IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 7, Issue 6 Ver. I. (Nov.-Dec.2018), PP 43-54
www.iosrjournals.org

Responses of Unconscious Patients to Painful Procedures in Intensive Care Units

Haitham MokhtarAbdallah[1],Nermine M. Elcokany[2],Hany Eid[3],
Nadia Taha Mohamed[4]

[1]*Assistant Lecturer of Critical Care & Emergency Nursing, Faculty of Nursing, Alexandria University.*
[2] *Lecturer of Critical Care & Emergency Nursing, Faculty of Nursing, Alexandria University. Egypt.*
[3]*Lecturer of Critical Care Medicine, Faculty of Medicine, Alexandria University.*
[4]*Professor of Critical Care & Emergency Nursing, Faculty of Nursing, Alexandria University.*
Corresponding Author: Haitham MokhtarAbdallah

Abstract:
Purpose*: to assess responses of unconscious patients to painful procedures in intensive care units;*
Design*: descriptive cross-sectional research design;*
Settings*: General ICUs namely; (unit I, unit II, and unit III) in Alexandria Main University Hospital, Egypt;*
Participants*: A convenience sample of 70 unconscious intubated critically ill patients of both sexes who were admitted to the previously mentioned intensive care units was included in this study. Quadriplegic patient, patients who receive neuromuscular blockade, and haemodynamically unstable patients were excluded from this study;*
Methods*: Approval of ethics committee of the faculty of nursing was obtained. Permission to conduct the study was obtained from hospital responsible authority after explanation of aim of the study. Tool used for data collection was tested for content validity and reliability. All included patients were assessed for pain intensity during painful procedures;*
Results*: The main results of the current study revealed that 62.9% were male, while 37.1% were females and their age ranging between 18 and 60 years with a mean age of 43.29 ± 14.30. It can be noted that (18.6%) of studied patients had more than two admission diagnoses, whereas (81.4) the majority of the studied patients had one or two admission diagnose. Concerning the number of co-morbidities, it was found that the highest percentage of patients had two or less co-morbidities (88.56%). Regarding the presence of co-morbidities, it can be noted that 35.7 % had no co-morbidities; while 64.3% had co-morbidities. Concerning invasive devices, it was noted that the total number of invasive devices were between 4 to 5 devices.* ***Conclusion:*** *The main findings of the current study revealed that positioning and suctioning were significantly painful procedures as revealed by physiological and behavioral indicators of pain.*

Keywords*: Unconscious patients, pain assessment, intensive care units*

Date of Submission: 21-10-2018 Date of acceptance: 03-11-2018

I. Introduction

Procedures are frequently performed to critically ill patients in intensive care units(ICUs). Many of these procedures are considered painful. They are varied from simple procedures such as intravenous cannulation, physical examination, and physiotherapy to vigorous procedures such as tracheal intubation, tracheal suctioning, positioning, wound care, chest tube removal and arterial punctures for blood gases. Of those, tracheal suctioning, positioning, arterial punctures and wound care are commonly performed in criticallyill patients [(1-4)].

From those procedures, procedural pain is considered a stressor in ICU. It increases catecholamine production and stress hormone levels which can result in tachycardia, hypertension, diaphoresis, and changes in pupil size. Furthermore,it can result in increased oxygen consumption and decreased tissue perfusion. Unrelieved pain causes discomfort to patients, resulting in inadequate sleep, disorientation, exhaustion, increased infection rate, prolonged mechanical ventilation, compromised immunity, and increase ICU length of stay. [(5-7)].

Critically ill patients are often unable to communicate because of changes in the level of consciousness (LOC) or changes in physiological status,intubationor sedation, which may make pain assessment difficult. However, pain recognition and assessment are the first steps to effective pain management. Pain assessment is an important critical care nursing responsibility, and may have an impact on patient outcomes by reducing the

duration of mechanical ventilation and the incidence of nosocomial infections and has a positive effect on pain management [8-10].

Certain behavioraland physiological parameters may be effectiveobjective indicators for pain assessment. Facial expressions, such as grimacing, frowning, wrinkling of the forehead and tears, are possible indicators of pain. Patients' movements, especially during procedures, are also related to pain. Immobility can also be a cue that pain is present. Moreover, some physiological signs can indicate the presence of pain, e.g. increased heart rate and blood pressure and thus can be used in pain assessment[11-13].

Appropriate pain management depends on the systematic and comprehensive assessment of pain to guide decision making regarding administration or titration of analgesia. Although most ICUs have protocols for pharmacological pain management, or even pro re nata (prn) medical orders, the means to assess the presence and intensity of pain in critically ill patients have been inconsistent, therefore limiting the benefit of analgesia protocols[14-17].

Several research[18-20] have showed that pain assessment in critically ill patients is inadequate specifically in unconscious patients and that its severity is often underestimated. Despite several decades of research, pain is still a significant problem for critically ill patients throughout their stay in ICU that has not been adequately addressed. However pain assessment is a priority, management in critically illpatients, very few studies have focused on assessing pain in unconsciouspatients nationallyand internationally[11, 21-23]. Therefore, it is imperative that health care providers assess pain accurately in the unconscious intubated critically ill patients. That's why the current study was conducted to assess responses of unconscious patients to painful procedure in ICUs

II. Aim Of The Study

To assess responses of unconscious patients to painful procedure in intensive care units

Research question:

Do the unconscious intubated critically ill patients respond to procedural pain?

Operational Definitions:

Procedural Pain in this study was assessed during tracheal suctioning, patient positioning, eye care and central venous catheter dressing.

III. Material And Methods

Materials

Research design: A descriptive cross-sectional research design was used to conduct this study.

Setting: This study was carried out in the following general ICUs namely; (unit I, unit II, and unit III) at Alexandria Main University Hospital (AMUH) affiliated to Alexandria University in Egypt. These ICUs receive patients who have a variety of disorders in acute stage of illness, who were admitted directly from the emergency room or transferred from other hospital departments.

Subjects: A Convenience sample of 70 unconscious intubated critically ill patients (age 18-60 years) who were admitted to the previously mentioned intensive care units were included in the current study. This estimation was based on the power analysis using Epi-Info 7 program, applying the following parameters: population size =85/month, expected frequency = 50%, accepted error = 5%, confidence coefficient = 95%, minimum sample size = 70. Parients were excluded from the study if they were quadriplegic, on neuromuscular blockade or haemodynamically unstable.

Tools: One tool was used to collect data of this study.

Unconscious patients' perception of procedural pain assessment record.

This tool was used by the researchers after extensive review of relevant literature [14, 17, 24-30] to assess perception of procedural pain among unconscious intubated critically ill patients. It includes two parts:

Part I: "Demographic and clinical data".

This part includes: patient's age, sex, date of admission, diagnosis, past medical history, date of starting mechanical ventilator; the FOUR(Full Outline of UnResponsiveness) score and this scale was adopted from Wijdicks, et al (2005)[27]which was used to assess level of consciousness that allows the assessor to derive a score of between 16 (fully conscious) and 0 (unconscious), the FOUR score assigns a value of 0 to 4 to each of four functional categories: eye response, motor response, brainstem reflexes, and respiration, in each of these categories, a score of 0 (minimum score) indicates non-functioning status, and a score of 4(maximum score) represents normal functioning.

Furthermore, the sedation level was measured by using Richmond Agitation Sedation Scale (RASS)[29]. The RASS is a 10-points scale, ranging-5 (unarousable) to 0(calm and alert) to +4 (combative). This scale(RASS) was validated against a visual analogue scale of sedation and agitation and tested for inter rater reliability in 5 adult intensive care units[29] .In addition, a measure of severity of illness was documented on

admission to the study by using the Acute Physiology and Chronic Health Evaluation (APACHE) II[31, 32]. The APACHE II score was recorded from the medical record within 24 hours of admission of a patient to an intensive care unit (ICU): an integer score from 0 to 71 is computed based on several measurements; higher scores correspond to more severe disease and a higher risk of death. The number of invasive devices attached to the patients was also recorded in this part.

Part II: "The Revised Nonverbal Pain Scale (NVPS)".

This part was adopted from Kabes, et al (2009)[14].The NVPS was based on the Faces, Legs,Activity, Cry, andConsolability(FLACC)scale[14]. It was used to assess pain intensity in unconscious intubated patients and is based on the sum score of behavioral dimensions(Facial expression, Activity (movement),and Guarding) and physiological indicators dimensions(heart rate, blood pressure, and respiratory rate).Each domain is ranked from 0 to 2, with a total score between 0(no pain) and 10(maximum pain).

Method

- Approval of the ethics committee of the faculty of nursing was obtained.
- An official letter from the faculty of nursing was delivered to the hospital authorities in the Main University Hospital and approval to conduct this study was obtained after providing explanation of the aim of the study.
- Witness consent was obtained for unconscious patients. It included the aim of the study, potential benefits, risks and discomforts from participation in this study. The anonymity, confidentiality and privacy of responses, voluntary participation and right to withdraw from the study were emphasized before participation in the study.
- **Part I** "Unconscious patients' perception of procedural pain assessment record" was developed by the researcher after reviewing the related literature [17, 24-27, 29]and **part II** "the revised Nonverbal Pain Scale (NVPS)" was adopted[14].
- The study tool was tested for content validity by **5 experts** in the field of the study; **1** statistician, **1** anesthetist, **1** Critical care medicine professor, and **2** experts from the faculty of nursing staff members from the critical care and emergency nursing department.
- The modifications suggested in partI "Unconscious patients' perception of procedural pain assessment record" were addingthe FOUR score to assess conscious level instead of Glasgow Coma Scale (GCS) which is more reliable for assessing intubated patients who had impaired level of consciousness.
- The necessary modifications were done prior to data collection accordingly.
- Reliability of the tool was tested using Cronbach's Alpha test and result was 80.02 which was accepted.
- A pilot study was carried out on 10% of the studied patients (seven critically ill patients) to assess the clarity and applicability of the research tool. This number was excluded from the study sample.Pilot study revealed that further modifications were not needed.

Data collection:

- Data were collected by the researcher over approximately a period of four consecutive months (from April to July 2016) from 70 patients.
- All admitted patients to the previously mentioned ICUs who met the inclusion criteria were enrolled in this study.
- Patients' bio-demographic data which included the age, sex, and severity of illness, admission diagnosis and comorbidities were obtained upon admission and recorded using part I of the tool.
- All enrolled patients were assessed for the sedation level and the consciousness level before observation using the RASS and FOUR score coma scale consequently.
- Patients` pain intensity were observed by the researcher using the revised Nonverbal Pain Scale (NVPS), during four distinct procedures that are part of the routine care in the ICU: 1) the nociceptive procedures known to be painful (positioning and tracheal suctioning); and 2) non-nociceptive procedures known to be non-painful (Eye care and central venous catheter (CVC) dressing) as identified from related literatures[14, 24, 33].
- All previously mentioned procedures were performed by the ICU nurse while the researcher performed real time observations at the bedside at the foot of the bed to capture all patients' behaviors.
- The patient`s nurse informed the researcher when the patient required tracheal suctioning according to clinical assessment and also when routine positioning, CVC dressing, and eye care were going to be performed.
- The duration to complete all procedures was up to 2 minutes, except during patient positioning which lasted longer (up to 5 minutes), to capture all behaviors exhibited during the entire procedure.

- A time of at least 30 minutes separated each procedure to reduce the effect of each procedure on the other.
- Each patient was assessed for pain intensity throughout previously mentioned four procedures.
- Patients` pain intensity was assessed using part II of the tool.
- All patients were assessed for pain intensity twice for the same procedure to decrease error variance, within 48 hours using part II of the tool.
- For each procedure, patients were assessed for pain intensity during three phases:

1) **Phase one**: at rest immediately before the previously mentioned procedures.
2) **Phase two**: during the procedure
3) **Phase three**: twenty minutes after the procedure; this time was selected as a post procedure rest assessment period, because that amount of time is required for the liberation, and the elimination of stress hormones (epinephrine and norepinephrine). The epinephrine and norepinephrine half life is short, 1 to 3 minutes, and these hormones are completely eliminated after 15 to 20 minutes.

- Comparison between pain mean scores before, during and after each procedure was done.
- In addition, a comparison was done between pain mean scores of different procedures.

Statistical analysis(10 Bold)

- The raw data were coded and transformed into coding sheets. The results were checked. Then, the data were entered into SPSS system files (SPSS package version 20) using personal computer. Output drafts were checked against the revised coded data for typing and spelling mistakes. Finally, analysis and interpretation of data were conducted. The following statistical measures were used:

Descriptive statistics:

- Numbers and percentages used to describe qualitative data.
- Arithmetic mean and standard deviation: used as measure of central tendency and dispersion respectively.

Analytical statistics:

- Wilcoxon signed ranks test was used to compare the means of pain intensity between three phases of all procedures.
- Chi square for Friedman test was used to compare the means of pain intensity between all procedures.
- Mann Whitney test was used to compare means between two groups.
- Kruskal-Wallis test was used to compare means between more than two groups.
- All reported p values are two-tailed and the 0.05 level was used for statistical significance.

IV. Result

Table I & II represent distribution of studied critically ill patients according to demographic and clinical data. Seventy patients were recruited in the current study. Concerning the age of the studied patients, it was ranging between 18 and 60 years with a mean age of 43.29 ± 14.30. Regarding patients' sex, this table shows that 62.9% were male, while 37.1% were females.

It can be noted that 18.6% of studied patients had more than two admission diagnoses, whereas the majority of the studied patients (81.4%) had one or two admission diagnose. Concerning the number of co-morbidities, it was found that the highest percentage of patients (88.56%)had two or less co-morbidities. Regarding the presence of co-morbidities, it can be noted that 35.7 % had no co-morbidities; while 64.3% had co-morbidities. Concerning invasive devices, it was noted that the total number of invasive devices were between 4 to 5 devices.

Table (I): Distribution of patients according to demographic data

Demographic data	no.= 70	%
Age (years)		
18 ≤25	10	14.3
>25 - ≤40	17	24.3
>40 - ≤60	43	61.4
Min. – Max.	18.0 – 60.0	
Mean ± SD.	43.29 ± 14.30	
Sex		
Male	44	62.9
Female	26	37.1
Unit		
I	25	35.8
II	19	27.1
III	26	37.1

Table (2):Distribution of patients according to clinical data

Clinical data	no.= 70	%
ICU length of stay(LOS)(days)		
Min. – Max. Median	1.0 – 99.0 7.50	
FOUR score		
Min. – Max. Mean ± SD.	2.0 – 7.0 5.53 ± 1.14	
RASS		
Min. – Max. Median	-5.0 – 0.0 -0.68	
APACHE 2 score		
Min. – Max. Mean ± SD.	11.0 – 37.0 22.74 ± 5.96	
Number of admission diagnosis		
≤2	57	81.4
>2	13	18.6
Number of co-morbidities		
No comorbidities	25	35.71
≤2	37	52.85
>2	8	11.44
Total numberof invasive devices		
Min. – Max	4.0 – 5.0	

Table (III) and figure (I) clarifies mean pain scores regarding positioning. As shown in this table, all studied patients were assessed two subsequent times during positioning. It was noted that pooled mean pain score of first time was (3.05±1.16), while pooled mean pain score of second time was (3.00±1.14), which indicates that there was no significant difference between first and second time (P_1=0.47).On the other hand, it was found that a mean difference average of first and second time pain score between phase one and phase two was (8.08±1.76), which was statistically significant (P2 <0.00*). However, a mean difference average of first and second time pain score between phase one and phase three was (0.96±1.56), which was statistically significant (P3 <0.00*).

Table (III): Mean pain scores regarding to positioning

Positioning	Phase one (Before)	Phase two (During)	Phase three (After)	P_2	P_3
First time					
Min. – Max.	0.0 – 1.0	3.0 – 10.0	0.0 – 5.0	<0.00*	<0.00*
Mean ± SD.	0.01 ± 0.12	8.10 ± 1.75	1.04 ± 1.63		
Pooled Mean ± SD	3.05±1.16				
Difference	8.09±1.76		1.03±1.63		
Second time					
Min. – Max.	0.0 – 1.0	3.0 – 10.0	0.0 – 5.0	<0.00*	<0.00*
Mean ± SD.	0.01 ± 0.12	8.09 ± 1.75	0.91 ± 1.55		
Pooled Mean ± SD	3.00±1.14				
Difference	8.07±1.76		0.90±1.55		
P_1	0.47				
Average of first and second time					
Min. – Max.	0.0 – 1.0	3.0 – 10.0	0.0 – 5.0	<0.00*	<0.00*
Mean ± SD.	0.01 ± 0.12	8.09±1.75	0.98 ± 1.55		
Difference	8.08±1.76		0.96 ± 1.56		

- Sig. between periods was done using Wilcoxon signed ranks test.
- P_1: p value for comparing between first and second time.
- P_2: P values for difference between phase one and phase two.
- P_3: P values for difference between phase one and phase three.
- *: Statistically significant at $p \leq 0.05$

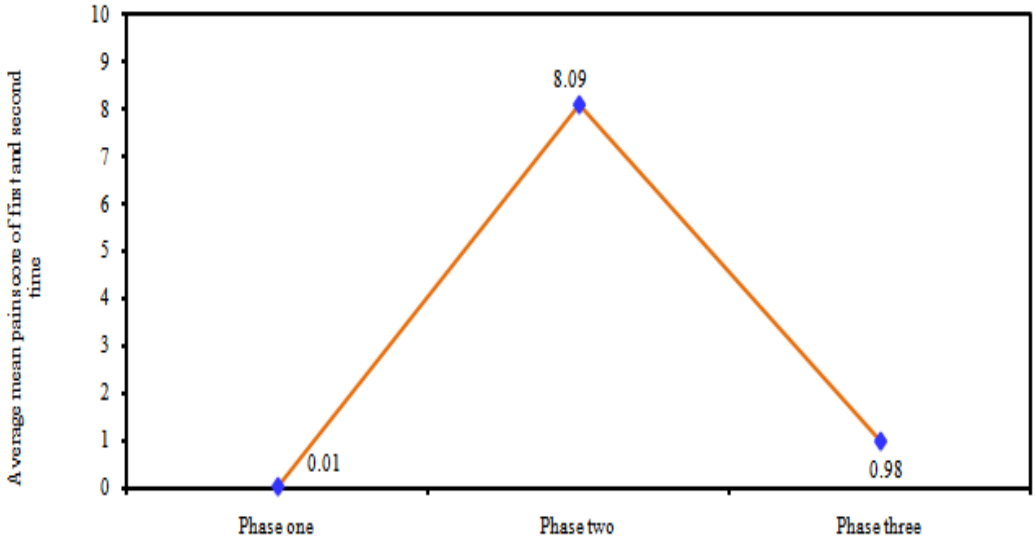

Figure (I): Mean pain score regarding positioning procedure

Table (IV) and figure (II) reflects mean pain scores regarding suctioning. As shown in this table, all studied patients were assessed for two subsequent times during suctioning. It was noted that pooled mean pain score of first time was(2.73±0.82), while pooled mean pain score of second time was (2.72±0.82), which indicates that there was no significant difference between first and second time (p_1=0.73).On the other hand, it was found that a mean difference average of first and second time pain score between phase one and phase two was (7.49±1.40), which was statistically significant (p_2<0.00*).However, a mean difference average of first and second time pain score between phase one and phase three was (0.69±1.07), which was statistically significant (p_3<0.00*).

Table (IV): Mean pain score regarding to Suctioning

Suctioning	**Phase one (Before)**	**Phase two (During)**	**Phase three (After)**	**P_2**	**P_3**
First time					
Min. – Max.	0.0 – 0.0	4.0 – 10.0	0.0 – 3.0	<0.00*	<0.00*
Mean ± SD.	0.0 ± 0.0	7.50 ± 1.41	0.69 ± 1.07		
Pooled Mean ± SD	2.73±0.82				
Difference	7.50±1.41		0.69 ± 1.07		
Second time					
Min. – Max.	0.0 – 0.0	4.0 – 10.0	0.0 – 3.0	<0.00*	<0.00*
Mean ± SD.	0.0 ± 0.0	7.47 ± 1.40	0.69 ± 1.07		
Pooled Mean ± SD	2.72±0.82				
Difference	7.47 ± 1.40		0.69 ± 1.07		
P_1	0.73				
Average of first and second time					
Min. – Max.	0.0 – 0.0	4.0 – 10.0	0.0 – 3.0	<0.00*	<0.00*
Mean ± SD.	0.0 ± 0.0	7.49±1.40	0.69 ± 1.07		
Difference	7.49±1.40		0.69 ± 1.07		

Sig. between periods was done using Wilcoxon signed ranks test.
P_1: p value for comparing between first and second time.
P_2: P values for difference between phase one and phase two.
P_3: P values for difference between phase one and phase three.
*: Statistically significant at $p \leq 0.05$

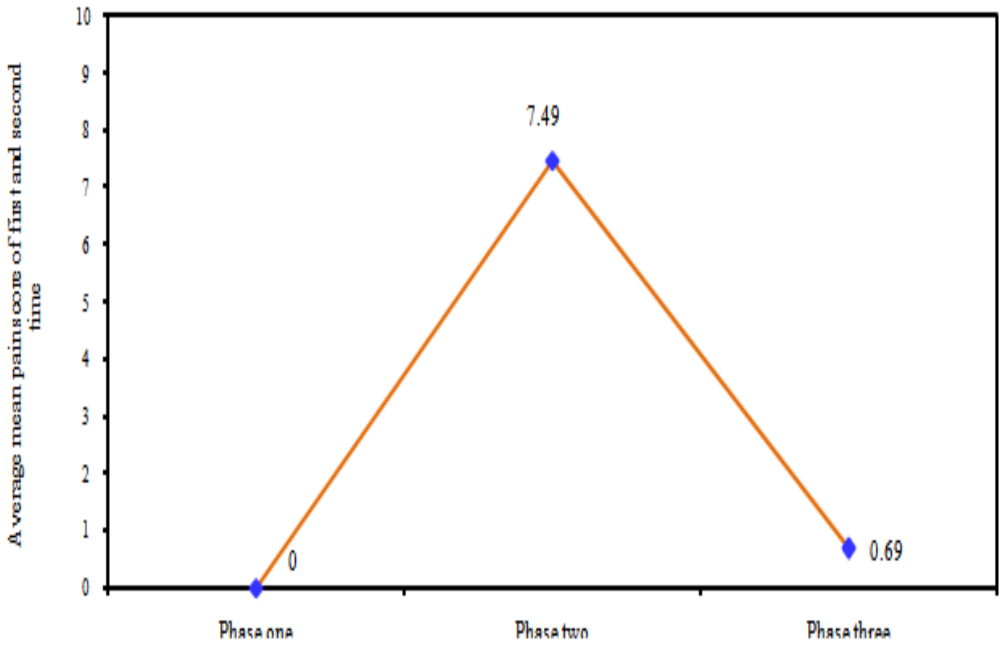

Figure (II): Mean pain scores regarding suctioning procedure

Table (V) and figure (III) reveals mean pain scores regarding to eye care. As shown in this table, all studied patients were assessed for two times during eye care procedure. It was noted that pooled mean pain score of first time was (0.21±0.32),while pooled mean pain score of second time was (0.21±0.32), which indicates that there was no statistical significant difference between first and second time (p_1=1.00).On the other hand, it was found that a mean difference average of first and second time pain score between phase one and phase two was (0.64 ± 0.98), which was statistically non-significant (p_2=0.08).However, a mean difference average of first and second time pain score between phase one and phase three was (0.0±0.0), which was statistically non-significant (p_3 =1.00).

Table (V): Mean pain scores regarding to Eye care

Eye care	Phase one	Phase two	Phase three	P_2	P_3
First time					
Min. – Max.	0.0 – 0.0	0.0 – 3.0	0.0 – 0.0	0.08	1.00
Mean ± SD.	0.0 ± 0.0	0.64 ± 0.98	0.0 ± 0.0		
Pooled Mean ± SD	0.21±0.32				
Difference	0.64 ± 0.98		0.0 ± 0.0		
Second time					
Min. – Max.	0.0 – 0.0	0.0 – 3.0	0.0 – 0.0	0.08	1.00
Mean ± SD.	0.0 ± 0.0	0.64 ± 0.98	0.0 ± 0.0		
Pooled Mean ± SD	0.21±0.32				
Difference	0.64 ± 0.98		0.0 ± 0.0		
P_1	1.00				
Average of first and second time					
Min. – Max.	0.0 – 0.0	0.0 – 3.0	0.0 – 0.0	0.08	1.00
Mean ± SD.	0.0 ± 0.0	0.64 ± 0.98	0.0 ± 0.0		
Difference	0.64 ± 0.98		0.0 ± 0.0		

Sig. between periods was done using Wilcoxon signed ranks test.
P_1: p value for comparing between first and second time.
P_2: P values for difference between phase one and phase two.
P_3: P values for difference between phase one and phase three.
*: Statistically significant at $p \leq 0.05$

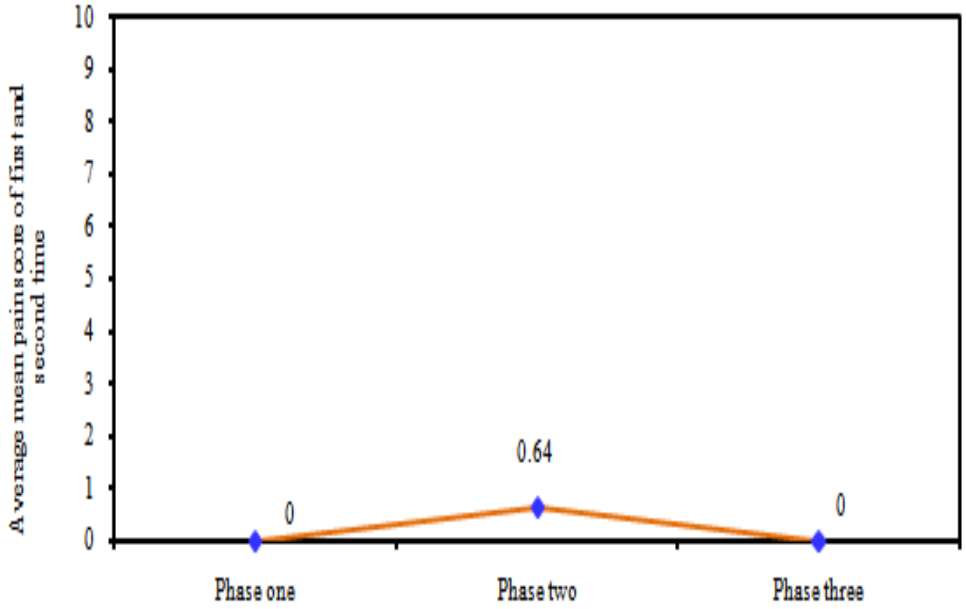

Figure (III): Mean pain score as regards eye care procedure

Table VI and figure IVrepresent mean pain scores regarding to CVC dressing. As shown in this table, all studied patients were assessed for two times CVC dressing. It was noted that pooled mean pain score of first time was (0.03±0.13), while pooled mean pain score of second time was (0.03±0.17), which indicates that there was no statistically significant difference between first and second time (p_1=0.77).On the other hand, it was found that a mean difference average of first and second time pain score between phase one and phase two was (0.10±0.39), which was statistically non-significant (p_2=1.00). However, a mean difference average of first and second time pain score between phase one and phase three was (0.01±0.06), which was statistically non-significant (p_3 =1.00).

Table (VI): Mean pain score regarding to CVC dressing

CVC dressing	Phase one	Phase two	Phase three	P_2	P_3
First time					
Min. – Max.	0.0 – 0.0	0.0 – 2.0	0.0 – 0.0	1.00	1.00
Mean ± SD.	0.0 ± 0.0	0.10 ± 0.39	0.0 ± 0.0		
Pooled Mean ± SD	0.03±0.13				
Difference	0.10 ± 0.39		0.0 ± 0.0		
Second time					
Min. – Max.	0.0 – 0.0	0.0 – 2.0	0.0 – 1.0	1.00	1.00
Mean ± SD.	0.0 ± 0.0	0.10 ± 0.39	0.01 ± 0.12		
Pooled Mean ± SD	0.03±0.17				
Difference	0.10 ± 0.39		0.01 ± 0.12		
P_1	0.77				
Average of first and second time					
Min. – Max.	0.0 – 0.0	0.0 – 2.0	0.0 – 0.50	1.00	1.00
Mean ± SD.	0.0 ± 0.0	0.10 ± 0.39	0.01 ± 0.06		
Difference	0.10 ± 0.39		0.01 ± 0.06		

Sig. between periods was done using Wilcoxon signed ranks test.
P_1: p value for comparing between first and second time.
P_2: P values for difference between phase one and phase two.
P_3: P values for difference between phase one and phase three.
*: Statistically significant at $p \leq 0.05$

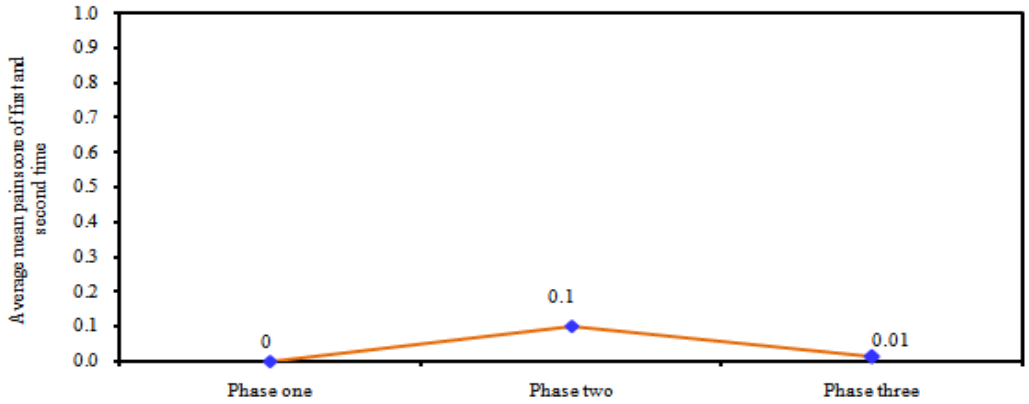

Figure (IV): Mean pain score regarding CVC dressing procedure

Table VII represents comparison between the mean pain scores difference of first and second time between phase one and phase two of four procedures. From this table it can be noted that positioning and suctioning were significantly painful, while eye care and CVC dressing were significantly non painful. On the other hand, it can be noted that the mean pain score of positioning was (8.08±1.76), which indicates that positioning is significantly the most painful procedure, when the difference in mean pain score between phase one and phase two was taken (p=<0.001*).

Table (VII): Comparison between the mean pain scores difference of first and second time between phase one and phase two of four procedures.

First and second time	Mean pain scores				
	Positioning	Suction	Eye care	CVC dressing	p
Min. – Max.	3.0 – 10.0	4.0 – 10.0	0.0 – 3.0	0.0 – 2.0	<0.001*
Mean ± SD.	8.08±1.76	7.49±1.40	0.64 ± 0.98	0.10 ± 0.39	

p: p value for Friedman test for comparing the pain score difference of first and second time between phase one and phase two of four procedures.
*: Statistically significant at $p \leq 0.05$

V. Discussion

Pain is a significant common and distressing symptom in intensive care unit (ICU) patients and represents a major clinical, social, and economic problem. It has been reported that most of the critically ill patients experience different intensities of pain during their intensive care unit stay and identify it as one of the greatest sources of stress[34, 35].

Inaccurate pain assessment and the resulting inadequate treatment of pain in critically ill patients can have significant physiological and psychological consequences. Underdiagnosed pain has been linked to a number of harmful multisystem effects including increased infection rate, prolonged mechanical ventilation, hemodynamic derangements, delirium, and compromised immunity, which can result in and therefore can impair a patient's recovery and discharge[36, 37].

Appropriate pain management depends on the systematic and comprehensive assessment of pain to guide decision making regarding titration and administration of analgesic medications. The sophistication of pain control has increased specifically in unconscious patients responses to painful procedures in ICUs; so the current study was conducted toassess perception of procedural pain among unconscious intubated critically ill patients[26, 38].

Regarding positioning, results of this study shows that there was a statistical significant difference of average mean pain scores between pre procedure and during procedure (p=1.00) and pre procedure and post procedure (p=1.00). Specifically, a mean difference average of first and second time pain score between pre procedure and during procedure was higher than a mean difference average of first and second time pain score between pre procedure and post procedure. This may be attributed to positioning that takes a lot of time to be performed, which vary among ICU nurses, and may result in changes in muscle tension and activity in skeletal position, which may contribute to pain. In addition, tracheal tube may have caused coughing during positioning procedure, leading to higher mean pain scores.

Additionally, positioning performed regularly in ICU every 2 hours to maintain skin integrity. Research indicates that a noxious barrage of the central nervous system can lead to the development of **central sensitization**[39]. Central sensitization occurs when an increase in the excitability of a neuron can cause a response in a neural receptive field that previously was unresponsive. The increased excitability that

accompanies central sensitization can produce an expansion of the area that will respond to a noxious stimulus, increase the magnitude and duration of a response, and reduce the threshold for a nociceptive response even in areas that previously had responded only to non-noxious stimuli and that can lead to persistent pain, that is, pain that continues for some time after a noxious event[39, 40].

Several studies suggested that pain intensity increased during painful procedures such as tracheal suctioning and positioning [24, 26, 41]. These findings are reinforced by Young et al (2006)[24]who assess pain in ventilated, unconscious and/or sedated patients. They found that pain scores increased after patients were repositioned.

Furthermore, the findings are supported by Gélinas et al (2009)[42] who evaluate psychometric qualities (sensitivity and specificity) of the Critical-Care Pain Observation Tool during a nociceptive procedure-turning (exposure). They found that pain scores and sensitivity was high during the nociceptive exposure.

In addition, in the line with the current study, Faigeles et al (2013)[41] examined predictors and use of non-pharmacologic interventions for procedural pain associated with turning among hospitalized adults. The findings show that the mean pain score was significantly higher during position changes.

Moreover, the current study findings are supported by Linde et al study (2013)[43] which examined concurrent validation of scores on the Critical-Care Pain Observation Tool for a painful and a non-painful Procedure. The findings of this study concluded that mean pain scores increase significantly during positioning.

Regarding tracheal suctioning, the results of the current study show that there was a statistical significant difference of average mean pain score between pre procedure and during procedure (p>1.00) and pre procedure and post procedure (p>1.00). Specifically, a mean difference average of first and second time pain score between pre procedure and during procedure was higher than a mean difference average of first and second time pain score between pre procedure and post procedure. That might be attributed to mechanical stimulationwhich may lead to a more dominant activation of Adelta fibers, with a more rapid transmission of thestimulus[44, 45]. This difference could lead to a predominantperception of more incisive sensations such as sharp,stabbing, and shooting as a result of a procedure. Additionally, tracheal suctioning is likely to be done on an emergency basis (unplanned) and is performed quickly.

The current study findings are consistent with those reported by Payen et al. (2001)[33] who assess pain in the critically ill sedated patients. They observed significant increase in pain scores when painful procedures such as positioning or tracheal suctioning were performed.

Also, the current study was supported by Arroyo-Novoaet al (2008)[25] study which assessed pain related to tracheal suctioning in awake acutely and critically ill adults. The findings show that pain intensity scores were significantly greater during the tracheal suctioning procedure than prior to or after tracheal suctioning.

Regarding to eye care, results of the current study show that there was no statistical significant difference of average mean pain score between pre procedure and during procedure (p=0.08) and also between pre procedure and post procedure (p=1.00). Specifically, a mean difference average of first and second time pain score between phase one and phase two was approximately equal a mean difference average of first and second time pain score between phase one and phase three.

Based on **the gate control theory**, which proposed that amechanism in the brain acts as a gateto increase or decrease the flow of nerveimpulses from the peripheral fibers tothe CNS. An open gate allows theflow of nerve impulses, and the braincan perceive pain. A closed gate does not allow flow of nerve impulses,decreasing the perception of pain. Specifically, eye care procedure keep gate closed and that can decrease the perception of pain.

The current study findings are supported by Young et al (2006) [24]study which assessed pain in ventilated, unconscious and/or sedated patients. The findings show that there was non-significant shift in pain score (indicating no pain) after the eye care procedure. Moreover, these findings are confirmed by Gélinas et al. (2009)[17]study which described behavioral and physiologic indicators during a nociceptive procedure in conscious and unconscious mechanically ventilated adults. The findings show that there was no significant change in pain score during eye care procedure.

Regarding to CVC dressing, results of the current study show that there was no statistical significant difference of average mean pain score between pre procedure and during procedure(p=1.00) and also between pre procedure and post procedure(p=1.00). Specifically, a mean difference average of first and second time pain score between phase one and phase two was approximately equal a mean difference average of first and second time pain score between phase one and phase three. This might be attributed to gate control theory too, CVC dressing procedure keep gate closed and that can decrease the perception of pain.

The current study findings are supported by Payen et al. (2001)[33] study which assessed pain in critically ill sedated patients. The findings show that there was no significant change in pain score during central venous catheter dressing change. In addition, The current study findings are supported by Linde et al (2013)[43] study which examined concurrent validation of scores on the Critical-Care Pain Observation Tool for a painful

and a non-painful Procedure. The study findings revealed that mean scores did not increase significantly during dressing changes.

This difference in the qualitative nature of backgroundand procedural pain may have a physiologicalexplanation[15, 44]. That is, cutaneous afferent noxiousimpulses are transmitted from the periphery to thecentral nervous system through small-diameter myelinatedA delta fibers and smaller diameter unmyelinatedC fibers. Pain thought to be transmitted throughA delta fibers is sharp and fast. In contrast, painthought to be transmitted through C fibers is diffuse,dull, and delayed. Activation of C fibers may bedominant during steady, background pain, as aresponse to biochemical mediators released frominflamed tissue[15, 44]. Moreover, the desensitization of ICU nurses to commonly and frequently performed procedures and a lack of awareness of patients' pain and distress associated with those procedures. In addition, **positioning and tracheal suctioning** are usually performed quickly (unplanned on an emergency basis), with little time or attention to pre analgesic medications.

In accordance to that, the results from Thunder project II by Puntillo et al (2001)[46], describe pain associated with turning, wound drain removal, tracheal suctioning, femoral catheter removal, placement of a central venous catheter, and nonburn wound dressing change and frequency of use of analgesics during procedures. They found that, the most painful and distressing procedures were turning for adults and wound care for adolescents, and procedural pain varies considerably and it is procedure specific.From the ongoing discussion, it can be noted that the aim of pain assessment for unconscious patients is to minimize patient discomfort. So, these current work suggest that patients, whatever their levels of consciousness, may respond to nociceptive procedures through physiological and behavioral indicators.

VI. Conclusion

It can be concluded that**positioning and suctioning** were significantly **painful**, while **eye care and CVC dressing** were significantly **non painful**. In addition,critically ill patients commonly have pain and physical discomfort from obvious factors, such as pathophysiology of disease, monitoring and therapies, routine nursing care, prolonged immobility, and trauma. The performance of procedures is a common occurrence in clinical practice, and many of these procedures cause substantial pain. Moreover, critically ill patients often cannot self-report their level of pain because of changes in cognition or physiological status or the presence of an endotracheal tube. The inability to communicate verbally does not negate the possibility that patient is experiencing pain and is in need of appropriate pain relieving treatment. So, pain and suffering must be considered in all patients with disturbed level of consciousness.

Acknowledgment

The authors would like to thank patients' families and critical care nurses in the study setting for their cooperation and support during data collection period.

References

[1]. Paulson-Conger M, Leske J, Maidl C, Hanson A, Dziadulewicz L. Comparison of Two Pain Assessment Tools in Nonverbal Critical Care Patients. Pain Management Nursing. 2011;12(4):218-24.
[2]. Vaartio H L-KH, Suominen T,Puukka P. Nursing Advocacy in Procedural Pain Care. Nursing Ethics. 2009;16(3):340-62.
[3]. Rojoa R P-FJ, López-Valverdeb A. Pain assessment using the Facial Action Coding System. A systematic review. Medicina Clinica (Barc). 2015;145(8):350–5.
[4]. Clukey BL, Weyant RA, Roberts M, Henderson A. Discovery of Unexpected Pain in Intubated and Sedated Patients. American Journal of Critical Care. 2014;23(3):216-20.
[5]. Pudas-Tähkä S-M, Axelin A, Aantaa R, Lund V, Salanterä S. Pain assessment tools for unconscious or sedated intensive care patients: a systematic review. Journal of Advanced Nursing. 2009;65(5):946-56.
[6]. Herr K, Coyne PJ, Key T, Manworren R, McCaffery M, Merkel S, et al. Pain Assessment in the Nonverbal Patient: Position Statement with Clinical Practice Recommendations. Pain Management Nursing. 2006;7(2):44-52.
[7]. Le Q, Gélinas C, Arbour C, Rodrigue N. Description of Behaviors in Nonverbal Critically Ill Patients With a Traumatic Brain Injury When Exposed to Common Procedures in the Intensive Care Unit: A Pilot Study. Pain Management Nursing. 2013;14(4):e251-e61.
[8]. Voepel-Lewis T, Zanotti J, Dammeyer JA, Merkel S. Reliability and Validity of the Face, Legs, Activity, Cry, Consolability Behavioral Tool in Assessing Acute Pain in Critically Ill Patients. American Journal of Critical Care. 2010;19(1):55-61.
[9]. Rahu MA, Grap MJ, Cohn JF, Munro CL, Lyon DE, Sessler CN. Facial Expression as an Indicator of Pain in Critically Ill Intubated Adults During Endotracheal Suctioning. American Journal of Critical Care. 2013;22(5):412-22.
[10]. Bruno M-A, Laureys S, Demertzi A. Coma and disorders of consciousness. Handb Clin Neurol 2013;118:205-13.
[11]. Gregory J. Initial testing of a behavioural pain assessment tool within trauma units. International Journal of Orthopaedic and Trauma Nursing. 2017;24:3-11.
[12]. Barr J, Joffe A, Puntillo K, Gélinas C. A Validated Approach to Evaluating Psychometric Properties of Pain Assessment Tools for Use in Nonverbal Critically Ill Adults. Seminars in Respiratory and Critical Care Medicine. 2013;34(02):153-68.
[13]. Samuelson KAM. Adult intensive care patients' perception of endotracheal tube-related discomforts: A prospective evaluation. Heart & Lung: The Journal of Acute and Critical Care. 2011;40(1):49-55.
[14]. Kabes AM, Graves JK, Norris J. Further validation of the nonverbal pain scale in intensive care patients. Critical care nurse. 2009;29(1):59-66.
[15]. Helms J BC. physiology and treatment of pain. Critical care nurse. 2008;28(6):38-49.

[16]. Williams T LG, Tamaliunas S. Duration of mechanical ventilation in an adul intensive care unit after introduction of sedation and pain scales. Am J Crit Care. 2008;17(4):349-56.
[17]. Gelinas C, Arbour C. Behavioral and physiologic indicators during a nociceptive procedure in conscious and unconscious mechanically ventilated adults: similar or different? Journal of critical care. 2009;24(4):628 e7-17.
[18]. Mordeniz C. Pain Perception Within Consciousness. NeuroQuantology. 2016;14(2).
[19]. Puntillo KA, Morris AB, Thompson CL, Stanik-Hutt J, White CA, Wild LR. Pain behaviors observed during six common procedures: Results from Thunder Project II*. Critical Care Medicine. 2004;32(2):421-7.
[20]. Czarnecki ML, Turner HN, Collins PM, Doellman D, Wrona S, Reynolds J. Procedural Pain Management: A Position Statement with Clinical Practice Recommendations. Pain Management Nursing. 2011;12(2):95-111.
[21]. Demertzi A, Schnakers C, Ledoux D, Chatelle C, Bruno MA, Vanhaudenhuyse A, et al. Different beliefs about pain perception in the vegetative and minimally conscious states: a European survey of medical and paramedical professionals. 2009;177:329-38.
[22]. Ruˇzi ´ca V ID, Stankeb K. Effect of expectation on pain assessment of lower-and higher-intensity stimuli. ScandinavianJournalofPain. 2017;14(3):9-14.
[23]. Georgiou E, Hadjibalassi M, Lambrinou E, Andreou P, Papathanassoglou EDE. The Impact of Pain Assessment on Critically Ill Patients' Outcomes: A Systematic Review. BioMed Research International. 2015;2015:1-18.
[24]. Young J, Siffleet J, Nikoletti S, Shaw T. Use of a Behavioural Pain Scale to assess pain in ventilated, unconscious and/or sedated patients. Intensive and Critical Care Nursing. 2006;22(1):32-9.
[25]. Arroyo-Novoa CM, Figueroa-Ramos MI, Puntillo KA, Stanik-Hutt J, Thompson CL, White C, et al. Pain related to tracheal suctioning in awake acutely and critically ill adults: A descriptive study. Intensive and Critical Care Nursing. 2008;24(1):20-7.
[26]. Robleda G, Roche-Campo F, Membrilla-Martínez L, Fernández-Lucio A, Villamor-Vázquez M, Merten A, et al. Evaluation of pain during mobilization and endotracheal aspiration in critical patients. Medicina Intensiva (English Edition). 2016;40(2):96-104.
[27]. Wijdicks EF, Bamlet WR, Maramattom BV, Manno EM, McClelland RL. Validation of a new coma scale: The FOUR score. Annals of neurology. 2005 Oct;58(4):585-93.
[28]. Marcati E, Ricci S, Casalena A, Toni D, Carolei A, Sacco S. Validation of the Italian version of a new coma scale: the FOUR score. Internal and emergency medicine. 2012;7(2):145-52.
[29]. Sessler CN GM, Grap MJ, et al. The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care unit patients. Am J Respir Crit Care Med. 2002;166(10):1338-44.
[30]. Jalali R, Rezaei M. A Comparison of the Glasgow Coma Scale Score with Full Outline of Unresponsiveness Scale to Predict Patients' Traumatic Brain Injury Outcomes in Intensive Care Units. Critical Care Research and Practice. 2014;2014:1-4.
[31]. Knaus A DA, Wagner P, Zimmerman E. APACHE II: a severity of disease classification system. Critical Care Medicine. 1986;13(10):818-29.
[32]. Knaus A WP, Draper A, Zimmerman E, Bergner M, Bastos G, Sirio A, Murphy J, Lotring T, Damiano A, et al. The APACHE III prognostic system. Risk prediction of hospital mortality for critically ill hospitalized adults. Chest. 1991;100(6):1619-36.
[33]. Payen J BO, Bosson J, Lagrasta A, Novel E, Deschaux I, Lavagne P, Jacquot C. Assessing pain in critically ill sedated patients by using a behavioral pain scale. Crit Care Med. 2001. 2001;29(12):2258-63.
[34]. Ito Y, Teruya K, Kubota H, Yorozu T, Nakajima E. Factors affecting pain assessment scores in patients on mechanical ventilation. Intensive and Critical Care Nursing. 2017.
[35]. Gelinas C. Pain assessment in the critically ill adult: Recent evidence and new trends. Intensive &Critical Care Nursing. 2016 Jun;34:1-11.
[36]. Rijkenberg S, Stilma W, Bosman RJ, van der Meer NJ, van der Voort PHJ. Pain Measurement in Mechanically Ventilated Patients After Cardiac Surgery: Comparison of the Behavioral Pain Scale (BPS) and the Critical-Care Pain Observation Tool (CPOT). Journal of Cardiothoracic and Vascular Anesthesia. 2017;31(4):1227-34.
[37]. L. M. Pain perception in altered states of consciousness. Journal of Observational Pain Medicine. 2013;1(2):21-5.
[38]. Aktaş YY, Karabulut N. A Turkish Version of the Critical-Care Pain Observation Tool: Reliability and Validity Assessment. Journal of PeriAnesthesia Nursing. 2017;32(4):341-51.
[39]. Woolf J CM. Preemptive analgesia: treating postoperative pain by preventing the establishment of central sensitization. . Anesth Analg. 1993;77:362-79.
[40]. Puntillo k MA, Stanik-Hutt J, Thompson C, White C. PRACTICES AND PREDICTORS OF ANALGESIC INTERVENTIONS FOR ADULTS UNDERGOING PAINFUL PROCEDURES. AMERICAN JOURNAL OF CRITICAL CARE. 2002;11(5):415-31.
[41]. Faigeles B, Howie-Esquivel J, Miaskowski C, Stanik-Hutt J, Thompson C, White C, et al. Predictors and Use of Nonpharmacologic Interventions for Procedural Pain Associated with Turning among Hospitalized Adults. Pain Management Nursing. 2013;14(2):85-93.
[42]. Gélinas C, Harel F, Fillion L, Puntillo KA, Johnston CC. Sensitivity and Specificity of the Critical-Care Pain Observation Tool for the Detection of Pain in Intubated Adults After Cardiac Surgery. Journal of Pain and Symptom Management. 2009;37(1):58-67.
[43]. Linde SM, Badger JM, Machan JT, Beaudry J, Brucker A, Martin K, et al. Reevaluation of the Critical-Care Pain Observation Tool in Intubated Adults After Cardiac Surgery. American Journal of Critical Care. 2013;22(6):491-7.
[44]. Reardon DP, Anger KE, Szumita PM. Pathophysiology, assessment, and management of pain in critically ill adults. American Journal of Health-System Pharmacy. 2015;72(18):1531-43.
[45]. Rodriguez L. Pathophysiology of Pain: Implications for Perioperative Nursing. AORN Journal. 2015;101(3):338-44.
[46]. Puntillo K WC, Morris A,Perdue S, Stanik-Hutt J,Thompson C and Wild L. Patients' perceptions and responses to procedural pain: results from thunder project ii. American journal of critical care. 2001;10(4):238-51.

Haitham MokhtarAbdallah. "Responses of Unconscious Patients to Painful Procedures in Intensive Care Units" IOSR Journal of Nursing and Health Science (IOSR-JNHS) , vol. 7, no.6 , 2018, pp. 43-54.