

Pain and Daily Functioning of Critically Ill Patient

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Abstract

Pain is an unpleasant sensation that can range from mild, localized discomfort to agony. Also pain is a common and distressing symptom in intensive care unit (ICU) patients represents a major clinical, social, and economic problem. It has been reported that about 80% of patients experience different intensities of pain during their stay in intensive care unit and identify it as one of the greatest sources of stress.

The aim of the current study is to assess the level of pain interference of daily functioning of critically ill patient.

A descriptive study design was utilized in this study on 105 critically ill patients.

Brief Pain Inventory (Short Form) was employed to complete the survey needed for the study.

Results of this study revealed that, pain was rated as severe for the critically ill patients participated in this study and also had extremely high degree of interference with the activity of daily life also no significant statistical relation were seen between pain perception and sociodemographic characteristics of the participants while level of education was seen to be significantly correlate with the pain interference with the activity of daily life.

Recommendation of the study is assessment of physical functioning early and longitudinally in the critical care units and intensive care units is required to determine patients at risk of poor physical outcome and effect of daily activities

Key words; pain, daily functioning & critically ill patient

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I. Introduction

Pain is an unpleasant sensation that can range from mild, localized discomfort to agony. Also pain is a common and distressing symptom in intensive care unit (ICU) patients are represents a major clinical, social, and economic problem. It has been reported that about 80% of patients experience different intensities of pain during their stay in intensive care unit and identify it as one of the greatest sources of stress⁽¹⁾. Such pain is problematic because it produces adverse psychological and physiological response that includes increased heart rate, blood pressure, respiratory rate, neuroendocrine secretion and psychological distress. Failure to relieve pain produces a prolonged stress state, which can result in harmful multisystem effects and can therefore impair a patient's recovery and discharge⁽²⁾.

Although, adequate pain control is a basic human right, a number of factors complicate the management of pain in the critically ill patient⁽³⁾. In particular, critically ill patients may experience pain due to their underlying disease or surgery, but also it may be result of various and painful medical procedures (procedural pain) such as inserting urinary catheter, nasogastric tube, chest tubes, tracheal suctioning, invasive lines, (arterial and central venous catheter) suture removal and routine nursing care Nursing care procedures such as bathing, massage of back and pressure points, sheets change and repositioning are the most common painful procedures in ICU patients⁽⁴⁾. Adults who are critically ill, and spend time in an ICU, can develop muscle weakness and other problems. This can occur because of the illness that led to their admission to the ICU, treatments associated with this illness, the impact of ongoing health conditions, and their lack of movement while in the ICU. They may also have ongoing problems when they leave ICU (or hospital) such as having trouble doing daily activities (for example dressing, bathing and mobility); feeling depressed or anxious and having difficulty returning to work⁽⁵⁾. It is however difficult for ICU physicians to predict the onset of pain and clarify the correlation between the new-onset pain and physiological changes such as hypertension, tachycardia and tachypnea⁽⁶⁾. Therefore, patient's self-reporting is regarded as the gold standard of pain assessment⁽⁷⁾. Pain scales such as visual analog pain scale (VAS) and numerical rating pain scale (NRS) are used to measure intensity of pain in patients with self-report abilities⁽⁸⁾. These tools cannot be applied to many adult ICU patients because they are unable to self-report with limited verbal capabilities.

Pain has emerged as a leading stressor for ICU patients causing physical stress, sleep disturbances, and psychological distress, all which may interfere with activity of daily life and eventually affect the quality of life after ICU discharge⁽⁹⁾.

Also pain impact on patients, their social environment and the health care system also affects his/her family and social circle⁽¹⁰⁾. In fact, the intensity, duration, or location of pain have a decisive influence on a patient's physical performance, diminishing their physical activity and even causing disability, which in turn affects other aspects of their daily life⁽¹¹⁾. Management of sedation and analgesia "analgesedation" with established protocols allows early mobilization, which is associated with better outcomes in ICU patients: fewer hospital and ICU days and better functional mobility at hospital discharge⁽¹²⁾. The use of multimodal analgesia techniques is recommended in ICU patients to reduce opioid administration, thereby minimizing problems related to prolonged use of high doses of opioids such as tolerance, hyperalgesia, and withdrawal⁽¹³⁾.

Aim of the study

The aim of the current study is to assess the severity of pain as well as the level of pain interference of daily functioning of critically ill patient.

II. Methodology

Research Design and Sampling. The researchers utilized a descriptive study design to explore pain and the daily functioning of critically ill patients. This study was conducted in one of the regional government hospitals in Saudi Arabia and data collection commenced from June 2017 until June 2018. A total sample of 105 patients diagnosed with critical illness were recruited to participate. Purposive sampling method was deployed and only patients who were diagnosed with critical illness, ages 18 years old and above were eligible to participate. However, patients with language and communication needs and severe cognitive dysfunction were not included in this study.

Tool of the study. A structured interview questionnaire. The tool includes two parts presented as followings: part A: had been developed by the researcher to collect data from the study subject is demographic characteristics of the participants. Part B :is the Brief Pain Inventory (Short Form) was employed to complete the survey⁽¹⁴⁾. The questionnaire contained two parts. First, sociodemographic profile of the participants were determined which included gender, age, marital status, educational level and diagnosis. The second part of the questionnaire contained statements from the Brief Pain Inventory (Short Form) tool to assess pain prevalence and interference with daily activities. This research instrument consisted of 7 questions with 15 items. With an 11-point Numeric Rating Scale (NRS), patients were asked to rate their pain over the last 24 hours. Responses to this part ranges from zero (0) as" no pain" to ten (10) "pain as bad as you can imagine." Furthermore, respondents were asked to rate the interference of pain with daily activities (general activity, mood, walking ability, normal work, relations with other people, sleep and enjoyment of life) over the last 24 hours were responses ranges from zero (0) "does not interfere" to ten (10) "completely interferes. The BPI SF was developed in 1983 by Dual et al⁽¹⁴⁾.

Ethical consideration

The pertinent research and ethical committees and all the legal guardians of the patients approved the study protocol. Either verbally or written permission was obtained from every patient before participating in the study. No hazards were present. Participants were assured of confidentiality,. Data were only available to the researchers and participants and all patients were informed that they have the right to withdraw from the study at any time. Voluntary participation was sought from the participants and consent forms provided before actual data gathering. Patients were approached individually for an interview after ethical approval was obtained.

Statistical analysis

Data gathered from the questionnaire were collated for statistical treatment and analysis utilizing the Statistical Package for Social Science (SPSS) software program. Varied statistical were employed to come up with the results. Descriptive statistics reflecting measures of frequencies were utilized to present data from the demographic profile, pain location, pain intensity, interferences of pain and medications. Meanwhile, a simple linear regression was used for the results of the relationship between the severity of pain and the degree of interference. Whereas, Kruskal Wallis H test determined the differences of the severity of pain on the demographic characteristics and the differences of the degree of interference of the pain on the demographic characteristics.

III. Results

**TABLE 1: DEMOGRAPHIC PROFILE OF THE RESPONDENTS
(RQ A: What is (are?) the demographic characteristics of the respondents?)**

Variables	Group	Frequency	Percentage (%)
Gender	Male	76	72.38%
	Female	29	27.62%
Age	30 - 45	20	19.05%
	45 - 60	34	32.38%
	61 - 75	31	29.52%
	75 - 93	20	19.05%
Marital Status	Single	10	9.52%
	Married	95	90.48%
	Divorced	-	-
	Widow	-	-
Educational Level	Primary	-	-
	Secondary	9	8.57%
	College	41	39.05%
	Bachelor	40	38.10%
	Master's Degree	15	14.29%
Diagnosis	Hypertension	34	32.38%
	Atherosclerosis	1	0.95%
	Cardiomyopathy	2	1.90%
	Myocardial infarction	15	14.29%
	Angina	28	26.27%
	Coronary artery disease	2	1.90%
	Congestive heart failure	4	3.81%
	Hemorrhagic stroke	1	0.95%
	Mitral valve stenosis	2	1.90%
	Arrhythmia	5	4.76%
Pulmonary alveolar microlithiasis	4	3.81%	

Table 1 shows the demographic characteristics of the 105 respondents who had pain experience other than minor headaches, sprains, and toothaches. From the table, it can be observed that the majority (72%) were male and 28% of them were female. On the average, the age of the respondents is about 60 years with the standard deviation of about 16 years. The range of their age was found to be 63 years starting from 30 to 93 years. At the time of survey, approximately 90% reported they were married, and 10% reported they were single. Also, the table shows that about 9% were educated up to secondary level, thirty-nine percent 39% reached up to college level only, and thirty-eight 38% of them were college graduates. A considerable number of respondents (14%) attaining post-graduate degree were very few.

Among the health problems specified in the table above, about 32% of the respondents reported they experienced high blood pressure (i.e., hypertension), while 26% admitted they encountered a type of chest pain known as angina. On the other hand, very few (14%) of them expressed to have myocardial infarction, commonly known as heart attack. Other health problems experienced by the respondents were arrhythmia, pulmonary alveolar microlithiasis, congestive heart failure, and others as indicated in the table above.

**TABLE 2: PAIN LOCATION
(Added RQ: What are the most common anatomic location of pain?)**

Variables	Frequency	Percentage (%)
Left Shoulder	35	33.33%
Neck	29	27.62%
Arms	1	0.95%
Right Upper Chest	2	1.90%
Back of Neck	3	2.86%
Right Shoulder	6	7.62%
Midsternal	0	0%
Left Chest	23	21.90%
Right Chest	2	1.90%
Left Upper Chest	1	0.95%

It is evident from Table 2 that out of the 105 respondents, approximately 33% reported to have a severe pain in their left shoulder, 22% in their left chest, and 28% in their neck. Other specified parts of the body were less to have intense pain.

TABLE 3: PAIN INTENSITY
(RQ B: What is the severity of pain among critically ill patients?)

Pain Intensity	Mild*	Moderate*	Severe**
Worst	3 (2.86%)	17 (16.19%)	85 (80.95%)
Least	6 (5.71%)	18 (17.14%)	81 (77.14%)
Average	4 (3.81%)	14 (13.33%)	87 (82.86%)
Current	2 (1.90%)	15 (15.24%)	87 (82.86%)

*Rate (1-4), **Rate (5-6), ***Rate (7-10)

Pain intensity was obtained for worst, least, average, and current pain. As shown in Table 3, eighty-five out of 105 respondents (81%) rated their worst pain as severe, and 17 respondents (16%) as moderate. Consequently, a very large number of respondents (97%) had moderate to severe pain. Furthermore, respondents experienced a median worst pain of 9, least pain of 8, average pain of 8, and current pain of 9.

TABLE 4: INTERFERENCE OF PAIN

a. (RQ C: What is the degree of interference of the pain in the daily functioning among the respondents?)

Daily Activities	No Interference	A Little Interference*	Quite A Bit Interference**	Very Much Interference***
General Activity	-	12 (11.43%)	25 (23.81%)	68 (64.76%)
Mood	-	7 (6.73%)	29 (27.88%)	68 (65.38%)
Walking Ability	-	10 (9.52%)	28 (26.67%)	67 (63.81%)
Normal Work (includes both work outside the home and housework)	-	9 (8.57%)	24 (22.86%)	72 (68.57%)
Relations with other people	-	9 (8.57%)	27 (25.71%)	69 (65.71%)
Sleep	-	6 (5.71%)	33 (31.43%)	66 (62.86%)
Enjoyment of Life	-	7 (6.67%)	27 (25.71%)	71 (67.62%)

*A little interference (1-4), ** Quite A Bit Interference (5-6), *** Very Much Interference (7-10)

Table 4 shows the interference of the pain in the daily activities among the respondents. It can be inferred from the table above that large number of respondents seemed to have extremely high degree of interference of the pain in all daily activities with a median average of 7.5. In particular, normal work, followed by enjoyment of life, were among the daily activities of the respondents that were greatly affected by the interference of the pain with median average of 6 and 7, respectively.

TABLE 5: MEDICATIONS
(Added RQ: What are the respondents' most common medications?)

Variables	Frequency	Percentage (%)
Panadol	9	8.57%
Aspirin	38	36.19%
Nitrate	15	14.29%
Paracetamol	26	24.76%
Lisinopril	2	1.90%
Ibuprofen	12	11.43%
Panadrex	2	1.90%
Enalapril	1	0.95%
Warfarin	1	0.95%
Digoxin	1	0.95%
Betablockers	1	0.95%
Propranolol	1	0.95%
Lanoxin	1	0.95%
Celebrex	2	1.90%
Metformin	5	4.76%
Captopril	3	2.86%
Salbutamol	1	0.95%
Panadol	1	0.95%
Aspirin	2	1.90%

N=105

Table 5 reveals that among the pain relief treatments taken, *aspirin, paracetamol, nitrate, and ibuprofen*, were the most commonly used drugs. Further, these pain treatments have given a median relief of 80% among the respondents. Other pain treatments were presented in the table above.

Table 6: Relationship between the Severity of Pain and the Degree of Interference
(RQ D: Is there a significant relationship in the severity of pain and the degree of interference?)

Variables	F-Statistic Value	P-Value	R-squared	Adjusted R-squared
Severity of Pain - Degree of Interference	$F(1, 103) = 125.99$	0.0000*	0.5502	0.5458

*Significant level $\alpha = 0.05$

A simple linear regression analysis established that severity of pain could statistically significantly predict the degree of interference of the pain in the daily activities of the respondents, $F(1, 103) = 125.99$, $p\text{-value} = 0.000$. Moreover, the severity of pain accounted 55% of the explained variability in the degree of interference.

Table 7: Differences of the Severity of Pain on the Demographic Characteristics of the Respondents
(RQ E.a: Are there significant differences between demographic characteristics (gender, age, diagnosis) and severity of pain?)

Characteristics	Group	Frequency	Worst Pain		Least Pain		Average Pain		Current Pain	
			Rank Sum	P = Value	Rank Sum	P = Value	Rank Sum	P = Value	Rank Sum	P = Value
Gender	Male	76	3724.00	0.022	3762.50	0.052	3747.50	0.039	3720.50	0.024
	Female	29	841.00		1802.50		1817.50		1844.50	
Age	30 - 45	20	1031.00	0.162	1105.00	0.445	1085.50	0.873	1090.00	0.992
	45 - 60	34	1842.00		1624.00		1778.00		1812.00	
	61 - 75	31	1405.00		1613.50		1559.00		1611.50	
	75 - 93	20	1287.00		1222.50		1142.50		1051.50	
Marital Status	Single	10	609.50	0.371	642.50	0.210	591.00	0.494	570.00	0.654
	Married	95	4955.50		4922.50		4974.00		4995.00	
Education Level	Secondary	9	533.50	0.616	579.50	0.562	485.50	0.994	434.00	0.905
	College	41	2302.50		2226.0		2190.50		2268.00	
	Bachelor	40	1941.50		2047.50		2123.50		2067.00	
	Masteral	15	787.50		712.00		765.50		796.00	
DIAGNOSIS										
• Hypertension	Yes	34	1614.00	0.184	1829.50	0.848	1708.50	0.511	1719.00	0.560
	No	71	3951.00		3735.50		3856.50		3846.00	
• Myocardial infarction	Yes	15	554.50	0.023	542.00	0.021	577.00	0.040	574.50	0.038
	No	90	5010.50		5023.00		4988.00		4990.50	
• Angina	Yes	28	1458.50	0.849	4220.50	0.302	299.50	0.170	1299.50	0.170
	No	77	4106.50		1344.50		4265.50		4265.50	
• Congestive heart	Yes	4	213.50	0.979	222.50	0.858	194.50	0.764	190.50	0.712
	No	101	5351.50		5342.50		5370.50		5374.50	
• Arrhythmia	Yes	5	341.50	0.234	308.00	0.509	360.00	0.142	5250.00	0.440
	No	100	5223.50		5257.00		5205.0		315.00	
• Pulmonary alveolar microlithiasis	Yes	4	358.00	0.011	126.50	0.144	288.00	0.192	353.50	0.015
	No	101	5207.00		5438.50		5277.00		5211.50	

Significant level $\alpha = 0.05$

Table 7 shows the median pain severity in relation to the demographic profile of the respondents with pain. The Kruskal Wallis H test reveals that the median pain severity was statistically higher in men than women for worst, average, and current pain ($p\text{-value} = 0.0246$; $p\text{-value} = 0.0390$; $p\text{-value} = 0.0238$). However, no significant differences in the median pain severity found between the marital status category, educational levels, and age intervals. However, respondents in pain who have not experienced myocardial infarction had higher risk for all pain intensities (worst, least, average, and current), while those who have pulmonary alveolar microlithiasis had lower risk for worst and current pain.

Table 8: Differences of the Degree of Interference of the Pain on the Demographic Characteristics of the Respondents
(RQ E.b: Are there significant differences between the demographic characteristics and degree of interference?)

Characteristics	Group	Frequency	Interference of Pain	
Gender			Rank Sum	P = Value
	Male	76	3966.50	
	Female	29	1598.50	
Age	30 - 45	20	1071.50	0.1841
	45 - 60	34	1729.00	
	61 - 75	31	1454.50	
	75 - 93	20	1310.00	
Marital Status	Single	10	630.00	0.2722
	Married	95	4935.00	
Education Level	Secondary	9	441.00	0.0017
	College	41	2702.50	
	Bachelor	40	1925.50	
	Masteral	15	496.00	
DIAGNOSIS				
• Hypertension	Yes	34	1362.50	0.0025
	No	71	4202.50	
• Myocardial infarction	Yes	15	533.00	0.0158
	No	90	5032.00	
• Angina	Yes	28	1555.00	0.6048
	No	77	4010.00	
• Congestive heart	Yes	4	226.50	0.8071
	No	101	5338.50	
• Arrhythmia	Yes	5	280.5	0.8145
	No	100	362.00	
• Pulmonary alveolar microlithiasis	Yes	4	5203.00	0.0115
	No	101	5203.00	

Significant level $\alpha = 0.05$

Table 8 shows the differences of the degree of interference in the demographics of the respondents in pain. The Kruskal Wallis H test established no significant differences in the sex, age, and marital status category. However, significant differences were found in the educational background. In particular, the post hoc test (Dunn's test) reveals that the degree of interference of the college-level respondents was statistically significantly higher than of secondary-level, but college graduates seemed to have higher degree of interference than of college-level. Also, post-graduates had more wide-ranging interference of the pain in their daily activities than of college-level and college graduates.

Furthermore, respondents who have hypertension, myocardial infarction, and pulmonary alveolar microlithiasis had a lower degree of interference of the pain. Other diagnoses specified have no significant differences in the degree of interference as indicated in Table 8.

IV. Discussion

Pain is a common and distressing symptom in ICU & CCU, It has been reported that majority of patient's experience different intensities of pain during their stay in ICU & CCU, and identify it as one of the greatest source of stress which will markedly affect the daily functioning of critically ill patients⁽¹⁵⁾. The current study was conducted on 105 critically ill patients, to evaluate the severity of pain and the impact of this pain on the daily functioning of critically ill patients. The results revealed the following; majority of the participants were male with average age of 60 years old and married, while more than one third of them were college educated.

Among the health problems specified in the study about one third reported they experienced hypertension, this comes in agreement of Owens 2011⁽¹⁶⁾ who stated that chronic atrial hypertension is an important cardiovascular risk factor and associated with significant morbidity and mortality in general population which need ICU admission. Also the same percentage one third reported to have severe pain in their left shoulder regarding pain intensity majority of participants of the current study rated their worst pain as severe, It may be justified by the fact that cardiovascular problems are the major causes leads to ICU admission which usually associated with left shoulder pain.

The results of this study showed a majority of the participants seemed to have extremely high degree of interference of the pain in all daily activities, It is logically accepted because the previous findings which is the majority of the participants rated their pain as severe and according to Duenas etal2016⁽¹⁷⁾ ,pain can significantly restrict a person's ability to perform activities of daily living .

Results of this study also revealed no significance statistical relation was found between marital status, educational level and age and pain perception this finding contradict with the finding of Wandneretal2014⁽¹⁸⁾ ...and others ^(4,5,6,7), who stated that pain is perceived ,assessed and treated differently depending on a person's sex, race and age moreover Vallerand etal2000⁽¹⁹⁾ found that physicians and nurses prescribe less pain medication to women which is mean gender affect on the perception of pain.

Regarding the effect of demographic characteristics of the participants and its effect on the level of pain interference on the activity of daily life , the study showed no significant relation is noticed except with level of education to the degree that even within the educational categories the difference is apparent , it may be due to the work responsibilities which impeded on the higher graduate from his work position , this comes in line with Dong 2104 &Beydon 2005 ^(20,21) who found that total score of instrumental activity living significantly associated with gender, advanced age ,cognitive impairment and level of education .

V. Conclusion &Recommendation

This study concluded that pain was rated as severe for the critically ill patients participated in this study and also had extremely high degree of interference with the activity of daily life also no significant statistical relation were seen between pain perception and sociodemographic characteristics of the participants while level of education was seen to be significantly correlate with the pain interference with the activity of daily life. Based on the study results, it can be recommended to assess physical functioning early and longitudinally in the critical care units and intensive care units to determine patients at risk of poor physical outcome and effect of daily activities

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