

Pain practices in a Saudi emergency department

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ABSTRACT

الأهداف: النظر في ممارسات الألم في قسم الطوارئ السعودية.

الطريقة: أجريت دراسة اترابية استعادية خاضعة لتحليل البيانات القابلة للمقارنة و سجلت حالات 2199 مريض. ومن خلال مراجعة السجلات الطبية المنظمة لجميع المرضى البالغين أكثر من 14 عام الذين قدموا إلى قسم الطوارئ خلال 1 أغسطس حتى 31 أكتوبر 2006م و مستشفى الملك عبد العزيز – الإحساء – المملكة العربية السعودية. تبين أن هناك تنوع في الحالات المتعرضة للألام باختلاف أنواعها من مرضى تكسر الدم المنجلي، والصداع، وآلام الظهر، والمغص الكلوي، والإصابات المتفرقة. و قد تم التأكد من مدى الألم عند المرضى لدى وصولهم باستخدام جهازين للقياس.

النتائج: تم استقبال 2199 زائر خلال فترة الدراسة و قد كان منهم 1190 ذكر (54.1%). كان متوسط العمر 24.4 ± 10.6 عام. لم يتلقى ربع المرضى أي مسكنات في قسم الطوارئ ED. وكان متوسط الوقت لاستخدام المسكن الأولي 54 دقيقة. غادر حوالي ربع المرضى إلى منازلهم دون الحصول على أي مسكنات. أوضحت البيانات انخفاض مستوى تقييم الحالات المبدئية للمريضات الإناث وحاجتهن لوقت أطول بما يتعلق بمعالجتهن بالمسكنات الأولية للتخفيف من آلامهن.

خاتمة: تبين البيانات المتوفرة لدينا أن حالات البالغين الذين يشكون من أوضاع مؤلمة في قسم الطوارئ ED عادة ما يتلقون علاج غير كافي للتخفيف من آلامهم أو لا يتم صرف أي علاج مسكن لهم.

Objectives: To describe analgesic practices among adults presenting to the emergency department (ED), and to determine factors affecting the timeliness and adequacy of analgesia.

Methods: A retrospective cohort study with descriptive and comparable data analysis was conducted on 2,199 patient visits. This included a structured medical records review for all adult patients (over 14 years old) from August 1, 2006 to October 31, 2006 that presented to the Emergency Department (ED) of King Abdul-Aziz Hospital, Al-Ahsa, Kingdom of Saudi Arabia. Patients

with acute pain episode associated with sickle cell disease, headache, backache, renal colic, and trauma (specific isolated injuries) were included. Patients quantified their pain on arrival by using 2 scales.

Results: There were 2199 patient visits during the study period that included 1190 males (54.1%). The mean age was 24.4 ± 10.6 years. One quarter of all the patients did not receive any analgesia in the ED. The median time to administration of initial analgesic was 54 minutes. Approximately one fourth of all patients were sent home with no analgesics. Data identified female patients and low triage level as the predictors for longer time to initial analgesia.

Conclusion: Our data illustrate that adults with painful conditions in our ED often receive inadequate or no analgesic treatment.

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Pain is frequently the reason for attending an emergency department (ED), and it is often under-identified.¹ Appropriate pain management is a fundamental part of the art and science of practice of emergency medicine. Previous studies have shown that more than 70% of patients visiting the EDs have a chief complaint related to pain.² Oligoanalgesia has been widely recognized as an issue in ED patients.^{3,4} This could be explained: 1. By insufficient evaluation of pain, 2. By delayed prescriptions even for severe pain, and their inadequate delivery^{5,6} both because of lack of education on pain assessment and limited impact of published guidelines and healthcare policy,⁷ and 3. By

doctors having other priorities, like 'the need of pain for making a diagnosis,' or 'the priority given to life threatening diseases'. In addition, pain is observed in a great variety of situations with different levels of gravity, whereas acute pain treatment is not often the first goal of medical management. One of the quality indicators that are used as a clinical indicator for assessing the quality of emergency care is time to analgesia.^{8,9} We found that a number of studies have looked at inadequate pain relief in the emergency setting, very few have looked at time to analgesia, and mostly emphasized on inadequate doses of analgesics.¹⁰ To improve ED pain management, it is important to understand the current state of patients' pain experiences, as well as the clinicians' analgesic practices. The objective of this study was to describe the analgesic practices among adults for the treatment of the 5 common painful conditions presenting to our ED, and to determine the factors that affects the timeliness and adequacy of the analgesia.

Methods. A retrospective cohort study was conducted in the ED of King Abdul-Aziz Hospital, Al-Hasa in the eastern region of Kingdom of Saudi Arabia. We reviewed the records of 2199 adult patient visits presenting to the ED from August 1, 2006 to October 31, 2006. Patients included those with an acute pain episode associated with sickle cell disease (SCD), headache, back ache, renal colic, and trauma (specific isolated injuries). Exclusion criteria were age younger than 14 years or with multiple trauma. The Regional Research committee approved the study proposal however, the study was exempted from ethical approval due to its retrospective design. Pain intensity was scored by a previously validated numeric response scale (NRS), and/or the adjective response scale (ARS) on arrival. The NRS is a numeric scale used to measure the intensity of pain that is simple to use and easily understood.¹¹ The patient is asked to select a number on a scale from 0-10, to represent the intensity of pain at a given moment. The ARS, a verbal rating scale, consists of 5 ranked word descriptors, "none," "slight," "moderate," "severe," and "agonizing."¹² The NRS score was preferentially used to assess pain intensity and pain progression, and the ARS score was used when patients did not provide an NRS score. Unfortunately, pain scores at the time of discharge are poorly recorded in the ED medical records, and we could not obtain this information.

Protocol of pain assessment. Pain intensity was defined as "severe" if the NRS score exceeded 6 points, or if the ARS score was "severe" or "agonizing." Pain intensity was defined as "moderate" if the NRS score was from 4-6 points, or if the ARS score was "moderate," and low if the NRS score was from 1-3 points, or if the ARS score was "slight." We abstracted the data from the chart

into a standardized spreadsheet. A structured medical record review was used to abstract all data from the charts of 5 eligible conditions, including the following outcome variables: name of painful condition, time of arrival to the ED, analgesic agent and dose, route, and time of administration of the initial analgesic. All pain scores were abstracted as documented in the medical record using a scale from 0-10. The median time of administration was calculated by subtracting the time the first analgesic agent was provided from the time of arrival in the ED. Additional variables abstracted included the patients' demographics (gender and age), triage level, whether intravenous (IV) access was obtained, disposition from the ED, and prescriptions given from the ED. Analgesic agents were categorized as narcotic or non-narcotic. Analgesic routes were categorized as IV, intramuscular, or oral. Patients were then compared on the basis of these demographic and clinical characteristics to determine whether they differed from one another, and whether any factors were significantly associated with patients suffering and delay to analgesia. The extractor was not blinded to the study design. Triage priority levels were recorded as 1-5 using the Canadian Triage Acuity Scale (CTAS) triage system.¹³ Triage level 1 is the highest priority and reserved for immediate life-threatening situations, while level 5 indicates the lowest priority. It incorporates pain level into the grading of triage level.

Statistical analysis. Data was stored electronically in a security password-protected Excel database. Descriptive and comparative statistical analysis was performed by the Statistical Package for Social Sciences version 16 (SPSS Inc, Chicago, IL, USA). Descriptive statistics were used to report the time to administration of initial analgesic, and to describe agents, doses, and routes of administration. Mean, median, standard deviation and proportions were used when appropriate. Univariate analysis was carried out by Mann-Whitney U test, or the Kruskal-Wallis tests to identify differences in time to administration of initial analgesic between the following groups: gender, triage level, pain score on arrival, and IV access. Due to the small number of patients who were assigned a triage score of 1, 4, or 5, the triage score was dichotomized to high and low levels, and analyzed as 1 or 2 versus 3, 4, or 5. Mean and 95% confidence interval (CI) of the differences between groups are reported. Spearman's rank order correlation coefficient was calculated to assess the relationship between age and time to administration of initial analgesic. Multiple logistic regression was performed to assess the relationship between all variables and time to initial analgesia. Associations are expressed as odds

ratios (ORs) with 95% CI. All tests were 2-tailed, and the statistical significance was set at $p < 0.05$.

Results. There were 2199 patient visits during the study period. It included 1190 males (54.1%), and 1009 females (45.8%). The mean age of the studied patients was 24.4 ± 10.6 years. There were 517 (23.5%) patients with severe pain (triage category 1 and 2), while 1682 (76.5%) patients have low to moderate pain. The distribution of patient visits was as follows: SCD 870 (39.5%), trauma 978 (44.5%), headache 159 (7.2%), backache 90 (4.1%), and renal colic 102 (4.6%). Ten percent of patients were admitted to the hospital because of their pain or injury. In the ED, only 77% of patients with these acutely painful conditions received analgesic medications (Table 1). The median time to administration of initial analgesic was 54 minutes (25th-75th interquartile range [IQR], 32-84 minutes). Among the analgesics, narcotics were given to

832 (49%) patients, while 868 (51%) patients received non-narcotics alone. When narcotics were given, 40% of patients received less than the usual initial dose recommended. The ED analgesic treatment for specific diagnoses is shown in Table 1. For those that have pain with SCD, 85% of patients received analgesics. There were less females than males with this condition receiving medication for pain ($p=0.01$). Only 63% of all patients with trauma received analgesics, and there was no difference in gender among those who received the analgesics. However, all the patients with headache, backache, and renal colic received analgesics in the ED. Sick cell disease is clearly very common in our ED, and we also analyzed the data excluding these patients to ensure that the conclusion applies more generally. It showed that even when the data is analyzed by excluding SCD patients, it does not change the results of the study. We found that only 75% of all patients received prescriptions for analgesics when leaving the ED (Table

Table 1 - Descriptive data of emergency department patients.

Variables	Sickle cell	Trauma	Disease Headache [†]	Backache	Renal colic [†]	Total [†]
Number of visits	870	978	159	90	102	2199
Age, mean \pm SD	22.4 ± 11.5	27.0 ± 10.7	32.3 ± 14.3	27.0 ± 10.7	39.0 ± 16.0	24.4 ± 10.6
Female, n (%) [*]	487 (56.0)	348 (36.0)	93 (58.4)	33 (37.0)	48 (47.0)	1009 (45.8)
Triage level, n (%)[*]						
1	1 (0.1)	11 (1.1)	1 (0.6)	0 (0)	0 (0)	13 (0.6)
2	252 (29.0)	195 (20.0)	21 (13.2)	12 (13.3)	24 (23.5)	504 (22.9)
3	576 (66.2)	529 (54.1)	104 (65.4)	59 (65.6)	64 (62.7)	1332 (60.6)
4	41 (4.7)	221 (22.6)	33 (20.8)	19 (21.1)	14 (13.8)	328 (14.9)
5	0 (0)	22 (2.2)	0 (0)	0 (0)	0 (0)	22 (1.0)
Arrival pain score (mean \pm SD) [*]	7.4 ± 1.3	6.4 ± 1.4	5.4 ± 1.3	6.2 ± 1.2	7.2 ± 1.5	6.8 ± 1.3
IV access obtained, n (%) [*]	525 (60.3)	418 (42.7)	96 (60.4)	44 (48.9)	85 (83.3)	1168 (53.1)
Initial analgesic agents, n (%)						1700 (77.3)
Morphine sulfate	214 (24.6)	7 (0.7)	11 (5.5)	0	0	232 (13.6)
Pethidine	170 (19.5)	48 (5.0)	23 (11.5)	9 (10.0)	18 (17.6)	268 (15.8)
Tramadol	163 (18.7)	101 (10.3)	41 (20.5)	14 (15.5)	28 (27.5)	348 (19.8)
Voltran	151 (17.4)	383 (39.1)	56 (28.0)	41 (45.6)	44 (43.1)	675 (38.4)
Buscopan	0 (0)	0 (0)	0 (0)	0 (0)	24 (23.5)	24 (1.4)
Ibuprofen	12 (1.4)	32 (3.3)	21 (10.5)	16 (17.8)	6 (5.9)	87 (4.9)
Acetaminophen	24 (2.8)	44 (4.5)	32 (16.0)	10 (11.1)	0 (0)	110 (6.5)
Others			16 (8.0)			16 (0.9)
None	136 (15.6)	363 (37.1)	0 (0)	0 (0)	0 (0)	
Initial analgesic route, n (%)						
Intravenous	576 (33.9)					
Intramuscular	933 (54.9)					
Oral	191 (11.2)					
Prescription on discharge, n (%)	644 (74.0)	672 (68.7)	149 (93.7)	84 (93.3)	96 (94.1)	1645 (74.8)

Data represent individual patients' visits. ^{*}variables analyzed by logistic regression, [†]total exceeds number of visits due to use of multiple drugs, IV - intravenous. SD- standard deviation

1). There was no gender difference in patient discharged with prescriptions to take analgesics at home. Sixty-two percent of patients who were discharged with medication received narcotics. For patients with sickle cell crises and trauma, only 68% and 62% were discharged with prescriptions for analgesics. However, more than 90% of patients with headache, backache, and renal colic went home with pain medications. Univariate regression with longer times to administration in minutes (median) of the initial analgesic agent was carried out as shown in Table 2. It revealed that female gender, patients assigned at low triage level, and having no IV access have statistically significant longer times to administration of initial analgesic agent. Table 3 identifies the final model for multiple logistic regression, and revealed that female patients and patients with low triage level remained significant predictors of longer times for receiving the initial analgesic in this model.

Table 2 - Univariate analysis of variables associated with delay in administering initial analgesic.

Variables	Time to analgesia in minutes Median	P-value
All patients	54	
Gender		0.001
Female	65	
Male	43	
Age, years		0.52
<40	56	
>40	52	
Pain score on arrival		0.22
<7	57	
>7	50	
Triage level		0.001
Low (3, 4, and 5)	66	
High (1 and 2)	43	
Intravenous access		0.004
No	68	
Yes	40	

Table 3 - Final model* of predictors for time to initial analgesia in the emergency department.

Variables	Increased time to initial analgesia Odds ratio (95% confidence interval)
Gender	
Female	2.65 (1.35 - 5.63)
Male	1
Triage level	
Low (3, 4, and 5)	4.69 (2.12 - 7.85)
High (1 and 2)	1
Intravenous access	
No	0.63 (0.34 - 1.97)
Yes	1

*variables were included in the logistic regression model, and a backward stepwise procedure was used to include in the final model only factors independently associated with increase time to initial analgesia

Discussion. In this study, we found that almost a quarter of patients who seek care in our ED for acute, painful conditions do not receive analgesics, and there is a median delay of 54 minutes in providing initial analgesia. Narcotics are used as commonly as the non-narcotics, but the doses were usually less appropriate. Health care providers have an obligation to treat patient's pain and suffering according to philosophical and ethical principles. Furthermore, the Joint Commission for International Accreditation (JCIA) has mandated routine pain assessment in hospitals.¹⁴⁻¹⁶ Patients expect rapid pain relief in the ED, an expectation that is not met in many EDs (including ours) despite the availability of evidence-based pain management guidelines.^{7,17,18} Although EDs are faced with problems of overcrowding, a delay of 54 minutes leaves much room for improvement. This may be achieved by standardized triage policies and implementation of standing orders that would allow nurses to administer analgesic agents before physician evaluation. We identified several factors that contributed to delays in receiving initial analgesics. Patients assigned a lower triage priority waited an average of 45 minutes longer before receiving their first analgesic, compared with patients assigned a higher triage priority, despite pain scores being equal. The triage nurse plays a critical role in determining how quickly patients with an acute pain episode will be placed in a room and evaluated by a physician. This has a direct effect on time to receiving analgesia. If a triage nurse assigns a lower triage priority level, patients will wait significantly longer before receiving pain relief in the current atmosphere of overcrowding.

We also identified a gender disparity in time to initial analgesia. Female patients waited a mean of 24 minutes longer than the males for analgesic administration, despite no statistically significant differences in initial pain scores. It is unclear if the patients in our study actually presented to the ED with differing pain experiences, or if the delay in the administration of opioids may be attributed to gender bias. We have also analyzed pain severity at arrival in univariate regression, but it is not found to be statistically significant with time to administration of initial analgesic. In the univariate analysis, we also found that the lack of IV access contributed significantly to delays in the administration of an initial analgesic. This delay did not remain significant in the multivariate model, but is still worth discussing. The delay may be secondary to multiple unsuccessful attempts as IV access is often difficult for persons with SCD due to diseases' complications, and many previous venous access attempts. This delay could be avoided by instituting protocols of immediate subcutaneous (SQ) administration of

an opioid if IV access is unsuccessful with the initial attempt. We understand that SQ administration of an opioid is possibly not the best alternative to IV, but is recommended because intranasal narcotics are not available in the Kingdom. The intramuscular route is not recommended because it is associated with unreliable absorption and the potential to cause muscle and soft tissue damage.¹⁷

Sickle cell disease is common in eastern Saudi Arabia. In contrast to American Pain Society (APS) guidelines,¹⁹ only 63% of patients received narcotics with lengthy delays. Only a quarter of patients received morphine. Many of our patients had multiple frequent visits. It is possible that patients with frequent ED visits may be at risk for being perceived as "drug seekers," and it is not known whether emergency physicians may subconsciously delay administration of the initial analgesic. More than half of the patients received the initial drug intramuscularly. It is not known whether it is due to the difficulty with IV access, or the preference of the emergency physicians.

In addition, a need for improving pain management practices in trauma patients was identified. A recent retrospective study of 646 patients with fractured neck of femur in 5 Australian states showed that approximately 70% of patients received analgesia.²⁰ Similar to another study,²¹ our study revealed that 63% of patients with musculoskeletal injuries received analgesia, and 20% received narcotics. Headache is an uncommon symptom in alert patients presenting to the ED. Our study revealed that headache accounted for 0.5% of new patient visits, and many of them reported moderate-to-severe pain. We found that more than 90% of patients were diagnosed with migraine, tension, or mixed-type benign headache. As found in a large US study,²² polypharmacy was common in our study because many patients received at least 2 classes of medication, and parenteral agents were commonly used. Approximately two thirds of adults suffer from back pain at some time during their life. While most acute attacks settle rapidly, residual symptoms and recurrences are common. Thirty patients presented to our ED every week because of acute low back pain, and many of these were treated with non-steroidal analgesics. We found that a quarter of our patients received narcotics.

Acute renal colic is a common, often recurrent condition with an annual incidence of 1-2 cases per 1000, and approximately 10% of cases attend the ED. Similar to a French study,²³ we found that almost all patients received analgesia, and the proportion of narcotics was almost equal to non-narcotics.

There have been few studies on pain control after discharge in the general ED setting. We found that 25% of patients were sent home without the drug prescription, which is consistent with the literature.²⁴ However,

another study noted that half of the patients treated for acutely painful conditions did not receive prescriptions for pain management at discharge.²⁵ The literature shows that the improvement in pain management in ED patients will depend on documenting pain intensity using validated scales, establishing clear guidelines for use of analgesics, and educating ED staff in pain management.²⁶⁻²⁸ Educational strategies to provide information on analgesic options and its use have resulted in higher rates of ED patient satisfaction.²⁹ Based on the finding of the study, we have developed medical directives that allows nurses to administer simple analgesia, if needed, to patients before being seen by a physician and specific pain management guidelines in our ED. Several limitations must be considered in the interpretation of the results of our study. First, it was a single hospital study and therefore, generalization would be a problem. The study excluded a significant number of patients presenting to the ED with pain, thus the findings could be affected considerably by selection bias. Unfortunately, non-pharmacologic pain control methods (such as ice and elevation) are poorly recorded in the ED medical records and so we could not reliably obtain this information. For this reason, our study may underestimate the frequency of pain control interventions. The retrospective chart review design has all its potential limitations. There were a large number of physicians that participated in the study, and there was no control for physician's characteristics such as training, experience, or age. It was not possible to address the issue of patient preference of route of administration. Similarly, we were not able to measure the contribution of overcrowding, or the effect of repeat visits by an individual patient on longer wait times for initial analgesic administration.

In conclusion, in this study approximately a quarter of the patients do not receive any analgesia in the ED, and a significant number did not receive analgesic prescriptions- when they left ED. This finding suggests that the phenomenon of oligoanalgesia is widespread and resistant to cultural differences. Changes in everyday practice are required to improve the management of pain, and care providers should be trained to integrate pain and its relief into the assessment of the emergency level.

Further research is underway to study the effect of these strategies and guidelines on the delivery of rapid analgesia for patients with an acute pain episodes in the ED.

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