

Research on Improvement of Negative Emotion of Inpatients By 9S Management for Medical Equipment Management in MICU of Hospital

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Abstract: Objective To explore the improvement effect of 9S management in MICU medical equipment management on patients' negative emotions Methods The MICU of a hospital in Xi'an adopted the 9S management method in the management of medical equipment. The inpatients after the implementation of the 9S management were taken as the experimental group, and the inpatients before the implementation of the 9S management method were taken as the control group. The inpatients in the experimental group and the control group were evaluated by the Self-rating Anxiety Scale(SAS) and the Self-rating Depression Scale(SDS) when they were transferred to and out of the MICU, and the results of the evaluation were compared and analyzed. Results In the comparison of SAS evaluation, the SAS evaluation results of both the experimental group and the control group showed that the patients were in mild anxiety state when they were transferred to MICU, and there was no significant difference in the evaluation values between the two groups ($P>0.05$). The SAS evaluation results of the experimental group and the control group showed that all the patients in the experimental group had got out of the anxiety state, and most of the patients in the control group had got out of the anxiety state. There were still some patients with mild anxiety, and the SAS evaluation values of the experimental group were significantly lower than those of the control group ($t=-18.028$; $P < 0.05$); in the comparison of SDS evaluation, the SDS evaluation results of both the experimental group and the control group showed that the patients were in mild depression state when they were transferred to MICU, and there was no significant difference in the evaluation values between the two groups ($P>0.05$). The SDS evaluation results of the experimental group and the control group showed that the patients in the two groups had got out of the depression state when they were transferred out of the MICU. SDS of the experimental group was significantly lower than that of the control group ($t=-15.543$; $P < 0.05$). Conclusions Using 9S management method in MICU medical equipment management can not only improve the management efficiency of medical equipment, but also effectively reduce the SAS and SDS evaluation values of inpatients, reduce inpatients' anxiety and depression negative emotions, improve patients' satisfaction with inpatient services, and ultimately improve the treatment effect and life quality of inpatients.

Keywords: MICU, 9S management, Negative emotion, SAS, SDS.

1. Introduction

The 9S management concept originated from the improvement of enterprise management efficiency in developed countries. Managers initially proposed the 5S enterprise management system and applied it to enterprise management. After long-term exploration and improvement, the essence of 9S management system was formed[1]. Due to the significant improvement of 9S management on enterprise management quality, this method was introduced into China and gradually applied in hospital management in China, achieving good results. 9S management includes nine core elements: Seiri, Seiton, Seiso, Seiketsu, Saving, Safety, Service, Satisfaction and Shitsuke[2]. 9S management strictly requires from these nine aspects, and finally achieves the improvement of management quality.

Medical Intensive Care Unit (MICU) is a management unit for the admission and treatment of severe internal medicine patients in a hospital. The MICU can use a variety of medical equipment to provide continuous, dynamic, intensive monitoring and accurate treatment for these patients, reflecting the overall treatment level of the hospital. There are many types and large quantities of medical devices in the

MICU. If effective management is not carried out, some medical devices will run tiredness for a long time at the bedside without effective maintenance, resulting in sudden equipment failure and affecting medical safety[3]. Using 9S management to manage medical equipment can effectively reduce the failure rate of medical equipment, improve the normal operation rate of medical equipment, and reduce the maintenance cost. At the same time, 9S management puts forward high requirements for the training and improvement of personnel's quality, requiring medical staff to improve the initiative of work and the awareness of service to patients. 9S management has put forward high requirements for the cultivation and improvement of personnel's quality. It requires medical staff to improve the initiative of work, improve the service consciousness of patients, change passive service into active service, so as to achieve satisfactory results for patients and their families. MICU patients tend to have complex conditions and are older. Because patients have been in a closed environment for a long time and have fear of treatment, they may have negative emotions such as anxiety and depression during treatment[4]. This paper studies the improvement of patients' anxiety and depression in the process of medical device management by using 9S

management in MICU.

2. Research Materials and Methods

2.1. Research Materials

The MICU of a large hospital in Xi'an has 20 beds and 38 medical staff. Since July 2019, the MICU has adopted the 9S management method to manage the medical equipment in the department. The inclusion criteria for this study were: (1) the patients were conscious during hospitalization; (2) the patients were able to communicate normally; (3) the patients had no other mental illness; (4) the patients had complete admission and discharge records. The exclusion criteria were: (1) the patient resisted treatment and nursing services; (2) the disease was still severe at the time of discharge; (3) the patient was hospitalized for less than 7 days. According to the inclusion and exclusion criteria, 60 inpatients after the implementation of 9S management from July 2019 to October 2019 were included as the experimental group, and 60 inpatients before the implementation of 9S management from March 2019 to June 2019 were included as the control group. There were 36 males and 24 females in the experimental group with an average age of (58±4.2) years, and 39 males and 21 females in the control group with an average age of (61±3.2) years. There was no change in medical staff during the study period, and the results were comparable.

2.2. Research Methods

For patients in the control group, the department used conventional methods to manage medical equipment and ward, and used conventional methods for nursing and treatment of patients; For the patients in the experimental group, the department used 9S management method to manage the medical equipment and the environment of the ward, and psychological intervention was carried out among the service elements of 9S management. The following describes how to implement the 9S management method in the MICU

2.2.1. Preparation Phase

(1) Establish the 9S management team

Establish a 9S management team composed of the head nurse, nurses in charge and the engineer of the medical equipment management department. The management team members should have a deep understanding of the essence of 9S management thought and jointly promote the implementation of 9S management method.

(2) Develop the 9S management methods

According to the actual medical equipment management of the department, the 9S management method and operating rules for all kinds of medical equipment were studied and formulated, and the quantitative assessment rules related with 9S management methods were clarified.

(3) Carry out 9S management training

The 9S management training video was recorded and the 9S management learning wechat group was established for medical staff to study independently in their spare time and exchange learning experience with each other in the wechat group. Every Monday morning, a medical staff would make PPT to explain the learning experience of 9S management in turn to strengthen and consolidate the learning effect.

2.2.2. Implementation Phase

(1) Doing the Seiri, Seiton, Seiso, Seiketsu for medical equipment and ward environment

In 9S management, the four elements of Seiri, Seiton, Seiso

and Seiketsu mean to tidy and clean the objects of quality management and keep them in good condition continuously. In the 9S management of medical equipment in MICU, engineers should first check the medical equipment and distinguish between the equipment in normal use, the equipment to be repaired and the equipment to be scrapped. The equipment in normal use should be placed in the equipment access area, hung with a green label for use; the faulty equipment to be repaired should be placed in the equipment repair area, hung with a yellow label to be repaired, and the responsible nurse should contact the clinical medical engineer to repair on site or send the equipment to the medical equipment management department; the equipment to be scrapped should be transferred to the idle warehouse, hung with a red label to be scrapped. Devices in the equipment access area should be placed in a centralized manner according to usage frequency and function type, and devices with high usage frequency should be placed in the most accessible position according to the principle of easy access. The daily responsible nurse should carry out daily maintenance of the equipment in the access area. They daily wipe the stains on the surface of the equipment, check whether the power of the rechargeable equipment is sufficient, check whether the filter screen needs to be cleaned or replaced for the equipment with filter screen, check whether the air supply pressure and negative pressure of the treatment belt are normal, check whether the equipment is in normal operation, and tidy up the accessories. The faulty equipment should be moved to the equipment repair area in time, and the clinical medical engineers should be contacted to deal with it. After the use of medical equipment, the equipment and accessories should also be cleaned and disinfected in time, and the equipment should be moved to the equipment access area. In addition, the responsible nurse also needs to clean the ward environment every day, clean up the dirt in the ward area, store the items after use in the ward area at a fixed point, ensure that the ward environment is clean and tidy, so as to provide a comfortable working environment for medical staff and a comfortable hospital environment for patients. The daily arrangement, rectification and cleaning of medical equipment and ward environment should be recorded in time. The 9S management team should supervise and evaluate the cleaning and arrangement of medical equipment and the environment of the ward by means of regular inspection and random sampling inspection, and the evaluation results would be counted into individual year-end assessment results with certain weight.

(2) Saving and safety awareness in the use of medical equipment and consumables

The medical equipment management department of the hospital has studied and established a three-level maintenance system to carry out preventive maintenance for medical equipment. In the process of preventive maintenance, engineers and medical staff can timely find and eliminate the potential use of equipment, replace aging and vulnerable parts, thereby reducing the failure rate of equipment in the process of use, reducing the cost of equipment maintenance, and saving the cost of medical equipment. Among them, the first-level daily maintenance is carried out by medical staff of clinical departments, the second-level monthly maintenance is carried out by clinical medical engineers, and the third-level quarterly maintenance is jointly carried out by clinical medical engineers and manufacturer engineers. In the use and management of consumables, medical staff are required to use

them according to the actual usage to avoid waste. Meanwhile, the use process of consumables should be standardized to avoid consumables loss caused by improper operation, so as to save the cost of consumables. In addition, it is necessary to strengthen the safety operation training of medical staff. In the process of handling and moving equipment and consumables, we should pay attention to the accidental injuries caused by falling, dumping and line pulling, and also pay attention to the safety usage of electricity, gas and liquid to prevent accidental injuries caused by circuit flash, fire, flammable liquid leakage and high-pressure gas injection, so as to ensure the safety of patients and medical staff.

(3) Improving the core quality of medical staff and the quality of service to achieve the purpose of patient satisfaction

Shitsuke is the core content of 9S management, which means quality of personnel. It requires the improvement of personnel's quality, the improvement of management consciousness, and the active participation of everyone in management. Patients hospitalized in MICU may have negative emotions such as anxiety and depression due to concerns about their own condition, long bed time, limited body position, inadaptability to the closed environment, and pressure on medical expenses. In order to effectively relieve patients' such emotions, improve patients' hospitalization experience and improve patients' hospitalization satisfaction, medical staff should first clean and tidy the medical equipment and ward environment. Clean and orderly environment is an important factor to improve patients' comfort in hospital and relieve patients' negative emotions. Secondly, medical staff should carry out psychological intervention for patients in nursing services. They should communicate with patients like relatives so as to understand the needs of patients and solve the confusion of patients. They should also try to reduce patients' discomfort in the process of contact treatment of patients with medical equipment, so as to reduce patients' psychological fear, improve patients' comfort in hospital, and finally obtain patients' satisfaction with good hospital services.

2.3. Evaluation Indicators

The anxiety and depression emotions of awake patients in the experimental group and control group were evaluated when they were transferred into and out of the MICU, so as to compare the relief of negative emotions of patients by improving service quality after the implementation of 9S management method. Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) were used in the evaluation. SAS and SDS both have 20 items and use a 4-point score system to assess the frequency of symptoms in the item list, with "1" indicating "no or very little time", "2" indicating "a small part of the time", "3" indicating "considerable time", and "4" indicating "most or all of the time"[5,6]. The evaluation time was 2 days after transferring into MICU and 1 day before transferring out of MICU respectively. After the completion of self-evaluation of patients according to the list of items, the scores of all items were added up to obtain the

total score. The total score was multiplied by 1.25 and the integral part was taken, which was the SAS or SDS score. A higher score indicates more severe symptoms. The SAS threshold is 50 points. A SAS score below 50 is normal, 50-60 is mild anxiety, 60-70 is moderate anxiety, and over 70 is severe anxiety. The SDS threshold is 53 points. A SDS score below 53 is normal, 53-62 is mild depression, 63-72 is moderate depression, and 73 or more is severe depression[7].

2.4. Statistical Analysis

SAS and SDS evaluation data of patients were imported into SPSS20.0 software for processing. The evaluation scores were measurement data, expressed as $X \pm S$, and analyzed by T test. $T < 0.05$ indicated statistically significant differences.

3. Results

SAS/SDS evaluation results of patients with MICU consciousness when transferred into and out of the department are shown in Table 1 below. It can be concluded that the SAS evaluation results of both the experimental group and the control group showed that the patients were in mild anxiety state when they were transferred to MICU, and there was no significant difference in the evaluation values between the two groups ($P > 0.05$). The box plot of SAS evaluation results of conscious patients of the two groups when they were transferred out of MICU is shown in Figure 1, in which group 1 represents the experimental group and group 2 represents the control group. The SAS evaluation results (Table 1) and boxplot (Figure 1) of patients in the experimental group and control group when they were transferred out of MICU showed that all the patients in the experimental group had got out of the anxiety state, and most of the patients in the control group had got out of the anxiety state. There were still some patients with mild anxiety, and the SAS evaluation values of the experimental group were significantly lower than those of the control group ($t = -18.028$; $P < 0.05$).

Similarly, the SDS evaluation results of both the experimental group and the control group showed that the patients were in mild depression state when they were transferred to MICU, and there was no significant difference in the evaluation values between the two groups ($P > 0.05$). The box plot of SDS evaluation results of conscious patients of the two groups when they were transferred out of MICU is shown in Figure 2, in which group 1 represents the experimental group and group 2 represents the control group. Patient No. 66 in Figure 2 represents the outlier, indicating that the evaluation data of patients was abnormal due to various reasons. The SDS evaluation results (Table 1) and boxplot (Figure 2) of patients of the two groups when they were transferred out of MICU showed that the patients in the two groups had got out of the depression state when they were transferred out of the MICU. SDS of the experimental group was significantly lower than that of the control group ($t = -15.543$; $P < 0.05$).

Table 1. Comparison of anxiety and depression evaluation results between the experimental group and the control group of MICU awake patients[Score(x±s)]

Group	n	SAS		SDS	
		Transferred to MICU	Transferred out of MICU	Transferred to MICU	Transferred out of MICU
Experimental group	60	57.06±2.98	35.78±2.20	56.21±3.47	32.49±2.68
Control group	60	57.71±3.59	44.43±3.00	57.79±4.23	40.77±3.13
t	-	-1.086	-18.028	-0.823	-15.543
P(*p<0.05)	-	0.280	0.000*	0.412	0.000*

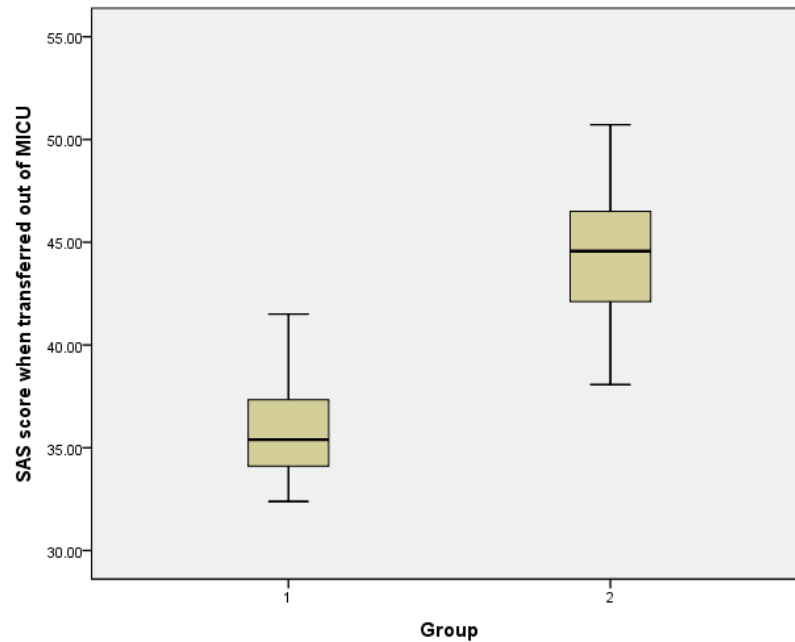


Figure 1. The box plot of SAS evaluation results of conscious patients of both the experimental group and the control group

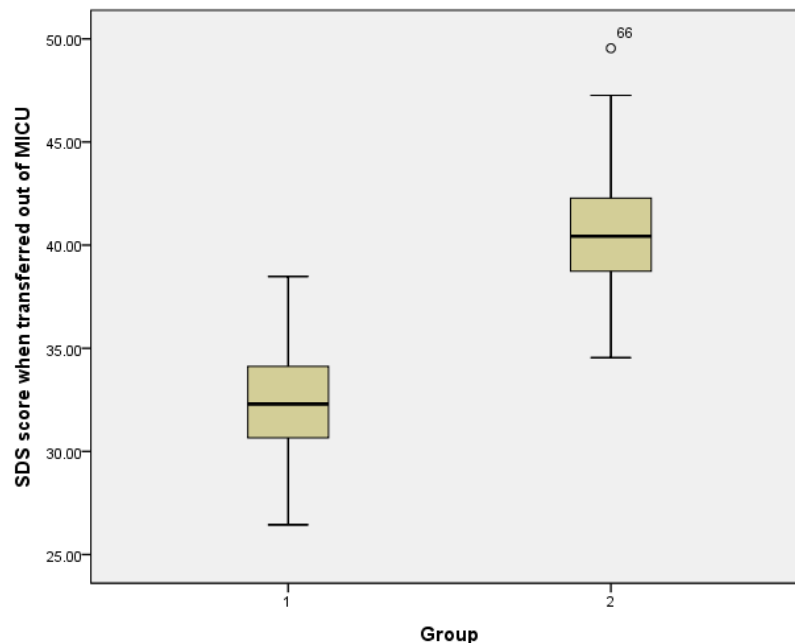


Figure 2. The box plot of SDS evaluation results of conscious patients of both the experimental group and the control group

4. Discussion

As a type of intensive care unit, MICU has a relatively closed environment due to the requirements of infection control in the intensive care units. There are a large number

of medical electronic devices working within the visual range of the ward, producing various mechanical sounds, alarm sounds and various light stimuli. Meanwhile, there are also many critical patients and busy medical staff in the ward. These situations make MICU hospitalized awake patients feel

anxious and nervous. At the same time, some patients are too worried about their own condition and cannot communicate with their relatives in time, and some other patients are restricted in position due to receiving medical equipment for monitoring and treatment. This leads to negative emotions such as anxiety and depression in patients, some patients would even resist treatment[8,9].The 9S management is a modern enterprise quality management method with the quality of personnel as the core. The difference between the 9S management and other management methods is that this management method not only standardizes the objective management elements, but also puts forward higher requirements for the quality of personnel. In the management process, it improves people's subjective initiative, improves service quality, and finally improves the overall management quality.

In this study, we applied 9S management to medical device management of MICU and observed the impact of 9S management on patients' negative emotions. In the 9S management, medical staff cleaned the ward environment every day, so that patients could get a comfortable hospital environment. Due to the daily maintenance of medical equipment by medical staff, the medical equipment to be used was in the best state of use. When patients receive medical equipment treatment, the good state of equipment avoids misdiagnosis, failure shutdown and other situations affecting patients' treatment experience. As in the Service elements of the 9s management, medical staff were required to pay attention to proper manipulation when using medical equipment or consumables to contact patients for treatment, so as to minimize the discomfort of patients, so that the fear of patients receiving treatment of medical equipment is reduced. In addition, among the Service elements, medical staff were also required to communicate with patients like relatives and carry out psychological intervention in various ways. The elements of the above 9S management in all aspects are combined to alleviate the anxiety and depression of patients.

In the SAS evaluation of this study, there was no significant difference in SAS of patients of both the experimental group and the control group when they were transferred into MICU. After the intervention of 9S management measures, all patients of the experimental group got out of anxiety state when they were transferred out of MICU, while most patients of the control group got out of anxiety state, and some patients of the group were still in mild anxiety state. The SAS values of the experimental group were significantly lower than those of the control group. In SDS evaluation, there was no significant difference in SDS of patients of both the two groups when patients were transferred to MICU. After 9S management intervention, both the two groups got out of depression when the patients were transferred out of MICU, and the SDS evaluation values of the experimental group were significantly lower than those of the control group ($t=15.543$; $P < 0.05$). 9S management measures can obviously improve the patients' anxiety, depression and other negative emotions.

5. Conclusions

Using 9S management method in MICU medical equipment management can not only improve the management efficiency of medical equipment, but also effectively reduce the SAS and SDS evaluation values of inpatients, reduce inpatients' anxiety and depression negative emotions, improve patients' cooperation to treatment, improve patients' satisfaction with inpatient services, and ultimately improve the treatment effect and life quality of inpatients.

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