhaling a large quantity of oxygen while the changes in their SPO₂ level were observed [3]. Medication: Patients were given their prescription drugs according to their doctors' advice. The infusion speed was carefully controlled (i.e., it should neither be too fast nor contain too much liquid) to avoid cardiac load. Obtaining patients' statistics within 24 hours post-treatment will help doctor to better evaluate the correct drug dosage. Psychology: Psychological care intervention was provided according to the requirement of each patient to hasten the process of recovery. Physical care: Patients were provided with a warm and comfortable ward. In addition, they were kept warm and patients with impaired mobility were given extra support such as meal-feeding and cleaning. Guidance: Patients were advised to rest, gradually increase the amount of physical activity, avoid strenuous exercise, consume low salt and high protein food, and choose food that is easy to digest. They were also informed of the potential reasons for the manifestation of their illness [4]. Other factors: While in recovery, patients were given guidance on appropriate physical exercise to improve the patient's lung function in order to stimulate a faster recovery. In addition, patients were given post-hospitalization guidance on important matters to ensure they receive the same quality of care after discharge [5].

2.3. Observation index

Both groups of patients (i.e., with nursing intervention vs. control) were observed and their recovery progress compared (based on the disappearance of symptoms such as cyanosis and pulmonary rales). Using a scoring method (taken 3 days after admission), patients with anxiety was evaluated using 0-10 scale to indicate their state of anxiety.

2.4. Data processing

The experimental data of our hospital were analyzed using the SPSS 18.0 software package for statistical analysis. The test value was set at 0.05. When $p < 0.05$, the difference was statistically significant.

The disappearance of symptoms of the two groups of patients over time and their state of anxiety were used to compare the mean \pm standard difference using t -test for between groups comparison.

3. Results

Patients in the experimental group showed a faster disappearance of cyanosis along with an improvement in pulmonary rales compared with patients in the control group, and these results are significantly different with $p < 0.05$. Patients in the experimental group were also less anxious than patients in the control group ($p < 0.05$) and the difference was statistically significant. The detailed results are shown in Table 1.

Table 1. Comparison of symptoms and anxiety level in the two patient groups.

Group	Case number	Cyanosis disappearance time (h)	Pulmonary rales disappearance (h)	Anxiety state (minute)
Experimental group	26	6.88 \pm 1.24	8.51 \pm 1.01	3.02 \pm 1.55
Control group	26	12.85 \pm 2.01	13.24 \pm 2.54	5.11 \pm 0.84

In this study, the results were not significantly different ($p > 0.05$) before the treatment of both patient groups. However, the clinical symptoms of the experimental group were significantly less severe than the control group ($p < 0.05$) post treatment (see Table 2).

Table 2. Comparison between the two patient groups before and after treatment.

Group	Case number	Before treatment	After treatment	Difference value
Experimental group	26	5.14 \pm 1.40	1.74 \pm 1.12	2.80 \pm 0.22
Control group	26	5.40 \pm 1.22	3.53 \pm 1.38	1.49 \pm 0.15
t	/	1.02	23.53	35.99
p value	/	>0.05	<0.05	<0.05

4. Discussion

Patients experiencing pulmonary edema have physical symptoms such as headache, chest pain, cough and cyanosis, accompanied by a difficulty in breathing and other conditions. The cause of the illness is not clear and may be associated with pulmonary hypertension. When combined with hypoxia induced pulmonary artery contraction, this results in reduced blood flow and increased pulmonary blood flow, hence causing pulmonary edema

[6]. At present, there is a lack of ideal clinical treatment for high-altitude pulmonary edema but conventional methods can improve the symptoms. However, the long-term efficacy of existing treatment is poor. Additionally, the prognosis is poor among patients who do not receive adequate nursing care. In our hospital, the implementation of a systematic nursing intervention program involves the centralization of resources and integrating all effective nursing measures. By using a properly defined system, nurses have a better understanding of the clinical work flow and could avoid erroneous practices (e.g., delayed response or omission of procedures). This is especially true for young nurses owing to the lack of nursing experience. Patients who received nursing intervention showed a rapid disappearance of symptoms. In the experimental group, the disappearance times for cyanosis and pulmonary rales are $6.88 + 1.24$ h and $8.51 + 1.01$ h, respectively. They are both lower than those of the control group and the group comparison also has a significant difference ($p < 0.05$) [7].

In addition, the nursing intervention system is in line with the needs of the whole nursing program, taking into consideration psychological nursing, overall care quality and physical health guidance. It is important for nurses to realize that nursing work is not only to follow the doctor's advice, but also includes making the patients feel comfortable and meeting their healthcare expectations. Using this method, patients received a more comprehensive care and their level of anxiety is significantly lower (3.02 ± 1.55 points lower than the control group, $p < 0.05$). In conclusion, this study showed that the conditions of two groups of pulmonary edema patients were comparable before treatment ($p > 0.05$). Nonetheless, after the introduction of a nursing intervention program, the clinical symptoms of the experimental group were significantly lower than the control group ($p < 0.05$). The implementation of an effective nursing practice model is relatively

important in developing the professional skills of nurses. Therefore, nurses should continuously learn and master more skills, implement targeted care for each patient, improve clinical treatment work flow and the overall quality of service [8].

In short, the implementation of a systematic nursing intervention program in dealing with patients suffering from high-altitude pulmonary edema is effective and should be promoted as a clinical strategy.

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