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Applying the instruction of pain control and sedation of the patients hospitalized in intensive care unit

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ABSTRACT

Aims: One of the main duties of treatment team in ICU is relieving pain of the patients hospitalized in this ward. Using pain instructions can have positive effects in reducing pain experience of patients hospitalized in ICU. The present study was done with the aim of "investigating the effect of applying the instructions of pain control and sedation of the patients hospitalized in intensive care unit" .

Methods: In a quasi-experimental study in Khatamolanbia hospital of Zahedan in 2012, we surveyed 80 critically ill patients who were under mechanical ventilation. We randomly assigned patients in two control and intervention groups. In intervention group, patients' pain control and sedation were performed by using pain and sedation instruction. In control group, patients received usual, none protocol pain control and sedation. Behavioral pain scale (BPS) and Richmond Agitation Sedation Scale (RASS) were used for data collection. Data were analyzed by $SPSS_{18}$ software and by using descriptive and inferential statistical tests.

Results: There wasn't any significant difference in terms of age and sex between two groups ($p<0.264$). Level of patients' pain in intervention group (instruction group) was significantly lower in compare with patients in control group ($p<0.000$). Also, level of patients' sedation in intervention group was near to ideal sedation of Richmond in compare with patients in control group. There was statistical significant difference in sedation level of patients between the two groups ($p=0.005$).

Conclusions: Many patients in ICU experience pain as an unpleasant experience. Results of the present study showed that using pain control and sedation can improve pain control and also better sedation remarkably in patients hospitalized in ICU.

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1. Introduction

Pain which is known as the fifth vital sign [1, 2] is an unpleasant sensory and emotional experience which is after actual or potential tissue damage [3]. Patients hospitalized in ICU are in the high risk for untreated pain because of some reasons such as inability to communicate due to reduced consciousness level, receiving sedative drugs and mechanical ventilation [4]. Pain prevalence during rest among patients who need mechanical ventilation and are hospitalized in ICU was reported 33%, it is while pain prevalence has been reported 56% during treatment procedures [5]. Results of the last studies show that with all the worldwide efforts such as developing instructions and directions, still there is high percentage of the patients hospitalized in ICU that are suffering from moderate to severe pain. Rafie et al. (2013) studied the effect of applying pain control and sedation instructions by the nurses in ICU on the level of pain and sedation of the addicted patients hospitalized in this ward, they used tools like RASS and BPS in their studies and they reported that pain management of the patients by the nurses is going to be done well by using appropriate instructions [3].

Spis et al. (2011) investigated the effect of Fentanyl and Remifentanil on the pain level of the patients hospitalized in ICU and they reported that these two drugs affect patients' pain control similarly, although Fentanyl had a little more analgesic effect. Also there was no difference in the two groups of the patients regarding duration of mechanical ventilation and duration of hospitalization in ICU [6]. Voein et al. (2012) investigated the method of sedation and pain control in the patients dependent on mechanical ventilation hospitalized in ICU of Norway. They report that Propofol and Midazolam are the most sedative drugs and Fentanyl and Morphine are the most analgesic drugs that are used in these wards; also there is a little number of ICUs in Norway that use relaxation and pain control instructions [7]. Rous et al. (2012) investigated performance of the nurses working in ICU regarding investigation and control of the patients' pain hospitalized in this ward; they reported that nurses did not like much to use tools for investigating pain level in the patients that are not able to speak and they had a little information about new instructions and guidelines of pain control which can have negative effect on their performance regarding patients' pain control [8].

For controlling pain in our country, usually analgesic drugs in the form PRN (Pro Re Nata) are injected by the physicians and nurses when the patients feel pain, without using tools for investigating pain and special instructions, it can cause lack of well management and control of patients' pain. Using instructions and tools of investigating pain can have positive effects in reducing pain experience in patients hospitalized in ICU. There have been little and restricted studies in this regard in our country so far. The present study had been done with the aim of "investigating the effect of using pain control instruction in ICU on the level of pain and sedation of the patients that are suffering from trauma and are dependent on mechanical ventilation".

2. Methods

This study had been done in ICU of Khatam-ol-anbia hospital of Zahedan in 2013. Necessary permission was taken form researches and technology center of Kerman and the ethical committee of this university. Patients' satisfaction was taken from their first degree relatives due to their lack of complete consciousness, it was taken after necessary and complete explanations regarding the aims and the method of the study.

Considering the last studies [3] and by using the formula for calculating sample size, necessary samples for the present study were determined 80 people. Inclusion criteria included: having an endotracheal tube or tracheostomy, need to ventilator, lack of ability in verbal communication, age between 16 to 50 years old, lack of sensitivity to Morphine and

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Fentanyl, systolic blood pressure higher than hundred millimeters of mercury, achieving score higher than negative three from Richmond scale and level of consciousness based on Gelasco scale between five to thirteen. Exclusion criteria included: consciousness and extubation during the study, changing prescribed painkiller by the physician, cutting prescribed painkillers, transferring to the operation room for the surgery and significant loss of consciousness. Patients who had inclusion criteria were randomly divided into two 40-people groups. At the time of entering the study pain and sedation level of all the patients were measured and registered in the special forms by using BPS (table 1) and RASS (table 2). Then in the control group, pain control and sedation was performed according to the last routine of the ward (permanent infusion of Fentanyl, 25 to 50 micrograms according to the body weight per hour in compare with the patients' conditions and one-mg of Midazolam infusion per hour).

Sedation and pain control of patients in intervention group had been done by using standard instruction that its details are in graph. Investigating patients' pain and sedation level was measured and recorded every one hour after doing a painful procedure for the patient and half an hour after injection of the drugs. All the documents was done by the nurses who were working in ICU and responsible for patients' care (before the beginning of the study, a one-day workshop was performed for the nurses with the presence of the researcher and anesthesia doctors in ICU and they were familiar with the method of the work). In all the stages of the study, anesthesiologist physician supervised the procedure of the study and patients' clinical situation.

The data was analyzed after its collection appropriate with the aims of the study by using descriptive statistic and paired t-test and one-way ANOVA in SPSS 18 statistical software. Significant level was considered less than 0.05 in all the tests ($p<0.05$).

3. Results

There wasn't any significant difference between two groups in terms of demographic variables (age and gender) ($p=0.264$). The mean age of eighty patients of the study was 38.5±10.16. All the patients who participated in the study were directly transferred from the

Table 1: Behavioral Pain Scale (BPS)

Behavioral Pain Scale (BPS)

score	description	The situations of the study
1	relax	Facial expressions
2	Partially tightened (for example, brow lowering)	
3	Fully tightened (for example, eyelid closing)	
4	Grimacing	
1	No movement	Upper limbs
2	Partially bent	
3	Fully bent with finger flexion	
4	Permanently retracted	
1	Tolerating ventilator	Compliance with the ventilator
2	Coughing but tolerating ventilator in most of the time	
3	Fighting with ventilator	
4	Unable Tolerating ventilator	

The lowest score 3 and the highest score 12

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emergency ward to the ICU. From eighty patients participated in the study, all of them were attached to the ventilator through endotracheal tube.

The score mean of pain that the patients achieved from the behavioral criteria of investigating pain before painful procedure in intervention group was more than control group (4.30 vs. 3.72); this difference was statistically significant (p=0.003). Paired t-test was used for comparing patients' pain score before painful procedure and half an hour after that (endotracheal tube suction). Results of this study showed that patients' pain score in both groups was increased significantly after painful procedure in compare with before that (p=0.000). Documented pain score in the end of the shift and comparing that with the reported pain score before painful procedure and half an hour after that between two groups showed that patients' pain in intervention group was significantly less than control group (p=0.000) (table 3).

Richmond scale was used for investigating patients' sedation level. Before painful procedure, the achieved score in this scale in intervention group was 0.42. This score in the patients of control group was -1.42. Half an hour after the painful procedure (endotracheal tube suction) the achieved score from this scale in both groups was significantly increased which showed more restlessness of the patients (in intervention group 1.15 and in control group 0.77).

Achieved score from Richmond scale was significantly near the ideal score of this scale in the patients of both groups up to the end of the shift and it is in compare with before painful procedure and half an hour after that (in intervention group -0.65 and in control group -1.1). when the score of this scale was compared between the two groups in the end of the shift, it was cleared that patients' sedation in intervention group was significantly in more appropriate level than control group (p=0.05) (table 3).

The mean of systolic blood pressure and heartbeat of the patients participating in the

Table 2: Richmond agitation sedation scale (RASS)

Score	Definition	description
+4	Aggressive and irritable	The patient is very nervous and aggressive and can be dangerous for the nurse.
+3	Very agitated	The patient pulls and takes out tubes and catheters and has violent behavior
+2	agitated	The patient has purposeless and repetitive movements. Patient's ventilation is not on the synchronize system
+1	Restless	The patient is anxious and restless but he/she does not show aggressive and violent movements.
0	Awake and relax	The patient is completely awake and relaxed.
-1	Sleepy (lethargic)	The patient is not completely conscious, but can be awaken more than 10 seconds and can open his/her eyes with verbal request.
-2	slight sedation	The patient is awake for a short time (less than 10 seconds) and he/she opens his/her eyes with verbal requests.
-3	Moderate sedation	The patient has restricted movements with verbal request (but does not have eye contact)
-4	Deep sedation	The patient does not have any response to noise, but he/she moves by physical stimulation
-5	Coma	The patient does not show any response to the acoustic or physical stimulation.

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Table 3: Documented pain score in the end of the shift and comparing that with the reported pain score before painful procedure

	Intervention group		Control group		
Scales	mean	Standard deviation	mean	Standard deviation	p
BPS before nursing painful measurement	4.30	0.82	3.72	0.87	0.0003
BPS after nursing painful measurement	6.60	0.74	5.55	1.28	0.000
BPS in the end of the shift	3.02	0.15	3.82	0.9	0.000
RASS before nursing painful measurement	0.42	0.71	-1.42	1.41	0.000
RASS after nursing painful measurement	1.15	0.36	0.77	0.73	0.005
RASS in the end of the shift	-.65	0.48	01.1	1.51	0.050

Table 4: The mean of systolic blood pressure and heartbeat of the patients participating

Vital signs	Intervention group	Standard deviation	Control group	Standard deviation	p
Systole pressure before nursing painful intervention	117.27	10.47	116.80	10.46	0.840
Diastole pressure before nursing painful intervention	74.10	10.91	74.20	11.53	0.968
Systole pressure after nursing painful intervention	129.15	11.3	129.25	10.2	0.967
Diastole pressure after nursing painful intervention	81.65	8.73	81.92	9.36	0.892
Final systole pressure	114.27	8.59	125.75	11.20	0
Final diastole pressure	70.47	9.76	79.02	9.76	0.000
Pulse rate before nursing painful intervention	85.65	7.64	87.42	8.43	0.327
Pulse rate after nursing painful intervention	95.20	8.86	98.27	9.28	0.134
Final pulse rate	82.45	6.57	93.10	9.22	0

study also was documented in different times that the related results are in table 4.

4. Discussion

Patients experience pain and restlessness due to some reasons such as; devices noise, lack of communication with the outside world, lack of understanding day and night changes, endotracheal tube, using respiratory ventilation and underlying problems, because of this many patients need pain control and sedation basically [9,10,11]. The aim of the present study was investigating the effect of pain control instruction in ICU on the level of pain and sedation of the patients hospitalized in this ward. Results of the present study showed that using pain control and sedation instructions can cause patients' analgesia and better sedation.

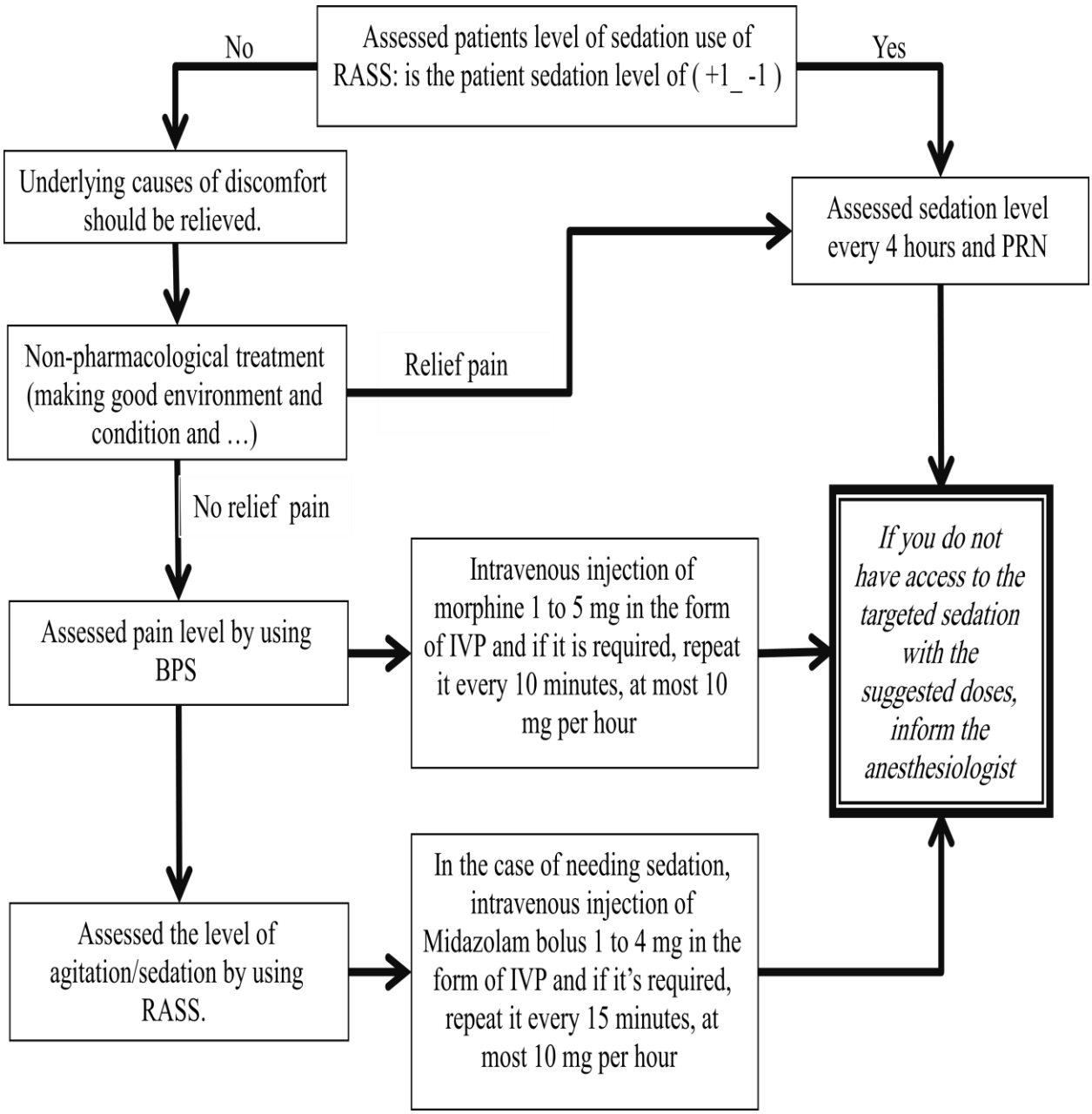
Similar to the findings of the present study, Rafiyee et al. in a study investigated the effect of using pain and sedation instruction by nurses on the level of sedation, pain and the amount of using sedative and analgesics for the addicted patients hospitalized in ICU. Results of that study show that using sedation instructions and pain control not only cause better sedation and

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analgesia for the patients, but also reduces the amount of using sedative drugs (Midazolam) and narcotic analgesics (Morphine) in those patients [3]. In another study Edordo et al. that investigated forty patients under mechanical ventilation report similar findings: using sedation and pain control instruction improves the quality of sedation in patients hospitalized in ICU in compare with the usual method [12].

Unlike the findings of the present study and most of the similar studies, Buknal et al. in their study in 2008 in Australia investigated 312

Graph: SCCM Analgesia/Sedation Agorithm



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patients, they report that using sedation instruction by the nurses for patients' sedation cannot help much in sedation of the patients hospitalized in ICU [13]. They also report that using pain control and sedation instruction in patients hospitalized in ICU cannot reduce duration of hospitalization in ICU, duration of hospitalization in the hospital and the amount of patients' death [13]. Buknal et al. in their study state that the reason of their findings difference with most of the studies in this regard is different tasks that are the responsibility of the Australian nurses. In the belief of Buknal et al. Australian nurses consider investigating their patients' pain and sedation level very important even when they do not use sedation instructions and it caused well-control of their patients' pain and maintenance of their sedation to the appropriate extent [13].

Using pain control and sedation instructions cause the nurses to evaluate the reasons f patients' pain and sedation before injection of analgesia and sedatives to the patients. It causes to identify many causes of pain and restlessness in patients such as noise in the ward and inappropriate position of the patient's body which do not need pharmacotherapy. Also many common reasons of pain in patients hospitalized in ICU such as; using skeletal traction inappropriately, incorrect pressure bandage, endotracheal tube pressure, nasogastric tube pressure to the patients' lips and nose are not relieved even with high doses of painkillers. Just eliminating the cause of these problems can cause relieving pain and sedation in the patients. Investigating pain level of the patients according to the preset instructions makes the nurses to identify problems that cause pain and are not relieved through pharmacotherapy and provide patients' sedation and analgesia easily.

5. Conclusions

Pain control and sedation of the patients in ICU allocated a remarkable part of the treatment team members' attention to itself. Using pain control and sedation instructions can be really effective. Nurses working in ICU can have an essential role in using these instructions in ICU because they are always present during work shift beside their patients.

Among the restrictions of the present study, it can be pointed to the lack of investigation and measurement of the variables including; the effect of instruction on the duration of patients' mechanical ventilation, duration of patients' hospitalization in the ward, extubation by the restless patients, delirium and pneumonia due to the ventilator; it is suggested to use these cases in the nest studies.

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