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Validating PRISM (Pictorial Representation of Illness and Self Measure) as a Measure of Suffering in Chronic Non-Cancer Pain Patients

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Abstract: **The Pictorial Representation of Illness and Self Measure (PRISM) is a recently developed tool designed to measure the burden of suffering due to illness in a variety of patient populations. The purpose of the current study was to validate PRISM as a measure of suffering in patients with chronic non-cancer pain. Patients (n = 138) were recruited from 2 hospital pain clinics, where they were participating in a 10-week, mindfulness-based chronic pain management course and during which they completed validated questionnaires to assess their outcomes. Convergent validity was assessed by correlating their PRISM scores with scores on the Short-Form 36v2 quality of life instrument, the Pain Catastrophizing Scale, and the 0 to 10 Numeric Pain Scale. Content validity and test-retest reliability were assessed, and a factor analysis performed to identify relationships among the PRISM domains. PRISM was found to have good reliability and was significantly correlated with many of the subdomains of the other questionnaires. Qualitative data (n = 26) revealed that PRISM was well understood and that there was consistency in interpreting the task. Our data suggest that the PRISM task measures constructs relating to quality of life, pain catastrophizing, and pain intensity and probably measures suffering in patients with chronic non-cancer pain, providing a novel and quick tool for clinicians.**

Perspective: ***This study demonstrates the reliability and validity of the PRISM task for measuring the burden of pain in a population of chronic pain sufferers. Clinicians in the field of chronic pain management may find PRISM useful for monitoring the impact of pain management strategies on pain perception and the psychosocial variables that influence suffering.***

Key words: *Chronic pain, Pictorial Representation of Illness and Self Measure, PRISM, mindfulness, validity, suffering.*

Chronic pain is defined as intermittent or continuous pain of more than 6 months' duration or pain lasting beyond the expected healing time. It is estimated that only 50% of patients with acute, chronic, and cancer pain receive adequate pain control,[6] whereas 20% to 30% of adults worldwide live with some form of chronic pain.[6,12,14] Pain represents an immense disease burden, as unrelieved acute pain can lead to chronic pain, as well as longer and more complicated recoveries from surgery and trauma.[21]

Disability from chronic pain is not due solely to the pain sensation but involves the interaction of the individual's physical, psychological, and social environment. Chronic pain may affect an individual's ability to carry out daily activities, hold a steady job, and interact with family and friends. Social support can even shape pain behaviors (such as rubbing the painful area, grimacing, or bracing).[8,16] It is essential for healthcare workers to be aware of an individual's social environment and changes to it, because this can profoundly affect prognosis, treatment, and subjective pain perception.

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Using Cassell's widely recognized definition of suffering as "a state of severe distress associated with events that threaten the intactness of the person,"[5] it is clear that the tremendous impact of chronic pain on some individuals qualifies as suffering. Cassell also acknowledges that suffering can occur "in relation to any aspect of the person," including social functioning and relationships with family and friends, all of which are affected by chronic pain. Still, there is no documented fast and simple tool for measuring the suffering caused by chronic pain.

Pictorial Representation of Illness and Self Measure (PRISM) is a recently developed tool thought to measure what in German is called *leidensdruck,* or in English, the burden of suffering due to illness, or, alternatively, the intrusiveness of illness into a patient's life.[4] PRISM requires patients to place disks representing different aspects of their lives, including illness, in relation to a disk representing the "self." The distances between the self disk and the other disks is measured and represents the influence of these variables on the self.

Questionnaires assessing quality of life, disability, and coping, such as the Short-Form 36 (SF-36v2),[11,19,20] Pain Disability Questionnaire,[1] or Coping Strategies questionnaire,[13] are lengthy and cumbersome for the patient and physician, making them difficult to use routinely in the clinical setting. The PRISM task is fast and simple for patients to complete, often taking less than 5 minutes, and can potentially be completed at every physician visit.[3] PRISM can measure multiple parameters, such as illness and family relations, allowing physicians to monitor many aspects of the patient's social environment quickly.

Before widespread use of PRISM can be considered or warranted, PRISM must be validated as a measure of burden of illness for specific illness populations. This has been done for chronic obstructive pulmonary disease (COPD), rheumatoid arthritis, and systemic lupus erythematosus (SLE).[2] However, to our knowledge, PRISM has not been validated as a measure of the impact of non-illness variables (such as family or work) on the individual.[3] The non-illness variables are unlikely to measure suffering directly but instead the effect of suffering due to pain on the individual.

The purpose of this study was to characterize the validity and reliability of PRISM as a measure of the suffering caused by chronic pain, as well as the impact of psychosocial variables, in a group of chronic non-cancer pain patients. If PRISM is measuring the burden of chronic pain, it should correlate significantly with measures of quality of life, as well as with physical and psychological variables.

Methods

Study Population

The study population was recruited from patients attending 2 tertiary care teaching hospital pain clinics in Toronto, Ontario, Canada (Sunnybrook Health Sciences Centre and St. Michael's Hospital), and consisted of patients diagnosed with chronic pain of non-cancer origin, entering a mindfulness-based chronic pain management course. One hundred thirty-eight patients completed 4 questionnaires, at class 1 before the mindfulness course began and again at class 10: The PRISM task,[4] the SF-36v2,[19,20] the Pain Catastrophizing Scale (PCS),[17] and the numeric pain scale.[7] Comparing their PRISM scores with scores on their other questionnaires, we looked at convergent validity, and conducted a factor analysis. A second group, which had done the course in the past (n = 26), completed the PRISM task twice, with a 24-hour interval, as well as a short qualitative questionnaire, to assess test-retest reliability (the consistency of a measure from one time to another) and content validity (the extent to which the instrument captures the content one is trying to measure). All 26 patients were attending a weekend mindfulness retreat run by one of the authors, which spanned Saturday and Sunday. Between the 2 days, patients either slept at home or at hotels. Patients completed the PRISM task at noon on Saturday and Sunday (test-retest reliability) and completed the questionnaire on the Saturday at noon immediately after completing PRISM (content validity). No incentives were provided for completing these tasks.

The mindfulness course, taught by one of the authors, consisted of 10 once-per-week classes of 2 hours' duration each, and was based on the mindfulness-based stress reduction program developed by Jon Kabat-Zinn.[9,15] Some patients joined the classes via telemedicine from their local hospital in Ontario.

Informed consent was obtained from all patients, and research ethics board approval was obtained from the hospitals.

PRISM Task

In the PRISM task, patients were shown a letter size (21.6 × 27.9 cm) piece of white paper, with a fixed yellow circle 7 cm in diameter glued in the bottom left-hand corner of the piece of paper (Fig 1). Each patient was asked to imagine that the paper represented his/her life

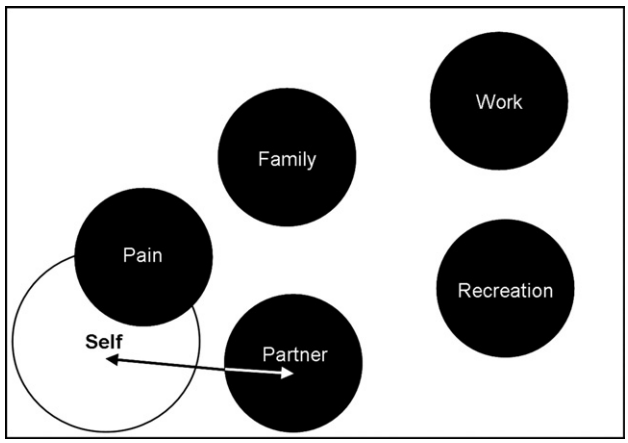

Figure 1. An example of the Pictorial Representation of Illness and Self Measure (PRISM) task, shown in monochrome (the actual task uses colored disks; see Methods). The horizontal line represents an example measurement of the self-disk separation (in this case the self-partner separation, SPS).

and that the yellow disk represented his/her concept of self. They were given a red paper disk, 5 cm in diameter, and asked to imagine that it represented their pain and glue the pain disk to the paper in a location, relative to the "self" disk, that best reflected the importance or intrusiveness of their pain into their life. The same request was made regarding 4 additional disks also 5 cm in diameter, which were used to assess other aspects of the individual's life: A blue disk representing work; green representing immediate family; purple, a spouse/partner; and a black disk representing recreation. Patients glued the disks onto the page in whatever order they wanted. The majority of patients had no difficulty gluing the disks, but those with limited use of their hands were assisted by volunteers or other patients. Disks were all glued to the same page, without removing one disk before gluing the next and thus there was occasional overlap of disks on the page.

PRISM was scored by measuring, to the nearest millimeter, the distance in centimeters from the center of the self disk, to the centers of the 5 other disks. The center of each disk was determined by drawing 2 perpendicular lines representing the diameter of the circle, and taking the intersection of these lines as the centre. If one disk overlapped the centre of another, then the top disk was measure first, then carefully peeled off, so that the disk below it could be measured. The original description of PRISM used only the self and illness disks, and the distance between the 2 was termed the self-illness separation (SIS).[4] For our purposes, the "illness" is chronic pain, and thus the SIS is the distance between the self disk and the pain disk. Distances between the non-pain disks were termed the self-family separation (SFS), self-partner separation (SPS), self-work separation (SWS), and self-recreation separation (SRS).

Quality of Life Questionnaire

The SF-36v2 questionnaire is the most widely used validated instrument in assessing health-related quality of life.[19,20] The SF-36v2 yields 2 summary measures, a physical health component and a mental health component, which are derived from 8 domains: Physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. Higher scores (on a scale of 0–100) indicate better health-related quality of life.

The Pain Catastrophizing Scale

The PCS is a validated tool with 13 items scored on a 5-point scale (0–4).[17] The PCS measures 3 domains of pain encompassing catastrophizing: Rumination, magnification, and helplessness. Higher scores are associated with greater catastrophizing and higher levels of disability.

Numeric Pain Scale

A ubiquitous scale used by physicians to assess perceived level of pain is the numeric pain scale.[7,10] Patients were asked to rate their pain from 0 to 10 (0 is no pain, 10 is the worst pain they can imagine) right now (as they are filling out the form), at its best during the past week, at its worst during the past week, and as the pain is usually.

Content Validity

Content validity was assessed in 26 patients who had just completed PRISM, by asking them to answer a short questionnaire regarding the PRISM task. For each of the 5 disks, patients were asked 3 questions: (1) Why did they place the disk at that particular location relative to the self disk; (2) What does it mean to them if the disk was as far as possible from the self disk; and, (3) What does it mean to them if the disk was placed as close as possible to, or on top of, the self disk? A similar method was used to evaluate the content validity of PRISM in patients with rheumatoid arthritis and SLE.[2]

Convergent Validity

Convergent validity was assessed for the 138 patients by correlating (Pearson product-moment) the PRISM pain disk (the self-illness separation) with the following: The 8 SF-36v2 domains, the physical health and mental health summary measures of the SF-36v2, the 3 domains of the PCS (rumination, magnification and helplessness), and the 4 pain scale measures.

The results of the content validity questionnaires suggested that the recreation disk had the most consistent interpretation by patients of any non-pain disk. For this reason, we decided to assess convergent validity for only the recreation disk, by correlating the SRS (Pearson product-moment) with the same measures listed above (our rationale is further explained in the discussion). Although patients completed all 4 questionnaires at 2 time points (class 1 and class 10), we are presenting only the data from class 1, since this would be most representative of a patient completing PRISM at their first visit with a physician. Correlations above 0.70 were considered strong, those between 0.30 and 0.69 moderate, and those below 0.29 were considered weak.

Test-retest reliability was assessed by asking 22 patients to complete the PRISM task twice, 24 hours apart. For each disk, the values for day one were correlated with the day-2 values using Pearson's product-moment correlations. A 24-hour test-retest interval was selected, as short time intervals between test administrations are preferable for measuring reliability. A longer interval may be biased by changes in any aspect of a patient's life, while too short an interval may be biased by patients simply repeating their first response.

To determine if the PRISM disks were measuring separate constructs, a factor analysis was performed on the data obtained at class 1.

Statistics

Statistical analyses were performed using the Statistical Package for Social Sciences Version 14 (SPSS, Inc., Chicago, IL). An α level of 0.05 was considered significant.

Table 1. Patient Demographics

	Convergent Validity and Reliability	*Content Validity*
N	138	26
Mean age (range), years	50.5 (25–86)	48.6 (34–77)
Sex, M:F	35:103	9:17
Employment status		
Full-time work	11	5
Part-time work	2	0
Retired	22	3
Students	2	0
Unable to work due to pain	101	18
Duration of chronic pain		
>5 years	131	24
<5 years	7	2
Cause of chronic pain		
Back pain	67	14
Fibromyalgia	19	1
Arthritis	17	1
Headache and facial	6	2
Other	29	8
Using opioid medication	93	21

Results

Demographics and Distribution

Table 1 shows the demographic breakdown of the patient sample. A total of 138 patients (103 female) were recruited from the pain management class. An additional 26 patients were recruited to complete qualitative questionnaires for the purpose of assessing content validity.

The most prevalent cause of chronic pain in the sample population was back pain (49%), followed by fibromyalgia (12%), arthritis (11%), and migraines and facial pain (5%). The remaining 23% of patients had other diagnoses including: Abdominal pain, neuropathies, complex regional pain syndrome, temporo-mandibular joint pain, and Lyme disease.

Of the 138 patients recruited, 134 (97.5%) were able to complete the 4 questionnaires. The remaining 4 patients could not complete the questionnaires due a language barrier (in 2 cases) or because they were experiencing too much pain (in 2 cases). The PRISM task, as well as the 3 other questionnaires, did not pose a visual barrier, as 2 patients were blind.

Pain Disk (SIS)

Reliability

Twenty-two patients completed the PRISM task twice, 24 hours apart. A Pearson product-moment correlation was calculated for the 2 SIS (pain disk) measurements, yielding a test-retest r value of .980 ($P < .001$). Also, a paired Student's t test revealed that the test-retest mean for each time point did not differ significantly [$t(21) = 0.216$, $P = .830$].

Content Validity

Twenty-six patients completing the PRISM task were asked to explain why they placed each of the 5 disks at a particular location. Table 2 gives several examples of patient comments, and indicates disk placement (listed as

Table 2. Comments From Individual Patients After Completing PRISM

SIS (cm)	**Why did you place the Pain disk in that location relative to the Self disk?**
0	"It [the pain] is such a major part of my life. It affects everything you do."
1	". . . At this moment in my life, it [the pain] controls my life."
18	"I am accepting my problem areas, and now moving on to more important [things] . . . to improve my quality of life."
22	"Pain is not invasive in my life right now."
SPS (cm)	**Why did you place the Partner disk in that location relative to the Self disk?**
3.5	"My partner is very close and has become involved in all aspects of my illness."
3.5	"My partner is able to help control the pain."
16	"[My partner] is very confrontational and controlling."
28	"No partner."
SFS (cm)	**Why did you place the Family disk in that location relative to the Self disk?**
0.5	"My family is a main focus with self."
3.5	"Most of my time/energy seems to be taken up with family matters."
11.5	"My brother, sister and their families do not believe I am so disabled, nor are they very supportive."
25	"There has been a distance between me and my family."
SWS (cm)	**Why did you place the Work disk in that location relative to the Self disk?**
1.5	"I hate not working and that affects me daily."
5	"My limited work is important to me/my sense of self/my dignity."
11	"Away [from work] . . . not sure when I will return [to work]."
22.5	"Work is the farthest thing from my mind with my pain situation."
SRS (cm)	**Why did you place the Recreation disk in that location relative to the Self disk?**
4	"The pain does not limit me – it does not control me."
9	"Very little time/energy left for recreation."
16	"Recreation is very difficult due to pain."
25	"Haven't been able to do what I used to."

Abbreviations: PRISM, Pictorial Representation of Illness and Self Measure; SIS, self-illness separation; SPS, self-partner separation; SFS, self-family separation; SWS, self-work separation; SRS, self-recreation separation.

self-disk separations). Reasons for placing the pain disk close to the self disk (low SIS score) included seeing the pain as controlling or intruding into their lives and as a central or integral part of their identities. Conversely, those with a high SIS score thought that pain was not invasive or overwhelming and felt some aspect of control over the pain.

Patients were also asked what meaning they would ascribe to each disk being placed as far away from the self disk as possible, or as close to (on top of) the self disk as possible. The responses were then categorized and tabulated. Fig 2 shows the frequencies for each category for high (Fig 2A) or low (Fig 2B) self-disk separations. For the pain disk, three main themes appeared: (1) The degree of control over the pain; (2) whether the pain was an important part of their self-image; and, (3) the amount or degree of pain.

Convergent Validity

Pearson product-moment correlations were conducted to quantify the relationship between the pain disk (ie, SIS), and each of the domains of the SF-36v2, the PCS, and the Pain Scale. The SIS correlated significantly with all domains of the 3 other questionnaires (Table 3). The SIS correlated positively with the SF-36v2 domains, and negatively with the 3 PCS domains and the 4 pain scale domains. Thus, a pain disk placed far away from the self disk, correlated with higher scores on the SF-36v2 (ie, better quality of life), and lower scores on the PCS and pain scale (ie, less pain catastrophizing and lower pain scores).

The stronger correlations, all in the moderate range, were found between the SIS and Physical Functioning, Bodily Pain, Vitality, and the Usual and Worst pain scale scores (all r values greater than .350). Compared with the recreation disk, the SIS showed the stronger and more significant correlations.

Non-Illness Disks (SPS, SFS, SWS, SRS)

Reliability

The test-retest r-values for the remaining disks were $r = .994$ ($P < .001$) for the partner disk; $r = .965$ ($P < .001$) for the family disk; $r = .951$ ($P < .001$) for the work disk; and $r = .978$ ($P < .001$) for the recreation disk. Also, paired Student's t tests revealed that the test-retest means for each of the disks were not significantly different from each other [pain disk: $t(21) = 0.216$, $P = .830$; partner disk: $t(21) = 0.256$, $P = .800$; family disk: $t(21) = 0.191$, $P = .850$; work disk: $t(21) = 0.386$, $P = .704$; recreation disk: $t(21) = 1.105$, $P = .281$].

Content Validity

Reasons for placing the partner and family disks close to the self disk (low SPS and SFS scores) included feeling close with their partners or families and seeing them as a coping mechanism for controlling the pain (Table 2). Some interpreted it differently: That their loved ones were a negative influence because they were overly controlling, or did not believe in the patient's disability. Patients with high SPS or SFS scores felt controlled by their partner or family members, or emotionally distant from them, whereas others did not have a partner or any close family. When patients were asked what meaning they ascribe to the relationship disks being placed as far away

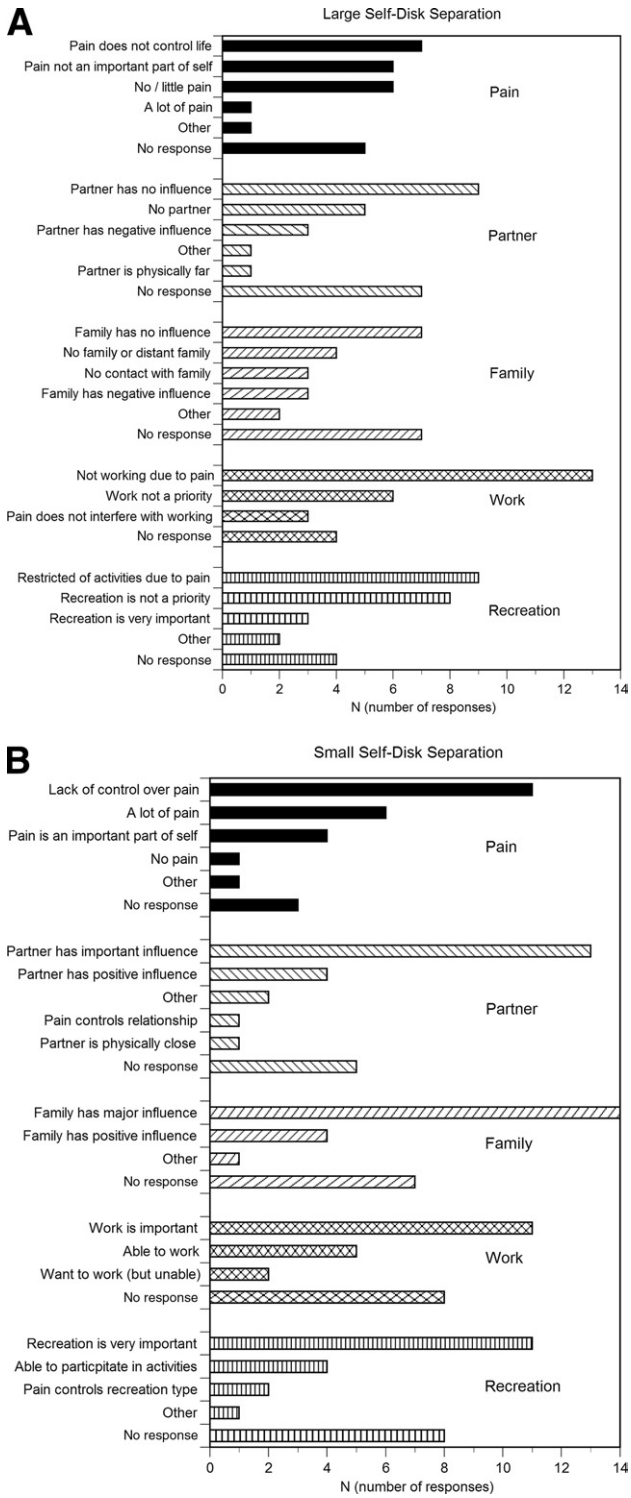

Figure 2. Meanings ascribed by patients to high **(A)** and low **(B)** self-disk separations. The qualitative data are categorized, showing frequency of responses on the x-axis. The same shading is used for a particular disk in part **A** and **B**.

Table 3. Correlations of SIS and SRS With SF-36v2, PCS, and Pain Scale Domains

	SIS (PAIN)	*SRS*
PCS Rumination	−0.256*	0.168
	n = 128	n = 126
PCS Magnification	−0.245*	0.220†
	n = 126	n = 124
PCS Helplessness	−0.282*	0.276*
	n = 128	n = 126
SF-36 Physical Functioning	0.405*	−0.220†
	n = 129	n = 125
SF-36 Role Physical	0.275*	−0.260*
	n = 130	n = 126
SF-36 Bodily Pain	0.360*	−0.238*
	n = 130	n = 126
SF-36 General Health	0.295*	−0.138
	n = 129	n = 125
SF-36 Vitality	0.374*	−0.310*
	n = 130	n = 126
SF-36 Social Functioning	0.343*	−0.285*
	n = 130	n = 126
SF-36 Role Emotional	0.206†	−0.251*
	n = 130	n = 126
SF-36 Mental Health	0.272*	−0.256*
	n = 130	n = 126
SF-36 Summary Physical	0.346*	−0.212†
	n = 128	n = 124
SF-36 Summary Mental	0.239*	−0.286*
	n = 128	n = 124
Pain Scale Now	−0.272*	0.253*
	n = 124	n = 122
Pain Scale Best	−0.304*	0.259*
	n = 126	n = 123
Pain Scale Worst	−0.434*	0.254*
	n = 126	n = 123
Pain Scale Usual	−0.458*	0.258*
	n = 124	n = 121

Abbreviations: PRISM, Pictorial Representation of Illness and Self Measure; SF-36v2, Short-Form 36; PCS, Pain Catastrophizing Scale; SIS, self-illness separation; SRS, self-recreation separation.

*$P < .01$.

†$P < .05$.

from the self disk as possible, or as close to (on top of) the self disk as possible, similar themes emerged for both the partner and family disks (Figs 2A and 2B). Most patients felt that high SPS and SFS values suggested that their partner and family have either very little influence over their everyday lives, or a significant but negative or harmful influence. Having no partner or family, or little contact with loved ones were other meanings ascribed to high SPS and SFS values. To most patients, low SPS and SFS values imply a very important influence of the partner or family over the patient's daily life, although the quality of that influence was not specified. Some patients, however, did specify that low SPS or SFS values meant a positive influence.

Patients placing the work disk close to self (low SWS score), were able to work, and felt that having a job was important for maintaining dignity and purpose. Several patients who were not working due to pain had low SWS scores because they thought that this was a major limitation and embarrassment in their lives. Patients with high SWS scores were unable to work and thought that their chronic pain made it unrealistic to think about a job. Patients thought that high SWS values meant 1 of 3 things: (1) They were not working due to the pain; (2) that work was not an important part of their lives (whether they were working or not); or (3) that pain does not interfere with work. Conversely, low SWS values were interpreted as meaning (1) that work is an important part of their lives; (2) that they are able to work; or (3) that they want to work, but are unable to due to pain.

Most with a low SRS score felt that they could control their pain sufficiently to participate in recreational activities. Alternatively, some with a low SRS felt very limited by the pain, and this impacted their daily routine. Patients with high SRS scores were more consistent in considering their recreational activities severely limited due to pain. Most patients thought that high SRS values reflected a restriction of recreational activities due to pain, or that recreation is not a priority in their lives. Although three patients felt that a high SRS value meant that recreation was important in their lives, the majority felt this would be the case if the SRS value was low. Similarly, some felt that a low SRS reflected the ability to participate in recreational activities. For 2 patients, a low SRS meant that their pain would control the types of recreational activities in which they participated.

Convergent Validity

The SRS demonstrated significant positive correlations with most dimensions of the PCS and pain scale and negative correlations with most domains of the SF-36v2 (Table 3).

Factor Analysis

Using Varimax rotation, a factor analysis was conducted, revealing 2 constructs with Eigenvalues greater than 1, and a third construct, with an Eigenvalue close to 1 (0.983). Table 4 shows the loading of each PRISM disk onto the 3 constructs. The first construct accounted for 32.15% of the variance in the PRISM scores and was composed mainly of the partner and family disks. The second construct accounted for 24.05% of the variance among disks and was composed mainly of the work and recre-

Table 4. Factor Loadings for the PRISM Disk at Class 1

	COMPONENT		
	1	*2*	*3*
Pain disk	−0.027	−0.074	0.981
Partner disk	0.840	−0.087	−0.143
Family disk	0.815	0.216	0.119
Work disk	−0.074	0.811	−0.116
Recreation disk	0.192	0.806	0.031

Abbreviation: PRISM, Pictorial Representation of Illness and Self Measure.

ation disks. The third construct accounted for 19.67% of the variance and was composed mainly of the pain disk.

Discussion

General

Our study investigates the validity and reliability of the PRISM task as a measure of suffering in chronic non-cancer pain patients. To our knowledge, our study is the first to attempt to validate and interpret non-illness PRISM disks: Partner, family, work, and recreation.

We confirmed that PRISM is a quick, simple, and manageable tool for patients with chronic pain to complete. Most patients found PRISM thought-provoking and did not have any difficulty conceptualizing the components of the PRISM task. In the future, a PRISM software program that uses the mouse to position the disks and automatically calculates self-disk separations may further enhance the applicability of PRISM. Although PRISM appears to be primarily dependent on vision, 2 patients in the study were blind and completed the task. This suggests that PRISM is also a tactile tool. The majority of patients in this study were middle-aged women. Although the results may differ in another pain population, epidemiological evidence suggests that chronic pain is more prevalent in women and increases with age, with middle-aged and older women being more likely to seek treatment for chronic pain compared with men.[14,18,22]

A recent study validated PRISM as a measure of suffering in other patient populations: COPD, rheumatoid arthritis, and SLE.[2] In this study, only the illness disk was used and the authors found that PRISM had a high degree of content validity, test-retest reliability, and correlated significantly with several measures of disease severity and quality of life (including the SF-36, the Hospital Anxiety and Depression Scale [HADS], Sense of Coherence [SOC] coping resources measure).[2]

Factor Analysis

One could predict that due to expected similarities, the partner and family disks, as well as the work and recreation disks, should correlate with one another, thus loading together in a factor analysis. Our results confirm this prediction. The factor analysis suggests that PRISM is measuring 3 chief components of the pain experience. The first construct primarily reflected the influence of the partner and family disks, suggesting that these disks were capturing a single factor: The impact of family (including the spouse or partner) on pain. The second construct loaded primarily on the work and recreation disks, indicating that most patients conceptualized these disks together, as non-familial social components that impact their pain. The final construct was composed almost exclusively of the pain disk; therefore, patients recognize and conceptualize the pain experience itself as being separate from its impact on family and social functioning.

Test-Retest Reliability

The test-retest reliability was strong for all five PRISM domains (correlation coefficients greater than 0.95), suggesting that the pain, partner, family, work and recreation PRISM disks are reliable measures across time.

Correlations

The pain disk did not correlate strongly (above 0.70) with any domain of the other questionnaires, suggesting that PRISM is measuring constructs related to but not identical to the constructs being measured by the SF-36v2, the PCS, and pain scale.

The SIS correlated positively with both physical and mental health-related quality of life domains (as measured by the SF-36v2) and negatively with the domains of catastrophizing (the PCS) and pain sensation (numeric pain scale). This indicates that patients who place the pain disk close to the self disk (low SIS) reported lower quality of life, greater pain catastrophizing, and greater perceived pain, compared with patients who placed the pain disk farther from the self disk (high SIS). The moderate correlations of the pain disk with the physical functioning, bodily pain, and vitality domains of the SF-36v2 were not surprising given that patients with chronic pain are often impaired in their ability to carry out daily tasks due to physical pain and fatigue. The moderate correlations between the pain disk and the usual and worst domains of the pain scale suggest that these are the most salient aspects of the pain experience for patients rather than their current or best pain levels. These correlations are well-supported by the content validity questionnaire, where patients with low SIS values tended to feel more pain, and to lack a sense of control over their pain.

The SRS alone was used in correlations to assess convergent validity of the non-pain disks, because the content validity questionnaires suggested that the recreation disk was the most univalent of the non-pain disks. The location of the partner disk, for example, was interpreted differently by different patients, suggesting that correlations with the other questionnaires would be difficult to interpret. The location of the SRS, however, was interpreted almost uniformly by patients, with a small SRS suggesting a lack of limitation on recreational activities due to pain. The SRS showed significant moderate correlations with many of the domains of the SF-36v2, PCS, and pain scale, suggesting that the SRS was capturing aspects of the patient's quality of life, catastrophizing behavior, and perceived pain. This suggests that the ability of chronic pain patients to participate in leisurely, social and recreational activity may have great impact on their perceived quality of life.

One explanation for the overall weaker correlations for the recreation disk compared with the pain disk is that there remained a greater variability in each patient's personal interpretation of the recreation disk placement. This was even more evident with the other non-pain disks. A patient placing the partner disk close to the self disk might imply that the patient has a supportive partner but could also mean that the partner is

abusive or has a strong negative influence on their health. The qualitative data reveals that although most patients interpreted the non-pain disk placement similarly, this was certainly not uniformly true. It is necessary for the person administering PRISM to clarify with the patient what was meant by a particular non-pain disk placement. This reduces their usefulness as measures in large scale studies. However, these disks may have great value in clinical consultations, where the health care professional is following disk placement over time, and is aware of their context in the patient's life. One limitation of our comparison of the qualitative and quantitative data is that the 26 patients completing the content validity questionnaire were not the same as the 138 patients used in the correlations.

Suffering

PRISM was developed to measure the burden of suffering due to illness.[2,3] Do our data support this? We consider suffering a state of severe distress that affects a person's life and threatens the sense of self.[5] Our data suggest that the location of the pain disk is closely related to a sense of control over daily functioning as well as indicative of the degree to which patients associate pain with their self-image. The non-pain disks are indicative of the impact of pain on a particular domain of everyday life, such as the ability to hold a job. However, the social supports provided by family, work and recreation are also known to impact the disability caused by chronic pain as well as pain perception[8] and therefore influence the placement of the pain disk in the PRISM task. We believe that these data strongly support the hypothesis that PRISM is in fact measuring the burden of suffering due to chronic pain.

Conclusions

We believe that our data support the hypothesis that PRISM is measuring the burden of suffering due to chronic pain in our population of chronic non-cancer pain patients. Clinicians working with chronic pain patients can use PRISM to monitor the impact of treatment on various psychosocial and pain variables at each visit, and PRISM is fast to complete. Placement of the non-pain disks requires the clinician to be aware of their context in each patient's life for appropriate interpretation.

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References

1. Anagnostis C, Gatchel RJ, Mayer TG: The pain disability questionnaire: A new psychometrically sounds measure for chronic musculoskeletal disorders. Spine 29:2290-2302, 2004

2. Büchi S, Buddeberg C, Klaghofer R, Russi EW, Bändli O, Schlösser C, Stoll T, Villiger PM, Sensky T: Preliminary validation of PRISM (Pictorial Representation of Illness and Self Measure): A brief method to assess suffering. Psychoter Psychosom 71:333-341, 2002

3. Büchi S, Sensky T: PRISM: Pictorial Representation of Illness and Self Measure: A brief nonverbal measure of illness impact and therapeutic aid in psychosomatic medicine. Psychosomatics 40:314-320, 1999

4. Büchi S, Sensky T, Sharpe L, Timberlake N: Graphic representation of illness: A novel method of measuring patients' perceptions of the impact of illness. Psychother Psychosom 67:222-225, 1998

5. Cassell EJ: The nature of suffering and the goals of medicine. N Engl J Med 306:639-645, 1982

6. Cousins MJ, Brennan F, Carr DB: Pain Relief: A universal human right. Pain 112:1-4, 2004

7. Farrar JT, Young JP, LaMoreaux L, Werth JL, Poole RM: Clinical importance of changes in chronic pain intensity measured on an 11-point numeric pain rating scale. Pain 94:149-158, 2001

8. Gil KM, Keefe FJ, Crisson JE, Van Dalfsen PJ: Social support and pain behavior. Pain 29:209-217, 1987

9. Kabat-Zinn J: An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. Gen Hosp Psychiatry 4:33-47, 1982

10. McCaffy M, Pasero C: Pain: Clinical Manual, 2nd ed. Philadelphia, PA, Mosby, 1999

11. McHorney CA, Ware JE, Raczek AE: The MOS 36-item short-form health survey (SF-36), II: Psychometric and clinical tests of validity in measuring physical and mental health constructs. Med Care 31:247-263, 1993

12. Moulin DE, Clark AJ, Speechley M, Morley-Forster PK: Chronic pain in Canada: Prevalence, treatment impact and the role of opioid analgesia. Pain Res Manage 7:179-184, 2002

13. Rosenstiel AK, Keefe FJ: The use of coping strategies in chronic low back pain patients: Relationship to patient characteristics and current adjustment. Pain 17:33-44, 1983

14. Rustøen T, Wahl AK, Hanestad BR, Lerdal A, Paul S, Miaskowski C: Age and the experience of pain: Differences in health and quality of life among younger, middle-aged, and older adults. Clin J Pain 21:513-523, 2005

15. Santorelli SF: Mindfulness-based stress reduction (MBSR): Standards of practice, in Kabat-Zinn J, Santorelli SF (eds): Mindfulness-Based Stress Reduction Professional Training: Resource Manual. Worcester, MA: Center for Mindfulness in Medicine, Health Care, and Society; 2001

16. Siddall PJ, Cousins MJ: Persistent pain as a disease entity: Implications for clinical management. Anesth Analg 99:510-520, 2004

17. Sullivan MJL, Bishop SR: The pain catastrophizing scale: Development and validation. Psychol Assess 7:524-532, 1995

18. Verhaak PFM, Kerssens JJ, Dekker J, Sorbi MJ, Bensing JM: Prevalence of chronic benign pain disorder among adults: A review of the literature. Pain 77:231-239, 1998

19. Ware JE, Kosinski M, Dewey JE: How to score Version Two of the SF-36 Health Survey. Lincoln, RI, QualityMetric Incorporated, 2000

20. Ware JE, Sherbourne CD: The MOS 36-item short-form health survey (SF-36), I: Conceptual framework and item selection. Med Care 30:473-483, 1992

21. Watt-Watson J, Clark AJ, Finley GA, Watson CPN: Canadian Pain Society position statement on pain relief. Pain Res Manag 4:75-78, 1999

22. Wiesenfeld-Hallin Z: Sex differences in pain perception. Gen Med 2:137-145, 2005