Comparing the Visual Analog Scale and Verbally Administered Numeric Rating Scale in Traumatic versus Non-Traumatic Pain in a Community Hospital Emergency Center

Veronica Rachelle Avery

University of Toledo

2010

Dedication

This scholarly project is dedicated to my parents, Doug & Michele Avery.

Words could never express how grateful I am to them for all of their love, guidance, & encouragement.

Acknowledgments

Thank you to Dr. Paul Rega, Dr. Christopher Bork, and Meghan Reiser for all of their assistance and time spent collaborating on this scholarly project.

Thank you to Kendra Contreras and the nursing staff at Bay Park Community Hospital Emergency Center for all of their help and making data collection possible.

Table of Contents

Introduction....1

Literature Review....4

Methods....9

Results....12

Discussion....14

Conclusion....16

References....17

Tables....19

Abstract....22

Introduction

Pain is the most common symptom reported by patients who present to the emergency center, (EC) accounting for up to 78% of visits to the EC (Todd, et al., 2007). Health care professionals are becoming increasingly aware of the importance of pain measurement as an essential factor of routine patient assessment (Hartrick, Kovan, & Shapiro, 2003). Patients rely on physician assistants and their other health care providers to accurately and appropriately assess and manage their pain; therefore it is imperative that a valid and reliable measurement tool is used. Otherwise physician assistants and other healthcare providers may under-treat or over-treat patients' pain based on their assessment.

Pain has been incorporated into routine vital sign monitoring as it is often described as an additional vital sign. Current guidelines for pain management state that pain must be assessed and documented on a regular basis (Williamson & Hoggart, 2005). Patient perceived pain levels are also commonly used as an outcome measure and an indicator of clinical change (Todd, 2005). Unlike other vital signs, pain is subjective on the part of both the patient and the health care professional (Hartrick, et al., 2003). Therefore pain may be difficult to measure because it is dependent upon different etiologies of pain and influencing factors such as co-morbidities, gender, age and culture. This difference in patient perception of pain leads to difficulty in measuring pain. Accurate pain assessment results in well managed pain and appropriate treatment outcomes (Todd, 2005). In order to ensure that there is accurate assessment of pain, the health care provider must use reliable and valid pain scales. This is particularly true since health care professionals often underestimate patients' pain (Hartrick, et al., 2003). Methods based on a healthcare provider's assessment of pain are unreliable because patients are ultimately the only true experts in evaluating the intensity of their own pain (Berthier, Potel, Leconte,

Touze, & Baron, 1998). The interpretation of pain scores is not clear-cut. The key to successful pain management relies on the ability of the patient to use the tools, as well as the interpretation of the scores by the health care professional (Williamson & Hoggart, 2005).

Standardized pain assessment provides a window to the patient's intensity of pain and are used as a guide to understand pain (Todd, 2005). Pain rating scales have an essential place in clinical practice. Evidence suggests that pain rating scales are used as a way for patients to communicate their experience of pain and their response to treatment (Williamson & Hoggart, 2005). Various pain measurement tools are commonly used by clinicians and researchers to measure pain intensity. However, no single standard exists for quantifying pain (Fosnocht, Chapman, Swanson, & Donaldson, 2005). The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) recommends the use of a pain scale appropriate to the patient population to measure the intensity of a patient's pain and to document it (Eder, Sloan, & Todd, 2003). Two commonly used pain scales are the visual analog scale (VAS) and the numerical rating scale (NRS). Both the VAS and NRS are often favored over other scales because of their ease of administration and time efficiency (Mawdsley, Moran, & Conniff, 2002). Their simplicity and ease of use, as well as their sensitivity, make them suitable tools for evaluating acute pain in emergency center patients (Berthier, et al., 1998). However it is uncertain if the VAS and NRS correlate to each one another when measuring pain intensity.

At this time there is no standardized protocol for pain assessment in the emergency department. While JACHO recommends the 11 point numerical rating scale there is no protocol on the manner to verbally administer the tool. Our study may prove one tool to be more useful than the other in the emergency department setting. If a certain tool is found invalid or one is found to be more beneficial to another than JACHO may need to update their standards

and educate health care providers accordingly. It is also important to note that there are different types of pain, for example traumatic pain and non-traumatic pain. So using the same pain scale to measure all types of pain may not be the best approach to assessing pain. For example, the VAS or the NRS could be found to be more reliable when assessing a certain type of pain, such as non-traumatic or traumatic pain. This has not been well studied. This study will separate traumatic pain from non-traumatic pain and compare their assessment with two different pain scales, the NRS and the VAS.

Literature Review

The visual analog scale (VAS) is a single dimension pain intensity scale used in many clinical settings. The VAS has been determined to be a reliable measure of acute pain in the emergency setting (Fosnocht, et al., 2005). The VAS consists of a 10-cm horizontal line bordered by verbal descriptors of pain intensity. The descriptor "no pain" is placed to the left of the line, while a phrase describing an upper pain intensity limit such as "worst pain possible" is placed to the right of the line. The patient is asked to draw a line perpendicular to the VAS at his/her perceived level of pain intensity. The examiner will then measure the distance, in millimeters, from the "no pain" anchor that is left of the line to the patient's mark to interpret the patient's pain level (Todd, 2005). The simplicity of its use is considered the main advantage of the VAS. The line represents a continuum of pain intensity which is thought to provide greater sensitivity than the numerical rating scale. Change in VAS is an outcome measure that is regularly used to verify efficacy of pain management and relief (Fosnocht, et al., 2005). A disadvantage of the VAS is found when patients have visual or cognitive deficits and are unable to use the scale accurately. A source of error that has been found is a use of a photocopier to reproduce the VAS, as some photocopiers tend to slightly enlarge an image each time they are copied (Kahl & Cleland, 2005). Another limitation of the VAS is that it requires the patient to translate a sensory experience onto a linear format, which may be too abstract for some patients to complete (Briggs & Closs, 1999). While the VAS is a validated interval measure of pain, its administration requires additional resources, such as a measurement tool, which may reduce compliance (Hartrick, et al., 2003).

The numerical rating scale (NRS) is also commonly used to measure pain because it is a familiar clinical tool and it is easy to administer (Bijur, Latimer, & Gallagher, 2003). A typical

NRS consists of a range of numbers, usually 0-10, although other ranges have been used. Patients are told that zero represents "no pain" and that ten represents a maximum level of pain usually described as "worst pain possible" or another similar description (Todd, 2005). Patients are asked to indicate the intensity of pain by reporting a number that best represents their level of pain. The NRS is easy to administer verbally in a clinical setting and many patients are familiar with this tool (Bijur, et al., 2003). JCAHO recommends the 11-point Numeric Rating Scale (0-10) be used to measure pain in adult populations (Eder, et al., 2003).

In 2003, a study was done by Bijur, Latimer & Gallagher in an attempt to validate the NRS in the emergency setting and compare it to the VAS. This study selected a convenience sample of patients presenting with acute pain, which was defined as less than 24 hours duration and collected data on 108 patients. Patients were asked to rate their pain using both the NRS and VAS at 0, 30, and 60 minutes. A Pearson product-moment correlation was used to assess the degree of association between the VAS and the NRS (Bijur, et al., 2003). Using the Pearson product-moment correlation their study concluded that there was a strong correlation between the verbally administered NRS and the VAS ($r = 0.94$; 95% CI = 0.93 to 0.95). A zero value on the NRS correlates with a VAS score of -0.34 with a 95% CI extending from -0.67 to -0.01. This is a small difference, but it does indicate that the NRS is slightly higher to the corresponding VAS score. The findings of the research study suggested that the verbally administered NRS can be substituted for the VAS when measuring acute pain. The researchers found their study to have several limitations. Since they did not interview a consecutive series of patients, most of their patients reported moderate to high levels of pain. The etiology of their pain was not recorded and so it could not be determined whether the NRS and VAS are equal valid measures of traumatic

and non-traumatic pain (Bijur, et al., 2003). Also the Pearson product correlation has been criticized as providing an inflated estimate (Bijur, Silver, & Gallagher, 2001).

A study conducted by Fosnocht, Chapman, Swanson & Donaldson (2005), evaluated the validity of change in the VAS as a measure of pain relief and compared that to a verbal descriptor scale (VDS). Patients reported their pain level at presentation, using the VAS. Their descriptors included "least possible pain" and "worst possible pain." Patients' pain levels were reassessed thirty minutes after medication administration. The patients would also indicate, by using the VDS, if their pain was "much less, a little less, about the same, a little more, or much more" than at the time of their last pain measurement. The correlation between the change in VAS scores and the verbal descriptors was analyzed using the Spearman rho correlation. For each point in VDS, a larger range of changes was found in VAS scores. Many patients reported the maximum amount of pain when using the VAS. This caused a "ceiling effect" which limited the information that could be gathered at the upper level of the VAS. Their study concluded that when measured with the VAS, changes in pain intensity are only moderately correlated to the VDS ($p=0.677$). This does indicate that both scales are quantifying the same change in pain (Fosnocht, et al., 2005). Our study utilized the statistical test completed in this study.

Bijur, Silver and Gallagher worked to assess the reliability of the VAS when measuring acute pain (2001). Ninety-six patients were asked to rate their pain intensity using the VAS. One minute later, they were again asked to rate their pain on a new VAS. The researchers chose a minute difference as they assumed that their pain would not change during that time. The procedure was repeated until a maximum of five paired readings were recorded or until the patient left the ED. Reliability of the VAS was assessed by using two different methods, intraclass correlation coefficients (ICCs) and the Bland-Altman analysis. The ICCs analyzed

VAS scores that were one minute apart and were found to be between 0.95 and 0.98. All ICCs were found in the range considered to represent excellent reliability. The Bland-Altman plot suggested that minute-one pain ratings were not systematically lower or higher than time-zero pain ratings. One-minute ratings of pain were found to be less reproducible at moderate levels of pain and more reproducible at the extremes. The ICC demonstrated the VAS to have a higher reliability when compared to the data found using the Bland-Altman plot. The study concluded that the VAS is a highly reliable instrument for the measurement of acute pain. It was found that 50% of the two VAS pain ratings made by the same patient one minute apart were within 2 mm of each other, 90% were within 9 mm and 5% of the paired measurements, were within approximately 13 mm of each other (Bijur, et al., 2001). It was also determined that reproducibility was most accurate for the lowest and highest pain intensities rather than moderate intensity.

In 1998, a study was done by Berthier, Potel, Leconte, Touze and Baron to compare methods of measuring acute pain intensity in the emergency department. They divided patients into two groups, trauma patients and non-trauma patients. Three one-dimensional scales, the 11-point numerical rating scale, verbal rating scale and the visual analog scale, were used to assess acute pain in both groups. Two hundred ninety emergency department patients with acute pain were included and were asked to rate their pain using the three pain scales. Parametric statistical tests were used to analyze the results. An alpha of less than 0.05 was considered significant. By comparing means, they determined the NRS and VAS were closely correlated for trauma ($r=0.795$; $P<10^{-4}$) and non-trauma patients ($r=0.911$; $P<10^{-4}$) and for patients under 65 years of age ($r=0.851$; $P<10^{-4}$) and older than 65 years of age ($r= 0.905$; $P<10^{-4}$). The close correlation

between the NRS and VAS found in this study was similar to that reported in previous literature where the range was from 0.60 to 0.96, ($P < 0.001$) (Berthier, et al., 1998).

Even though both the NRS and the VAS are frequently used to measure pain, it is important to ensure validity and reliability of these measurement tools. Otherwise ineffective treatments may be incorrectly considered beneficial or treatment results can be obscured by measurement error (Bijur, et al., 2001). The primary goal of this research study was to assess the correlation of two commonly used pain scales; the visual analog scale and the numerical rating scale by comparing their use with traumatic versus non-traumatic pain as well as expand on a previous study by Bijur, Latimer & Gallagher in 2003 by including all levels of pain. Etiologies of pain were also recorded so that a comparison could be made between the NRS and VAS when evaluating traumatic and non-traumatic pain. The secondary purpose was to address limitations of previous studies in statistical analysis. This study used a Spearman rho correlation in place of the Pearson product correlation used in the Bijur, Latimer & Gallagher study and in place of parametric statistical tests used in the 1998 Bertheir et al study.

Methods

The research study was a pre-experimental, prospective and observational study conducted at the Bay Park Community Hospital Emergency Center. The study was approved by both the University of Toledo and the ProMedica Health System institutional review boards. Approved written informed consent forms were given to and signed by all participants. Data was collected on various days in September and October 2010.

All English speaking patients 18 years of age or older who presented to the emergency department with acute pain were eligible for inclusion. For the purpose of this study, acute pain was defined as an onset of pain within 72 hours of presentation to the emergency department. Exclusion criteria excluded non-English speaking patients, patients with cognitive deficits and/or visual deficits, patients triaged with an emergent acuity level, patients too ill to participate and patients who refused to participate in the study. Patients were advised that their decision would not affect their care in the emergency department in any way.

Once patients were triaged by the triage nurse and placed into a treatment room in the emergency department approval was granted by the primary nurse to the researchers and patients were asked to participate in the study. Participants were provided written informed consent and explained the risks and benefits of the study. Once patients consented, they were asked to rate their pain intensity by using two different pain scales, the VAS and the NRS. The patient was asked to give a number on a 0-10 scale which relates to the pain intensity felt at the time of questioning. Zero was equal to no pain and ten was equal to the worst pain imaginable. Patients were also given a visual analog scale, a 10 cm line with anchor points of "no pain" and "worst imaginable pain", and asked to rate their pain intensity at the time of questioning by marking a line perpendicular to the VAS. The order of the presentation of the NRS and VAS was

randomized. As approximately half of the subjects were asked the NRS first and approximately half were asked the VAS first. Patients were asked one scale immediately after the other, because according to Bijur, the level of pain intensity is assumed not to change during a one-minute interval (2001). Patient demographics such as age, gender, location and cause of pain were collected from the patient. Patients were also given a whole body homunculus in which they placed an "X" on the diagram to indicate where they felt their pain the worst. The patients were then asked to describe that location in their own words. The patient's pain was then classified as non-traumatic or traumatic based on the medical diagnosis given by the attending physician.

The methodology of the study was based on the study done in 2003 by Bijur et al. The goal of the proposed study was to focus on the limitations of that study by including lower levels of pain as well has high levels of pain. Etiologies of pain were also recorded so a comparison could be made among the scales between traumatic pain and non-traumatic pain.

For the primary purpose of the study the independent variables include the visual analog scale and the numerical rating scale. The dependent variable is pain. The variables were operationalized by the personal experience of pain as reported by the participant. For the secondary purpose of the study the independent variables were traumatic and non-traumatic pain. The dependent variables included the VAS and the NRS. The variables were again operationalized by the personal experience of pain as reported by the participant.

The instruments used in this study were the visual analog scale, a 10 cm horizontal line as well as the verbally administered 11 point numerical rating scale. A millimeter ruler was needed to measure the visual analog scale to one hundredth of a millimeter. Reliability was ensured as the researcher used the same script to verbally obtain the patients' NRS and VAS score the same way every time. The same ruler was used to measure every participants VAS. The

researcher ensured validity by only enrolling patients who complained of acute pain within 72 hours of presentation.

All data were entered into Microsoft Excel and exported into SPSS for statistical analysis. To compare the correlation between the NRS and VAS a Spearmen rho correlation was used because the NRS is classified as ordinal level data and for the purpose of this study the VAS was classified as interval level data. A Mann Whitney U was used to compare traumatic pain versus non-traumatic pain when asked by the NRS. The Mann Whitney U test is a non-parametric test that is used with ordinal level data to determine if the means of two groups are different from each other. To analyze the VAS between traumatic and non-traumatic pain an independent samples t-test was utilized to compare means of the different samples. The null hypothesis of the primary study is that there will be no correlation between the VAS and the NRS when used to assess pain. ($\alpha = 0.05$, $r=0$) The research hypothesis is that there will be a correlation between the VAS and the NRS when used to assess pain. ($\alpha = 0.05$, $r=0$) For the secondary purpose of the study the hypothesis are as follows: Ho: There will be no correlation between traumatic pain and non-traumatic pain when using the NRS. ($\alpha = 0.05$, $r=0$) Hr: There will be a correlation between traumatic pain and non-traumatic pain when using the NRS. ($\alpha = 0.05$, $r=0$) Ho: There will be no correlation between traumatic pain and non-traumatic pain when using the VAS. ($\alpha = 0.05$, $r=0$) Hr: There will be a correlation between traumatic pain and non-traumatic pain when using the VAS. ($\alpha = 0.05$, $r=0$)

Results

One hundred and sixteen patients were approached and data were collected on one hundred eligible participants. Nine patients refused to participate in the study and seven patients were not eligible because they failed to meet all of the inclusion criteria. Of the 100 patients that consented, 58 were asked the NRS first and 42 were asked the VAS first (Table 1). There were 54 males and 46 females enrolled in the study (Table 2). After classification of pain by the discharge diagnosis, 42 patients had pain due to trauma and 58 patients had non-traumatic pain (Table 3). The mean onset of pain to presentation to the EC was 22.87 hours. The minimum was 1 hour and the maximum was 71 hours. (Table 4) The mean age of patients included in the study was 41.44 years. The minimum age in years was 18 and the maximum age was 88 (Table 4). Most common traumatic etiologies of pain were strains, sprains, contusions, fractures and wounds. Most common non-traumatic etiologies of pain were musculoskeletal, headache, genitourinary, gastrointestinal and respiratory.

To compare the NRS and the VAS, a two-tailed Spearman rho correlation was calculated and resulted in a p value of 0.000 with an alpha of 0.01 (Table 5). Therefore the null hypothesis was rejected and it was determined that there is a correlation between the NRS and VAS when assessing pain and that the NRS and VAS can be used interchangeable to asses pain (Table 5). The Spearman rho determined a strong correlation between the NRS and VAS with a correlation coefficient of 0.893 (Table 5). A Mann Whitney U, shown in Table 6, was used to compare NRS scores of traumatic and non-traumatic pain and analyzed a p value of .311 ($\alpha = 0.05$). The null hypothesis failed to be rejected and it was determined that there is no statistically significant difference between the two NRS scores. Therefore, it was determined that the NRS can be used to asses both traumatic and non-traumatic pain. To compare the assessment of traumatic and

non-traumatic pain using the VAS an independent sample t-test was calculated. With an alpha of 0.05 and equal variances assumed, the calculation found a p value of 0.345 ($\alpha = 0.05$). The null hypothesis failed to be rejected and there is no statistically significant difference between traumatic and non-traumatic VAS scores. This shows that the VAS can be used to assess both traumatic and non-traumatic pain. As shown in Table 8, the mean VAS score for traumatic pain was 60.71, while the mean VAS score for non-traumatic pain was 65.56.

Discussion

This study proved that there is a strong correlation between the NRS and VAS when assessing pain in the emergency department. It also confirmed that both the VAS and the NRS can be used to measure both traumatic and non-traumatic pain in the emergency department. Previous studies have also demonstrated an association between the NRS and the VAS. One difference that set this study apart from previous studies is that the NRS was classified as ordinal level data. The NRS is treated as ordinal level data because it classifies data into mutually exclusive categories based on pain and has a logical order to its characteristics. Since this study treated NRS as ordinal level data, more suitable statistical tests, such as the Spearman rho, were used to analyze the data. Previous studies have treated both the NRS and the VAS as interval level data. In the Bijur, Latimer & Gallagher conducted in 2003, a Pearson product correlation was used to compare the VAS and the NRS. However, the Pearson product correlation should be used when the data is interval or ratio. Another problem with the Pearson product correlation is that it over-estimates reliability in small samples. It is also vulnerable to systematic error and is therefore inappropriate for assessing reliability (Bijur, et al., 2001). The Berthier et al study in 1998 did not classify the NRS as ordinal level data either. In this study, parametric statistical tests were used to compare the means of the NRS and the VAS and found the means to correlate. However, since the NRS is ordinal level data and the VAS is interval level data, comparing the means of both groups does not prove a correlation between the two scales. The Spearman rho correlation was chosen in this study because it is used when one or more of the variables are classified as ordinal level data, such as the NRS.

There are a few assumptions to be made during this research study. First it was assumed that the sample of patients were representative of a community hospital emergency room

population. Another assumption made is that patient's are honest regarding their pain level and that their pain can be objectified. Several limitations were found during this study. First the convenience sample may not have been representative of the emergency department population, as not all patients consented to participate and data collection was not continuous. The study did not occur during all hours of the day. Therefore patients who presented to the emergency department at night were not included. The study was not continuous during a twelve month period so it did not include pain caused by injuries that occur more frequently during certain seasons, for example a bee sting during the summer or a fall on ice during the winter months. The sample did not include patients who were triaged with an acuity level of emergent and therefore were too acutely ill to participate. Some patients did not have pain or had been given an analgesic which relieved their pain, and therefore were excluded from the study. Patients have dissimilarity in pain tolerances which may have caused a bias in the results. Even though the simplicity of use was considered an advantage of the VAS, various patients misunderstood how to properly use the VAS and needed extra instruction during their pain assessment which may have skewed their pain result. Patients were required to provide written consent and therefore were aware of the research study which may have caused a Hawthorne effect.

Future research should be directed at increasing the sample size and ensuring a sample representative of emergency department patients by collecting data throughout all hours and of various times of the year. Research could also be directed at studying the VAS in certain populations to determine which populations would benefit most from using this scale, for example pediatrics.

Conclusion

Since pain is the most common symptom reported by patients who present to the emergency center, health care professionals are becoming increasingly aware of the importance of pain measurement as an essential factor of routine patient assessment (Hartrick, et al., 2003). Our society uses evidence-based medicine to guide medical practice. Health care providers rely on evidence from research to assist them in the treating of their patients. New information, from studies such as this, will guide health care providers to appropriately assess and manage their patient's pain. Patients rely on physician assistants and their other health care provider to accurately and appropriately assess and manage their pain therefore it is imperative that a valid and reliable measurement tool is used. There are benefits to using the NRS and the VAS. The NRS is easy to administer verbally in a clinical setting and many patients are familiar with this tool (Bijur, et al., 2003). The VAS is also simple to use and it has been used as an outcome measure to verify efficacy of pain management and relief (Fosnocht, et al., 2005). This study validated that both the NRS and the VAS are reliable and accurate measures of pain when used to assess pain in the emergency department. It also proved that the NRS and the VAS could both be used to accurately measure traumatic and non-traumatic pain.

References

Berthier, F., Potel, G., Leconte, P., Touze, M. D., & Baron, D. (1998). Comparative Study of Methods of Measuring Acute Pain Intensity in an ED. *American Journal of Emergency Medicine, 16*(2), 132-136.

Bijur, P. E., Latimer, C. T., & Gallagher, E. J. (2003). Validation of a verbally administered numerical rating scale of acute pain for use in the emergency department. *Academic Emergency Medicine, 10*(4), 390-392.

Bijur, P. E., Silver, W., & Gallagher, E. J. (2001). Reliability of the visual analog scale for measurement of acute pain. *Academic Emergency Medicine, 8*(12), 1153-1157.

Briggs, M., & Closs, J. S. (1999). A descriptive study of the use of visual analogue scales and verbal rating scales for the assessment of postoperative pain in orthopedic patients. *Journal of Pain and Symptom Management, 18*(6), 438-446.

Eder, S. C., Sloan, E. P., & Todd, K. (2003). Documentation of ED patient pain by nurses and physicians. *American Journal of Emergency Medicine, 21*(4), 253-257.

Fosnocht, D. E., Chapman, C. R., Swanson, E. R., & Donaldson, G. W. (2005). Correlation of change in visual analog scale with pain relief in the ED. *American Journal of Emergency Medicine, 23*(1), 55-59.

Hartrick, C. T., Kovan, J. P., & Shapiro, S. (2003). The Numeric Rating Scale for Clinical Pain Measaurment: A Ratio Measure? *Pain Practice, 3*(4), 310-316.

Kahl, C., & Cleland, J. A. (2005). Visual analogue scale, numeric pain rating scale and the McGill Pain Questionnaire: an overview of psychometric properties. *Physical Therapy Reviews, 10*(2), 123-128.

Mawdsley, R. H., Moran, K. A., & Conniff, L. A. (2002). Reliability of two commonly used pain scales with elderly patients. *Journal of Geriatric Physical Therapy, 25*(3), 16-20.

Todd, K. H. (2005). Pain assessment instruments for use in the emergency department. *Emergency Medicine Clinics of North America, 23*(2), 285-295.

Todd, K. H., Ducharme, J., Choiniere, M., Crandall, C. S., Fosnocht, D. E., Homel, P., et al. (2007). Pain in the emergency department: Results of the pain and emergency medicine initiative (PEMI) multicenter study. *Journal of Pain, 8*(6), 460-466.

Williamson, A., & Hoggart, B. (2005). Pain: a review of three commonly used pain rating scales. *Journal of Clinical Nursing, 14*(7), 798-804.

Tables

Table 1 *Frequency of Scale Asked First*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NRS	58	58.0	58.0	58.0
	VAS	42	42.0	42.0	100.0
	Total	100	100.0	100.0	

Table 2 *Frequency of Gender*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	46	46.0	46.0	46.0
	Male	54	54.0	54.0	100.0
	Total	100	100.0	100.0	

Table 3 *Frequency of Traumatic versus Non-Traumatic Pain*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Traumatic	42	42.0	42.0	42.0
	Non traumatic	58	58.0	58.0	100.0
	Total	100	100.0	100.0	

Table 4 *Mean Age of Patients and Onset of Pain*

	N	Minimum	Maximum	Mean	Std. Deviation
Age	100	18	88	41.44	18.080
Onset	100	1.00	71.00	22.8650	22.46286
Valid N (listwise)	100				

Table 5 *Spearman's Rho*

			NRS	VAS
Spearman's rho	NRS	Correlation Coefficient	1.000	.893**
		Sig. (2-tailed)	.	.000
		N	100	100
	VAS	Correlation Coefficient	.893**	1.000
		Sig. (2-tailed)	.000	.
		N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6 *Mann-Whitney U Test for NRS*

	TraumaticNon	N	Mean Rank	Sum of Ranks
NRS	Traumatic	42	47.10	1978.00
	Non traumatic	58	52.97	3072.00
	Total	100		

Test Statistics

	NRS
Mann-Whitney U	1075.000
Asymp. Sig. (2-tailed)	.311

Table 7 *Independent Samples Test for the VAS*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
VAS	Equal variances assumed	.831	.364	-.950	98	.345	-4.84901	5.10526	-14.98023	5.28220
	Equal variances not assumed			-.939	84.512	.351	-4.84901	5.16636	-15.12197	5.42394

Table 8 *Mean VAS Scores*

	TraumaticNon	N	Mean	Std. Deviation	Std. Error Mean
VAS	Traumatic	42	60.7136	26.26645	4.05300
	Non traumatic	58	65.5626	24.39952	3.20381

Abstract

Objective: This study compared the numerical rating scale (NRS) and the visual analog scale (VAS) on their assessment of traumatic and non-traumatic pain in the emergency department, as this has not been well studied. **Methods:** Emergency department patients who presented within 72 hours of pain onset and met inclusion criteria were asked to rate their pain by using both scales. **Results:** With a convenience sample of 100, this study demonstrated a correlation between the NRS and VAS when assessing pain in the emergency department ($p = 0.000$, $\alpha = 0.01$). It also confirmed that both the NRS ($p = .311$, $\alpha = 0.05$) and the VAS ($p = .345$, $\alpha = 0.05$) can be used to measure both traumatic and non-traumatic pain in the emergency department. **Conclusion:** The NRS and the VAS are both reliable and accurate measures of pain assessment in the emergency department and can accurately measure both traumatic and non-traumatic pain.