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Diagnosis Specific Norms for the 0-10 Pain Scale

by

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Abstract

Purpose: To identify mean pain complaints in 10 body areas for persons in the community, and for low back and upper extremity pain patients.

Method: The BHI Pain Complaints scale was administered to a total of 1487 community subjects and 777 rehabilitation patients. Diagnosis specific subgroups were obtained from the patient sample. Mean pain scores were derived from ten regions of the body.

Results: Back pain and upper extremity pain patients reported distinct clusters of symptoms, which differed significantly from each other and from the community sample. Overall, back pain patients tended to report substantially more mid-back, low back and lower extremity pain than did persons in either the community or upper extremity patient sample. Similarly, upper extremity pain patients reported more head, neck, and upper extremity pain than did either the back pain or the community samples. There was no observed difference between these two groups and face or jaw pain, chest pain, abdominal pain, genital pain, or either the overall highest or lowest reported pain levels. The mean low back pain score for low back pain patients was 6.7. The mean upper extremity pain report for upper extremity patients was 5.9.

Conclusion: This study is the first attempt to identify standards and norm patient perception with specific medical diagnoses. The results reflect specificity of pain intensity related to patient medical diagnoses. Pain intensity scores would be expected to be higher in regions of the body related to their medical diagnoses. However, future research is needed to determine whether this trend consists in all medical diagnoses related to pain.

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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 common medical conditions, which are upper extremity pain and back pain.

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 777 patients obtained, 299 reported diagnoses of back pain, while 187 reported diagnoses of upper extremity pain. They were also 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 back pain patients and upper extremity patients both tend to report distinct clusters of symptoms, which differ significantly from persons in the community (see Table 1). Overall, back pain patients tended to report substantially more mid-back, low back and lower extremity pain than did persons in either the community or upper extremity patient sample. Similarly, upper extremity pain patients tend to report more head, neck, and upper extremity pain than did either the back pain or the community samples.

Interestingly, there are a number of areas in which back pain and upper extremity pain patients did not report any difference from each other. There was no observed difference between these two groups and face or jaw pain, chest pain, abdominal pain, genital pain, or either the overall highest or lowest reported pain levels.

Both groups of patients reported higher levels of pain than the community sample in most areas. The exceptions to this were chest pain, where the back pain patient group was not significantly different than the community group; in abdominal pain reports, where there were no group differences at all; and in the area of genital pain, where the community and upper extremity groups did not differ significantly.

Discussion

The findings of this study were at times consistent with what would be expected clinically, while on other occasions some of the findings were not what would be expected. For example, it was not surprising that the highest level of reported pain for back pain patients was in the low back area, while the highest reported level of pain for upper extremity pain patients was in the upper extremities.

Somewhat more interesting were the findings that empirically, there do seem to be clusters of pain reports observed in each of these two patient groups. Empirically, upper extremity pain patients are most likely to complain of upper extremity pain, with the average level of reported pain being 5.9. In order of descending importance, this was followed by neck pain and head pain. In contrast, back pain patients complained of a mean level of back pain of 6.7, followed by lower extremity pain and mid-back pain.

Anatomically, genital pain could be caused by a low back injury. However, empirically this does not appear to be at all common. Surprisingly, although the back pain patients had a slightly higher level of genital pain than did upper extremity patients, this was not significant. In contrast, although there would appear to be no direct anatomical connection, back pain patients reported a significantly higher level of head pain than did the community sample. The reason for this is not clear, although perhaps simply the strain of being a medical patient or having a back injury can lead to a higher incidence of tension headaches.

One of the more interesting findings was that when comparing the overall highest and overall lowest levels of pain, back pain and upper extremity pain patients did not differ significantly. Phenomenologically, both appear to cause equal levels of subjective distress.

One of the great advantages of having better norms for pain scores is that it provides a better empirical basis for making determinations with regard to what constitutes symptom magnification, and what does not. Specifically, knowing that the average back pain patient has a lumbar pain level of 6.7 and that the average person in the community sample had a pain level of 2.5 makes for some reasonable basis of comparison. Similarly, the fact that some head pain was not uncommon in back pain patients suggests that the fact that the back pain patient reports a headache is not necessarily an indication of symptom magnification or somatization. However, the results here do suggest that anterior pain reports are empirically quite uncommon in both back pain and upper extremity pain patients. For either of those groups of patients, the reports of face or jaw pain, chest pain and abdominal pain or groin pain is quite unusual, and should be reason for more careful clinical scrutiny.

Additionally, while these results were obtained in the clinical setting with patients, the patients were told the results would not be an official part of their clinical record. It is possible that the subjects would have been motivated to respond with higher or lower pain complaints had this been the case. By removing the possible effects of secondary gain, it was believed that the reported pain levels would be less biased by confounding factors, and closer to the patient's actual subjective experience. Thus, this data suggests that the mean back pain complaint for a person in the community is about 2.5, while the mean back pain complaint for back

pain patients is about 6.7. These are clinically useful benchmarks.

The mean pain scores mentioned in this study were obtained from a large and diverse sample. However, the ability to generalize these results is limited, as while this sample was diverse, it was not randomly obtained. Despite this caveat however, these results do strongly suggest that there are distinct patterns of responding in each of these three groups of subjects, and that an appreciation of these differences can lead to a deeper understanding of pain reports in the clinical setting.

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Table 1

Analysis of Variance for Pain Complaints of Back Injury Patients, Upper Extremity Injury Patients, and a Community Sample.

Pain Complaint	*df*	Community Sample Mean	Back Pain Patient Mean	Upper Extremity Patient Mean	F
Head	2	2.889	3.622	4.310	27.45 *** † ◊◊◊◊
Face/Jaw	2	0.636	1.164	1.374	23.36 **** ◊◊◊◊
Neck	2	2.338	3.946	5.209	113.37 **** †††† ◊◊◊◊
Upper Extremities	2	1.172	2.050	5.941	339.69 **** †††† ◊◊◊◊
Chest	2	0.844	1.097	1.326	7.34 ◊◊
Abdominal	2	1.489	1.689	1.754	1.80
Mid Back	2	1.591	3.729	2.465	86.75 **** †††† ◊◊◊◊
Low Back	2	2.509	6.702	3.086	271.36 **** †††† ◊
Genital	2	0.484	0.906	0.722	10.31****
Lower Extremity	2	1.752	4.465	2.722	122.88 **** †††† ◊◊◊◊
Highest Pain	2	3.945	7.164	7.053	246.58 **** ◊◊◊◊
Lowest Pain	2	0.823	2.920	2.642	211.40 **** ◊◊◊◊

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

Back v. Upper Extremity – †p<.05; ††p<.01; †††p<.001; †††† p<.0001

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

Community N = 1,487; Back Pain N = 299; Upper Extremity N = 187