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## Original Contributions

### THE PATIENT VS. CAREGIVER PERCEPTION OF ACUTE PAIN IN THE EMERGENCY DEPARTMENT

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**Abstract**—The assessment and management of acute pain is an essential part of care received in the emergency department (ED). This study was undertaken to measure how ED caregivers interpret and treat acute pain. A convenience cohort of 71 patients in a tertiary care teaching hospital were asked to rate their pain on arrival to the ED using a visual analog scale (VAS) and numerical rating scale (NRS). These ratings were compared with those given by their nurse and physician. Both physicians and nurses gave statistically significantly lower NRS and VAS pain ratings than those reported by the patients. Nurses' NRS pain ratings were found to be lower than physicians' ratings of the same patients. On chart review, no pain scale assessments were employed, and only one chart noted that a patient's pain had been relieved after treatment. Approximately half the patients (49%,  $n = 35$ ) felt on discharge from the ED that their pain had not been relieved. Pain assessment and treatment in the ED appears to be inadequate. The integration of pain assessment before and after treatment is essential in monitoring the effectiveness of pain management in the ED. © 2000 Elsevier Science Inc.

**Keywords**—acute pain; assessment; management; visual analog scale (VAS); numerical rating scale (NRS)

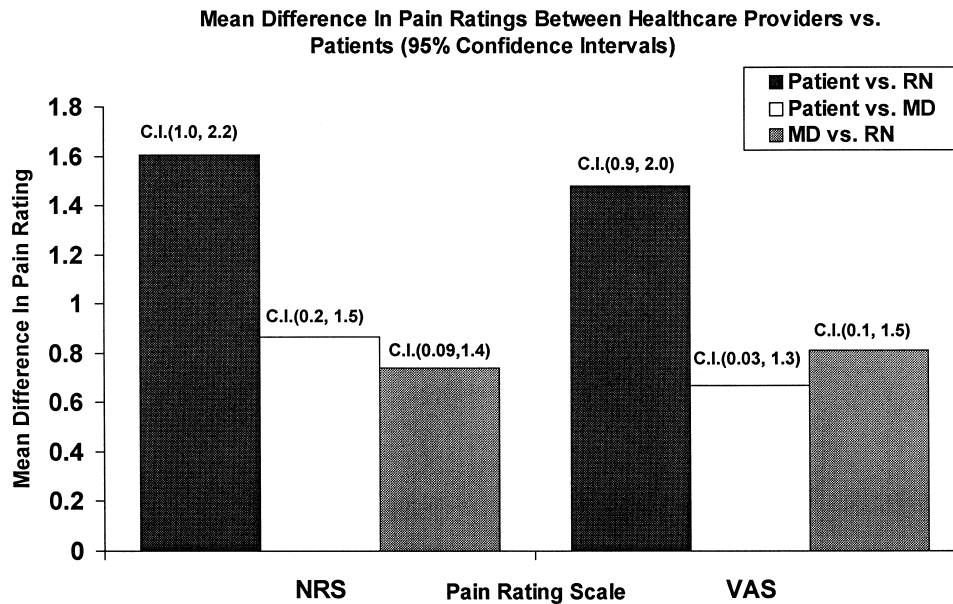
#### INTRODUCTION

Insufficient attention is given to comprehensive acute pain assessment and management in the emergency de-

partment (ED) (1–9). This may compromise patient comfort and exacerbate the already-stressful emergency visit. Unfortunately, little research has been conducted to determine how acute pain assessment and management in the ED can be improved. The few studies that have been done have shown that pain in the ED tends to be undertreated (1–6). In one of the rare prospective pain studies, Ducharme showed that acute pain was poorly assessed, and little pain relief was achieved, though patient satisfaction was relatively high (1).

The American Pain Society Quality of Care Committee guidelines recommend that the treatment of acute pain include close monitoring as well as encouraging patient communication of pain (7).

A Canadian Association of Emergency Physicians consensus document recommends that evaluation of pain use objective pain scales reported by the patient and not rely on the physician's impression (7). The document further states that patients should not have to wait for pain treatment while a physician is attempting to arrive at a diagnosis, and highlights the importance of understanding the time course before relief of pain, the half-life of analgesia, and the avoidance of adverse effects through titration (7). We undertook a study to assess how well pain was evaluated and treated in accordance with these recommended guidelines in a tertiary care emergency department.



**Figure 1. Differences in pain ratings: patients vs. health care providers. The mean of the differences plotted on the y-axis were calculated by subtracting the patient's pain rating score from the corresponding nurse's or physician's pain rating score of the same patient. The mean of these differences for each comparison was calculated and plotted. The paired *t*-test then evaluated whether the mean difference was statistically significant as indicated by the *p* values and confidence intervals stated on top of each corresponding bar in the graph. These results were calculated for both the Numerical Rating Scale and Visual Analogue Scale employed in the study.**

## MATERIALS AND METHODS

An observational prospective convenience cohort study evaluating the quality of acute pain assessment, interprofessional differences in pain assessment, and pain management was conducted in the emergency department of a tertiary care teaching hospital. Since the questionnaire was only observational and involved no intervention, it was exempt from ethics review. Patients 18 years of age or older were eligible. Exclusion criteria included chronic pain state (>48 h duration), life-threatening or unstable conditions, language barrier, altered mental status including intoxication, patients seen by a physician before an initial questionnaire was administered, and patients discharged before the final questionnaire was administered. Patients were also excluded if the patient, nurse, or physician did not wish to answer the questionnaire. Patients were enrolled from April 1997 to August 1997 on varied shifts when the researcher was available. Enrollment was significantly limited by the number of hours the researcher doing the data collection was available.

Patients were interviewed twice: after triage but before seeing a physician, and before being discharged from or admitted to the hospital. In the first interview, patients were asked about pain duration, pain medication history, level of pain on a 10-cm unmarked visual analog

scale (VAS) with one end of the line representing no pain and the other end the worst imaginable pain, and pain level on a numerical rating scale (NRS) similarly ranging from 0 to 10. During the second interview, patients were asked to again give VAS and NRS ratings of their pain level at that time. Patients were blinded to the pain ratings they reported during their first interview. The second questionnaire asked about pain relief (four-point Likert scale), patient satisfaction with pain treatment (four-point Likert scale), and general open-ended comments they wished to give about their pain state during the emergency visit. The patient's nurse, after interviewing the patient, was asked to rate the patient's level of pain on VAS and NRS scales. The patient's doctor was asked the same questions as the nurse after patient discharge. Pain ratings of patient, nurse, and physician were obtained independently, and were not divulged to any of the participants.

The differences in pain rating values among patients, nurses, and physicians were analyzed by a two-tailed paired difference *t* test at  $\alpha = 0.05$  (*p* values and 95% confidence intervals reported in Figure 1). Each of these differences was calculated by subtracting the nurse's or physician's pain rating score from the corresponding patient's pain rating score. The mean value of the difference between the scores for each comparison was calculated and plotted on the bar graph in Figure 1. The

**Table 1. Patient Numerical Rating Scale Pain Rating Categories on Arrival, Final Diagnosis, and Analgesia Administered in Hospital**

Diagnosis	Mild Pain (NRS 0–4) N/analgesics given (n)	Moderate Pain (NRS 5–7) N/analgesics given (n)	Severe Pain (NRS 8–10) N/analgesics given (n)
Soft tissue injury	10/po NSAID (1)	13/po NSAID (2)	7/i.v. opioid (1), i.m. opioid (1), acetaminophen (Acet)* (2)
Fracture	2/(0)	5/(0)	6/i.v. opioid (1), i.m. NSAID (1), Acet (3)
Abd. Pain	3/(0)	6/(0)	2/i.v. NSAID (1), i.v. opioid (1)
Corneal URI/dental	1/(0)	2/Acet (1)	2/i.m. NSAID (1)
Headache	1/(0)	1/Acet (1)	1/i.v. opioid (1)
Renal Colic		1/(0)	1/i.v. opioid + po NSAID
Chest Pain†		1/po ASA	1/(0)
Burn		1/(0)	
Sciatica			1/i.v. opioid + po NSAID
Misc.‡	1/(0)	1/(0)	1/(0)

\*Acetaminophen includes acetaminophen-codeine combinations.

†Chest pain, not yet diagnosed (NYD), and unstable angina, respectively.

‡Post-op pain, insect sting, and urinary tract infection (UTI), respectively.

paired *t* test was used because the pain ratings for a given patient were dependent values. The statistical tests were two-tailed because this was an observational study.

A chart review was conducted after discharge to collect data with respect to age, sex, time to triage, time to see physician, pain medication prescribed and administered (dose, route, time of administration), any description of pain in nursing or physician notes, any documentation of course of pain status or pain treatment during emergency stay, and final diagnosis.

## RESULTS

A total of 113 patients were enrolled in the study, but 42 were excluded for the following reasons. One was younger than 18 years of age, two were not seen by an emergency physician because they were directed to a specialty service, one patient's level of consciousness decreased during the emergency visit to the point that the patient was not able to complete the questionnaire, two patients were unable to grade their pain on a numerical scale because of a language barrier, 13 patients were discharged without the researcher's knowledge, and 17 patients had not been discharged or admitted by the end of the researcher's shift and therefore could not complete the second part of the questionnaire. Four nurses went off-shift before completing the questionnaire, and in two cases, emergency physicians could not grade the patient's pain since only their medical students had seen the patient.

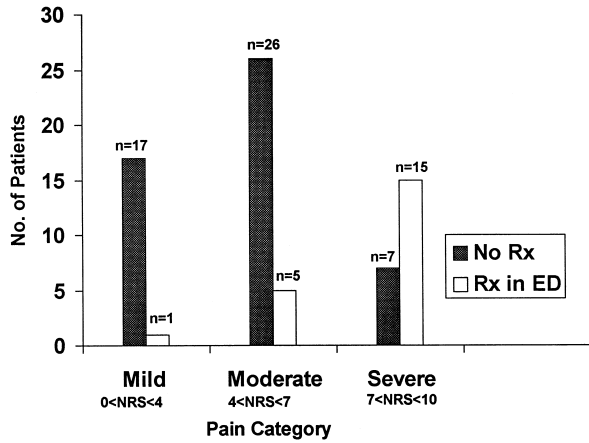
This resulted in a study cohort of 71 adult patients (36 women). The mean age of the sample population was

35.5 ± 15.7 years. Final diagnosis, NRS pain category, and analgesics administered are summarized in Table 1. The percentage of patients who received pain medication in the ED increased with the patient's NRS pain rating on arrival (Figure 1). The patients were divided into three categories, as in a previous study, according to the NRS pain rating reported on arrival to the ED (1). Six percent of patients in the mild pain category (0 <NRS <4) received analgesia, versus 18% in the moderate category (4 <NRS <7) and 68% in the severe category (7 <NRS <10).

On the NRS, both physicians (mean .86 units, 95% CI 0.2–1.5) and nurses (mean 1.6 units, 95% CI 1.0–2.2) perceived the patients' pain level to be lower than the patients' own rating of their pain (Figure 1). Nurses' NRS ratings were found to be lower than physician ratings of the same patient [*p* < 0.025, 95% CI = (0.089, 1.393)] (Figure 1). Similar results were found using a VAS (Figure 2).

On discharge, only 8% of the 71 patients enrolled had an NRS rating of zero, and in this cohort of patients, the corresponding pain category on arrival was equally distributed among the mild, moderate, and severe pain categories (Table 2). The proportion of patients in the mild and moderate pain categories on discharge remained relatively the same as on arrival (Table 2 vs. Table 1). The proportion of patients in severe pain was reduced to 18% on discharge as compared with 31% on arrival (Table 2 vs. Table 1).

On asking about patient satisfaction with pain treatment and degree of pain relief, it was found that pain was not relieved in 35 cases (49%), somewhat relieved in 27 cases (38%), and relieved or completely relieved in 13%.



**Figure 2. Number of patients who received pain medication (Rx) according to patient NRS category on arrival to ED.**

Thirty percent of the 71 patients were satisfied with their pain treatment. Responses from the 24 patients who commented on their pain treatment in the ED were as follows: One liked the fact that ice was provided immediately, helping to lessen the pain. Another said immobilization helped to control pain. Two patients felt pain management would have been improved if healthcare workers had demonstrated better communication skills. Fourteen patients felt the wait to receive pain medication was too long. Three patients did not receive pain medication and would have liked some. Three patients who did not receive ice felt it should have been given to them in the ED.

On chart review, 90% of physician charts noted that the patient was in pain, though there seldom was further description. No physician notes documented an objective pain scale assessment, whereas 5 nursing notes used an NRS to assess patients’ pain level. Only one physician noted whether pain had been relieved after administering analgesia. In contrast, 9 nursing notes contained a reassessment of patient pain state during the emergency visit.

**DISCUSSION**

Our study found that patients in the ED with self-reported mild to moderate pain were unlikely to receive pain medication (Figure 2). Even in the severe pain category, only two-thirds of patients received pain medication (Figure 2). Of 22 patients in severe pain, only 5 patients received i.v. opioids (Table 1), despite the fact that many authorities have stated that the use of i.v. opioids is a rapid and safe route to achieve analgesia for a patient with severe pain (7). A previous retrospective chart review in the emergency department postulated that physicians’ reluctance to use analgesics was due to patient refusal, overriding concern about making a diagnosis, potential to mask more serious conditions, adverse effects of medications, and potential drug dependency (3). However, it has been stated that it is unacceptable not to treat pain while attempting to arrive at a diagnosis (7).

Of note, approximately half the patients who were in severe pain on discharge received a prescription for take-home medications (Table 2), though guidelines

**Table 2. Patient Numerical Rating Scale Pain Category on Discharge (D/C) vs. Arrival to Emergency Department, and Corresponding Discharge Analgesia (Rx)**

Pain Category on D/C	Total No. D/C	Rx for Home (# patients)	Pain Category On Arrival
NRS = 0	n = 6 (8%)	NSAID (1) tylenol#3 (1)	mild (2), moderate (2), severe (2)
MILD (0 < NRS 4)	n = 22 (31%)	NSAID (1) tylenol#3 (3) tylenol#3/NSAID (1) tylenol#2 (1) tylenol (1)	mild (14), moderate (6), severe (2)
MODERATE (4 < NRS 7)	n = 30 (42%)	NSAID (5) tylenol#3 (6) tylenol#3/NSAID (1) tylenol#2/NSAID (1) tylenol/NSAID (2) tylenol (2)	mild (2), moderate (21), severe (7)
SEVERE (7 < NRS 10)	n = 13 (18%)	NSAID (1) tylenol#3 (2) tylenol#2 (1) tylenol#1(1) tylenol (1)	mild (1), moderate (2), severe (10)

have stated that it is the responsibility of the emergency physician to provide pain relief until the pain has stopped or follow-up with a family physician is available (7).

By the time of discharge, approximately half of those patients in the severe pain category had received sufficient analgesia to switch to a lower pain category (usually the moderate pain category, Table 2). It is evident from this, and the fact that 49% of all patients reported that their pain was not relieved on discharge from the ED, that the complaint of pain was not adequately treated in the emergency department. Despite this, 30% of all patients remained very satisfied with the way their pain was treated. Of note, of the patients who were very satisfied, 13% had no pain relief, and 50% of satisfied patients also had no pain relief. Satisfaction relates not just to pain treatment but the whole emergency visit experience as well (1–18). Thus, this satisfaction could be ascribed to exit bias, patient-physician interaction, patient-nurse interaction, or low patient expectation (1). In a previous study, less than 25% of patients received pain medication, yet more than half felt their pain had been treated fairly well (1). Pain relief and satisfaction are different in that satisfaction can vary with age, personal preference, personal experiences, cultural background, and measure of care derived from interactions with healthcare workers (11). Patients also commented that the communication skills of healthcare workers adversely affected the pain management they received. It has been acknowledged that medication is only part of the pain management process, and empathy, reassurance, and proper explanation of the cause of pain and its probable course will decrease anxiety as well as pain level for patients (7).

It is also evident from the statistical comparisons using a paired *t* test among the pain ratings (both VAS and NRS) reported by the patient, nurse, and physician that healthcare workers tend to underestimate the pain level experienced by patients. It appears that nurses tend to underestimate the pain level experienced by patients more than physicians. In a past study of adult and pediatric inpatients, it was found that nurses consistently underestimated their patients' pain using a visual analog scale (by statistically significant differences) despite the fact the nurses felt most patients were providing an accurate picture of their pain (15). A similar study showed that nurses working in burn units tended to overestimate the degree of pain relief experienced by patients after the administration of analgesia (14). It is conceivable that if caregivers do not use a pain assessment scale, patients may not be given an opportunity to express the level of pain they are experiencing, and this may lead to inappropriate pain treatment. It has been argued that even statistically significant differences in pain ratings may not be *clinically* meaningful, and more

research is needed to explore the clinical impact of statistically significant differences in pain ratings (16).

We also note that healthcare workers in the ED do not tend to document assessment or reassessments of patient pain levels. This has been noted in the past to be a vital part of pain management in the emergency department (1). If these reassessments were indeed not done (as opposed to not *documented*), it represents another deficiency in pain management.

The limitations of this study include the fact that it was conducted in a single center and may not represent the practices of other emergency departments, though in the past, similar results have been shown at other emergency departments (1–6). The fact that the healthcare workers involved were not blinded to the purpose of the study may have influenced their responses in interpreting patient pain levels. Care was taken, however, to elicit independent pain level responses from patients, nurses, and physicians, but because of the realities of an ED, this may not always have been the case. The fact that the pain evaluation was obtained at different times may have affected the responses received (19,20).

Another limitation is the significant exclusion number because the researcher was not able to follow patients past set shifts. While other studies of pain management have looked at the patients' age, gender, and ethnicity to analyze whether healthcare providers treat pain differently according to these factors (6,12,13), such factors were not analyzed in this study.

Finally, previous authors (4) have demonstrated that pain evaluation varies with the temporal relationship to the evaluation. Since our patients were assessed at different points in time, this may have affected the pain scale determinations.

In summary, pain severity tends to be underestimated by healthcare providers. We also note that pain management, and the documentation as well as reassessment of pain perception in the emergency department, was neglected in many instances. Despite this, most patients were satisfied with the way their pain was treated. We suggest that it would be useful to include pain assessment and reassessment as a standard part of care in the ED. Pain assessment should be regarded as a "vital sign" to ensure that it receives the attention it deserves in the busy environment of an emergency department.

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