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Research Article

Quality of Pain Assessment for Emergency Department Nurses and Physicians at a Tertiary Hospital

Gassan Abudari[1]*, Dina Aljawi[1], Kholoud Almass[2], Spasie Botha[2] and Sukaina Alhunaidi[2]

[1]*Palliative Care Clinical Nurse Specialist, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia*

[2]*Pain Clinical Nurse Specialist, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia*

***Corresponding Author:** Gassan Abudari, Palliative Care Clinical Nurse Specialist, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia.

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Abstract

Background: Assessment of patients' pain has been identified as crucial for pain management. Studies confirm that clinicians underestimate patients' levels of pain. Poor assessment of pain can eventually lead to undertreating pain and eventually influence patients' quality of life. The Emergency Department (ED) is considered the most challenging area for nurses and physicians to provide quality pain management. The quality of pain assessment has a prominent influence on the process of pain management in the ED.

Purpose of the Study: This study aims to measure the degree of congruence between pain characteristics as described by ED patients and the attending nurses' and physicians' documentation of pain assessment as well as the analgesia prescription pattern by ED and primary physicians.

Method: This study used a descriptive and quantitative design. 131 patients of ED admission were selected based on inclusion and exclusion criteria. The investigators interviewed patients and collected data to measure the level of pain congruency as well as sample demographics.

Results: Patient self-reported mean score was equal to 6.7 (SD = 2.3), whereas the nurses assessed pain mean score was equal to 4.9 (SD = 2.1). The paired t-test showed that the nurses significantly underestimated patients' pain scores $t(102) = 8.4$, $p < 0.001$). This result highlights an overall incongruence of nurses' scores with patient self-rating pain score. Regarding to the physicians, the analyzable scores were too small (n = 16) due to excessive missing documented pain scores by the primary physicians. The mean total number of conformities of nurses documented pain (score, location, frequency and character) was equal to 2.2 out of a maximum possible score of (= 4 points).

Conclusion/Application to Practice: The results indicate a modest compliance to the pain assessment documentation standards for nurses and physicians, which reflects a poor quality of pain assessment among healthcare providers in ED. It is recommended to further investigate the reasons for pain underestimation by nurses and the physicians poor pain documentation. A periodical quality audit is needed to reinforce the application of pain assessment documentation standards. Investigating physicians' pain management knowledge and compliance to pain management guidelines is required.

Keywords: *Pain Assessment; Pain Documentation; Emergency Department; Nurses; Physicians; Saudi Arabia*

Introduction/Literature Review

Pain is considered to be the most common symptom among patients seeking health care in the Emergency Department (ED) [1]. According to one study, the prevalence of pain as a chief complaint can reach as high as 78% [2]. Therefore, assessing and managing pain is a challenge encountered daily by nurses and physicians working in the ED. There are many barriers to effective pain management in the ED, such as lack of time because of overcrowding; lack of pain management knowledge; and health-care professionals' attitudes, personal beliefs and misconceptions about analgesia [3,4]. However, pain management is critically influenced by the quality of the pain assessment [5]. The main objectives for pain assessment is to assist the course of differentiating a diagnosis, set appropriate pain relief approaches, assess the impact of pain on the patient's quality of life and evaluate the response to treatment [6,7]. Hence, poor assessment of pain can eventually lead to undertreating pain, as made evident by inadequate pain analgesia prescription; consequently, this will compromise patients' quality of life and well-being as they become anxious, depressed and emotionally distressed [8,9].

The process of comprehensive pain assessment includes gathering self-reported data from patients, which represents a combination of quantitative and qualitative pain experience [10]. Quantitative data on pain intensity are measured using either a 10-point numerical rating scale (NRS), which is the most commonly used scale, or a verbal rating scale (VRS) that categorizes pain intensity from absent to severe [11]. However, because of the complex nature of pain, these unidimensional assessment tools lack specificity because they focus only on the intensity of the physical pain and disregard the other aspects of pain assessment [12]. Therefore, using multidimensional pain assessment tools is considered to be a more reliable approach in assessing pain through gathering qualitative data about the characteristics of the patients' pain, including location, onset, duration and accompanying symptoms as well as quantification of pain intensity [6].

Despite the presence of pain assessment tools and the availability of international and national pain management standards that emphasize the importance of assessment, pain assessment screening often falls short [13,14]. Previous studies that investigated the quality of pain assessment have shown that nurses and physicians in EDs underestimated patients' pain levels [15]. Additional study results have indicated inadequate pain assessment documentation by nurses and physicians [16,17]. Duignan and Dunn [18] investigated the congruence between ED nurses' assessments of their patients' pain intensity and patients' self-reports. The study showed that the nurses underestimated patients' pain in most cases. Further, and surprisingly, there was no significant correlation between nurses' demographics (i.e. age, pain management training and years of experience) and the pain scores they assigned [18].

Inaccurate pain assessment was also investigated in a similar study, which revealed that ED and inpatient nurses significantly underestimated patients' pain scores. In this case, the pain intensity accuracy compared with patients' self-reports was less than 50% across the various types of pain; musculoskeletal pain was especially noteworthy, with an underestimation of 95% [19]. Another study estimated the percentage of disagreement between the pain scores of triage nurses and patients at 72% [20].

Regarding pain assessment documentation, the results of a study that investigated the extent of pain assessment and treatment in ED clinics showed an alarming lack of documentation, pain treatment and follow-up [13]. Further, according to one study that evaluated ED documentation of patients' pain, a pain assessment scale was used for only 23% of patients at initial assessment and only 19% subsequent to analgesia therapy. Furthermore, nurses were more than twice as likely to document pain assessment than were physicians [16]. In spite of good pain identification by ED nurses and physicians upon patient arrival, the findings of an audit evaluating the quality of pain care in the ED showed that nurses and physicians inadequately documented patients' pain ratings, with reporting percentages of 23% and 11%, respectively [2].

Based on our literature review, all studies that have been conducted in EDs have utilized unidimensional rating scales in the form of NRSs or VRSs to measure the quality of pain assessment and documentation. However, the Joint Commission on Accreditation of Healthcare Organization pain management standards and American Pain Society's recommendations have highlighted the necessity for

comprehensive pain assessment in promoting the optimal quality of pain management, especially when dealing with chronic or cancer pain [21,22]. The findings of a study conducted in outpatient oncology units, which applied this comprehensive approach to evaluate the quality of pain care in patients with advanced cancer using several pain indicators, revealed poor performance of nurses in assessing a few indicators, such as quality of pain (47.6%), timing of pain (47.6%) and alleviating factors (9.5%) [23].

This study was conducted in a high-capacity tertiary health-care facility that is also a regional cancer center. This hospital's pain policies and standards of care mandate that both nurses and physicians conduct a comprehensive pain assessment and document it in patients' electronical medical charts. However, because a majority of pain complaints by patients visiting this ED are probably related to chronic or cancer pain, in combination with the high volume of patients, there are challenges for pain assessment in this ED; examples include the complex nature of pain, crowded conditions and un-investigated barriers such as language barriers and insufficient pain management training. Consequently, these challenges could influence the quality of pain assessment and documentation by ED nurses and physicians.

Aim of the Study

This study aims to examine the degree of congruence between pain as described by ED patients and the attending nurses' and physicians' documentation of pain assessment as well as the analgesia prescription pattern by ED and primary physicians. The results of this study will disclose any barriers and needs for improving pain assessment and management in the ED and inform practitioners and researchers about possible interventions to address such needs as well as future research directions.

Methodology

The research ethics committee at King Faisal Specialist hospital and Research Centre approved this study. The research was based on freely volunteered verbal consent. This research fully conformed with the Declaration of Helsinki.

This study used a descriptive and quantitative design with (a) a purposive sample of ED patients who present to the department with a primary complaint of pain and (b) a convenience sample of ED nurses and attending physicians. The calculated sample size of patients needed was 131 with power of 0.8. Patients were observed only one time in this context and were not followed up longitudinally. Data collection happened between December 2017 and March 2018. Pain assessment documentation in the hospital where the study was conducted is based on the McCaffery initial pain assessment tool, a validated, well-defined, multidimensional pain assessment tool [10].

Two researchers interviewed patients together to ensure the validity of the data gathered. The two researchers waited for a primary ED nurse to complete the assessment for pain complaints, and then the two researchers interviewed the patient to assess and document pain in a data collection tool.

This tool recorded three sets of variables: (a) patients' demographic data (age, gender and primary diagnosis); (b) patients' pain descriptions, similar to pain assessment documentation in electronic medical record, including pain score, location, onset and duration, A additionally, the tool recorded patients' chief pain complaint, e.g., chest pain, abdominal pain or fracture-related pain; and (c) ED nurses' documentation of their own assessment of patients' pain descriptions on the electronic chart. Furthermore, the primary nurse demographic data such as age, gender and previous pain management training were recorded.

Regarding physicians' pain assessment documentation, two researchers interviewed the same patients if they were complaining of pain at the time of the primary physicians' initial assessment. The researchers used the same data collection tool used with nurses. However, in the third set of variables, the investigators recorded primary physicians' demographic data such as age, gender and previous pain management training as well as their specialities and academic levels. Additionally, the investigators also recorded the analgesia prescribed by the physicians.

Scenario

This study was conducted in the ED of a tertiary hospital in Saudi Arabia located in Riyadh city. It is a 936-bed tertiary care facility and a regional cancer centre. It provides advanced care for the adult and paediatric population of Saudi Arabia, including critical care and cardiovascular, oncology, medical and surgical care. Nurses employed in the hospital reflect 30 different nationalities. A majority of the nurses have a cultural and language background different from the patient population. The sample population of patients was obtained by inclusion and exclusion criteria.

Inclusion criteria

Patients who are eligible to participate include the following:

1. Adults over 18 years of age.
2. Patients who are able to use a numerical pain scale.
3. Patients complaining of pain.

Exclusion criteria

Patients who are excluded from participation include the following:

1. Patients who are unable to use a numerical pain scale because of communication difficulties, mental illness, learning disabilities or dementia.
2. Patients who have critical conditions (categories I and II according to the Canadian Triage Acuity Scale).

Statistical considerations

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0 for Windows. Means and standard deviations were used to describe continuous metric measures and frequencies and percentages for the categorical and binary variables. The chi-squared (χ^2) test of independence was used to assess the bivariate association between categorically measured variables. Moreover, the independent groups t-test and One-way ANOVA were employed to assess the statistical difference on continuously measured variables across the levels of categorically measured binary and multi-level factors. The paired samples t-test was used as well to compare patients pain score with their caring team members scoring. Adjustments to these tests were applied where violations to the assumptions of each test were found and we quoted the corrected values of the test and their associated significance values. The count feature in the analytical program was employed to count the number of missing documented pain (intensity, frequency, location and character) in the nurses and physicians' documentation of pain. any missing field was considered as Non-conformity to the hospital pain assessment policy. A total congruence score between Nurses, ED and Primary Physicians with their patients' descriptions of pain characteristics (frequency, location, character and intensity of pain) was computed for each patient's record. This score was recoded using the recode feature in the analysis program into either (0 = Incomplete congruence, 1 = complete congruence) by rating those clinicians' agreements with their patients' descriptors of pain as complete when they had agreed with their patients on all characteristics. Next, we employed the Multivariate Binary Logistic Regression Analysis to assess the combined and individual associations between nurses and patients' characteristics, admission factors and pain management factors with Nurses odds of having had complete documented congruence with patients' descriptions of pain characteristics. Finally, a secondary post-Hoc used to analyze the profiles of the patients received treatment types for significant associations with the patients, nurse and physician classification of pain score levels. Our analysis focused on analyzing admissions, as some of the nurses and physicians may have cared more than one patient in the analyzed data.

Results

A total of 131 patients of emergency department admissions were selected. Patients demographics, pain locations and reasons for seeking ED are shown in table 1. The results showed that most patients were females 56.5%. The mean age of patients was equal to 46.34 years (SD = 17.2). Regarding the chief pain location, most of patient complained of abdominal pain 46.6% followed by those who presented by musculoskeletal pain 31.3%. Although, all patients complained of pain, 27.5% of the sample population sought ED for main reasons other than pain, such as dyspnea (13 patients, 9.9%) and Fever (10 patients, 7.6%). However, Abdominal pain remained the main reason for seeking ED (42 patients, 32.1%). Regarding pain management, most of the patients (47.3%) received Non-opioid pain medications, another (26.7%) of the patients were treated with weak opioids and the rest of the patients (26%) were treated with strong opioids.

	Frequency	Percentage
Sex		
Female	74	56.5
Male	57	43.5
Age (years), mean (SD)		46.34 (17.2)
17 - 27 Years	23	17.6
28 - 37 Years	22	16.8
39 - 47 Years	18	13.7
48 - 57 Years	31	23.7
> = 58 Years	37	28.2
Admitting reason		
Abdominal pain	42	32.1
shortness of breath	13	9.9
Back pain	11	8.4
Chest pain	13	9.9
Fever	10	7.6
Bleeding	5	3.8
Headache	4	3.1
Chief pain complaint location		
Abdominal	61	46.6
Neurological/Neurosurgical	6	4.6
Musculoskeletal	41	31.3
Renal/Kidney	2	1.5
Thoracic	15	11.5
Other	6	4.6
Administered pain medications		
Non-opioid	62	47.3
Weak opioid	35	26.7
Strong opioid	34	26

Table 1: *Patients demographic, admission reasons, pain locations and pain medications. N = 131.*

Table 2 illustrate nurses demographics.

	Frequency	Percentage
Sex		
Female	93	71
Male	38	29
Age(years), mean (SD)		34.23 (7.3)
24 - 31 Years	53	40.5
32 - 38 Years	35	26.7
39 - 46 Years	35	26.7
> = 47 Years	8	6.1
Experience (years), mean (SD)		5.31 (4.9)
1 - 4 Years	75	57.3
5 - 8 Years	28	21.4
9 - 12 Years	13	9.9
> 12 years	15	11.5
Mother Language		
Arabic Speaking	46	35.1
Non-Arabic Speaking	85	64.9
Pain management training		
No	40	30.5
Yes	91	69.5

Table 2: *Nurses demographic and professional characteristics, n = 131.*

The patient self-rated mean pain score was equal to 6.7 (SD = 2.3) out of maximum 10 points in the visual analog scale (VAS), whereas the nurses assessed patient mean pain score was equal to 4.9 (SD = 2.1) out of maximum 10 points on the same scale. The paired t-test showed that nurses had significantly underestimated patients pain score $t(102) = 8.4$, $p < 0.001$), this result highlight an overall incongruence of nurses scores with patient self-rating pain score on average. Mean patients pain score by ED physicians was 6.7 (SD = 2.0) out of 10 on VAS, paired t-test showed that ED physicians pain score did not differ statistically from patients self-rated pain score $t(10) = 1.9$, $P = 0.081$, however, the analyzable scores were equal to ten due to massive missing values of ED physicians documented pain scores. Similarly, primary physicians mean patients pain score was equal to 6.3 (SD = 2.5) out of 10 on VAS, and a paired t-test indicated no significant difference from patients self-rated pain scores $t(16) = 1.4$, $P = 0.115$, again, the analyzable scores were too small (n = 16) due to excessive missing documented pain score by the primary physicians.

The analysis of the nurses and Physicians congruence with the patients' self-description of pain characteristics are shown in the table 3. This table illustrate the numbers and percentages of records with missing fields at the bottom of each pain characteristics for each of the analyzed professionals. To elucidate, the statistical analysis of the nurses congruences showed that majority of the nurses documented pain score (56.3%) mismatched with the patients self-reported pain score and only (43.5%) matched exactly with the patients self-rated pain score on the VAS scale. However, 22.1% of the nurses documented patients pain scores were missing as such were treated as incongruences and included in the mismatched percentage. Next, the majority of the nurses documented pain locations were congruent with that stated by their patients (71.8%) and the rest of the documented pain locations (28.2%) were incongruent which included the 23.7%

of missed documented entry by the nurses. Therefore, these missed documented data were counted as standard of care non-conformity as well as Incongruence with the patients' self-report of pain locations. Similar statistical procedure was used for pain frequency and character. All in all, the mean total number of conformities of nurses documented pain (score, location, frequency and character) was equal to 2.2 out of a maximum possible score of (= 4 points), denoting that the nurses congruence level was equal to (100 X (2.2/4) = 55% Our of a maximum hundred percent complete congruence.

In the same manner, we analyzed the ED department physicians' documentation of their patients' pain congruences and missing fields. The yielded analysis showed that the majority of the ED physicians documented pain level scores (91.6%) were incongruent with the patients' self-report of pain scores which is mainly due to massive missed documentation by ED physicians. Those missing fields, to us, comprised the majority of the incongruences, but few (8.4%) of the ED physicians documented fields were congruent with the patients' self-report of pain scores. Similar statistical procedure was used for pain location, frequency and character. Not surprisingly, the overall mean congruence points score of the ED physicians showed very low congruence, mean = 0.8 out of maximum four points.

Primary Physicians congruences of pain assessment records with the patient's self-report of pain characteristics were treated in the same statistical manner to what applied to nurses and ED physicians. In general, there was substantial missing documentation in all aspects of the comprehensive pain assessment like ED physicians. The mean number of congruences for the Primary Physicians characterization of pain was equal to 1.1 out of maximum four points, which represent a low congruence. Table 3 shows Congruence between Patients and HCW's characterization of pain.

	Frequency	**Percentage**
Nurses pain score level		
Incongruent	74	56.5
Congruent	57	43.5
Missing documentation n(%)	**29**	**22.1**
Nurses pain Location		
Incongruent	37	28.2
Congruent	94	71.8
Missing documentation n(%)	**31**	**23.7**
Nurses pain character		
Incongruent	67	51.1
Congruent	64	48.9
Missing documentation n(%)	**37**	**28.2**
Nurses pain frequency		
Incongruent	62	47.3
Congruent	69	52.7
Missing documentation n(%)	**31**	**23.7**
Nurses mean total congruence level (SD)		**2.2 (1.4)**
ED physician pain score level		
Incongruent	121	92.4
Congruent	10	7.6
Missing documentation n(%)	**121**	**92.4**
ED physicians pain location		
Incongruent	56	42.7
Congruent	75	57.3
Missing documentation n(%)	**53**	40.5
ED physician pain character		
Incongruent	118	90.1
Congruent	13	9.9
Missing documentation n(%)	**113**	**86.3**
ED physician pain frequency		
Incongruent	127	96.9

Congruent	4	3.1
Missing documentation n(%)	**121**	**92.4**
ED physicians mean congruence level (SD)		**0.8 (0.9)**
Primary physician pain score level		
Incongruent	118	90.1
Congruent	13	9.9
Missing documentation n(%)	**115**	**87.8**
Primary physicians pain location		
Incongruent	43	32.8
Congruent	88	67.2
Missing documentation n(%)	**40**	**30.5**
Primary physician pain character		
Incongruent	111	84.7
Congruent	20	15.3
Missing documentation n(%)	**102**	**77.9**
Primary physician pain frequency		
Incongruent	112	85.5
Congruent	19	14.5
Missing documentation n(%)	**103**	**78.6**
Primary physicians mean congruence level (SD)		**1.1 (1)**
Pain intensity score		
Nurses Assessed Pain Intensity Score. mean (SD), n = 102		4.9 (2.1)
ED Physician's documented Pain Intensity Score. Mean (SD) n = 10		6.7 (2.1)
Primary Physician's documented Pain Intensity Score. Mean (SD) n = 16		6.25 (2.5)

***Table 3**: Congruence between patients and HCW's characterization of pain, n = 131.*

To understand the nurses incongruences with their patients records of pain characteristics we analyzed the records of nurse complete versus incomplete congruences for statistically significant differences on key nurse and patient characteristics. The yielded results are shown in table 4. It is important to mention that these congruence levels characterized the patient's records and Not the nurses themselves because our Unit-Of-Analysis remained the patients records across all the analysis and the subsequent analyses. the chi-squared test of independence showed no significant association between nurses' demographics and their patients self-report of pain characteristics. However, those patients record which measured complete congruence between the nurses and their patients had significantly higher nurse measured pain levels (M = 5.9, SD = 1.96) than those records in which the nurses' documentation had at least one or more incongruences (M = 4.6, SD = 2), t = 2.82, p = 0.006. Moreover, due to the very small sample size of valid pain scores for ED and Primary physicians, A Mann-Whitney U Non-parametric test showed that neither of the ED and Primary Physicians pain level scores differed significantly between Nurses congruence profiles. As well, the Pain medications received finally by the patients had No significant association with the Nurses congruence on pain with their patients' descriptions, p = 0.163.

	Nurses congruence with the patients pain description				
	No, n =	**Yes, n =**	**Test statistic**	**p-value**	
Nurses Sex					
Female	76 (71.%)	17 (68%)	$\chi^2(1) = 0.13$	0.714	
Male	30 (28.3%)	8 (32%)			
Nurses Age(years), mean (SD)	33.8 (7.5)	36.2 (6.2)	t(129) = 1.5	0.133	
Nurses Experience years mean (SD)	5.4 (4.6)	5.2 (5.8)	t(129) = 0.17	0.862	
Nurses Mother Language					
Arabic Speaking	35 (33%)	11 (44%)	$\chi^2(1) = 1.1$	0.301	
Non-Arabic Speaking	71 (67%)	14 (56%)			
previous pain management training					
No	33 (31.1%)	7 (28%)	$\chi^2(1) = 0.09$	0.761	
Yes	73 (68.9%)	18 (72%)			
Patients Sex					
Female	61 (57.5%)	13 (52%)	$\chi^2(1) = 0.25$	0.615	
Male	45 (42.5%)	12 (48%)			
Patients Age (years), mean (SD)	45.9 (17.3)	48.2 (17.3)	t(129) = 0.61	0.543	
Patients self-rated Pain intensity, mean (SD)	6.82 (2.3)	6 (2.1)	t(129) = 0.1.60	0.111	
Nurses Assessed Pain Intensity Score mean (SD), n = 102	4.6 (2)	5.9 (1.96)	t(100) = 2.82	0.006	
ED Physician's documented Pain Intensity Score, n = 10	7 (2.2)	5.5 (0.7)	U (10) = 3.5	0.267	Man-whit
Primary Physician's documented Pain Intensity Score, n = 16	5.9 (2.4)	7.7 (2.5)	U(16) = 27	0.307	
Administered Pain medications					
Non-opioid	54 (50.9)	8 (32%)	$\chi^2(2) = 3.62$	0.163	
Weak opioid	25 (23.6%)	10 (40%)			
Strong Opioid	27 (25.5%)	7 (28%)			

Table 4: *Nurses' congruence vs nurses' demographics, patients' demographics, mean pain scores and treatment. N = 131.*

The multivariate logistic Binary Regression was utilized to have better understanding the association between patient and Nurse characteristics with the Nurses incongruence vs congruence simultaneously in documenting the pain characteristics with their patients' self-reports (Table 5). The Multivariate Binary Logistic Regression Model was found to be statistically significant, $\chi^2(10) = 28.3$, $p = 0.002$. Therefore, one or more of those independent variables had a significant association with the Nurse congruence with their patients records of pain when analyzing the patients records as a unit-of analysis. The model predicted probability of Nurse congruences showed a great match with that we observed according to the Non-statistically significant Hosmer-Lemeshow Goodness-Of-Fit, $\chi^2(8) = 6$, $p = 0.647$, indicating the overall model accuracy in prediction in general, also the Operating Receiver Curve (AUC ROC) was generally substantial, AUC = 82.9, $p < 0.001$ that assured the overall accuracy of the model at prediction.

	B	S.E.	Wald	Adjusted Odds Ratio	95% C.I. for O.R		p-value
					Lower	Upper	
Nurses' Sex	-.018	.895	.000	.982	.170	5.671	.984
Nurses' Age (years)	1.383	.407	11.556	3.987	1.796	8.849	.001
Nurses' experience (years)	-.145	.362	.160	.865	.426	1.759	.689
Nurses Previous Pain training	1.029	.664	2.405	2.800	.762	10.284	.121
Nurses Mother Language = Non-Arabic	-1.206	.779	2.400	.299	.065	1.377	.121
Administered Pain medications Type	.989	.380	6.792	2.689	1.278	5.659	.009
Patients age	.470	.219	4.590	1.599	1.041	2.458	.032
Patients pain location	.071	.053	1.780	1.074	.967	1.193	.182
Patients verbalized pain intensity	-.197	.117	2.824	.821	.652	1.033	.093
Nurses sex X nurses language, (Male X Non-Arabic speaking)	-3.326	1.505	4.886	.036	.000	.686	.027
Constant	-6.77	2.087	10.525	0.001			.001

Table 5: *Multivariate logistic analysis explaining the individual and joint association of nurse and patient characteristics with the nurses congruence of pain characteristics documentation with their patients verbalized pain characteristics.*

The analysis model results showed that older Nurses tended to have significantly greater odds of congruence in their pain assessment documentation with that described by their patients self-report, p = 0.001. Further, nurses age tend to rise incrementally the probability of having complete congruence between the nurses and patients on pain characterization, O.R = 3.99. In other words, if nurses age tends to rise by one unit, their odds of being completely congruent with their patients' descriptors of pain rises by a factor of 3.99 times. However, the Nurses experience years, pain management training, and primary language did Not converge significantly on the odds of absolute congruence between documented Nurse and patients pain descriptions combined (p > 0.050).

The analysis from Binary Logistic Regression also showed that the patients administered pain medications were significantly associated with the Nurses congruence of their pain assessment with their cared patients O.R = 2.7, p = 0.009. Furthermore, the analysis showed that older patients tended to have significantly more congruences with their Nurses on average, so as the patients age rises by one unit their odds of having congruently documented nursing pain levels rises by 1.6 times, p = 0.032. However, patients self-reported pain level on the VAS score and their pain location were Not significantly associated with the Nurses congruence level with their patients self-endorsed pain characteristics.

A post-hoc secondary analysis examined the patients received pain control drugs profiles for statistically significant associations with the classified pain levels of the patients report and nurses report. Firstly, we divided the patient and Nurse VAS scored pain levels into three main pain levels groups (Mild = 1 - 4 pain level points, Moderate = 4 - 7 pain level points, and Severe = > 8 pain level points) and assessed their association with the types of drugs along with the other key relevant factors like the physicians and nurses total congruence scores. The analysis showed the Patients self-report of pain did Not correlate significantly with the pain treatment potency they had received according to the chi-squared test of independence, p = 0.329. However, by examining the contingency table 6 showed that many patients (23.5%) with low pain self-reports had received strong opioids and several patients with moderate level pain (46.8%) had received Non-opioids. Furthermore, the analysis showed that most patients with severe self-report of pain (38.7%) were treated with Non-opioids as well. From another hand, the nurses classified pain assessment levels of their patients were Not significantly associated with the potency of the pain treatments their patients have received (p = 0.312) according to the chi-squared test of association. However,

the contingency table analysis unveiled a similar pattern to that we found for the patients self-reported pain levels, many of the patients assessed with mild pain had received high potency opioids (46.2%) also most patients assessed by the nurses with moderate level pain had received weak opioids too, but also few patients with severe pain level as measured by the nurse had received Non-opioids. However, the yielded analysis showed that both Nurses and Physicians total congruences did Not differ statistically across the patients' treatment types.

	Administered Pain Treatment				
	Non-opioids	Weak opioids	Strong opioids		
	n = 62	n = 35	n = 34	Test statistic	p-value
Patient pain self-rating					
Mild	9 (14.5%)	7 (20%)	8 (23.5%)	$\chi^2(2) = 4.62$	0.329
Moderate	29 (46.8%)	16 (45.7%)	9 (26.5%)		
Severe	24 (38.7%)	12 (34.3%)	17 (50%)		
Patients' nurse rated pain level					
Mild	21 (43.8%)	14 (50%)	12 (46.2%)	$\chi^2(2) = 4.77$	0.312
Moderate	22 (45.8%)	9 (32.1%)	7 (26.9%)	LR	
Severe	5 (10.4%)	5 (17.9%)	7(26.9%)		
Nurses congruence score	2.1 (1.4)	2.2 (1.5)	2.3 (1.5)	f(2,128) = .21	0.814
ED congruence score	0.82 (0.84)	0.9 (1)	0.65 (0.7)	f(2,128) = 0.63	0.543
Primary congruence score	0.9 (0.9)	1.3 (1)	1.3 (1.1)	f(2,128) = 2.8	0.064

Table 6: *The bivariate analysis of the patients pain management profiles' N = 131.*

Discussion

Several studies have investigated the congruency of pain assessment in emergency departments. However, most of these studies strictly used NRS as the only parameter to ascertain the level of congruence. This study utilized a broader approach through measuring the documentation of both qualitative and quantitative comprehensive pain assessment parameters to evaluate the quality of pain assessment [24].

One main finding of this study was the modest compliance with pain assessment documentation standards by both nurses and physicians. This is a defect in the quality of pain assessment among health care providers in ED. The physicians' percentage of pain documentation was less than 10%, whereas nurses' documentation of pain characteristics was around 75%, regardless of the level of congruency. Lewen., *et al*. [13] found that pain was documented by nurses and physicians in half of the patients' records, even in serious cases such as chest pain. The findings of another study showed that nurses had a lower percentage of pain documentation than the nurses in this study did. Furthermore, the physicians were less likely to document pain assessment than the nurses were [13]. The phenomenon of inadequate pain documentation among nurses is related to internal factors such as knowledge gaps; misconceptions about assessment; and a lack of experience, skills, and competence and to external factors related to organizational barriers such as insufficient feedback; lack of quality audits; and managerial issues [13,25]. Mandating pain assessment documentation in a timely manner was one strategy that showed effectiveness [26]. However, nurses remained inadequate in their documentation in electronic medical records despite the presence of an obligatory pain policy. Regarding physicians, poor compliance with pain documentation may indicate a deficiency in the quality of pain assessment. However, based on our observations and pain prescription patterns, it is evident that physicians do assess patients' pain. Yet

physicians focus more on documenting disease management and do not prioritize pain documentation. The results of an observational study showed that physicians assessed and treated pain, but they performed unsatisfactorily in recording those activities [27].

The findings of this study are consistent with those of other studies in which nurses significantly underestimated the pain intensity scores of patients [18,19,28]. When estimating pain, the nurses' mean score was 4.9, whereas the patients' mean score was 6.7. Furthermore, only 43.5% of the nurses' documentation exactly matched the patients self-rated pain scores. The results of the study by Puntillo., *et al*. [19] showed a significant difference between the mean pain intensity scores of triage nurses and those of patients (5.1 versus 7.5, respectively). Another study also found that a majority of nurses underestimated pain intensity, finding that the nurses' mean score was 5.2, whereas patients' mean score was 6.4 [18]. Regarding the complete congruence of the comprehensive pain assessment, almost half of the nurses' pain documentation were completely congruent. Furthermore, the nurses who are completely congruent in their pain descriptions tended to make significantly better estimates of patients' pain scores, which often matched their patients' scores precisely. The highest congruent pain assessment characteristic was pain location, whereas the pain intensity score was the lowest. Pain location was found to be the category most frequently documented by nurses in previous studies that assessed postoperative pain documentation [29,30]. Because of massive missed documentation of pain scores among ED and primary physicians, the results were too unreliable to reflect the level of congruence, despite the fact that a limited number of physicians provided significant documentation for pain scores. Furthermore, ED and primary physicians earned low scores for complete congruence. In general, the physicians focused mainly on documenting pain location, which is directly related to the disease manifestation according to their specialty; for example, cardiologists tend to document only chest pain.

To explore the reasons for the difference in pain score estimations, several variables related to nurses' demographics such as age, gender, and previous pain management training were investigated. None of these variables were found to be correlated significantly with the difference in pain scores. One of the significant findings of the prediction model was that it indicated that as the age of the patients and nurses increases, the probability of making complete congruent pain assessments also increases. Similarly, Duignan and Dunn [18] showed that none of these variables correlate with differences in pain intensity scoring among nurses working in emergency departments. However, an observational study concluded that nurses' age and years of experience in ED were influential factors in the congruence of pain assessment because young nurses tend to overestimate pain and nurses with more experience tend to underestimate pain [28]. Although there was no influence of pain training on the congruency and documentation of pain, the application of pain education has previously been found to be largely effective in improving nurses' pain documentation [25]. In addition, several studies highly recommended the implementation of pain training to enhance nurses' pain assessment congruence [31]. The discrepancy between nurses and their patients in pain rating is influenced by personal judgment and beliefs about certain types of diseases, patients' personalities, past medical history, and age [32-34].

Regarding pain management in ED, there was no significant association between the nurses' congruence and the medication received. However, the contingency table 4 showed slightly more of the patients who received weak opioids tended to have nurses' records that showed exact congruence with their self-reports, whereas most of the patients who received non-opioids were, in fact, found to have nurses' records that mismatched their own pain characterizations. Also, more of the patients who received strong opioids were assessed by congruent nurses. According to the prediction model, it is evident that the potency of medication given to patients tends to rise from non-opioid to weak then to strong opioids as the likelihood of their caregiving nurses' congruence increases with their own patients' pain descriptions. Moreover, there was no significant association between the pain score ranking (mild, moderate, and severe) of nurses, physicians, and patients and the pain medication potency prescribed. This finding should raise concerns about pain management practice and the application of pain management guidelines among ED and primary physicians.

The findings of a study investigating ED physicians' opioid prescriptions showed that several factors influenced the physicians' decisions to manage patients pain with opioids, including issues related to pain assessment; patients' considerations regarding fear of misuse;

and issues related to policy, health care systems, and practice [35]. The results of a previous study found that the odds of prescribing opioids significantly increases with increasing pain severity [17]. However, the results of another study showed that 86% of patients with severe and moderate pain did not receive any pain analgesics [36]. The results of a United States national survey showed that older patients are less likely to receive pain medication in emergency visits, which is probably because of concerns about side effects such as sedation and severe illness or issues related to elder patients such as cognitive impairment and a failure to request analgesia [33]. In general, inadequate pain management was influenced by several factors, including poor pain assessment, inadequate knowledge of and training in pain management among physicians, and failure to implement pain management guidelines and protocols in the emergency department. Thus, these factors could also influence physicians' decisions in prescribing opioids [3,35]. However, one of the limitations of our study is its focus on investigating the pattern of analgesia prescription in relation to pain intensity without investigating the internal and external predisposing factors.

Another limitation of our study is that it mainly investigated the internal variables that are related to nurses' and patients' demographics that can contribute to this underestimation without looking into external variables such as a crowded ED and a staff shortage. The results showed insignificant associations with these internal variables. Therefore, a qualitative study is recommended to investigate nurses' and physicians' opinions about pain assessment practices in ED. Moreover, researchers should further investigate the reasons for pain underestimation by nurses and the poor pain documentation by physicians.

Periodic internal quality audits are also recommended to reinforce the application of pain assessment documentation standards. Regarding pain management practice, further investigation of physicians' pain management knowledge of and compliance with pain management guidelines is recommended.

Conclusion

Comprehensive pain assessment represents the best approach to validate patients' pain in ED. However, the process of assessing pain remains one of the challenges for clinicians in ED because of several internal and external variables. Despite joint commission recommendations and hospital regulations mandating pain assessment, the quality of pain assessment and documentation among nurses and physicians in our ED is inadequate. Consequently, pain management is influenced by the quality of pain assessment, which is evident from pain medication prescription patterns. Improving pain assessment and management among practitioners requires a quality performance improvement project that utilizes a multidimensional approach to resolve issues related to patients, nurses, physicians, and the hospital system. Additional focus on pain training and periodic feedback cycles is also necessary to ensure improvement in the quality of patients' pain assessments.

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