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A Multifactorial Intervention Based on the NICE-Adjusted Guideline in the Prevention of Delirium in Patients Hospitalized for Cardiac Surgery

Mohammad Ali Cheraghi[1], Mahsa Hazaryan[2*], Fatemeh Bahramnezhad[3], Farshid Mirzaeipour[3], Hamid Haghani[4]

[1] Department of Critical Care Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

[2] MSc in Critical Care Nursing, Lecturer, Shoushtar Faculty of Medical Sciences, Shoushtar, Iran

[3] Department of Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

[4] Department of Biostatistics, School of Health, Iran University of Medical Sciences, Tehran, Iran

**Corresponding e-mail: m.hazaryan@yahoo.com*

ABSTRACT

Delirium is the most common problem in patients in intensive care units. Prevention of delirium is more important than treatment. The aim of this study is to determine the effect of the NICE-adjusted multifactorial intervention to prevent delirium in open heart surgery patients. ***Methods:*** *This study is a quasi-experimental study on 88 patients (In each group, 44 patients) undergoing open heart surgery in the intensive care unit of Imam Khomeini Hospital, Tehran. Subjects received usual care group, only the incidence of delirium were studied. So that patients in the two groups of second to fifth postoperative day, twice a day by the researcher, and CAM-ICU questionnaire were followed. After completion of the sampling in this group, in the intervention group also examined incidence of delirium was conducted in the same manner except that multifactorial interventions based on the intervention of NICE modified by the researcher on the second day to fifth implementation and intervention on each turn, their implementation was followed. As well as to check the quality of sleep and pain in the intervention group of CPOT and Pittsburgh Sleep assessment tools were used. Data analysis was done using the SPSS software, version 16. A T-test, a chi-square test, and a Fisher's exact test were also carried out.* ***Results:*** *The incidence of delirium in the control group was 42.5%; and in the intervention group, it was 22.5%. The result showed the incidence of delirium in open heart surgery hospitalized patients after multifactorial intervention based on adjusted NICE guidelines has been significantly reduced.* ***Conclusion:*** *The NICE-adjusted multifactorial intervention guidelines for the prevention of delirium in cardiac surgery patients significantly reduced the incidence of delirium in these patients. So, using this method as an alternative comprehensive and reliable in preventing delirium in hospitalized patients in the ward heart surgery is recommended.*

Keywords: Delirium, Prevention, Guidelines, Cardiac surgery, Iran

INTRODUCTION

Delirium is the most common problem in patients in intensive care units. It is observed in more than 80% of critically ill patients [1]. In open heart surgery patients, it has been reported to be 32% to 70% [2]. The etiology of delirium is complex and multifactorial. In fact, the surgery puts patients at risk of delirium [3]. After surgery, patients are at risk of hypotension, hypoxia, and anemia; these factors can lead to delirium or its aggravation after surgery [4]. It should be noted that the highest incidence of postoperative delirium is during the seven days after the operation [5].

Delirium is accompanied by complications such as increased sensitivity to drugs, hospital-acquired infections, and an increased length of hospitalization [4,6,7]. The incidence of delirium in patients after open heart surgery is accompanied by more postoperative complications such as postoperative respiratory failure, instability of the sternum,

and likelihood of requiring modifications of the sternum. These complications lead to a longer stay in the sector [8]. Several reasons such as rarely a primary reason for admission, often believed to be iatrogenic due to medications, frequently explained away as "ICU psychosis," and it is not having any adverse impact on the disease process lead to a lack of attention to it [9]. So, it seems that the detection and the prevention of delirium are very important [10].

According to Zhang's study done on hospitalized patients, 40-80% of the cases of delirium are preventable [6]. In addition, the Institute of Critical Care Physicians, NICE, and SCCM believe that delirium risk factors can be changed. They are preventable and treatable, and all ICU patients should have a screening and delirium prevention program [9,10].

Prevention means implementing a strategy that will lead to a lower incidence of delirium in patients at risk [11].

Multiple component prevention includes stages such as the evaluation of patients at risk, the identification of the risk factors associated with delirium, and reforming them [12]. Hence, multiple component prevention is the clinically effective and important action for delirium. According to the study of Zolfaghari, et al., multifactorial intervention can be effective in preventing delirium [13].

Because of their long-term contact with patients and providing specialized services to them, nurses can play a fundamental role in the prevention, early detection, and treatment of patients with delirium [14,15]. The researcher did not see the prevention of delirium based on the instructions whereas care based on guidelines increases the quality of care, reduces the cost of health care, and the diversity of the care [16]. In this regard, NICE clinical guidelines are recommendations for the treatment and care of people with specific diseases and conditions within the NHS in England and Wales.

The NHS recommends the delirium guideline 103 for delirium prevention and the evaluation of patients on admission to the hospital [www.NICE.org.uk/NICEmedia/pdf].

This study aimed to determine the effect on the NICE-modified multifactorial intervention in the prevention of delirium in open heart surgery patients.

MATERIALS AND METHODS

The present study is an experimental clinical trial with samples available. The subjects in this study included all patients who had undergone open heart surgery in 2014. They were hospitalized in open heart surgery ICU of Imam Khomeini Hospital. To determine the sample size required at a 95% trust level and a test power of 80%. It was assumed that intervention effects reduced the incidence of delirium by 25% [13]. The sample size required in each group was estimated at n=36 subjects. Considering a 20% reduction in the sample size for each group, an n=44 was granted. It should be noted that based on similar studies, the incidence of delirium in hospitalized patients have been reported to be 35%.

Data collection tools

The instruments used in this study consisted of (1) CAM-ICU to evaluate the incidence of delirium, (2) PSQI, (3) survey questionnaire including demographic data, (4) studying the arrival of delirium, and (5) metrics of COPT measurement. The scale of CAM-ICU is a valid scale to assess the incidence of delirium. It can be used for patients in the ICU. Using this scale, a patient is examined twice a day (in the morning and in the evening) and from the second to the fifth day after the surgery to check the incidence of delirium [13].

PSQI is a self-report questionnaire to assess the quality of sleep. The credit of PSQI was calculated at 0.80 and its reliability was evaluated through test-retest between 0.93 and 0.98 [17].

Study of Pain by CPOT: This tool is used in adult patients. It studies the facial expression, body language, compliance with the ventilator (in mechanically ventilated patients) or voice production (in non-ventilated patients), and muscle tightness. To validate, it was given to ten faculty members of Tehran University of Medical Sciences, Tehran, Iran and was confirmed for the validity of the translation. The reliability of the instrument was confirmed with R=0.82.

The questionnaire consists of three parts: demographic data, age, sex, marital status, and education made by the researcher, the patient's. All questionnaires were filled out by the patients, their companion or using the patient's records before the operation. The checklist for delirium evaluation on admission to the hospital is used for all patients to provide a preliminary study of the risks and delirium indicators. Ethical considerations included obtaining the permission to carry out the research, describing the purpose and the nature of the study, receiving a written consent, allowing them to withdraw from the research, and ensuring the confidentiality of patients' personal information.

Methods of intervention

Firstly, after the selection of patients having inclusion criteria (being willing to participate in the study; not being alcoholic and addicted to drugs; having undergone open heart surgery; not using psychotropic drugs; not suffering from mental disorders such as psychosis, depression, not using haloperidol; having delirium during the study; and being over 18 years of age), the control group was sampled. Then, from the second day to the fifth day, the patients were followed up with CAM-ICU tools twice a day. In the intervention group, interventions based on modified guidelines (removal of cognitive abnormalities, elimination of dehydration and constipation, checking oxygenation, Checking Infection, beginning physical activities, helping to maintain adequate nutrition, checking sensory disorders, pain, improving sleep patterns and sleep hygiene) were implemented. To mitigate these instructions, 8 experts in the field of intensive care together with nurses working in intensive care units examined the interventions in a 4-hour session. Then, theses interventions were used for the intervention group during sampling.

Using the CAM-ICU scale, patients were assessed during the intervention twice a day (in the morning [9-12] and in the evening [17-20]), from the second day to the fifth day after surgery for the incidence of delirium. After collecting samples using SPSS, version 16, descriptive statistics in the form of frequency tables and distributional parameters were used to describe the data. To test the hypothesis and to respond to specific objectives in the inferential statistics, tests such as t-test, chi-square test and Fisher's exact test were used.

RESULTS

In this study, we examined 80 patients (40 in each group). In relation to demographics, the statistical tests showed that the subjects were homogeneous in the intervention and the control groups in terms of age, sex, marital status, and education (Table 1). The incidence of delirium in the control group was 42.5%; and in the intervention group, it was 22.5% (Table 2). Test results showed an accurate X2, there are significant differences in the incidence of delirium in the intervention and control groups (Table 3).

Table 1 Demographic information in the two groups

Characteristics		Control	Intervention	Statistical test and p-value
		N (%)	N (%)	
Age	<50	6 (15)	10 (25)	t=1/133, df=78, P=0.261
	50-59	8 (20)	10 (25)	
	60-69	16 (40)	11 (27.5)	
	>69	10 (25)	9 (22.5)	
Gender	Male	27 (67.5)	24 (60)	Chi-Square P=0.485
	Female	13 (32.5)	16 (40)	
Marital statues	Married	34 (85)	37 (92.5)	Fisher's Exact Test P=0.481
	Single	1 (2.5)	0	
	Divorced	5 (12.5)	3 (7.5)	
Education	Illiterate	22 (55)	18 (45)	Fisher's Exact Test P=0.442
	Less than High school diploma	10 (25)	16 (40)	
	high school diploma	7 (17.5)	4 (10)	
	higher education	1 (2.5)	2 (5)	

Table 2 The frequency of the incidence of delirium in control and intervention groups

Incidence of Delirium	Control	Intervention
	N (%)	N (%)
Yes	17	9
	42/5	22.5
NO	23	31
	57/5	77.5
Total	40	40
	100	100
Result test	Pearson Chi-Square, Value: 3.647, Df: 1, P: 0.047	

Table 3 The frequency of the incidence of delirium from the second day to the fifth day after operation

Incidence of delirium	Control		Intervention		Statistical test and p-value
	Yes	No	Yes	No	
	N (%)		N (%)		
The second morning	16 (40)	24 (60)	7 (17.5)	33 (82.5)	Pearson Chi-Square P=0.026
The second evening	15 (37.5)	25 (62.5)	6 (15)	34 (85)	Pearson Chi-Square P=0.022
The third Morning	13 (32.5)	27 (67.5)	5 (12.5)	32 (87.5)	Pearson Chi-Square P=0.032
The third evening	16 (40)	24 (60)	4 (10)	36 (90)	Pearson Chi-Square P=0.002
The fourth morning	7 (17.5)	33 (82.5)	1 (2.5)	39 (97.5)	Fisher's Exact Test P=0.57
The fourth evening	10 (25)	30 (75)	1 (2.5)	39 (97.5)	Pearson Chi-Square P=0.003
The fifth morning	4 (10)	36 (90)	0	40 (100)	Fisher's Exact Test P=0.58
The fifth evening	4 (10)	36 (90)	0	40 (100)	Fisher's Exact Test P=0.58

The absolute and relative frequency of the occurrence of delirium from the second day to the fifth day postoperative in patients showed that on the first day after surgery, the delirium is more and will be less during the following days. Statistical results of Fisher's exact test showed that there was no significant difference between the incidence of delirium and pain at rest and nursing practices in the intervention group. Fisher's exact test results showed statistically significant differences between the incidence of delirium and sleep disorders in the intervention group (Table 4).

Table 4 The relationship between pain at rest, during nursing procedures, quality of sleep, and the incidence of delirium in intervention group

Incidence of delirium	Pain at rest N (%)		Pain during nursing procedure N (%)		Quality of sleep N (%)	
	Pain	No pain	Pain	No pain	Desired	Inappropriate
Yes	1 (25)	8 (22.2)	8 (23.5)	1 (16.7)	1 (4.8)	8 (42.1)
No	3 (75)	28 (77.8)	26 (76.5)	5 (83.3)	20 (95.2)	11 (57.9)
Total	4 (100)	36 (100)	34 (100)	6 (100)	21 (100)	19 (100)
Result test	Fisher's Exact Test, P=1.000		Fisher's Exact Test, P=1.000		Fisher's Exact Test, P=0.007	

Test results of regression showed there was a significant relationship between age and incidence of delirium (p=0.002).

The results of Chi square test showed there was a significant relationship in CPOT with the pain of body movements and muscle tone.

Mann-Whitney test results showed that in Pittsburgh Sleep Quality Index, in all parts except the Sleep efficiency there is a significant association with delirium.

DISCUSSION

According to the study, the incidence of delirium in open heart surgery hospitalized patients after multifactorial intervention based on adjusted NICE guidelines has been significantly reduced. In this context, there was no case where the instruction is used, the studies found in Iran and other countries in the prevention of delirium are the same as with the above results. In the study by Vidan, et al. entitled " An intervention integrated into daily clinical practice reduces the incidence of delirium during hospitalization in elderly patients ", it was determined that non-pharmacological measures and multiple integrated actions reduced delirium in hospitalized elderly patients and improved the quality of care [18]. In this regard, the study of Martinez, et al. indicated that non-pharmacological interventions with families were more effective than usual care [19].

The study by Zolfaghari, et al. showed that multifactorial intervention on nursing practice, nursing education about environmental diagnosis of delirium, and simple interventions can reduce the incidence of delirium in hospitalized open heart surgery patients [13]. Nazeri, et al. stated that multi-component intervention at the end of the fifth day after admission, could significantly contribute to reducing the incidence of delirium [20].

Multifactorial interventions are potentially more effective than single interventions focused on environmental and internal factors because the multifactorial intervention significantly reduces the amount of delirium.

However, in a study by Jeffs entitled "Effect of exercise and cognitive activities on reducing delirium in hospitalized patients," it was found out that progressive resistance exercise together with awareness building has had no effect on the prevalence of delirium [21]. Because of long time intervals, evaluating the patients regarding delirium every 48 hours was not possible and no difference was observed between the two groups.

The study by Kalani et al. stated that the incidence of delirium was only one case in the control group (7.1 percent), nursing intervention (Listening to the radio and seeing family members out of the visiting hours for at most one week) had no effect on the incidence of delirium. There was no statistically significant difference between the two groups [22].

The study by Vaurio et al. done after surgery demonstrated that 46% of patients had delirium and postoperative pain. The postoperative pain management strategy was accompanied by the expansion of delirium independently [23].

Also in none of the mentioned studies has the intervention been done directly and by the researcher at the patient's bedside. They have been generally done through educating the personnel and/or the family. It seems that because of the intermediary role of the personnel and/or the family in the intervention, one cannot be completely sure about the reduction of the incidence of delirium. whereas in the present study, the interventions were fully done by the researcher with no intermediary between the researcher and the patient and boasts a high credibility. However, since this study was conducted in a small community in a particular sector, it is suggested that it be done in other areas so that the generalizations of the results to larger communities become possible. One limitation of the study was the impossibility of the random allocation of samples to the two groups. This was because of the fact that due to a need for controlling confounding factors (the structure of the unit, the personnel's awareness, and the way of delivering usual cares to patients, etc.), the study was designed in one part and the random inclusion of patients into the two groups was impossible. We advise carrying out a more extensive study where random allocation will be employed.

CONCLUSION

As the findings of this study showed that a multifactorial intervention based on a single instruction and step by step guide how to prevent delirium can reduce the incidence of delirium. Delirium depending on the severity of the disease, and age are different causes of hospitalization and a variety of clinical evidence of diagnosis and clinical care affects results. Therefore, the use of clinical guidelines can create consensus among experts and a clear understanding of decision-making models for the diagnosis and treatment easier. So, it is-given the diversity of care in the prevention of delirium in order to provide comprehensive and integrated care, providing services such as Nice is based on clinical guidelines.

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