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THE ASSESSMENT OF ACUTE PAIN IN PRE-HOSPITAL CARE USING VERBAL NUMERICAL RATING AND VISUAL ANALOGUE SCALES

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☐ **Abstract—Background: Prehospital care (PHC) pain evaluation is an essential patient assessment to be performed by paramedics. Pain intensity is frequently assessed using Verbal Numerical Rating Scale (VNRS) or Visual Analog Scale (VAS). Objective: Our aim was to evaluate the agreement between VNRS and VAS in measuring acute pain in prehospital setting and to identify the preference among paramedics and patients. Methods: This was a 3-month cross-sectional study. Convenience sampling was used to enroll patients with acute pain responded to by the ambulance team. Data from consented patients were analyzed using Bland-Altman method, Spearman's correlation test, and Cohen's κ test. Results: One hundred and thirty-three patients participated in this study (median age 32 years; 72.2% male). The median for pain score at the scene was 7.50 (interquartile range [IQR]: 5.00) for VAS and 7.00 (IQR: 5.00) for VNRS. The median for pain score on arrival at the hospital was 7.00 (IQR: 3.10) for VAS and 7.00 (IQR: 4.00) for VNRS. There was a strong correlation between VNRS and VAS at the scene (r = 0.865; p < 0.001), as well as on arrival at the hospital (r = 0.933; p < 0.001). Kappa coefficient values and Bland-Altman analysis indicates good agreement between both scales for measuring acute pain. VNRS was the preferred method to measure acute pain by patients and paramedics. Conclusions: VAS performs as well as VNRS in assessing acute pain in PHC. VAS and VNRS must not be used interchangeably to assess acute pain; either method should be used consistently.** © **2015 Elsevier Inc.**

☐ **Keywords—emergency; pain score; prehospital care; Verbal Numerical Rating Scale; Visual Analog Scale**

INTRODUCTION

The International Association for the Study of Pain defines "pain" as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage" (1). Pain also includes the subjective interpretation of the discomfort (real or imaginative). This perception provides information on the pain's location, intensity, and its nature. The various conscious and unconscious responses, including the emotional response, further define the overall concept of pain (1,2). Inadequately controlled pain has negative physiological consequences. This includes an increase in heart rate, respiration rate, and blood pressure, as well as anxiety and patient discomfort (3). The difficulties in quantifying pain intensity and the problem of inter-observer perception can be overcome by objectively gauging pain using various pain-scoring systems. Pain intensity can be simply classified as mild, moderate, or severe; however, specific pain measurement tools are available to determine pain intensity more objectively (4). These include the Faces Pain Scales (Wong-Baker scale), Visual Analog Scale (VAS), Oucher Scale, McGill Pain Questionnaire, Brief Pain Inventory, Verbal

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Descriptor Scale, and Verbal Numerical Rating Scale (VNRS) (1–5). The VNRS and the use of face scales appear to be the most appropriate pain measurement tools in the prehospital setting (5). Any prehospital pain-measuring tool should be quick and simple to use, of high reliability, and should not rely on specific equipment. In addition, it should be based on patient self-reporting, and applicable irrespective of the patient's age, psychological or emotional state, and cultural background.

The VRNS is the most commonly used tool to measure pain intensity in clinical practice (6). Patients are asked to rate the pain intensity by providing a numerical rating from 0 to 10. Zero indicates no pain and 10 indicates worst pain imaginable. The advantages of VNRS are that it can be performed quickly, does not depend on motor skill, and requires no additional tools (7). It is conceptually simple, has a high compliance rate, and is easy to score (8). However, language can be a major barrier in applying VNRS. In addition, although VNRS is used more commonly, there is limited information on its validity and reproducibility as compared to VAS, particularly in the prehospital environment (9).

When using the VAS, patients are asked to mark the pain that they are experiencing on a 100-mm-long horizontal line labeled "no pain" (with or without related facial expressions) at one extreme and "worst pain ever" at the other (Figure 1). Pain intensity is determined by the length of the line as measured from the left-hand side to the point marked (9). The VAS has been validated in measuring pain, and the technique has been applied to measuring alertness after sleep, quality of life, anxiety, breathlessness, nausea, dyspnea, pruritus intensity, and attitudes toward the environment (5–10). The VAS can also accurately and reliably reflect changes in pain (6,11). The VAS ruler is reusable, can be labeled in different languages, and is sensitive to changes in acute pain (6,8,11). However, it may take a longer time to measure, requires specific equipment, and patients may have difficulty with this measure, as they need to have intact fine motor skills that may be limited by their illness or injury (6,8).

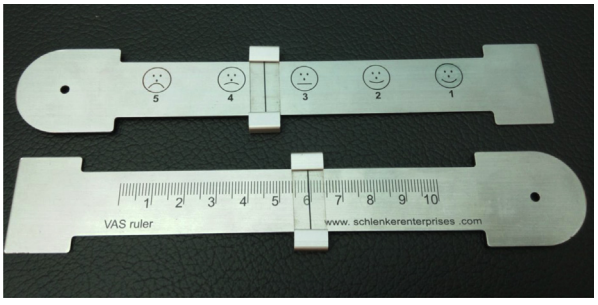

Figure 1. The Visual Analog Scale (VAS) scale showing the 100-mm line on one side with faces numbered 1 to 5 on the reverse side; 1 with the first smiling face stands for "no pain" and 5 with the crying face stands for "extreme pain." A difference of 10% to 20% on the VAS reflects minimal clinically significant pain difference. Patients with initial VAS score of >40 mm may require a greater reduction to achieve clinical significance in pain relief (11).

The prehospital setting poses a number of unique difficulties in measuring pain. Loud ambient noise, poor lighting, and movement may hinder any assessment technique. Time constraints in performing assessment and treatment interventions may add more difficulties (5). Currently, the prehospital care (PHC) team only uses the VNRS to score pain. This study assessed an alternative method of measuring acute pain in PHC.

The main objective of this study was to compare two different pain-assessment scales in measuring acute pain in the prehospital setting by determining their correlation and level of agreement. A secondary objective was to determine the preferred method for measuring pain among patients and paramedics.

METHODS

This was a single-center prospective observational study of patients treated by the ambulance team of a university hospital. The study was approved by the Institutional Ethics Committee prior to data collection and all data was treated with strict confidentiality. Convenience sampling method was used to collect data from March to May 2013. All patients responded to by the ambulance team and having acute pain were invited into the study by the investigators. Recruitment of participants was on voluntary basis. All participants were informed of the purpose of the study and consented before data collection. The exclusion criteria were refusal to provide consent, inability to communicate verbally, age <18 years, altered mental status with Glasgow Coma Scale <15 and pain >24 h. Patients were also excluded if they were transported to other hospitals.

Before commencing the study, a short seminar on measuring pain intensity using VAS and VNRS was conducted for the paramedics to explain the proper use of pain measuring tools and to standardize measurement. Each patient was assessed by the paramedics on scene, en route to the hospital (every 5 min), and on arrival at the emergency department (ED). Each patient was asked by the paramedics to score their pain using both VAS and VNRS. Patients were not allowed to review their previous pain scores. The scoring sequence for the same patient was maintained throughout the assessment. The initial scoring tool (VAS or VNRS) was alternated. A standardized data collection form was used to record data. The score from 0 to 10 was obtained using a VAS ruler. One side of the ruler depicts faces numbered 1–5, where