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The Verbal Numeric Pain Scale: ED Patient Understanding and Perspectives

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Clinical Science and Research

Scholarship in Medicine Final Report

By checking this box, I indicate that my mentor has read and reviewed my draft proposal prior to submission

Abstract

Objective: The objective of this study is to identify patient self-reported pain scores and understanding and perspectives of the Verbal Numeric Pain Scale.

Methods: In this prospective survey study, eligible participants were interviewed by research assistants. Data collected included ED patients self-reported pain scores, previous painful experiences, and their understanding of the Verbal Numeric Pain Scale,

Results:

Among 164 participants (92% response rate), the mean triage pain score was 6.4 (95% CI 6.0-6.9). Many participants had experienced significant painful experiences in the past, including major surgery (N = 113), broken bone (N = 102), childbirth (N = 89) and kidney stone (N = 70).

Higher pain scores were associated with African American race (pain score mean 7.4 (95% CI 6.7, 8.0)), and less fast food intake (7.0 (95% CI 6.5, 7.6)). Other clinical factors not associated with significant differences in self-reported pain include: gender, age, mode of arrival, triage

level, previous painful experiences, education, tobacco use, alcohol use, exercise, and hours of sleep per night. When asked about the meaning of “0”, most patients responded that it means “no pain” (N = 150; 91.5%). When asked about the meaning of “10”, most participants responded “severe” (N = 129; 78.7%). A minority of participants correctly stated that “10” corresponds to “worst pain imaginable” (N = 24; 15%). Most participants agreed that the verbal numeric pain scale is a good way to rate pain (N = 120; 73.2%).

Conclusions: Pain is a common reason for seeking emergency care. Higher self-reported pain scores were associated with African American race. Most participants agreed that the verbal numeric pain scale is a good way to rate pain.

Key Words: Pain, Verbal Numeric Pain Scale, Pain Scores, Emergency Department, Emergency

Introduction/Literature Review

One of the most common reasons for Emergency Department (ED) visits is pain.¹ In the United States, pain is estimated to result in expenditures of \$560 billion to \$635 billion dollars per year.² At the individual level, moderate to severe pain has been shown to cause increased healthcare expenses and loss of wages.³ When pain is managed appropriately, patients are more satisfied with their experience and are more likely to comply with treatment instructions.⁴

Effective pain management relies on appropriate assessment. The Joint Commission requires that hospitals screen and assess pain during ED visits and at the time of admission.⁶ Assessment of pain in the ED is often accomplished by asking patients to report the severity of their pain. The Verbal Numeric Pain Scale is a scale commonly used to quantify a patient's level of pain. The Verbal Numeric Pain Scale is a scale ranging from 0 to 10 where 0 is equal to "no pain" and 10 is equal to the "worst pain imaginable".⁷ Patients are instructed to rate their pain based on where it falls on this scale. The Verbal Numeric Pain Scale is often used in the ED because it is a quick way to assess pain that requires no equipment and does not require the patient to have intact motor skills.⁸

Many patients in the ED will experience the same type of illness, injury, or diagnosis but report varying levels of pain.⁹ Some patients have a difficult time relaying information about their pain levels and an appropriate pain assessment tool should be chosen based on the individual's needs.¹⁰ Given the variability in the reporting of pain, it is important to understand how and why patients assign a given rating to their pain to ensure that pain is being appropriately treated. It has been demonstrated that patients ratings of pain and physicians perceptions of pain do not coincide, with physicians underestimating the level of pain that their patient is experiencing.¹¹

Previous studies have identified factors associated with pain scores, including age, sex, and level of stress.¹²⁻¹⁷ Higher pain scores have been observed in patients who have lower levels of educational, Medicaid insurance, visit the ED more frequently, or who are younger.¹² On the contrary, educational materials regarding the pain score have been shown to result in decreased self-reported pain scores.¹⁸ There are no studies to our knowledge that address patients perspectives on the Verbal Numeric Pain Scale or how a decision is reached regarding a rating between 0 and 10. This study aims to understand how patients interpret the Verbal Numeric Pain Scale and how patients determine their rating, and to gain insight into how effective patients feel the use of the Verbal Numeric Pain Scale is in evaluating pain. Increasing the understanding of how patients interpret the Verbal Numeric Pain Scale and how they rate their pain will help health care professionals understand how to better use the pain scale and translate patients' responses into effective pain management.

Hypothesis/Specific Aims/Research Questions

The objective of this study is to identify patient self-reported pain scores and understanding and perspectives of the Verbal Numeric Pain Scale. The research hypothesis is that ED patients are able to report their pain accurately and understand the Verbal Numeric Pain Scale.

Methods

Context/Protocol

Eligible participants were identified through the Miami Valley Hospital ED Tracking Board and approached while in the ED treatment area. Eligible patients included those over 18 years of age, with a Triage Pain Score of 1 or above. Patients who were in distress, prisoners, or who did not speak English were excluded. Participation did not interfere with medical care. No protected health information was recorded.

Data Collection

Trained research assistants collected data from eligible ED participants utilizing the Data Collection Form (Appendix A). Data collected included age, gender, ethnicity, chief complaint, rating of their pain on the pain scale, reasoning for the score that was assigned, information regarding past painful experiences and the rating of the painful experience, information regarding common painful experiences and perceptions regarding the Verbal Numeric Pain Scale. Participation took approximately 5-10 minutes.

Data Analysis

Data were analyzed to identify ED patient self-reported pain scores, previous painful experiences, and understanding of the Verbal Numeric Pain Scale. Relationships between previous painful experiences and self-reported pain scores were identified. Pain scores were described with a median and interquartile range. Free text responses were coded by category and reported as qualitative variables. P-values less than 0.05 were considered statistically significant. A sample size of 96 was needed to achieve a confidence interval of +/- 10%. Scores were compared between subgroups of subjects using Mann Whitney Wilcoxon tests (for variables with

2 categories), Kruskal Wallis tests (for variables with 3 or more categories), or Spearman Correlation (for age and pain scores). Data were analyzed using SAS v9.4.

Results

The total number of participants in the study was 164 with an average age of respondents of 46 years old (Range: 18 – 87 years). respondents were 61% female and 39% male. The majority of participants were White (61%), African American (35%), Hispanic (2.4%) , and Multiracial (0.6%). The majority of patients surveyed arrived at the ER as walk-in (76.2%) with a triage level of 3 (62.2%). Two-thirds of patients were discharged home, and one-third of patients were admitted (Table 1).

The mean patient-reported pain score was 6.4 (95% CI: 6.0, 6.9). When patients were asked what a 0 on the verbal numeric pain scale meant to them, the majority of patients agreed that it meant “no pain” (91.5%). When patients were asked what a 10 meant to them, there was a bit more variety. Most patients felt a 10 meant “severe” pain (78.7%) while only 14.6% of patients correctly stating it meant “worst imaginable” pain.

Common painful experiences were assessed among the patients surveyed (Table 2). When asked about the most painful experience they have experienced, “Other” (38.4%) and “Childbirth” (22.6%) were the most common responses (Table 3). When asked how they would rate the pain of the most painful thing they have experienced, patients reported an average pain rating of 9.6 (CI: 9.5, 9.8).

Patients were asked how they felt about the verbal numeric pain scale and if it was a good way to describe their pain. 73.2% of patients surveyed felt that it was a good way to assess their pain, while 18.3% of patients said it was not.

There was a difference in mean pain score based on ethnicity. African American patients reported a mean pain score of 7.4 (6.7, 8.0) while White patients reported a mean pain score of 5.8 (5.2, 6.3) (Table 4).

There was no significant difference in the reporting of pain based on gender. The average pain score for males was 6.2 while the average pain score for females was 6.6. Additionally, there was no statically significant difference in reported pain score based on age, education, triage level, or mode of arrival (Table 4).

Discussion

Only 14.6% of patients correctly identified a 10 on the Verbal Numeric Pain Scale as “worst imaginable” pain. This could be due to a lack of patient education regarding how to utilize the verbal numeric pain scale. A study focusing on the effects of patient education as it relates to the Verbal Numeric Pain Scale concluded that patients who were provided education (via video or brochure) on how to rate their pain decreased their pain score by 2 or more points. This could indicate that there is some confusion in how patients interpret the Verbal Numeric Pain Scale.¹⁸

There was no significant association observed between pain score and gender. Other studies that have demonstrated that male gender is associated with lower pain scores while

female gender is associated with higher pain scores or lower pain tolerance.^{20,28,29} The reason for these differences remains unclear, but is theorized to be related to increased levels of estrogen.³⁰

Age did not have a significant relationship with self reported pain scores. It has been previously reported that patients who are younger report higher pain scores.¹² Alternatively, other studies have observed the opposite effect.¹⁶ The relationship between age and the impact it has on patients pain rating is still undetermined.

In this study, African American patients reported a higher self-reported pain score in comparison to White patients. Existing literature on the topic of pain and race is conflicted, however, highlighting the complexity of the experience of pain.¹⁹ When patients self-report their pain it is a subjective measure. This suggests that the way that a patient evaluates and perceives their pain could affect how they experience pain. One study observed lower pain tolerance among African Americans with no difference in reported pain intensity.²⁰ Another influence on self-reported pain level could be disparities in pain treatment. It has been found that Hispanic, Asian and Black patients are less likely to receive pain medications from EMS prior to arriving at the Emergency Department when compared to White patients.²¹ In addition, pediatric patients who were non-Hispanic Black patients were less likely to receive both narcotic and non-narcotic analgesics than non-Hispanic White patients in the Emergency Department.²² Black patients involved in motor vehicle accidents were also less likely to receive opioids but more likely to receive NSAIDs.²³ This trend has been observed in multiple settings but the disparity appears to be decreasing.²⁴ In relation to undertreatment, another study identified lower use surgical intervention in minorities, even though they sought out care as frequently as White patients.²⁵ It is also important to note that some studies have found no difference in patients self-reported pain score and race.²² The observation that Black patients' self-reported pain scores are higher on

average has been seen in multiple studies, but the reason behind this disparity remains unclear.^{19,21,25,26} The biopsychosocial model of pain confirms the complexity of the pain experience, suggesting that it is a mixture of biological, sociocultural, and psychological influences.²⁷ Further research should focus on these inputs to the pain experience.

Limitations

Information in this study was self-reported by patients in one Emergency Department. Results of this study may not be generalizable to other settings. Additionally, results are dependent on the accuracy of subjective participant responses.

Conclusion

The Verbal Numeric Pain Scale attempts to quantify the pain experience. When asked about a rating of “0” most patients correctly interpreted it as “no pain”. Conversely, when asked about the meaning of a rating of “10” most patients interpreted it as “severe”. Few patients correctly stated that a “10” corresponds to “worst pain imaginable”. When asked about the effectiveness of the Verbal Numeric Pain Scale, most patients felt that it was a good way to rate their pain. African American race was associated with higher mean self-reported pain scores.

Table 1: Patient Demographics

| Demographic | N (%) or Mean (95% CI) |
|-----------------------------|-------------------------------|
| Age (years) | 45.5 (42.9, 48.3) |
| Mode of Arrival in ED | |
| Walk-in | 125 (76.2%) |
| Ambulance | 39 (23.8%) |
| Gender | |
| Male | 64 (39.0%) |
| Female | 100 (61.0%) |
| Ethnicity | |
| African American | 59 (36.0%) |
| Asian | 0 (0%) |
| White | 100 (61.0%) |
| Hispanic | 4 (2.4%) |
| Multiracial | 1 (0.6%) |
| Other | 0 (0%) |
| Triage level | |
| 1 | 0 (0%) |
| 2 | 29 (17.7%) |
| 3 | 102 (62.2%) |
| 4 | 31 (18.9%) |
| 5 | 2 (1.2%) |
| ED disposition | |
| Discharge home | 108 (66.7%) |
| Admit | 54 (33.3%) |
| Average Current Pain Rating | 6.4 (6.0, 6.9) |

Table 2: Common Painful Experiences

| Have you ever experienced the following, and if so, how would you rate the pain you experienced? | Number of respondents | Mean (95% CI) |
|---|------------------------------|----------------------|
| Broken Bone | 102 | 8.0 (7.5, 8.4) |
| Childbirth | 89 | 9.1 (8.7, 9.4) |
| Kidney Stone | 70 | 8.9 (8.4, 9.3) |
| Major Surgery | 113 | 7.3 (6.8, 7.9) |

Table 3. Previous Painful Experiences

| What is the most painful thing you have experienced in your life? | Number of Respondents | Mean (95% CI) |
|--|------------------------------|----------------------|
| Childbirth | 37 | 6.8 (6.0, 7.5) |
| Current pain now | 16 | 6.6 (4.8, 8.4) |
| Broken Bone | 16 | 6.8 (5.5, 8.1) |
| Surgery | 14 | 6.1 (4.3, 7.8) |
| Back or neck pain | 6 | 6.5 (4.3, 8.7) |
| MVC | 5 | 6.2 (3.4, 9.0) |
| GSW | 5 | 8.6 (6.9, 10.3) |
| Dental Pain | 2 | 8.5 (2.1, 14.9) |
| Other | 63 | 5.9 (5.2, 6.7) |

Table 4. Factors Associated with Self-Reported Numeric Pain Scores

| | Number of Subjects | Mean (95% CI) | P-value |
|---|---------------------------|----------------------|----------------|
| Gender | | | |
| Male | 64 | 6.2 (5.5, 6.9) | 0.34 |
| Female | 100 | 6.6 (6.0, 7.1) | |
| Ethnicity | | | <0.001 |
| African American | 59 | 7.4 (6.7, 8.0) | |
| White | 100 | 5.8 (5.2, 6.3) | |
| All Other | 5 | 7.8 (6.2, 9.4) | |
| Age (years) | 162 | $r = 0.03$ | 0.69 |
| What is the highest level of education that you have completed? | | | 0.25 |
| Grade school | 18 | 7.4 (6.3, 8.6) | |
| High school | 90 | 6.5 (5.9, 7.0) | |
| College | 44 | 6.1 (5.2, 7.1) | |
| Postgraduate education | 12 | 5.6 (3.8, 7.4) | |
| Mode of Arrival in ED | | | 0.09 |
| Walk-in | 125 | 6.2 (5.8, 6.7) | |
| Ambulance | 29 | 7.1 (6.1, 8.0) | |
| Triage level | | | 0.24 |
| 1 | 0 | - | |
| 2 | 29 | 5.5 (4.3, 6.7) | |
| 3 | 102 | 6.6 (6.1, 7.1) | |
| 4 | 31 | 6.6 (5.8, 7.5) | |
| 5 | 2 | 7.0 (-18.4, 32.4) | |
| What is the most painful thing you have experienced in your life? | | | |
| Back or neck pain | 6 | 6.5 (4.3, 8.7) | |
| Broken bone | 16 | 6.8 (5.5, 8.1) | |
| Childbirth | 37 | 6.8 (6.0, 7.5) | |
| Dental pain | 2 | 8.5 (2.1, 14.9) | |
| GSW | 5 | 8.6 (6.9, 10.3) | |
| MVC | 5 | 6.2 (3.4, 9.0) | |
| Current pain now | 16 | 6.6 (4.8, 8.4) | |
| Other | 63 | 5.9 (5.2, 6.7) | |
| Surgery | 14 | 6.1 (4.3, 7.8) | |
| How would you rate the pain of the most painful thing you have experienced? | 162 | $r=0.09$ | $r=0.09$ |

Appendix A:

The Verbal Numeric Pain Scale: Patient Understanding and Perspectives
Survey Instrument

Good morning/afternoon/evening. My name is _____. I am a research assistant. We are doing a brief research study about the pain scale. We would like to ask you some brief questions to help us understand your history and point of view. Your participation is voluntary and your health information will be kept confidential. Participating will not affect your medical care at all. We expect that the study will take about 5 minutes of your time. Are you willing to participate?
Thank you in advance for your time.

STUDY ID _____ (Research assistant initials and consecutive numbers; NO PHI)

Day of the week:

- ___ (1) Sun ___ (2) Mon
- ___ (3) Tues ___ (4) Wed
- ___ (5) Thurs ___ (6) Fri
- ___ (7) Sat

Patient age (years) _____ (if 90 or older, enter “90”)

Patient gender

- ___ (1) Male
- ___ (2) Female

Patient ethnicity

- ___ (1) African American
- ___ (2) Asian
- ___ (3) White
- ___ (4) Hispanic
- ___ (5) Multiracial
- ___ (6) Other _____

Mode of Arrival in ED

- ___ (1) Walk-In
- ___ (2) Ambulance

ED Chief Complaint _____ (enter free text)

Triage level 1 2 3 4 5
(circle one)

ED Diagnosis _____ (enter free text)

ED Disposition: ___(D) discharge home ___(A)Admit

1. How would you rate your pain, right now?

0 1 2 3 4 5 6 7 8 9 10

2. Why did you choose that number?

3. On the verbal numeric pain scale (the 0-10 pain scale), what does 0 mean?

4. On the verbal numeric pain scale (the 0-10 pain scale), what does 10 mean?

5. What is the most painful thing you have experienced in your life?

6. How would you rate the pain of the most painful thing you have experienced?

0 1 2 3 4 5 6 7 8 9 10

7. Have you ever experienced the following, and if so, how would you rate the pain you experienced?

a. Broken bone 0 1 2 3 4 5 6 7 8 9 10

b. Childbirth 0 1 2 3 4 5 6 7 8 9 10

c. Kidney stone 0 1 2 3 4 5 6 7 8 9 10

d. Major surgery (What type of surgery?) _____
0 1 2 3 4 5 6 7 8 9 10

7. Give an example of something that is a 0.

8. Give an example of something that is a 10.

9. Give an example of something that is a 5.

10. Is there anything that affects how you perceive or experience pain?

11. Do you think the Verbal Numeric Pain Scale (0-10 scale) is a good way to describe your pain? Why or why not?

12. Do you have any ideas for how we can better understand your pain?

13. What is the highest level of education that you have completed? (circle one)
Grade school High school College Postgraduate education

14. If you have any other comments or suggestions about pain scales, please include them here:

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