

# Pain scores among ED patients: correlation with desire for pain medication

Catherine A. Marco \* †‡, Megan McGervey †, Joan Gekonde †, and Caitlin Martin †

† University of Toledo Health Science Campus, Toledo, OH 43614, and \*Wright State University, Dayton, OH 45435

**Introduction:** Pain has been identified as the most common reason for Emergency Department (ED) visits. The verbal numeric rating pain scale (VNRS) is commonly used to assess pain in the ED. This study was undertaken to determine whether VNRS pain scores correlate with desire for pain medication among ED patients.

**Methods:** In this prospective survey study, eligible patients included Emergency Department patients over 18 with painful conditions. The primary outcome measures included self-reported VNRS, ED diagnosis, number of ED visits and number of ED admissions within the past year, and the self-reported desire for pain medication.

**Results:** Among 482 participants in 2012, the median triage pain score was 8 (IQR 6-10); the most frequently occurring score was 10. Overall, there were significant differences in pain scores with patient desire for analgesics. 67% reported desire for pain medications. Patients who did not want pain medications had significantly lower pain scores (median 6; IQR 4-8) compared to those who wanted medication (median 8; IQR 7-10) ( $p < 0.001$ ) and compared to those who were ambivalent about medication (median 7; IQR 6-10) ( $p = 0.01$ ). There was no association between desire for pain medication and demographics including age, gender, race, or insurance status.

**Conclusions:** ED patients who did not desire pain medication had significantly lower pain scores than patients who desired pain medication. Pain scores usually effectively predicted which patients desired pain medications. Desire for pain medication was not associated with age, gender, race, or insurance status.

pain | emergency | pain assessment

Treatment for pain and related conditions has been identified as the most common reason for Emergency Department (ED) visits (1). Pain is estimated to cost \$560 to \$635 billion dollars per year in America (2). Effective pain management results in improved patient satisfaction, reduced anxiety, and improved comfort.(3) However, despite widespread consensus that pain relief should be one of the priorities of the medical profession, numerous studies have documented inadequate pain management in ED patients (4,5,6).

The verbal numeric rating scale (VNRS) is commonly used to assess pain by self-report in Emergency Departments. The VNRS asks for a patient self report of pain on a scale of 0-10, where 0 is "no pain" and 10 is "worst pain imaginable". Previous studies have demonstrated that both VNRS and visual analog scales (VAS) are valid methods of measurement of self-reported pain (7,8,9).

ED patients report variable levels of pain, even with similar types of diagnoses or injuries (10).

This prospective survey study was undertaken to identify pain scores among ED patients with painful conditions, and identify association with desire for pain medication.

## Materials and Methods

**Study Design.** This prospective observational survey study was conducted at the University of Toledo Medical Center ED, an urban, university hospital with an annual census of 34,000. The study was approved by the University of Toledo Institutional Review Board. Data were collected prospectively from the ED electronic medical records and from patient surveys during May - July 2012. Eligible participants included ED patients over 18 years of age with painful conditions ranging from 1-10 on the VNRS scale.

**Patient Selection and Data Collection.** Participants were identified and invited to participate as a convenience sample when a research assistant was available. Eligible participants were identified based their self-reported triage VNRS ranging from 1-10 on the VNRS scale. Patients who rated pain as 0 were not included. For patients who had multiple visits during the period of this study, only data from the initial visit was recorded.

**Outcome Measures.** Patients were asked to consent to completing a written survey (Appendix A). This survey included questions on demographics including age, sex, race, insurance status. The number of University of Toledo ED visits and admissions within the past year was extracted by research assistants from the medical record. The patient's triage pain score and final ED diagnosis were noted. Finally, patients responded to whether or not they desired pain medication during their current visit along with comments as to why or why not. For participants not capable of making medical decisions, the power of attorney (POA) or the primary care-taker was asked to complete the survey.

The patient's initial triage pain score was obtained from the medical record. If they met the requirements for selection (a pain score ranging from 1-10 on the VNRS scale), the patient was invited to participate, and a research assistant compiled the patient's responses to the survey. Research assistants were made available during a variety of hours to obtain a range of responses to reach a broad demographic population. Diagnoses were coded into one of 19 categories, based on a previous diagnostic reporting method (11) Patient responses were collected and data was categorized to determine if there was any correlation between the perceived pain as measured by the verbal numerical rating scale and the patient's demographics.

**Statistical Analysis.** Descriptive statistics are provided for all 482 patients using frequency and percent, or median, interquartile range and mode. Differences in triage pain scores by patient's desire for medication was tested overall (yes, no, undecided) using a Kruskal Wallis two-tailed test. Comparisons between patients desiring medication or not were tested using Wilcoxon two-tailed tests. (The 15 patients who responded neither yes or no were eliminated from the sub-group analyses due to small sample size). The 6 patients with "other" insurance were not included in the analysis of insurance because their group was small. Associations between desire for pain medication and demographic characteristics were tested using Chi-square tests. P values  $< 0.05$  were determined to be statistically significant. Data were analyzed using SAS v 9.1. (Statistical Analysis Software, Cary NC v 9.1).

‡ To whom correspondence should be sent: Catherine.Marco@wright.edu

Author contributions: CAM designed the research protocol; CAM, MM, JG and CM collected study data; CAM supervised the data analysis; all authors contributed to the manuscript and CAM takes responsibility for the paper as a whole

The authors declare no conflict of interest

Freely available online through the UTJMS open access option

**Results**

A total of 482 patients were enrolled in the study between May and July 2012. Participants included 62% females and 38% males. The median age was 40 (IQR 28 - 55). Ethnicity included Caucasians (58%; n=278), African American (37%; n=176), Hispanic (4%), Asian (1%), and Multiracial, other, or unknown (1). Insurance status included four categories: Self-pay (21%), Government (33%), Private (44%), or Other (1%). The majority of patients had not been hospitalized at UTMC in the past year, and the median visits to the UTMC Emergency Department within a year from the survey was 1 (IQR 0-2).

The median VNRS pain score was 8 (IQR 6-10). The mode pain score was 10. Overall, 67% of patients surveyed desired pain medication (n=323). 30% of patients did not want pain medications (n=141) and 3% of patients did not express a desire nor deny a desire for pain medications (n=15).

The Primary ED Diagnosis was categorized into 14 categories. Categories with the most study participants included “Abdominal pain/GI/Pelvic causes” with 18% of all participants, and “Chest pain equivalents” with 11% of participants.

Table 1. Primary Diagnosis Among 482 Study Participants

Primary Diagnosis	N	(%)
Abdominal pain/ GI/ pelvic	87	(18%)
Chest pain	55	(11%)
Traumatic skin/soft tissue	48	(10%)
Musculoskeletal/extremity pain	47	(10%)
Sprain/strain/spasm	40	(8%)
Respiratory infection	30	(6%)
Back/neck pain	29	(6%)
Headache/migraine/concussion	29	(6%)
Toothache	25	(5%)
Fracture/dislocation	21	(4%)
UTI/STI/vaginosis	14	(3%)
Abscess/cellulitis/rash	8	(2%)
Renal colic/flank pain	7	(1%)
Other	41	(9%)
Missing	1	(0%)

Overall, there were significant differences in triage pain scores with patient desire for pain medication (Kruskal Wallis p<0.001). Comparing groups two-at-a-time, patients who did not want pain medication had significantly lower pain scores (median score 6) compared to those who expressed desire for pain medication (median score 8, Wilcoxon p<0.001) and compared to those who were undecided about pain medication (median score 7, Wilcoxon p=0.01). There was not a significant difference in pain scores between patients who desired pain medication and those who were undecided (Wilcoxon p=0.2; Table 2).

There was not enough evidence to support an association between patient desire for pain medications and age, gender, race, nor insurance status (Table 3). Due to small numbers in individual groups, statistical testing was not performed on diagnoses and associated with desire for pain medication.

The diagnoses with the highest percentage of patients desiring pain medications were back/neck pain (93% reported a desire for pain medications), fracture/dislocation (86%), and renal colic/flank pain (86%). Diagnoses with the lowest percentage of patients desiring pain medications were chest pain (52%), abscess/cellulitis/rash (52%), and UTI/STD/bacterial vaginosis (57%; Table 3).

Table 2. Differences in triage pain score between patient desire for pain medications

	N	Median [interquartile range]	Mode
Patient wants pain medications	323	8 [7, 10]	10
Patient doesn't want pain medication	144	6 [4, 8]	6
Patient did not answer either yes or no	15	7 [6, 10]	10

Table 3. Association between Desire for Pain Medication and Patient Demographics

	Would you like pain medication in the ED today?		Chi-square P-value
	No	Yes	
Age			0.08
<60	112 (78%)	273 (85%)	
>60	32 (22%)	50 (15%)	
Gender			0.30
Male	50 (35%)	128 (40%)	
Female	94 (65%)	194 (60%)	
Race			0.38
African American	52 (36%)	119 (37%)	
Caucasian	87 (60%)	182 (57%)	
Other	5 (3%)	21 (7%)	
Insurance			0.06
Self-pay	27 (20%)	71 (22%)	
Private	74 (53%)	134 (42%)	
Government	38 (27%)	117 (36%)	
Primary Diagnosis <sup>1</sup>			
1 traumatic skin/soft tissue	18 (13%)	30 (9%)	
2 sprain/strain/spasm	9 (6%)	30 (9%)	
3 back/neck pain	2 (1%)	25 (8%)	
4 abdominal pain/ GI/ pelvic	21 (15%)	59 (18%)	
5 fracture/dislocation	3 (2%)	18 (6%)	
6 headache/migraine/concussion	5 (3%)	25 (8%)	
7 chest pain	25 (17%)	27 (8%)	
8 respiratory infection	2 (1%)	6 (2%)	
9 abscess/cellulitis/rash	12 (8%)	13 (4%)	
10 toothache	5 (3%)	24 (7%)	
11 uti/std/bacterial vaginosis	6 (4%)	8 (2%)	
12 renal colic/flank pain	1 (1%)	6 (2%)	
13 musculoskeletal/extremity pain	12 (8%)	34 (11%)	
14 other	23 (16%)	17 (5%)	

<sup>1</sup>No statistical testing

## Discussion

Pain management is an important and challenging task in emergency medicine. Despite widespread educational initiatives regarding pain management, oligoanalgesia among ED patients remains a common issue (12,13). Thirty to 60% of patients complaining of pain do not receive any treatment for pain while in the Emergency Department (14). Oligoanalgesia has been attributed to several causes. The main attribution since the term was coined by Wilson and Pendleton in 1989 has been physician bias and disbelief or belief of exaggeration of pain reporting due to racial and ethnic factors (15).

Accurate assessment of pain can be an important step in adequate pain management (16). Self-reported pain scores are considered the standard of choice in assessing pain. The VNRS is commonly used to assess pain. Other pain scales may also be used, including the Visual Analog Scale (VAS), Verbal Descriptor Scale (VDS), and the Wong-Baker Faces Pain Scale. Previous studies have demonstrated that patients' self-reported pain is highly variable (17). Marco et al showed that ED patients rate pain on the VNRS based on current subjective pain, or by comparison to previous or hypothetical pain experiences (18).

Although the VAS and VNRS are well correlated, patients systematically score their pain higher on the VNRS, with an unacceptably wide distribution of the differences (19). The authors also note several important advantages of the VNRS, including ease of use and no requirement for motor skills or instruments. To improve and standardize ED pain care, multi-center prospective studies are needed to validate the widely variable disparities of pain management based on patient and physician characteristics; and examine knowledge and attitude development about pain and its management (20).

Other ED issues contribute to the challenge of appropriate and adequate pain management, including acuity and triage issues and disparities in pain assessment and management. Several studies have identified racial and gender disparities in ED analgesia administration (21,22). Another study identified practice variation to be affected by

age, race, and type of pain and the physician's identity, and training (23). Age also plays into the disparities seen in pain assessment. A recent study demonstrated that patients aged 75 years and older with pain-related ED visits were less likely to receive an analgesic pain medication in the ED, compared to patients aged 35 to 54 years (24).

Despite these numerous studies citing disparities in ED administration, our study did not identify differences in desire for pain medication by gender, age, or ethnicity. One explanation is that although no difference exists for desire for pain medication, there may be disparities in the delivery of analgesia by demographic characteristics.

To improve patient care, guidelines and treatment principles have been developed and adapted by several national societies (25). Changing the attitudes of emergency medical providers about pain assessment and management will require attention in several areas of research, education, and training (26).

**Study Limitations.** This study was conducted at a single urban academic hospital, and results may not be generalizable to all ED patients. Data were only collected during the summer months between May and July; therefore, results only represent a few months of the year. The survey results were based on patients' self-reported pain scores as well as patients' self-reported desire for pain medication. Both of these assessments are highly subjective measures that are apt to change depending on several confounding factors. To assess desire for pain medication a single, open-ended question was asked. "Pain medication" was also not defined for patients, thus results may have been skewed by differences in how each participant defined pain medication.

**Conclusions.** ED patients who did not desire pain medication had significantly lower pain scores than patients who desired pain medication. Desire for pain medication was not associated with age, gender, race, or insurance status. The question, "Would you like pain medication in the ED today?" is a feasible and effective question to guide pain management in the ED setting.

1. Niska R, Bhuiya F, and Xu J. (2010) National Hospital Ambulatory Medical Care Survey: 2007 Emergency Department Summary. National health statistics reports; no 26. Hyattsville, MD: National Center for Health Statistics.
2. Institute of Medicine. Relieving pain in America: a blueprint for transforming prevention, care, education, and research. Washington, DC: The National Academies Press, 2011.
3. Brent ASG (2000) The management of pain in the emergency department. *Pediatr Clin N Amer* 47:651-679.
4. Blank F, Mader T, Wolfe J, Keyes M, Kirschner R, Provost D (2001) Adequacy of pain assessment and pain relief and correlation of patient satisfaction in 68 ED fast-track patients. *Journal of Emergency Nursing* 27(4):327-334.
5. Guru V, Dubinsky I (2000) The patient vs. caregiver perception of acute pain in the emergency department. *J Emerg Med* 18:7-12.
6. Rupp T, Delaney KA (2004) Inadequate analgesia in emergency medicine. *Ann Emerg Med* 43:494-503.
7. Holdgate A, Asha S, Craig J, Thompson J (2003) Comparison of a verbal numeric rating scale with the visual analog scale for the measurement of acute pain. *Emerg Med (Fremantle)* 15:441-446.
8. Bijur PE, Latimer CT, Gallagher EJ (2003) Validation of a verbally administered numerical rating scale of acute pain for use in the emergency department. *Acad Emerg Med* 10:390-393.
9. Daoust R, Beaulieu P, Manzini C, Chauny JM, Lavigne G (2008) Estimation of pain intensity in emergency medicine: a validation study. *Pain* 138:565-570.
10. Marco CA, Plewa MC, Buderer N, Hymel G, Cooper J (2006) Self-reported pain scores in the emergency department: lack of association with vital signs. *Acad Emerg Med* 13:974-979.
11. Todd KH, et al. (2007) PEMI Study Group. Pain in the emergency department: results of the pain and emergency medicine initiative (PEMI) multicenter study. *J Pain* 8(6):460-466.
12. Fosnocht DE, Swanson ER, Barton ED (2005) Changing attitudes about pain and pain control in emergency medicine. *Emerg Med Clin North Am* 23(2):297-306.
13. Allione A, et al. (2011) Factors influencing desired and received analgesia in emergency department. *Intern Emerg Med* 6(1):69-78.
14. Miner J, Biro MH, Trainor A, Hubbard D, Beltram M (2006) Patient and Physician Perceptions as Risk Factors for Oligoanalgesia: A Prospective Observational Study of the Relief of Pain in the Emergency Department. *Acad Emerg Med* 13:140-146.
15. Wilson, J, Pendleton, J (1989) Oligoanalgesia in the emergency department. *Am J Emerg Med* 7(6):620-623.
16. Silka PA, Roth MM, Moreno G, Merrill L, Geiderman JM (2004) Pain Scores improve analgesic administration patterns for trauma patients in the emergency department. *Acad Emerg Med* 11(3):264-270.
17. Marco CA, Kanitz W, Jolly M (2013) Pain Scores among Emergency Department (ED) Patients: Comparison by ED Diagnosis. *J Emerg Med* 44(1):46-52.
18. Marco CA, Nagel J, Klink E, Baehren D (2012) Factors associated with self-reported pain scores among ED patients. *Am J Emerg Med* 30(2):331-237.
19. Holdgate A, Asha S, Craig J, Thompson J (2003) Comparison of a verbal numeric rating scale with the visual analogue scale for the measurement of acute pain. *Emerg Med* 15 (5-6): 441-446.
20. Rupp T, Delaney KA (2004) Inadequate analgesia in emergency medicine. *Ann Emerg Med* 43(4):494-503.
21. Mills AM, Shofer FS, Boulis AK, Holena DN, Abuhl SB (2011) Racial disparity in analgesic treatment for ED patients with abdominal or back pain. *emAm J Emerg Med* 29(7):752-756.
22. Chen EH, et al. (2008) Gender disparity in analgesic treatment of emergency department patients with acute abdominal pain. *Acad Emerg Med* 15(5):414-418.
23. Heins A, Grammas M, Heins JK, Costello MW, Huang K, Mishra S (2006) Determinants of variation in analgesic and opioid prescribing practice in an emergency department. *J Opioid Manag* 2(6):335-340.
24. Platts-Mills TF, et al. (2012) Older US emergency department patients are less likely to receive pain medication than younger patients: results from a national survey. *Ann Emerg Med* 60(2):199-206.
25. American College of Emergency Physicians (2004) Pain management in the emergency department [policy statement]. *Ann Emerg Med* 44:198.
26. McManus JG, Harrison B (2005) Pain and Sedation Management in the 21st Century Emergency Department. *Emergency Med Clinics N America* 23(2): xv-xvi.

**ACKNOWLEDGMENTS.** The authors would like to acknowledge Nancy Buderer, MS, for her statistical expertise with the data analysis for this project.