Multidimensional Nursing Interventions effect on Delirium and Hospital Admission Duration

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ABSTRACT

Introduction & Objective: Delirium is the most prevalent among hospitalized patients, especially patients admitted to intensive care units (ICUs). This study aimed to investigate the effect of multidimensional nursing interventions on the prevention of delirium and the duration of hospital admission in cardiac care units. Materials & Method: In this clinical trial study, 110 patients admitted to Imam Reza Hospital affiliated to Ahvaz Jundishapur University of Medical Sciences were randomly divided into two experimental (55 people) and control (55 people) groups. The Mini-Mental State Examination (MMSE) was completed by both experimental and control groups before and after the intervention. Data were analyzed by SPSS using Chi-square, Mann-Whitney, Independent T-test, and Fisher's exact test. Results: The results showed that there was no significant difference between the levels of delirium in the morning and evening in the two groups before the study ($P>0.05$). The results of the delirium levels after the intervention in the two groups of morning and evening were significant between the two groups ($P<0.05$). Moreover, the mean duration of delirium was lower in the experimental group ($P<0.05$). There was no significant difference between the two groups in terms of the duration of hospital admission ($P<0.05$). Conclusion: According to the results, multidimensional nursing interventions have been effective in preventing delirium disorder, but they do not reduce the duration of hospital admission in cardiac care units. However, these interventions can be used as a safe way to prevent delirium in cardiac care unit.

Key Words: Multidimensional Nursing Interventions, Delirium, Duration of Admission, Cardiac Care Unit.

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INTRODUCTION

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM), delirium is defined as a disturbance in alertness, attention and concentration, which usually has a sudden onset, accompanied by impairment in navigation, short-term memory, change in sensory perception (illusion), abnormal thinking and disturbing behavior [1]. Delirium is most prevalent among patients admitted to ICUs. This is in good agreement with the results of epidemiological studies; delirium is reported to occur in 47% of cases after cardiac surgery [2]. The reported prevalence of this disorder in

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the cardiac care unit is largely variable. A cross-sectional study on 590 patients with delirium admitted to intensive care units showed that the mortality rate in the CCU was 20% higher than the ICU [3]. Since delirium occurs in more than 80% of patients who are hospitalized in intensive care units, it reduces one's function, increases the duration of hospital admission, increases the prevalence of illness, and leads to a poor prognosis and costs [4].

Nowadays, researchers focus on the prevention of delirium syndrome. They argue that it is essential to carry out studies in order to identify its risk factors. Prevention should be done at two primary levels, attempting to reduce the risk factors of delirium (environmental interventions) and early diagnosis of delirium [5]. It is estimated that 30-40% of delirium cases can be predicted [6]. Since nurses have special and frequent contacts with patients, they can play a major role in preventing, diagnosing, and treating patients with delirium. Martinez et al. (2012) and Rosenbloom-Brunton et al. (2010) showed in two separate studies that the intervention protocol based on the implementation of the program for the recovery of elderly patients hospitalized in different parts of the hospital could have a significant effect on the prevention of delirium [7, 8].

Lundström et al. conducted a study on elderly patients admitted to a hospital in Sweden. They reported that interventions such as personnel training with an emphasis on the evaluation, prevention, and treatment of delirium and the interaction between patient and nurse could decrease the duration of delirium, hospital admission, and the mortality rate in patients with delirium [9]. Several studies have been carried out on this subject, but most have focused on a particular aspect of preventive care of delirium. However, a systematic approach and a comprehensive protocol have not been observed in most studies [8, 10]. Multidimensional intervention with a systemic approach includes professional, environmental and educational intervention. The professional intervention involves actions taken according to the status of the health care workers. For example, nurses encourage patients to consume fluids in dehydration. In each shift, they may introduce themselves to patients, inform patients about time and place, and encourage staff to engage more with patients [11]. Given the results of the researchers' search in authoritative scientific sources, major studies on this disorder focus on epidemiology, evaluation tools, pathophysiology, risk factors and delirium management in patients. However, the role of important factors such as hospital admission and effective care interventions by the nursing personnel has been neglected in many studies. On the other hand, a great emphasis has been placed on preventive interventions to reduce the level of delirium. As mentioned earlier, the present study aimed to investigate the effect of multidimensional nursing interventions on delirium prevention and the duration of patient's admission in cardiac care units in order to achieve an effective intervention and reduce the prevalence of delirium disorder.

METHODS

This is a quasi-empirical study (2018) in which the effect of multidimensional nursing interventions on delirium prevention and duration of admission of patients admitted to the intensive care unit of Imam Reza Hospital affiliated to Ahvaz Jundishapur University of Medical Sciences was investigated. The inclusion criteria included age over 18, complete alertness (score 15 in terms of Glasgow's scale), no previous history of mental illness, no previous history of hospitalization in the cardiac care unit, absence of delirium disorder in patients (25-30 points), and willingness to participate in the study by completing the informed consent form. The exclusion criteria included the transfer of the patient to another treatment unit and lack of motivation of the patient and his/her family to continue cooperation in the study. This research was carried out as a clinical trial design in experimental and control groups. Before the intervention, the Glasgow Criteria [10, 12] was evaluated for state of alertness. During admission, the patients in both groups completed the MMSE questionnaire.

The validity and reliability of the MMSE questionnaire have been examined by Sidian et al. (2007) in Iran [13]. In order to investigate the effect of educational intervention on delirium prevention and the duration of patient's admission in cardiac care units, one of the nurses of the department was trained as a researcher's assistance how to use the MMSE questionnaire. The prevalence of delirium disorder and alertness was evaluated twice a day, in the morning at 8 o'clock and in the evening at 17, using MMSE questionnaire. In this study, intervention refers to multidimensional nursing interventions which was performed as a standard protocol after training the medical personnel. This protocol was designed by the researcher. It should be pointed out that the findings of Zayghami et al. (2016), Zalafari et al. (2012), and Kalani et al. (2013) [14-16] contributed to this study. The protocol consisted of modifiable risk factors of delirium, including vision and hearing impairment, patients' sleep deprivation, cognitive impairment, and immobility. The researcher first presented a training package to the nurses of the cardiac care unit in a two-hour session. The contents were also provided to them in the form of a booklet. Finally, after the intervention, the contents were

installed in the unit in the form of a poster, and then the intervention provided for multidimensional nursing care was performed according to the following protocol.

After the data were encoded and entered into SPSS, using T-test, paired t-test and other descriptive and analytical methods, the data were summarized. Furthermore, the changes in the mean cognitive scores in each group before and after the intervention were compared in order to determine the prevalence of cognitive impairment in each group (P<0.05).

Ethical Considerations

This study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences with the clinical trial code IRCT20181005041233N1. Besides, the participants completed a written informed consent before entering the study. The participants and their fellows were explained about the study. They were also allowed to exit the study at any stage.

RESULTS

In this clinical trial study, 110 patients admitted to the emergency department of Imam Reza Hospital, affiliated to Ahvaz Jundishapur University of Medical Sciences were divided into experimental (55 subjects) and control (55 people) groups. The subjects were eligible to participate in the study. In this study, 60% of the patients in the experimental group (33 patients) and 49.1% in the control group (27 patients) were male, and 40% of the patients in the intervention group (22 patients) and 50.9% of the patients in the control group (28 patients) were female. The mean age of the patients was 64.29±9.18 and 64.33±11.04 in the experimental and control groups, respectively. There was no significant difference between the two groups in terms of their demographic characteristics (P>0.05).

According to the Chi-square test, there was no significant difference between the two groups in terms of the levels of delirium in the morning and evening before the study (P>0.05). The absence of delirium was confirmed in the majority of the patients in the morning before the intervention (61% of the patients in the experimental group, 47.3% of the patients in the control group). However, before the study, the absence of delirium was reported in 49.1% of the patients in the experimental group and 34.5% of the patients in the control group. It should be noted that this difference was not significant between the two groups (P>0.05) (See Table 1). As shown in Table 2, the results of delirium levels were significant between the two groups after the study in patients in the morning and evening (P<0.001). Accordingly, on the next morning, it was reported that 47 patients in the experimental group (85.5%) did not suffer from delirium. Furthermore, 12 patients in the control group (21.8%) did not suffer from delirium. According to the results, 8 patients (14.5%) in the experimental group and 36 patients (65.5%) in the control group were suspected of having delirium. Moreover, 12.7% of patients in the control group were diagnosed with definitive delirium.

Table 1: Different levels of delirium detected before the intervention in the test and control groups

Variable			Before the Intervention	P
			Number (%)	
Delirium-Morning	Test Group	Without Delirium	34 (61.8)	0.13
		Suspected of Delirium	17 (30.9)	
		Delirium	4 (7.3)	
	Control Group	Without Delirium	26 (47.3)	
		Suspected of Delirium	27 (49.1)	
		Delirium	2 (3.6)	
Delirium-Evening	Test Group	Without Delirium	27 (49.1)	0.16
		Suspected of Delirium	22 (40)	
		Delirium	6 (10.9)	
	Control Group	Without Delirium	19 (34.5)	
		Suspected of Delirium	32 (58.2)	
		Delirium	4 (7.3)	

Table 2: Different levels of delirium detected after intervention in the test and control group

Variable	Intervention Group	Control Group	Total	P-value
Delirium- After the Intervention				<0.0001
Delirium	0 (0)	7 (12.7)	7 (6.4)	
Suspected of Delirium	8 (14.5)	36 (65.5)	44 (40)	
No Delirium	47(85.5)	12 (21.8)	59 (53.6)	
Delirium- After the Intervention				<0.0001
Delirium	0 (0)	9 (16.4)	9 (8.2)	
Suspected of Delirium	21 (38.2)	35 (36.3)	56 (50.9)	
No Delirium	34 (61.8)	11 (20)	34 (61.8)	

Table 3: Comparison of the average duration of admission in the cardiac care unit in the intervention and control groups

Variable	Intervention Group		Control Group		p-value
	Mean	Standard Deviation	Mean	Standard Deviation	
Duration of Admission	2.62	1.08	2.69	1.03	0.71

According to the results of Chi-square test, 61.8% of the patients (n=34) did not suffer from delirium in the experimental group, while 20% of the patients (n=11) did not suffer from delirium in the control group. Accordingly, 38.2% of the patients (n=21) in the experimental group and 63.6% of the patients (n=35) in the control group were suspected of having delirium. Finally, 16.4% of the patients (n=9) in the control group were diagnosed with delirium.

The results of the comparison of the average duration of admission in the cardiac intensive care unit in the experimental and control groups showed that there was not a significant difference between the mean duration of delirium in both groups (P> 0.05) (Table 3).

DISCUSSION

According to the results, there was a significant difference between the two groups in terms of the delirium levels both in the morning and afternoon sessions (P<0.05). Accordingly, delirium was not observed in 85.5% of the patients in the experimental group in the morning and in 61.8% of the patients in the day after the intervention. However, in the control group, only 21.8% of the patients and 20% of them on the day after the intervention were not diagnosed with delirium. However, there was no significant difference between the two groups in terms of the duration of admission in the intensive care unit. The multidimensional intervention which is based interventions including visual impairment, hearing loss, sleep deprivation, cognitive impairment and immobilization of patients can only reduce the prevalence of delirium among patients admitted to the cardiac care unit. Wassenaar et al. (2016) showed a significant increase in the scores of cognitive function and quality of life in 90 days after the intervention in the patients (P<0.05). These significant changes lasted six months after the intervention. There was a significant reduction in the mortality rate in the patients during the 28-day preventive intervention. The level of delirium decreased by 67% during the 28-day intervention period [4]. Avendaño-Céspedes et al. (2016) reported that the intervention reduced the severity of delirium symptoms in the intervention group compared to the control group (35% versus 65%, the mean difference was 30%). Mortality was higher in the patients with diabetes, compared with those who did not have diabetes (33.3% versus 14.6%) [17]. Kalani et al. (2013) showed that after the intervention on the second day of admission, the mean scores of cognition increased in the experimental group (P<0.05), while there was no change in the control group (P>0.05). Finally, after the intervention, the mean scores of cognition in the experimental group increased, while the reverse happened in the control group (P<0.05) [16]. Zayghami et al. (2016) showed that the level of delirium was significantly higher in the control group than in the intervention group (P<0.05). Overall, the changes in the two groups were significant (P<0.05). The multifactorial intervention reduced the probability of delirium in patients [14]. Given that the scale used in this study was different from other studies, the type of interventions performed in this study was almost similar and they aimed to investigate the effect of environmental moderation on the reduction of delirium. Therefore, it can be said that multidimensional interventions include training the personnel, installing educational posters, and modifying the environment. For this purpose, customizable light bulbs and a digital calendar with solar, lunar and weekly calendars are recommended. On the other hand, Moon et al. (2015) reported that the protocol had no significant effect on delirium in patients [18]. Adib-Hajbaghery et al. (2018) indicated that except in the third to fifth runs, the level of delirium in the intervention group was less than that of the control group. In the sixth run, none of the patients in the intervention group had delirium, but more than 12% of the patients in the control group did. However, no significant difference was observed between the two groups in terms of the level of delirium. Although the frequency of prevalence and risk of delirium in both groups has been reduced. However, in none of the cases, there was a significant difference between the two groups in terms of delirium exposure [19]. Adib-Hajbaghery et al. and Moon et al. emphasized on a particular dimension of nursing interventions to prevent delirium, but the results of these studies are based on multidimensional interventions. The difference in the type of scale used to study delirium, the difference in the type of admission, the inclusion criteria, the number of samples, and the environmental conditions are all important factors influencing the results. Evidence show that delirium is reported with great variability, given the severity of the illness, the scale used and the duration of admission [18, 19]. According to the results, the multidimensional nursing interventions were effective in the prevention of delirium in the cardiac care unit but did not have a significant effect on the duration of admission

of patients in the intensive care units. Therefore, it can be argued that the multifactorial intervention and the training of all nurses working in the intensive care unit through teamwork, discussion, and presentation of the film on how to take the necessary interventions to prevent delirium and improve the mental health of patients admitted to the intensive care unit can decrease the prevalence of delirium. Given the fact that a number of factors play a role in delirium, prevention of delirium should also involve multiple interventions simultaneously, which necessitates the use of multifactorial interventions and the use of standard and appropriate diagnostic and therapeutic methods based on processes and protocols designed appropriately. The measures can affect the duration of admission of patients in different units of the hospital. However, in the present study, the use of multidimensional nursing interventions has not been effective in reducing the duration of admission of patients in intensive care units. Factors such as duration of intervention, the demographic information of patients such as age, gender, place of residence, as well as other associated illnesses, such as diabetes, can also be considered as factors influencing the duration of the patient's duration of admission. Several studies have focused on the association of these factors during the patient's admission [20-23]. Therefore, it is necessary to consider these factors in assessing the duration of admission of patients in different units of the hospital.

CONCLUSION

According to the results, the multidimensional nursing interventions can prevent delirium in patients in cardiac care units; therefore, these interventions can be safely used to prevent delirium in the cardiac care unit.

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Flowchart of the participants in the study