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0-10 Pain Scale Complaints For Head Injured And Orthopedic Patients

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Introduction

Measures of patient's pain complaints have been developed and used in clinical studies and research for decades (Gatchel & Turk, 1999). However, it has been noted that there has been little normative information available for such instruments (Turk & Melzack, 1992). They note that:

> The appropriateness of norms of tests has rarely been considered in the pain literature. In the absence of normative information, the raw score on any test is meaningless. To observe that a patient with a migraine headache scores a 10 on a Visual Analog Scale (VAS) of intensity conveys little or no information. However, if it is known that the average pain severity for 100 migraine headache patients is 5.4 with a standard deviation of 1.0, this information would permit the conclusion that this patient is expressing a very high level of pain relative to other migraine sufferers.

Turk and Melzack go on to state that general medical norms are not helpful. They noted that it would be of little value to compare the pain level of a migraine sufferer to the average pain level of cancer patients. This is, in effect, comparing apples with oranges. Such norms would be of no benefit in determining whether or not a particular migraine sufferer's headache complaints were unusual.

The International Association for the Study of Pain defines pain as a subjective experience which can occur in the absence of tissue damage (Mersky, 1986). Consequently, a subjective approach to pain assessment would seem indicated. Although patient pain reports can be influenced by such factors as primary gain, nevertheless, the patient's subjective report is still regarded by many as being the best means to assess chronic pain (AHCPR, 1992).

There are four primary types of self-reported measures of pain, which include verbal rating scales (VRS), numerical rating scales (NRS), visual analog scales (VAS), and pain drawings (PD) and other graphic methods. Each of these methods has advantages and disadvantages.

Although PD assessment tools are often used in clinical settings, the results are more difficult to quantify. Although scoring systems have been devised (Margolis, Tait & Krause, 1986), PD instruments are often interpreted using qualitative methods (Ransford, Cairns & Mooney, 1976). One of the strengths of PD instruments is that they are among the few methods that record the location of pain (Jensen & Karoly, 1992). While such tools are commonly used for gathering information in the clinical setting, they generally lend themselves less well to research.

VRS scales utilize adjectives to describe the quality of pain (such as burning or throbbing) or the intensity of pain (such as severe or excruciating). The disadvantages of utilizing the VRS measures are that the patient may not understand the descriptors, or may feel forced to choose a word that is not an accurate descriptor. Despite these disadvantages though, such measurement scales are clinically useful, and are best represented by the McGill Pain Questionnaire (Melzack, 1975). The MPQ has been used widely in research, but is often supplemented with measures utilizing interval or ratio data (Jenson & Karoly, 1992).

VAS and NRS scales create ratio level data that can be more easily compared (Jensen & Karoly, 1992). Both of these measures require patients to rate pain intensity on a continuum from no pain at all to some descriptor of extreme pain (such as the worst pain imaginable or worst possible pain). On VAS scales, the patient responds by placing a mark on a line (often 10 centimeters long) somewhere between the endpoints. The VAS score is then the distance from the lowest pain level to the mark. While VAS scales have a number of strengths (Price & Harkins, 1992), it has also been found that a number of persons have difficulty using them (Jensen, Karoly, & Braver, 1986).

NRS scales have been found by some researchers to be the most commonly used measure of pain reports (Price, Bush, Long & Harkins, 1994). In a manner similar to that employed in VAS scales, the patient is asked to rate pain levels using numbers, from zero being no pain at all to a level of 10 (or 100) being the worst pain imaginable (Jenson, Turner & Romano, 1994). NRS scales are easy to administer and understandable to the patient.

While pain intensity scales are widely used both clinically and in research to measure patient pain perception, little research has been conducted with large patient samples regarding diagnosis specific medical norms for pain intensity measures. This study is an attempt to identify specific pain complaints in two broad categories of medical conditions, which are orthopedic injury and head injury.

After reviewing the literature, it was decided to develop the BHI pain assessment procedure using an 11 point NRS scale ranging from 0-10. As research has shown that there is little or no gain in reliability in Likert measures with over 7 levels (Cicchetti, Showalter & Tyrer, 1985), there seemed to be little to be gained by utilizing a 0-100 scaling method, and a 0-10 scaling method was used.

The authors are aware of clinical settings where pain ratings employ such high-end descriptors as “Pain so bad that you would want to die.” However, such descriptors would seem to confound pain with depression. As research has indicated that pain affect seems to be distinct from pain intensity (Jensen, et al., 1989) this approach would seem to lead to a confoundment of these two variables. As a result, the 0 level was defined as “No pain at all,” while a level of 10 was defined as “The worst pain imaginable.”

Subjects were asked to rate their pain levels over the course of the last month. A month long period was chosen as it was believed it would lead to greater test-retest reliability than the immediate pain level.

A final consideration was that while a patient with carpal tunnel syndrome and a patient with low back pain might both report a pain level of 6, they will likely experience this pain in different areas of their bodies. Consequently, subjects were also asked to rate their highest and lowest pain levels in ten body areas, as well as their overall highest and lowest pain levels. It was hoped that this would promote a greater specificity of the measures.

Method

Subjects

Patient and community samples were gathered from a total of 2,264 subjects in 36 U.S. states at over 90 sites during the BHI validation studies. The final patient sample was comprised of 777 patients who were currently in treatment for a physical injury. The community sample was comprised of 1487 community subjects. All of the subjects were adults ranging in age from 18 to 65.

Procedure

The data used here was collected during the BHI validation study (Bruns, Disorbio & Copeland-Disorbio, 1996), but is unreported elsewhere. A total sample of 1487 community subjects was obtained, using subjects recruited through advertisements, and who were reimbursed for their participation. The subjects of the patient group were recruited by one of their health care providers. Of the patients obtained, 115 reported traumatic brain injuries, while 687 were suffering from orthopedic pain. All subjects were reimbursed for their participation.

Subjects were administered the BHI-R, and additional data was also gathered. The BHI-R was administered anonymously. Subjects signed an informed consent form stating that the information would be used for research purposes only, and that no results or feedback from this test would be given. Information about patient diagnosis and type of treatment was also collected, along with other demographic information.

As part of the BHI-R, the subjects were asked to rate their pain in ten body areas. The rating system used was a 0-10 scale, where 0 was defined as no pain at all, while a 10 was defined as the worst pain imaginable.

Instrumentation

The Battery for Health Improvement (BHI) is a 202-item inventory designed for the psychological assessment of medical patients. It is included within a larger 600-item research version (BHI-R), which was administered to the subjects in this study. The BHI has 14 scales that assess factors related to delayed recovery from medical conditions such as chronic pain or somatization.

Results

Overall, the results suggest that head injured patients differed from orthopedic patients in that they had higher levels of headaches ($p< .0001$), facial/TMJ pain ($p< .0001$), chest pain ($p< .05$), and in an overall pain score taking into account all areas of the body ($p< .0001$).

There were a number of areas in which head-injured patients and orthopedic patients did not report any difference from each other. There was no observed difference between these two groups with regard to low back pain, mid back pain, upper extremity pain, lower extremity pain, abdominal pain, genital pain, or either the overall highest or lowest reported pain levels.

The overall highest pain levels were both about 7 (head injured patients averaged 7.356 while the mean score of the orthopedic patients was 7.022). The overall lowest pain levels head injured orthopedic patients was also very similar (2.989 and 2.627 respectively). These numbers are very similar to those reported elsewhere with back pain and upper extremity pain patients (Disorbio and Bruns, 1998). Thus, across a variety of diagnoses, a mean high pain of about 7 and a mean low pain of about 3 have been observed. This suggests that possibility that the report of pain may to some extent be independent of diagnosis, and may be associated with equal levels of subjective distress. Further studies would be helpful to see if this trend holds with other diagnoses.

Both groups of patients reported higher levels of pain than the community sample in most areas ($p < .0001$). The exceptions to this were abdominal and genital pain reports, where there were no group differences at all.

Discussion

The 0-10 pain scale has enjoyed an extremely broad acceptance in the field. Its usefulness is limited, though, by the previous lack of a standardized method for performing such a rating, or any scientifically-based norms for making comparisons. The ideal means of establishing medical norms for pain complaints would be to obtain a sample of subjects selected at random from the universe of all medical patients who were reporting pain at any given point in time. Unfortunately, there would appear to be almost insurmountable barriers to this approach.

In the present study, the patient and community samples were obtained from a broad national cross-section of patients, gathered from 106 sites in 36 US states. The numbers obtained from this study may help to establish useful benchmarks for the clinical evaluation of pain.

Both brain and orthopedic injuries produced global pain ratings that were not significantly different from each other. Both produced global highs of about 7, and global lows of about 3, which was significantly higher than the Community global high of 4, and global low of 1. This is offered as an estimate of the “normal” level of pain.

A number of significant differences in pain reports did appear when subjects were asked to provide localized pain ratings in 10 bodily areas. Here, the mean numerical pain ratings for brain and orthopedic injuries differed significantly in several respects. This suggests that there may be an identifiable pattern of specific pain ratings that are consistent for each medical diagnosis. The mean level of head pain for a brain-injured patient was 5.9. Patients reporting pain levels that diverge far from these levels should be examined more carefully to explain this divergence.

Patients in the clinical setting reporting anterior pain (face/jaw, chest, abdomen and genital areas) may warrant further evaluation since the reporting of anterior pain with these two diagnoses was not common. Further research is needed to identify pain profiles for other medical diagnoses so that a broader range of baseline ratings can be determined.

Table 1

Multiple Analysis of Variance for Pain Complaints of Brain Injury and Orthopedic Patient Groups.

Pain Complaint	Community Mean	Brain Injury Mean	Ortho Injury Mean	F
Head	2.848	5.913	3.715	77.1 **** †††† ◊◊◊◊
Face/Jaw	0.611	2.817	1.166	86.9 **** †††† ◊◊◊◊
Neck	2.303	5.400	4.204	141.5 **** †††† ◊◊◊◊
Upper Extremities	1.157	3.174	3.186	150.5 **** ◊◊◊◊
Chest	0.832	1.591	1.144	13.7 **** † ◊◊◊
Abdominal	1.490	1.991	1.709	3.9 * ◊
Mid Back	1.557	3.696	3.054	92.9 **** † ◊◊◊◊
Low Back	2.492	4.470	4.742	135.3 **** ◊◊◊◊
Genital	0.487	0.870	0.766	8.9 * ◊◊◊
Lower Extremity	1.739	3.365	3.999	146.2 **** † ◊◊◊◊
Highest Pain	3.921	6.913	7.022	330.3 **** ◊◊◊◊
Lowest Pain	0.808	2.713	2.627	233.1 **** ◊◊◊◊

Community N = 1,487; Brain Injury N = 115; Orthopedic Injury N = 687

MANOVA Wilks Lambda df = 4, 4462 F=121.689 $p < .0001$

Post hoc tests using Bonferroni/Dunn correction:

Brain v. Community – *p<.05; **p<.01; ***p<.001; ****p<.0001

Brain v. Orthopedic – †p<.05; ††p<.01; †††p<.001; †††† p<.0001

Community v. Orthopedic – ◊p<.05; ◊◊p<.01; ◊◊◊p<.001; ◊◊◊◊ p<.0001

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