

# Nurses Use of Critical Care Pain Observational Tool in Patients with Low Consciousness

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## ABSTRACT

**Objectives:** The diagnosis of pain in patients with low consciousness is a major challenge in the intensive care unit (ICU). Therefore, the use of behavioral tools for pain assessment could be an effective tool to manage pain in this group of patients. The aim of this study was to determine the effects on pain management by nurses using a critical care pain observational tool in patients with a decreased level of consciousness. **Methods:** Our research used a before and after design to evaluate the ability of nurses to manage pain in patients with low consciousness. A total of 106 ICU nurses were included in the study. The study was divided into three phases: pre-implementation, implementation, and post-implementation. The researchers first observed the nurses management of pain in their patients; this was done three times using a checklist following tracheal suctioning and position change procedures. The nurses were then taught how to apply the critical-care pain observational tool (CPOT). Post-implementation of the tool, the researchers re-evaluated the nurses' pain management. **Result:** Performance scores after training improved with relation to the nurses diagnosis of pain, pharmacological and nonpharmacological actions, reassessment of pain, and re-relieving of any pain. However, use of the tool did not improve the recording of the patient's pain and the relief measures used. **Conclusion:** Use of the CPOT can increase nurse's sensitivity to pain in non-conscious patients and drive them to track and perform pain management.

Pain assessment in the intensive care unit (ICU) is often delayed due to changes in consciousness following head trauma or other changes in physiological state and sedative use.<sup>1</sup> Pain is a common phenomenon among ICU patients and in the presence of life-threatening illness or injury, investigation and management of pain is often ignored by the health care team.<sup>1</sup> Approximately 64% of ICU patients have claimed that they experienced pain while admitted.<sup>2</sup>

Assessment is a fundamental principle in many nursing care situations and can be a basis for intervention. The judgment of a patient's progress in treatment is essential in achieving a correct diagnosis.<sup>3</sup> Specifically, the assessment will determine what strategy is used to relieve pain. Accurate diagnosis of pain can help the administration of effective pain medications. For this reason, nurses must give considerable attention to pain assessment.<sup>4</sup>

The methods of pain assessment used should be in line with a patient's communication capabilities.<sup>5</sup>

Unfortunately, some patients are not able to report the pain verbally, in writing or by other means, such as a blinking, to answer yes or no questions.<sup>6</sup> Because ICU patients are not able to communicate due to severe illness or sedatives, identifying and assessing the pain in these patients is difficult.<sup>7</sup> The inability to express pain or discomfort due to cognitive problems, developmental or physiological, is a major obstacle for them that leads to inadequate pain management and interventions. Therefore, the use of a behavioral tool to assess pain in this group of patients may be helpful in identifying pain.<sup>6</sup>

Behavioral measures, the Behavioral Pain Scale, for example, are used as indicators for assessing pain in non-verbal patients.<sup>6</sup> The use of behavioral measures are strongly suggested to assess pain in non-conscious patients.<sup>5,8</sup>

The proper management of pain, especially in the ICU, is complex.<sup>9</sup> Although many studies have demonstrated that pain is the most important issue for patients, this is the last priority for nurses. This

is because the pain is not always evident and clear.<sup>10</sup> A study on the evaluation and control of analgesics found that 35–55% of nurses report pain to be less than it is. The authors also found that 64% of patients did not receive any medication before and during painful procedures.<sup>11</sup> Another study stated that, although patients frequently experience pain under mechanical ventilation, pain assessment was below 40%.<sup>12</sup>

Possible reasons for the inadequacy of pain management included: a lack of knowledge, inadequate pain assessment, a lack of communication between staff and patients, different attitudes, and a lack of systemic pain control records.<sup>13</sup> According to a study published by Aslan et al,<sup>14</sup> the majority of ICU nurses do not know how to assess pain in patients with communication problems. Without proper assessment and a stable record, it is impossible to evaluate interventions designed to reduce pain.<sup>15</sup> Improvements in recording and assessment have led to improved pain management.<sup>16</sup>

The Critical-Care Pain Observation Tool (CPOT) is a behavioral pain scale used for detecting the presence of pain in nonverbal critically ill adults. It was recommended for use in the recent clinical practice guidelines of the Society of Critical Care Medicine (SCCM).<sup>17</sup>

The CPOT includes four behavioral categories: facial expressions, body movements, muscle tension, and compliance with the ventilator for ventilated patients and vocalization for those who are not ventilated. Each behavior is scored on a scale from zero to two for a possible total score ranging from zero to eight.<sup>18</sup>

The validity and reliability of the CPOT have been supported in pain assessment in intensive care patients in many studies, but the impact of its implementation in the management of pain has been evaluated in only a few.<sup>19,20</sup>

The aim of our study was to determine and compare the performance of nurses in managing pain in patients with loss of consciousness followed by tracheal suctioning and position changing procedures before and after applying the CPOT to determine if there were positive effects of its use.

## METHODS

Our research used a before and after design to evaluate the ability of nurses to manage pain in

patients with low consciousness. Pain was assessed before and after tracheal suctioning and position changing procedures. Our study was reviewed and approved by the ethical committee of Tehran University of Medical Sciences.

Nurses were recruited from hospitals within the Tehran University Medical Sciences between November 2011 and April 2012. Nurses with a bachelor's degree or higher, willing to participate in research, working in the morning and afternoon shifts, and with minimal pain management training were included in the study. After training, the nurse would use the critical care pain observational tool to assess patients' pain. Initially, 110 nurses were enrolled in the study (four were excluded due to transfer to the public sector). Nurses were selected from the surgery, trauma, and ICU. Patients over the age of 18 years old unable to make any verbal or nonverbal communication for at least 24 hours were included in the study. Patients suffering from severe facial injuries were not selected. Additionally, the patient's Glasgow Coma Scale score needed to be between five and eight with a motor response of at least two and the patient did not use pain medication or muscle relaxants or sedatives. It was expected that patients would suffer pain in the procedure, and the nurse's response would be recorded.

Patients admitted to the ICU included those who had been in car accidents and had an epidural, subdural, or intraparenchymal hemorrhage and underwent surgery. Patients with medical problems, such as diabetic ketoacidosis, which were accompanied by a sharp drop in the level of consciousness, were also admitted to the ICU.

The demographic profile of the nurses was collected as well as data on their ability to manage pain (the nurses performance checklist). The demographic characteristics collected included age, sex, marital status, work experience, ICU nursing experience, and education level.

The nurse's performances checklist in pain management had eight items including proper pain diagnosis, reporting of pain to the physician, administration of pharmaceutical or nonpharmaceutical measures, making a record of the pain, recording pharmaceutical and nonpharmaceutical measures undertaken, re-evaluation of pain relief measures, and re-relief measures following re-evaluation. Re-relief measures used included pharmaceutical measures consisting

of opiates such as morphine, pethidine, fentanyl, methadone, as well as acetaminophen and diclofenac suppository, and non-pharmaceutical measures consisting of heat treatment, position change, and massage therapy. For each of the items listed in the checklist, there were “yes” and “no” options. After training, nurses were tested individually and as a group. Nurses learned how to use the tool to a good level and the variability between them was low.

The study was divided into three phases: pre-implementation, implementation, and post-implementation. In the pre-implementation phase, the researcher selected qualified nurses as subjects, collected personal information and consent. They then studied the nurse’s management of pain in patients with a decreased level of consciousness using the previously described checklist following tracheal suctioning and position change procedures. The performance of each nurse (in correct diagnosis and following pain) was assessed three times. If the response to each of the eight checklist points was yes, a score of one was given, and if the response was no, the score was zero. If the nurse acted properly each time, the total score was three and a score of zero was given if the nurse received three no responses and the response was considered very favorable or unfavorable, respectively. If the response was yes twice and no once, then the score was two, and the performance was considered favorable. A relatively favorable score was a total of two.

During the implementation phase, the researcher taught the nurses how to use the CPOT individually in one-hour sessions. Training tapes were used to improve the application and scoring of the tool items. Pocket cards and posters on how to use the CPOT and other complementary measures to educate nurses were also given. The implementation phase lasted for one week, after which the researchers reassessed the nurses pain management, again a total of three times.

The data collected before and after training were analyzed using descriptive statistics and the non-parametric Wilcoxon signed-rank test and the SPSS statistics program (SPSS Inc., Chicago, USA) version 16.

## RESULTS

In this study, the ability of 106 nurses to manage pain before and after use of a CPOT was assessed. The

majority of nurses (72.5%) were aged between 26–35 years old. The majority of subjects (87.7%) were female, and more than half (58.8%) were married. More than half of the nurses had less than five years of experience. The majority of subjects (99.1%) were educated to master’s level [Table 1].

With respect to the correct diagnosis of pain, less than half of the nurses were determined to have relatively favorable scores before the intervention, while more than half of the units had favorable conditions after the intervention [Table 2], which was statistically significant.

More than half of the nurses had unfavorable status before the intervention when looking at the administration of pharmacological interventions to relieve pain and in reporting pain to the physician. After the intervention, most nurses were in the relatively favorable status ( $p < 0.001$ ) [Table 3].

For nonpharmacological measures, more than half of the nurses (67%) were scored as unfavorable before the intervention, and 56.6% were scored as unfavorable after the intervention. However, this difference was statistically significant ( $p = 0.038$ ).

The majority of nurses had an unfavorable response score before the intervention with regard to recording patient’s pain. After the intervention, their score was still unfavorable, and the difference was not statistically significant [Table 4].

More than half of the nurses had an unfavorable response status before and after the intervention

**Table 1:** Demographic information of participant nurses in the study.

Demographics	n (%)
<b>Age (years)</b>	
25–35	77 (72.5)
35–45	23 (21.8)
45–55	6 (5.7)
<b>Gender</b>	
Male	13 (12.3)
Female	93 (87.7)
<b>Education</b>	
Bachelors	3 (13.8)
Masters	103 (86.2)
<b>Experience</b>	
Less than five years	67 (63.2)
More than five years	39 (36.7)
<b>Marital status</b>	
Single	44 (41.2)
Married	62 (58.8)
<b>Total</b>	<b>106 (100)</b>

**Table 2:** Absolute and relative frequency distribution of nurses' performance in relation to diagnosis of pain before and after using the CPOT tool.

Response status	Before intervention	After intervention	Wilcoxon signed-rank	p-value
	n (%)	n (%)		
Very favorable (3)	1 (0.9)	17 (16.0)	z=-7.387	<0.001
Favorable (2)	24 (22.6)	57 (53.8)		
Relatively favorable (1)	52 (49.1)	25 (23.6)		
Unfavorable (0)	29 (27.4)	7 (6.6)		
Total	106 (100.0)	106 (100.0)		
Average score±SD	0.97±0.74	1.97±0.79		

**Table 3:** Absolute and relative frequency distribution of nurses' performance in providing pharmacological interventions to relieve pain and reporting pain to the physician before and after using the CPOT tool.

Response status	Before intervention	After intervention	Wilcoxon signed-rank	p-value
	n (%)	n (%)		
Very favorable (3)	0 (0)	0 (0)	z=-7.197	<0.001
Favorable (2)	6 (5.7)	42 (39.6)		
Relatively favorable (1)	44 (41.5)	54 (50.9)		
Unfavorable (0)	56 (52.8)	10 (9.4)		
Total	106 (100.0)	106 (100.0)		
Average score±SD	0.53±0.61	1.30±0.64		

**Table 4:** Absolute and relative frequency distribution of nurses' performance in connection with the registration of the patient's pain before and after using the CPOT tool.

Response status	Before intervention	After intervention	Wilcoxon signed-rank	p-value
	n (%)	n (%)		
Very favorable (3)	0 (0)	0 (0)	z=-1.257	0.209
Favorable (2)	0 (0)	1 (0.9)		
Relatively favorable (1)	20 (18.9)	12 (11.3)		
Unfavorable (0)	85 (80.2)	93 (87.7)		
Total	106 (100.0)	106 (100.0)		
Average score±SD	0.20±0.40	0.13±0.37		

**Table 5:** Absolute and relative frequency distribution of nurses' performance in association with the re-evaluation of pain after palliative measures before and after using the CPOT tool.

Response status	Before intervention	After intervention	Wilcoxon signed-rank	p-value
	n (%)	n (%)		
Very favorable (3)	0 (0)	4 (3.8)	z=-7.561	<0.001
Favorable (2)	2 (1.9)	27 (25.5)		
Relatively favorable (1)	28 (26.4)	58 (54.7)		
Unfavorable (0)	76 (71.4)	17 (16.0)		
Total	106 (100.0)	106 (100.0)		
Average score±SD	0.30±0.50	1.17±0.74		

concerning the use of palliative measures, and there was no statistically significant difference observed.

The majority of nurses were scored as unfavorable before the intervention when looking at the re-evaluation of pain after palliative measures [Table 5]. After the intervention, more than half of the nurses were scored as relatively favorable ( $p < 0.001$ ).

When assessing the relief effort after re-evaluation of lack of pain relief, the majority of nurses were scored as unfavorable, and this was also the same after the intervention. However, there was a statistically significant difference in the scores ( $p < 0.001$ ).

## DISCUSSION

The CPOT was successfully applied in our study and seemed to have a positive impact on nurses' pain management in patients with a decreased level of consciousness for the purposes of diagnosing pain, the administration of pain relieve and/or reporting pain to the physician, and reassessing pain. The tool did not help nurses in the recording of the pain and its related activities.

The increase of almost double in the response status (score) of nurses diagnosing pain in patients with a low consciousness after using CPOT tools is compatible with other studies. For example, in a study looking at the use of this tool in nursing care and pain management, information was only obtained through medical records and it was determined that the reporting of pain by nurses after using this tool was three to four times higher than before using the tool. The study also noted that of the 30 cases reviewed, in five to 10 medical cases the CPOT score was more than two, which suggests a recognition of the pain by nurses after use of the tool.<sup>20</sup> A study on the impact of the systematic evaluation of pain and agitation in an ICU concluded that the observed mean values were significantly higher in the intervention group (the group that behavioral tools was used for pain diagnosis) than the control group.<sup>7</sup> Another study reported an increase of 33% in reported pain after using the Neonatal Infant Pain Scale tool.<sup>21</sup> The results of these studies and our study suggest that nurses had increased sensitivity about the existence of pain in their patients after the use of behavioral tools. We expected that the nurses would not be able to recognize pain, but training and use of the CPOT substantially increased the mean correct pain diagnosis.

Some studies observed an increase in the use of sedative and analgesic drugs after using behavioral pain tools, as in our study.<sup>7,22</sup> However, Gélinas<sup>20</sup> stated that the number of prescribed opioids before using the tool was higher compared to the post-application of the tool.<sup>20</sup> Payen and colleagues,<sup>12</sup> also found that the pain assessment was associated with the reduced use of sedatives. Topolovec<sup>1</sup> also conducted a study to determine patients' satisfaction with evaluation and treatment of pain after using a non-verbal pain scale in adults. The results showed that pain intensity decreased and medication time from pain onset reduced, but there were no significant differences between the type and amount of narcotic pain medication prescribed for patients before and after application of the scale. This difference in the results observed could be due to the correct diagnosis of pain. Due to these contradictory findings, it can be concluded that the teaching of pain assessment should always be accompanied by teaching the proper use of analgesics or sedatives.

Puntillo<sup>23</sup> stated that valid measures of pain behaviors could help nurses to distinguish pain from other symptoms, for example, anxiety, and that the correct diagnosis of the presence or absence of pain can be effective in the administration of analgesics and sedatives. A remarkable finding was that the reporting of pain medicine use or reporting of pain to a doctor did not have a very favorable score before and after the intervention. This could mean that there was a lack of awareness and inadequate attention to the issue of pain control in patients with low consciousness. However, factors such as hemodynamic instability, the patient's inability to communicate, excessive nursing workload, fear of respiratory failure, and addiction, tolerance and physical dependence on narcotic, can cause damage to the quality of pain control and management.

Our study found that the majority of nurses had an unfavorable score with relation to the administration of nonpharmacological interventions, suggesting a lack of attention and little use of nonpharmacological measures in pain management. Gélinas<sup>24</sup> also stated that pharmacological intervention (89%) rather than non-drug interventions (less than 25%) was used to relieve pain. Although the use of nonpharmacological measures, both before and after the intervention, had an unfavorable score, the mean score difference before and after the intervention suggests the relative development of this aspect of

performance. The lack of very favorable scores when assessing nonpharmacological interventions suggests nurses need training in this form of care.

Documentation of pain assessment and pain relief in clinical case in the majority of cases both before and after the intervention were scored as unfavorable, and no improvement in these areas was observed after application of the CPOT.

The registration and management of patient's pain were noted as incomplete and inadequate in patients' medical records in two studies.<sup>24,25</sup> Regular and careful pain measurement as the fifth vital sign and use of a pain assessment tool to improve the registration system has been suggested by other researchers.<sup>26,27</sup> Shannon and Bucknall<sup>28</sup> also suggested that an effective pain assessment tool should become part of the recording process as a tool for effective communication between the medical staff, not only between the nurses and patients.

Treatment cannot be adjusted according to patient's needs if reports of pain management are not recorded.<sup>29</sup> This occurs due to the lack of tracking the course of treatment and continued treatment in the absence of any suitable record system. Reviewing the results of this study, the researchers concluded that even if nurses were sensitive to pain because of their use of the pain assessment tool, it did not improve their recording of pain and use of palliative measures. Perhaps the suggestions of other researchers, based on measurement of pain as the fifth vital sign and use the pain assessment tool, could be effective in improving pain control and recording of pain.<sup>26,27,30</sup> This supports Gallo's<sup>21</sup> study, which found a 33 percent increase in reports of pain assessment after using the Neonatal Infant Pain Scale tool in the ICU chart. A study by Gélinas<sup>24</sup> emphasized the use of the chart for recording of pain and its impact on the improvement of the pain record and its management.

We found an increase in the status of nurses pursuing the process of pain relief from unfavorable (71.4%) to relatively favorable (54.7%). Gélinas<sup>20</sup> also found a similar result. Arbour and colleagues,<sup>31</sup> reported an increase of 53% in the reassessment of pain after using behavioral pain tools. Frequent and regular reassessment of pain intensity can enable nurses to correctly decide on the effectiveness of palliative interventions and follow-up pain management. Tools such as the CPOT have the ability to sensitize nurses to pain in patients with low consciousness and can be effective in the

improvement of performance of nurses in association with the re-evaluation of pain relief measures and the complete process of pain management.

With reviews of nursing practice in connection with pain re-relief measures, we found that the scores both before and after the intervention in this area were unfavorable, using an observational tool to assess pain we were able to improve some of these defects and improve the status of nurses in this regard. Of course, weaknesses in the reassessment of pain after treatment can lead to incomplete pain management and pain is left untreated.<sup>32</sup>

## CONCLUSION

Our study investigated the effects of nurses using the CPOT in patients with a decreased level of consciousness on pain management. The findings and results of the analysis showed that the performance of nurses in relation to the correct diagnosis of pain, use of pharmacological and nonpharmacological interventions to relieve pain, and reporting of pain to the physician, re-evaluation of pain after palliative measures, and the relief effort after re-evaluation of pain, there was a significant difference before and after intervention. Moreover, comparing the mean performance score before and after the intervention it was noted that nurses' performance in these areas improved after the intervention. However, using the CPOT could not lead to improved performance of nurses in connection with the registration of the patient's pain and palliative measures undertaken in connection with the pain. Finally, we can say that the use of the CPOT as a behavioral tool to assess pain can improve nurses' performance and many aspects of pain management in the areas of pain relief.

### Disclosure

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