Patterns of Pain Descriptor Usage in African Americans and European Americans With Chronic Pain

JEFFREY E. CASSISI  
MASATAKA UMEDA  
Jackson State University  
JULIE A. DEISINGER  
Saint Xavier University  
CHRISTINE SHEFFER  
Arkansas Foundation for Medical Care  
KENNETH R. LOFLAND  
Pain and Rehabilitation Clinic of Chicago  
CHERYL JACKSON  
Jackson State University

This study examined ethnic differences in the use of pain descriptors, comparing standardized pain assessment data from African American and European American patients with heterogeneous chronic pain syndromes. The measure was the Short-Form McGill Pain Questionnaire (SF-MPQ) including the embedded Visual Analog Scale (VAS). Exploratory factor analyses of SF-MPQ data identified differences in factor structure with the VAS loading on a different factor for each group. A 5-factor solution was obtained from the African American group and a 4-factor solution was obtained from the European American group. There was little overlap in the pattern matrices for African American and European American groups. Results suggest that the VAS is as sensitive to ethnic differences as other traditional pain measures.

- Short-Form McGill Pain Questionnaire  
- Visual Analog Scale  
- African Americans  
- European Americans  
- exploratory factor analysis

• Jeffrey E. Cassisi, Masataka Umeda, and Cheryl Jackson, Department of Psychology, Jackson State University; Julie A. Deisinger, Department of Psychology, Saint Xavier University; Christine Sheffer, Arkansas Foundation for Medical Care, Little Rock, Arkansas; Kenneth R. Lofland, Pain and Rehabilitation Clinic of Chicago.

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Correspondence concerning this article should be addressed to Jeffrey E. Cassisi, Department of Psychology, Jackson State University, P.O. Box 17550, Jackson, MS 39217-0350. E-mail: cassisi@worldnet.att.net
Pain is the most commonly reported presenting complaint in medical settings (Hardin, 1998). The importance of appreciating the level and quality of patients’ pain has recently come to the fore with the implementation of recommendations for the addition of pain level as a vital sign (American Pain Society Quality of Care Committee, 1995). The importance of acknowledging ethnic differences in patient report of pain has been acknowledged for over three decades (Zatzick & Dimsdale, 1990). Much of the early research used medical staff report of differences among European Americans, with Jewish and Italian patients demonstrating greater emotional reactions to pain than Irish and Nordic patients (Zborowski, 1969). Given the recent focus on the routine report of pain level as well as the current urgent focus on health care disparities (Pope et al., 2000; Smedley, Stith, & Nelson, 2002), understanding the influence of ethnicity on the level and quality of patient reports is imperative to countering any bias that minority patients encounter when describing their pain experiences.

African American and European American patients appear to report significantly different levels and qualities of pain in both laboratory and clinical conditions (Breitbart et al., 1996; Edwards, Doleys, Fillingim, & Lowery, 2001; Edwards & Fillingim, 1999; Faucett, Gordon, & Levine, 1994; Stewart, Lipton, & Liberman, 1996). At first glance, African American patients appear to report lower pain tolerances despite similar pain thresholds. However, a less Eurocentric interpretation of these results indicates that these differences are actually due to cultural and linguistic factors rather than biological factors.

Summers, Cooper, Carlton, Andrews, and Kolb (1999) investigated ethnic differences among African American and European American myocardial infarction patients by using a qualitatively driven method to gather descriptions of pain recorded by physicians in patients’ medical records. They computed odds ratios for the use of different descriptors by the patient ethnicity and found that African American patients were more likely to use “atypical” pain descriptors. A lack of understanding of this type of difference may lead a Eurocentric medical community to view African American patients as less tolerant of pain. African American patients subsequently may be treated differently as a consequence of this Eurocentric perceptual bias.

Although Summers et al.’s (1999) study was informative for a preliminary investigation, their approach was unstandardized and contingent on physician reporting bias. To date, there has been no empirical investigation of ethnic response differences to a widely used, standardized pain assessment instrument such as the Short Form of the McGill Pain Questionnaire (SF–MPQ; Melzack, 1975, 1987). The purpose of this article is to determine whether African American and European American patients with chronic pain differ in the use of pain descriptors on a standardized assessment instrument, the SF–MPQ. Understanding any ethnic differences for this instrument will assist in a more accurate interpretation of its results for African Americans and has the potential to improve the quality of medical care offered to this ethnic group.

Factor analytic procedures will be used to determine and understand differences on the SF–MPQ. Precedent for the use of this procedure in the analysis of ethnic differences is found in Reynolds (2000), who described the use of factor analysis to examine ethnic differences in response to psychological inventories. Cepeda-Benito and Gleaves (2000) also used this approach to examine ethnic differences for the Hopkins Symptom Checklist–21. Both of these studies purport that if a different factor solution is produced for each group, then an argument can be made that the items may have different meanings for the members of each respective group.

**Method**

**Participants**

The data set consisted of 489 consecutive new patients who presented to a pain reha-
bilitation clinic in Chicago for the treatment of chronic pain. Selection criteria included complete data, age range between 21 to 65 years, and self-identification as African American (n = 97) or European American (n = 392). Participants from other ethnic categories were eliminated from the data set because there were too few to include in the analyses. All patients held some form of insurance or were self-paying. The mean age of the participants was 49.8 years (SD = 16.2), and the mean duration of pain was 43.7 months (SD = 78.9). Sixty-two percent of the sample were female. A full range of International Association for the Study of Pain (IASP) pain sites was represented, with 66.7% reporting low back and lower limb pain, 12.1% reporting upper shoulder and upper limb pain, and 8.9% reporting cervical pain. The remaining IASP pain sites constituted less than 12.3% of the sample.

Measure

The SF–MPQ (Melzack, 1987) is a 15-item adjective checklist of pain descriptors (11 sensory and 4 affective pain descriptors) rated on a 4-point intensity scale from 0 = none to 3 = severe. The SF–MPQ provides a sensory subscale (MPQ-Sen), an affective subscale (MPQ-Aff), and a total score (Melzack, 1987). Higher scores indicate greater pain. The MPQ-Sen subscale rates sensory or nociceptive aspects of pain, with scores ranging from 0 to 33. The MPQ-Aff subscale rates emotional aspects of pain, with scores ranging from 0 to 12. The SF–MPQ has been shown to be sensitive to the effects of traditional therapies and to provide discriminatory information about different pain syndromes (Melzack, 1987).

This questionnaire includes an item called the Visual Analog Scale (VAS) that allows patients to rate the intensity of their current pain. This item consists of a 10-cm line on which patients mark the point that corresponds to their pain perception. The line is anchored with the descriptor NO PAIN below the left end and WORST POSSIBLE PAIN below the right end. The distance from the left end to the mark indicates the severity of pain. The VAS has been shown to be responsive to changes in the pain stimulus. Furthermore, correlations between successive pain measurements have been reported as high as .99 for the VAS (Huskisson, 1983), and a high correlation exists between the VAS and other measures of pain severity (Huskisson, 1983; Melzack & Katz, 1992).

Procedure

Participants were administered the SF–MPQ and VAS as part of routine clinical intake procedures. No incentives were provided. Summary scores and medical diagnoses were entered into a computerized record system. Identifying information was deleted after being exported into the database.

Results

Preliminary examination of the demographic variables was conducted to assess for homogeneity between groups. There was no significant difference in the mean age of African American patients (M = 47.0 years, SD = 13.6) or European American patients (M = 49.7 years, SD = 16.0). Chi-square analyses revealed significant ethnic differences in marital status, χ²(4, N = 489) = 16.92, p = .002, with 30.8% of the African Americans being divorced, widowed, or separated, and 15.9% of the European Americans being divorced, widowed, or separated. Chi-square analyses also revealed significant ethnic differences in educational level, χ²(5, N = 489) = 25.94, p < .001, with 17.7% of the African Americans having college degrees or more and 38% of the European Americans having college degrees or more. No significant ethnic differences were found for IASP pain site, gender, or current employment status.

An exploratory factor analysis (EFA) on the 15 items of the SF–MPQ and the VAS was then conducted for each group. The number of factors to be extracted in each analysis was determined according to Kaiser’s criterion (Gardner, 2001), the percent-
age of variance accounted for by each factor (Tinsley & Tinsley, 1987), and simple structure (Thurstone, 1947, cited in Gardner, 2001).

Bartlett’s test of sphericity (BTS) and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy were applied to the African American (BTS = 446.59, \( p < .001 \); KMO = 0.78) and European American (BTS = 1,337.31, \( p < .001 \); KMO = 0.85) data sets. These indicated that the data from each group were appropriate for factor analyses.

To find a factor solution that conformed most closely to Thurstone’s definition of simple structure (1947, cited in Gardner, 2001), we tried both principal-components analysis and principal-axis factoring as the factor extraction method. Each of these extraction methods was followed by both orthogonal (varimax) and oblique (oblimin) rotations. Factor loadings with absolute values greater than or equal to .30 were considered significant (Gardner, 2001).

Comparison of these four factor analyses revealed that principal-axis factoring followed by oblique rotation produced the cleanest separation of factors. For the African American factor solution, only two descriptors (fearful and splitting) loaded on two factors. The factor solution for the European American sample yielded only one item (tiring) that loaded on two factors.

Factor structures for both groups differed from the two-factor solution described by Melzack (1987). Items that Melzack and Katz (1992) indicated as relevant to sensory aspects of pain loaded onto different factors, making interpretation of each factor difficult. To facilitate understanding of the constructs underlying these newly identified factors, we labeled them according to the item that loaded most strongly on each factor. SF–MPQ items in each of the factor descriptions below are listed in descending order of factor loading.

Five eigenvalues greater than one emerged for the African American group (see Table 1). This factor solution accounted for 61.8% of the total variance in the data, and each of these factors accounted for more than 5% of the total variance (Tinsley & Tinsley, 1987). For the

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Punish</td>
<td>0.82</td>
<td>0.06</td>
<td>-0.17</td>
<td>0.00</td>
<td>-0.08</td>
<td>0.73</td>
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<td>14. Fearful</td>
<td>0.67</td>
<td>0.00</td>
<td>0.01</td>
<td>0.31</td>
<td>-0.08</td>
<td>0.66</td>
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<tr>
<td>13. Sickening</td>
<td>0.44</td>
<td>-0.08</td>
<td>-0.21</td>
<td>0.15</td>
<td>0.12</td>
<td>0.44</td>
</tr>
<tr>
<td>11. Splitting</td>
<td>0.43</td>
<td>0.02</td>
<td>0.16</td>
<td>0.00</td>
<td>0.46</td>
<td>0.55</td>
</tr>
<tr>
<td>1. Throbbing</td>
<td>0.02</td>
<td>0.85</td>
<td>-0.13</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.76</td>
</tr>
<tr>
<td>16. VAS</td>
<td>0.09</td>
<td>0.13</td>
<td>-0.82</td>
<td>-0.04</td>
<td>0.00</td>
<td>0.75</td>
</tr>
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<td>6. Gnawing</td>
<td>0.05</td>
<td>0.02</td>
<td>0.11</td>
<td>0.65</td>
<td>-0.09</td>
<td>0.39</td>
</tr>
<tr>
<td>9. Heavy</td>
<td>0.11</td>
<td>0.14</td>
<td>-0.12</td>
<td>0.51</td>
<td>0.09</td>
<td>0.48</td>
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<td>5. Cramping</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.13</td>
<td>0.41</td>
<td>0.11</td>
<td>0.25</td>
</tr>
<tr>
<td>12. Tiring</td>
<td>0.26</td>
<td>-0.10</td>
<td>-0.15</td>
<td>0.33</td>
<td>0.29</td>
<td>0.52</td>
</tr>
<tr>
<td>4. Sharp</td>
<td>0.05</td>
<td>0.02</td>
<td>-0.05</td>
<td>0.30</td>
<td>0.24</td>
<td>0.39</td>
</tr>
<tr>
<td>3. Stabbing</td>
<td>0.02</td>
<td>-0.21</td>
<td>-0.14</td>
<td>0.14</td>
<td>0.69</td>
<td>0.57</td>
</tr>
<tr>
<td>10. Tender</td>
<td>-0.06</td>
<td>0.11</td>
<td>-0.07</td>
<td>-0.05</td>
<td>0.54</td>
<td>0.35</td>
</tr>
<tr>
<td>8. Aching</td>
<td>-0.08</td>
<td>0.18</td>
<td>0.03</td>
<td>0.07</td>
<td>0.36</td>
<td>0.21</td>
</tr>
<tr>
<td>7. Hot</td>
<td>0.29</td>
<td>0.09</td>
<td>0.04</td>
<td>-0.12</td>
<td>0.31</td>
<td>0.24</td>
</tr>
<tr>
<td>2. Shooting</td>
<td>0.13</td>
<td>0.12</td>
<td>0.05</td>
<td>0.12</td>
<td>0.25</td>
<td>0.19</td>
</tr>
</tbody>
</table>

Note: Numbers in bold type represent significant factor loadings. VAS = Visual Analog Scale.

TABLE 1 Results of Principal-Axis Factoring With Oblimin Rotation for African Americans
African American sample, Factor 1 (Punishing) accounted for 32.4% of the variance and was defined by four descriptors (punishing, fearful, sickening, and splitting). All but one of the items from the MPQ–Aff subscale loaded onto this factor. Accounting for 8.9% of the variance, Factor 2 contained a single descriptor (Throbbing). Factor 3 accounted for 7.2% of the variance and likewise consisted of a single item, the VAS; it was identified as a Pain Intensity factor. Six descriptors (gnawing, heavy, cramping, tiring, fearful, and sharp) defined Factor 4 (Gnawing), which accounted for 6.9% of the variance. The fifth factor (Stabbing) accounted for 6.4% of the variance and was defined by five descriptors (stabbing, tender, splitting, aching, and hot). Item 2 of the MPQ (i.e., shooting) did not load significantly on any factor, although it approached significance on Factor 5.

The EFA of the European American group produced a four-factor solution accounting for 52.2% of the total variance in the data. Each factor had an eigenvalue greater than 1 and accounted for more than 5% of the total variance (see Table 2). Factor 1 (Heavy), accounting for 28.0% of the variance, was defined by four descriptors (heavy, aching, tiring, and gnawing) and the VAS. Factor 2 (Stabbing) accounted for 10.0% of the variance and included three descriptors (stabbing, shooting, and sharp). Accounting for 7.4% of the variance, Factor 3 (Fearful) contained all the items from the MPQ–Aff subscale (fearful, punishing, sickening, splitting, and tiring). Factor 4 (Tender) accounted for 6.8% of the variance and consisted of four descriptors (tender, hot, throbbing, and cramping).

To explore the potential impact of differences in education on the factor structure, we split the European American group into a high education group (some college, college graduate, and graduate school) and a low education group (less than high school, high school graduate and GED, and trade school). The African American group could not be split in this way because the subsamples would have been too small for factor analysis. EFAs were conducted with the low and high education groups, using

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor loading</th>
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<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Heavy</td>
<td>0.54</td>
<td>0.02</td>
<td>−0.23</td>
<td>−0.05</td>
<td>0.44</td>
</tr>
<tr>
<td>8. Aching</td>
<td>0.52</td>
<td>0.04</td>
<td>0.12</td>
<td>0.15</td>
<td>0.32</td>
</tr>
<tr>
<td>12. Tiring</td>
<td>0.43</td>
<td>0.09</td>
<td>−0.31</td>
<td>−0.01</td>
<td>0.43</td>
</tr>
<tr>
<td>6. Gnawing</td>
<td>0.41</td>
<td>0.00</td>
<td>−0.10</td>
<td>0.02</td>
<td>0.23</td>
</tr>
<tr>
<td>16. VAS</td>
<td>0.30</td>
<td>0.26</td>
<td>0.00</td>
<td>0.16</td>
<td>0.29</td>
</tr>
<tr>
<td>3. Stabbing</td>
<td>0.01</td>
<td>0.72</td>
<td>0.02</td>
<td>0.00</td>
<td>0.51</td>
</tr>
<tr>
<td>2. Shooting</td>
<td>−0.08</td>
<td>0.69</td>
<td>0.00</td>
<td>0.14</td>
<td>0.54</td>
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<td>4. Sharp</td>
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<td>0.69</td>
<td>−0.05</td>
<td>−0.13</td>
<td>0.46</td>
</tr>
<tr>
<td>14. Fearful</td>
<td>−0.10</td>
<td>0.02</td>
<td>−0.80</td>
<td>0.00</td>
<td>0.50</td>
</tr>
<tr>
<td>15. Punish</td>
<td>0.13</td>
<td>0.01</td>
<td>−0.53</td>
<td>0.04</td>
<td>0.39</td>
</tr>
<tr>
<td>13. Sickness</td>
<td>0.09</td>
<td>0.03</td>
<td>−0.52</td>
<td>0.10</td>
<td>0.40</td>
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<tr>
<td>11. Splitting</td>
<td>0.13</td>
<td>0.16</td>
<td>−0.36</td>
<td>0.20</td>
<td>0.40</td>
</tr>
<tr>
<td>10. Tender</td>
<td>0.10</td>
<td>−0.07</td>
<td>−0.16</td>
<td>0.42</td>
<td>0.28</td>
</tr>
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<td>7. Hot</td>
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<td>1. Throbbing</td>
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Note: Numbers in bold type represent significant factor loadings. VAS = Visual Analog Scale.
principal-components analysis followed by oblique rotation. The high education group produced a four-factor solution in which 14 out of 16 items loaded on the same factors as in the original European American EFA. The low education group also produced a four-factor solution, but only 7 out of 16 items loaded on the same factors as the original European American EFA. In addition, only 5 of 16 items from the low-education group loaded on the same factors as those derived from the African American sample. Thus, although different factor solutions were obtained when groups were formed by education level, the solution derived from the low-education group did not resemble either pattern obtained when the analysis was conducted by ethnic group.

**Discussion**

Exploratory factor analyses yielded ethnic differences in the factor structure of the SF–MPQ. A five-factor solution was obtained from the African American group, and a four-factor solution was obtained from the European American group. There was little overlap in the pattern matrices for African American and European American groups. Additionally, the VAS loaded differently for each group. For example, the first factor obtained from the EFA of the European American group was defined by four descriptors and the VAS. In contrast, the VAS formed its own factor for the African American sample. According to Jordan (1999), examinations of ethnic differences within a single study are good evidence for difference and preferable to comparisons made across studies. As with this study, within-study comparisons contrast the same measures administered in the same clinical context, thereby reducing sources of confounding variance.

A problem with the EFA solutions was the difficulty in clearly labeling the factors. For the African American sample, the dimensions underlying Factors 2 and 3 were apparent by virtue of the fact that each of these factors consisted of only a single significant loading. However, the constructs underlying the factors obtained from the EFA of the European American sample were not as obvious. It does appear that for the African American sample, Factor 3 relates to pain intensity because that is what the VAS measures. However, the European American sample responded to the VAS in a different way. It is clear that additional qualitative research is necessary to elucidate the nature of the constructs associated with the factors identified in this study.

Despite difficulty in labeling the factors, the evidence for the number of factors was robust. The EFAs were performed using a variety of accepted approaches, including principal-components analysis and with both orthogonal and oblique rotations as well as with principal-axis factoring followed by orthogonal rotation. In every case, a five-factor solution emerged for the African American group and a four-factor solution emerged for the European American group. In no case did the VAS load on the same factor for both groups. Therefore, these results support Summers et al.’s (1999) conclusion that African American patients use different pain descriptors than European American patients. By using the rationale proposed by Reynolds (2000), the item descriptors on the SF–MPQ have different meanings for African American and European American patients. However, the nature of these specific differences in meaning remains to be identified in future research.

Because of its graphic presentation, Wolff (1985) and others have considered the VAS to be relatively independent from ethnic or linguistic influences. However, these results suggest caution in accepting this logic. The results of this study suggest that the VAS is as sensitive to ethnic differences as other traditional pain measures. Only one previous study has investigated the SF–MPQ using EFA (Burckhardt & Bjelle, 1994). Burckhardt and Bjelle examined the factor structure of a Swedish version of the SF–MPQ using EFA and found a three-factor
Not surprisingly, these authors attributed the emergence of three factors to linguistic differences. They did not include the VAS in their EFA.

The results obtained here, while preliminary because of the small sample size of the African American group, imply that there may be systematic differences in how pain descriptors are used by African American and European American patients. Ethnic differences in levels of stoicism have long been recognized (Williams, 1999; Zborowski, 1969). However, the possibility also exists that the group differences reported in this study might reflect the nature of the social position of African Americans in a Eurocentric culture. Further inquiry into the meaning of the VAS, perhaps based on qualitative inquiry, might serve to provide insight into these group differences.

Environmental variables often lead to group differences. Members of a minority group may report greater symptom severity simply as a consequence of being provided a different quality and quantity of medical care than the dominant group. For example, minority patients are often prescribed fewer analgesics than European American patients. Consequently, they may be more likely that European Americans to use less effective over-the-counter medications (see Davis, 1997). Indeed, Morrison, Wallenstein, Natale, Senzel, and Huang (2000) reported that pharmacies in African American communities stock fewer pain-relieving medicines than in European American communities. Additionally, members of minority groups may emphasize symptoms because they have less trust in their health care providers or feel that they will not be heard (cf. Paniagua, 1998; Sue & Sue, 1999). In understanding difference, the importance of understanding the psychosocial variables associated with being a member of a marginalized group cannot be emphasized enough.

Important implications of this study remain to be confirmed and addressed in future research. Although no differences in diagnostic information or pain duration were found between the groups, the treatment histories of the patients were not included. The possibility exists that significantly different treatment histories may have produced these ethnic differences. If the African Americans received less treatment, or less effective treatment, it is very possible that they would progress to a more advanced stage of illness and have more symptoms given the same diagnosis and pain duration. The literature on health care disparities is replete with studies demonstrating inferior treatment provision for minorities (Smedley et al., 2002). Also, the exclusion of patients who were uninsured or unable to pay for services may have affected the composition of the samples, thereby influencing the results (see Fleishman, Hsia, & Hellinger, 1994). In addition, EFAs also suggested that education influences the factor solution as greatly as ethnic group membership. However, these differences seemed to be operating in a manner relatively independently of ethnicity. Because demographic differences are difficult to handle in EFA, more research is needed to understand the role of treatment history and education in producing these different solutions.

The disproportion in sample size between the African American and European American groups used in the EFAs must temper these conclusions. On the positive side, the adequacy of these factor solutions is supported by several sources. For instance, according to Tinsley and Tinsley (1987), a minimum of 5 participants per item is an adequate sample size for EFA. The size of both samples in this study meets this criterion. Also as reported earlier, the BTS and KMO indices provided further evidence that the data could appropriately undergo factor analysis. Nonetheless, the European American sample was four times as large as the African American sample. Therefore, the European American factor structure is presumably more stable than the African American factor structure (Gardner, 2001). Future studies need to replicate these findings with larger samples of African American patients with chronic pain.
Several studies were cited in the beginning of this article that have concluded that African Americans exhibit lower pain tolerances in both laboratory and clinical pain situations (Breitbart et al., 1996; Edwards et al., 2001; Edwards & Fillingim, 1999; Faucett et al., 1994; Stewart et al., 1996). Before the conclusion of these studies is further reified in the scientific literature, the ethnic equivalence of standardized pain assessment devices used in such studies needs to be established. Indeed, the preliminary research presented here suggests that even the most basic pain measures are probably not equivalent across ethnic groups.

References


