

**Behavioral Pain Scale Versus Critical Care
Pain Observational Tool on Mechanically
Ventilated patient**

Thesis

Submitted for the Partial Fulfillment of
The requirement of
The Master Degree

In

*Nursing Sciences
(Critical Care Nursing)*

By

Noha Mohamed El Sayed Mohamed

*Demonstrator of Medical Surgical Nursing
Faculty of Nursing
Ain Shams University*

**Faculty of Nursing
Ain Shams University
2019**

**Behavioral Pain Scale Versus Critical Care
Pain Observational Tool on Mechanically
Ventilated patient**

Thesis

Submitted for the Partial Fulfillment of
The requirement of
The Master Degree

In

*Nursing Sciences
(Critical Care Nursing)*

Under Supervision

Prof. Sahar Yassien Mohamed

*Professor of Medical Surgical Nursing
Faculty of Nursing-Ain Shams University*

Assist Prof. Dalia Ali Amin

*Assistant professor of Medical Surgical Nursing
Faculty of Nursing-Ain Shams University*

Assist Prof. Basma Mohamed Khalil

*Assistant professor of Medical Surgical Nursing
Faculty of Nursing-Ain Shams University*

**Faculty of Nursing
Ain Shams University
2019**



Acknowledgement

First and foremost, I feel always indebted to **Allah**, the Most Kind and Most the Merciful for all his blessing and for giving me the will and strength for completion of this work.

I wish to express my deep appreciation and gratitude to **Professor. Sahar Yassin Mohamed**, Professor of Medical surgical Nursing, Faculty of Nursing, Ain Shams University, and words cannot describe how grateful I am for her guidance, valuable support, constructive criticism, and continuous, unlimited help. I would not have been able to start and reach perfection of this work without her.

I am deeply grateful to **Ass. Prof. Dalia Ali Amin**, Assistant Professor of Medical surgical Nursing, Faculty of Nursing, Ain Shams University, for her supervision, help and valuable support and guidance, I am deeply affected by her noble character, perfection, care and consideration.

I would like to express my deep thanking and appreciation to **Ass. Prof. Basma Mohamed Khalil**, Assistant Professor of Medical surgical Nursing, Faculty of Nursing, Ain Shams University, for her meticulous supervision and for the time she devoted to me in this work.

 **Noha Mohamed el Sayed Mohamed**

Contents

<i>Subject</i>	<i>Page</i>
List of Tables.....	i
List of Figures	iv
List of Appendices	vi
List of Abbreviations.....	vii
Abstract	viii
Introduction	1
Aim of the Study	5
Review of Literature	6
Subject and Methods.....	42
Results.....	55
Discussion	102
Conclusion.....	116
Recommendations	117
Summary	119
References	123
Appendices	I
Arabic Summary	—

List of Tables

<i>Table</i>	<i>Title</i>	<i>Page</i>
1	Frequency and percentages distribution of the studied patients according to their demographic characteristics	56
2	Frequency and percentage distribution of the studied patients according to their Present history	57
3	Frequency and percentage distribution of the patients according to their past history	58
4	Frequency and percent distribution of the studied patients according to base line physiological parameters	59
5	Frequency and percent distribution of patients' conscious level according to their Glasgow Coma Scale	60
6	Patients' pain score using Critical Care Pain Observation during turning.	61
7	Patients' pain score using Critical Care Pain Observation during wound dressing	62
8	Patients' pain score using Critical Care Pain Observation during measuring blood pressure	63
9	Frequency and percent Distribution of patient's pain level among the study subjects using Critical Care Pain Observation during turning	64

List of Tables (Cont.)

<i>Table</i>	<i>Title</i>	<i>Page</i>
10	Frequency and percent Distribution of patient's pain level among the study subjects using Critical Care Pain Observation during wound dressing	66
11	Frequency and percent Distribution of patient's pain level among the study subjects using Critical Care Pain Observation during blood pressure measurement.	68
12	Pain assessment using a ventilator setting, parameters, and vital signs during turning	70
13	Pain assessment using a ventilator setting, parameters and vital signs during wound dressing	73
14	Pain assessment using a ventilator, setting, parameters and vital signs during measuring blood pressure	76
15	Patients' pain score using Behavioral Pain Scale during turning	79
16	Patients' pain score using Behavioral Pain Scale during wound dressing	80
17	Patients' pain score using Behavioral Pain Scale during measuring blood pressure	81
18	Frequency and Percent Distribution of patient's pain level among the study subjects using Behavioral Pain Scale during turning	82
19	Frequency and Percent Distribution of patient's pain level among the study subjects using Behavioral pain scale during	84

<i>Table</i>	<i>Title</i>	<i>Page</i>
	wound dressing.	
20	Frequency and Percent Distribution of patients' pain level among the study subjects using Behavioral pain scale during measuring the blood pressure	86
21	Pain assessment using a ventilator setting, parameters and vital signs during turning	88
22	Pain assessment using a ventilator setting ,parameters and vital signs during wound dressing	91
23	Pain assessment using a ventilator setting, parameters and vital signs during measuring blood pressure	94
24	Internal consistency and Inter-rater reliability of critical pain observation and behavioral pain scale	97
25	Correlation of pain scores during painful procedure and 10m after procedure at Critical pain observation	98
26	Correlation of pain scores during painful procedure and 10m after procedure at Behavioral pain scale	100

List of Figures

<i>Figure</i>	<i>Title</i>	<i>Page</i>
In results		
1	Percent distribution of patients' conscious level according to their Glasgow coma score	60
2	Patient's pain level distribution using Critical Care Pain Observation during turning	65
3	Patients' assessment total pain score using Critical Care Pain Observation during wound dressing	67
4	Patients' total pain score using Critical Care Pain Observation during measuring blood pressure	69
5	Percent distribution of changing in ventilator parameters and vital signs during turning	72
6	Percent distribution of changing at ventilator parameters, and vital signs during wound dressing	75
7	Percent distribution of changing at ventilator parameters, and vital signs during measuring the blood pressure	78
8	Patient's pain levels' distribution with Behavioral Pain Scale during turning	83
9	Patients' pain level distribution with Behavioral Pain Scale during wound dressing	85
10	Patients' pain level distribution with Behavioral Pain Scale during measuring blood pressure	87

<i>Figure</i>	<i>Title</i>	<i>Page</i>
11	Percent distribution of changing at ventilator parameters and vital signs during turning	90
12	Percent distribution of changing at ventilator parameters and vital signs during wound dressing	93
13	Percent distribution of changing in ventilator parameters and vital signs during measuring blood pressure	96
14	Correlation of pain scores during painful procedure and 10m after procedure at Critical pain observation	99
15	Correlation of pain scores during painful procedure and 10m after procedure at Behavioral pain scale.	100

List of Appendices

- ❖ Protocol (Appendix I)
- ❖ Administrative letter (Appendix II)
- ❖ Patient assessment record (Appendix III)
- ❖ Critical Care pain Observational Tool (Appendix IV)
- ❖ Behavioral Pain Scale (Appendix V)

List of Abbreviations

CPOT:	Critical Care pain observational tool
BPS:	Behavioral Pain Scale.
PIP:	Peek Inspiratory Pressure.
TV:	Tidal volume
PEEP:	Positive End Expiratory Pressure.
FiO₂:	Fraction of Inspired Oxygen.
R.R:	Respiratory Rate.
H.R:	Heart Rate.
BP:	Blood Pressure.
T:	Turning.
WD:	Wound Dressing.
SD:	Standard deviation
ICCs:	international conference on computer sciences
T :	international conference on conceptual structure

Behavioral Pain Scale Versus Critical Care Pain Observational Tool on Mechanically Ventilated Patients

Back ground: Critically ill patients frequently experience both procedural pain and pain at rest. Tracheal suctioning, wound care, turning and arterial line insertion has been shown to be the most painful procedures. Untreated acute pain in adult ICU patients can lead to short- and long-term physiological and psychological complications. **Aim:** This study was conducted to assess pain intensity for mechanically ventilated patient through: Applying Critical care Pain Observational Tool for mechanically ventilated patient, applying Behavioral Pain Scale for mechanically ventilated patient and Compare between critical care observational tool and behavioral pain scale. **Method:** This study was conducted at surgical Intensive care Units at Ain Shams university Hospital. **Research Design :** A comparative, descriptive study utilized for the conduction of this study . **Study Sample:** A purposive sample of (80) patients in surgical intensive care unit at Ain Shams University Hospital. **Tools:** 1) Patient assessment record 2) Critical care pain observational tool 3) Behavioral pain scale. **Results:** The results of this study shows that, (62.5%) were males with mean age of 54 ± 12.30 years old. 68.8% had mechanical ventilation for the first time while 73.8% of them were on SIMV mode. Regarding internal consistency of the critical care observational tool were more than the behavioral pain scale. Regarding inter rater reliability the critical care observational tool was (.904). While the behavioral pain scale was (.851). Regarding the inter rater reliability the critical care observational tool was (.632), while the behavioral pain scale was (.515). A significant positive correlation of pain score during procedure and 10 minutes after using both scales . at $r.0.387$ and 0.248 . **Conclusion:** The current study concluded that, the Critical pain observation tool is more accurate than Behavioral pain scale due to: Internal consistency "Cronbach alpha", Inter-rater reliability "ICCs" and test-retest reliability "correlation coefficient" at critical pain observation higher than observational pain scale **Recommendations:** Further studies are recommended to assess pain intensity of mechanically ventilated patient.

Key words: critical care pain observational tool, Behavioral pain scale.

Introduction

Pain is an unpleasant subjective and multidimensional experience related to actual or potential tissue damage, Intensive Care Unit (ICU)-admitted patients experience pain because of the painful interventions and routine daily care procedures, there are barriers to effective verbal communication in these patients such as decreased level of consciousness, endotracheal intubation, and mechanical ventilation, which are limiting factors for patient's self-report of pain, the inability to report pain does not exclude the possibility of its existence (*Gomarverdi, Seifrabiei & Nikooseresht, 2019*).

Pain is a frequent event in Intensive Care Unit (ICU) patients, with an incidence of up to 50% in medical as well as surgical patients. Pain is associated with an acute stress response including changes in neurovegetative system activity, neuroendocrine secretion and psychological distress often manifested as agitation. Improved pain management is associated with better patient outcomes in the ICU (*Chanques, et al., 2014*).

Critically ill patients frequently experience both procedural pain and pain at rest. Chest tube removal, tracheal suctioning, wound care, turning and arterial line insertion have been shown to be the most painful procedures. Untreated acute pain in adult ICU patients can lead to short- and long-term physiological and psychological complications such as

postoperative myocardial infarction, insufficient sleep and posttraumatic stress disorder (*Rijkenberg, Peter & Voort, 2016*).

Practice guidelines recommend an individualized and goal directed pain management. This includes a systematic assessment of pain with a validated pain scales appropriate to the patient's level of consciousness (*Baron & Binder, 2015*).

Pain assessment in critically ill patients is a challenge due to mechanical ventilation, severe illness, administration of sedatives and analgesics or a decreased level of consciousness. When a patient's self-report is unachievable, validated behavioral pain scores are advised for the assessment of pain in this particular group of patients. Two independent systematic reviews compared the psychometric proportions of pain assessment scores for intensive care patients who are unable to self-report pain. The critical-care pain observation tool (CPOT) and behavioral pain scale (BPS) received the best scores in their quality assessments and both scores are recommended in recent clinical practice guidelines for the assessment of pain in nonverbal critically ill adult (*Rijkenberg, Peter & Voort, 2016*).

Accurate assessment is the basis for effective pain management. A patient's self-report is the gold standard for pain assessment, but the majority of critically ill patients cannot report the experience of pain because of unconsciousness, endotracheal intubation, and/or other factors. Patients'

manifestations of pain include vocalizations, body movement and facial expressions, which are also commonly used as behavioral indicators to assess pain in nonverbal patients. Behavioral pain assessment tools, recommended by the American Society for Pain Management Nursing (ASPMN), may help recognize pain in patients unable to self-report (*Liu, Li & Herr, 2015*).

Significance of the study:

The estimates of the World Health Organization (2017) demonstrate that almost 83% of the world population lives in countries with poor or no access to pain management. During ICU treatment, up to 40–70% of patients experience pain (moderate to severe). Several studies reported that, almost 30% of patients experience pain at rest and 50% during various nursing interventions. The majority of patients discharged from an ICU identify the pain experienced as a huge source of stress. Most of them are not able to self-assess their pain (verbally) due to consciousness-related changes and connection to mechanical ventilation (*Kotfis, et al., 2017*).

Patients in intensive care unit environment (ICU), are subjected to several procedures that could be painful, and healthcare professionals are not always alert to pain in these patients. In this context, patients are incapable of communicating, submitted to sedation, invasive mechanical