

**Original Article**

# Self-Compassion in Patients With Persistent Musculoskeletal Pain: Relationship of Self-Compassion to Adjustment to Persistent Pain

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**Abstract**

**Context.** Self-compassion entails qualities such as kindness and understanding toward oneself in difficult circumstances and may influence adjustment to persistent pain. Self-compassion may be a particularly influential factor in pain adjustment for obese individuals who suffer from persistent pain, as they often experience heightened levels of pain and lower levels of psychological functioning.

**Objectives.** The purpose of the present study was to examine the relationship of self-compassion to pain, psychological functioning, pain coping, and disability among patients who have persistent musculoskeletal pain and who are obese.

**Methods.** Eighty-eight obese patients with persistent pain completed a paper-and-pencil self-report assessment measure before or after their appointment with their anesthesiologist.

**Results.** Hierarchical linear regression analyses demonstrated that even after controlling for important demographic variables, self-compassion was a significant predictor of negative affect ( $\beta = -0.48$ ,  $P < 0.001$ ), positive affect ( $\beta = 0.29$ ,  $P = 0.01$ ), pain catastrophizing ( $\beta = -0.32$ ,  $P = 0.003$ ), and pain disability ( $\beta = -0.24$ ,  $P < 0.05$ ).

**Conclusion.** The results of this study indicate that self-compassion may be important in explaining the variability in pain adjustment among patients who have persistent musculoskeletal pain and are obese. *J Pain Symptom Manage* 2012;43:759–770. © 2012 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.

**Key Words**

*Self-compassion, pain, obese, persistent musculoskeletal pain, pain adjustment, pain catastrophizing, self-efficacy*

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**Introduction**

Over the past 30 years, numerous studies have focused on the role of negative psychological variables in patients' experiences with chronic illness (e.g., rheumatoid arthritis,

AIDS, cardiovascular disease, musculoskeletal pain).<sup>1-6</sup> Work within this field has continually reemphasized the detrimental role that negative psychological variables (e.g., negative affect, catastrophizing) can play in adjustment to symptom distress and disability, including persistent pain.<sup>7-15</sup> Although such research has continued, there has been a growing interest in the role of positive aspects of psychological adjustment that might influence one's ability to adjust to chronic illnesses and cope with symptoms such as persistent pain.<sup>12,16-21</sup> Research has shown that among patients with chronic illnesses (e.g., cancer, arthritis), constructs such as self-efficacy, acceptance, and optimism are related to important outcomes including pain, psychological distress, and disability.<sup>16,22-26</sup>

A potentially important positive construct that has just begun to receive attention in relation to chronic illness is self-compassion. Self-compassion has been defined as the quality of being touched by one's own suffering and feeling compelled to help alleviate one's own difficulties.<sup>27</sup> Self-compassion within this context is composed of three components: self-kindness vs. self-judgment, common humanity vs. isolation, and mindfulness vs. overidentification.<sup>28</sup> Self-kindness refers to the ability to be caring and supportive to oneself when dealing with a difficult aspect of one's personality or life circumstance and avoiding being overly self-critical. Embodying a sense of common humanity involves recognizing that one's difficulties are universal and part of a larger human experience. Lastly, the quality of mindfulness refers to the ability to be in the present moment with one's experiences, so as not to ignore or overidentify with difficult thoughts or feelings.

To date, only one study has evaluated self-compassion in a population with chronic illness. In a sample of patients with mixed persistent pain conditions, self-compassion was associated with increased acceptance of pain.<sup>29</sup> Although this study is important in showing that self-compassion is related to pain acceptance, it did not examine how self-compassion relates to other important indices of adjustment to persistent pain, including pain, affect, pain catastrophizing, pain self-efficacy, and pain disability. Research in healthy populations suggests that

individuals who have high self-compassion report less negative affect, more positive affect, and higher levels of overall well-being.<sup>28,30,31</sup> In patients with mood disorders, self-compassion also has been associated with psychological well-being and better quality of life.<sup>32</sup> In sum, research is needed to establish how self-compassion relates to adjustment in persons having persistent pain and chronic illness.

In this study, we examined the relationship of self-compassion to measures of pain and pain adjustment in patients with persistent musculoskeletal pain who were obese. Persons who have persistent pain and who are obese represent a particularly appropriate group in which to study self-compassion. Persistent pain and obesity are common in many chronic illnesses (e.g., arthritis, diabetes, heart condition).<sup>33-35</sup> Obese persons who live with persistent pain may face multiple challenges, including dissatisfaction with their bodies,<sup>36,37</sup> difficulties maintaining involvement in meaningful daily activities,<sup>38-41</sup> increased pain,<sup>41,42</sup> and psychological distress.<sup>7,43-45</sup> Interestingly, clinical observations suggest that there are substantial variations in how obese individuals adjust to persistent pain. Some obese individuals experiencing persistent pain lack confidence that they can manage pain, seem prone to catastrophizing, and report high levels of disability and negative mood.<sup>13,39,44</sup> Other obese individuals with persistent pain report fewer confidence problems with regard to their pain coping skills, mood, and activity levels.<sup>26</sup> Self-compassion is potentially a useful construct for understanding these variations in how obese individuals adjust to persistent pain.

However, to date, no studies have examined how self-compassion relates to adjustment to persistent pain in patients who are obese. To examine the role of self-compassion in this population, several basic questions must be addressed. First, it is important to determine whether self-compassion can be reliably assessed in obese patients with persistent pain. Second, it is necessary to examine how self-compassion relates to obese patients' reports of the intensity of their persistent pain. Third, it is important to assess how reports of self-compassion relate to measures of psychological functioning (e.g., negative affect, positive affect) and pain coping (e.g., self-efficacy, pain catastrophizing). Finally,

there is a need to determine whether self-compassion is associated with pain-related disability.

The present study examined these questions. Specifically, this study investigated the reliability of a measure of self-compassion<sup>28</sup> and how self-compassion related to indices of adjustment to pain (i.e., pain intensity and unpleasantness, negative and positive affect, pain self-efficacy, pain catastrophizing, pain disability) in a sample of patients who have persistent musculoskeletal pain and are obese. It was hypothesized that higher levels of self-compassion would be associated with lower levels of pain intensity and unpleasantness, negative affect, pain catastrophizing, and pain disability, and higher levels of positive affect and pain self-efficacy, even after controlling for important demographic and medical variables.

## Methods

### *Participants and Procedures*

The participants in this study were 88 obese patients with persistent musculoskeletal pain recruited from the Duke Pain and Palliative Care Clinic from September 2009 to April 2010. To be enrolled in the study, patients had to meet the following criteria: 1) have persistent musculoskeletal back, neck, or leg pain; 2) be older than 20 years; 3) have complaints of persistent pain (i.e., pain on most days of the month for at least six months); 4) meet criteria for obesity (body mass index [BMI]  $\geq 30$ );<sup>46</sup> and 5) be able to speak, understand, and read English. Every participant provided informed consent prior to participation in the study. The study visit involved completing a packet of paper-and-pencil self-report assessment measures in the research offices at the Duke Pain and Palliative Care Clinic. All procedures and protocols were approved by the Duke University Medical Center's Institutional Review Board.

### *Measures*

*Self-Compassion.* Self-compassion was measured using the 26-item Self-Compassion Scale (SCS).<sup>28</sup> The SCS assesses three different aspects of self-compassion: Self-Kindness (e.g., "I try to be understanding and patient toward aspects of my personality I don't like") vs. Self-Judgment (e.g., "I'm disapproving and judgmental about my

own flaws and inadequacies"), Common Humanity (e.g., "I try to see my failings as part of the human condition") vs. Isolation (e.g., "When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world"), and Mindfulness (e.g., "When something painful happens I try to take a balanced view of the situation") vs. Overidentification (e.g., "When I'm feeling down I tend to obsess and fixate on everything that's wrong"). Patients rate each item on a scale from 1 = almost never to 5 = almost always. Negative items are reverse coded and mean scores on the six subscales are averaged to produce an overall self-compassion score. Research indicates the SCS has an appropriate factor structure and that a single factor of "self-compassion" can explain the intercorrelations among the six facets.<sup>47</sup> The SCS has demonstrated good internal consistency, concurrent validity, convergent validity, discriminant validity, internal consistency, and test-retest reliability.<sup>28,47</sup>

*Pain.* Pain intensity and pain unpleasantness were measured with 0–100 mm visual analogue scales. Participants were asked to indicate their average level of pain intensity experienced that day by marking along a 100 mm line. Patients then followed the same procedure and marked their average level of pain unpleasantness for the day along a second 100 mm line. Pain visual analogue scales are commonly used in pain research<sup>48</sup> and many studies have supported their reliability, validity, and sensitivity.<sup>49,50</sup> Pain intensity and pain unpleasantness were measured separately to examine both the sensory-discriminative (intensity) and affective-cognitive (unpleasantness) dimensions of pain.<sup>51,52</sup> Pain intensity measures the strength of the pain experience, whereas pain unpleasantness assesses how disturbing the pain experience is to an individual. Previous studies have supported the distinction between these two dimensions of pain.<sup>51,52</sup>

*Psychological Functioning.* Psychological functioning was measured with the 20-item Positive and Negative Affect Scale.<sup>53</sup> Patients indicate the degree of their positive and negative affective states (e.g., excited, distressed, scared, inspired) by rating items from 1 = very slightly or not at all to 5 = extremely. Scores for both negative affect and positive affect are averaged, yielding two indices of affect. A high score on

positive affect reflects enthusiasm, energy, and alertness, whereas a high score on negative affect reflects distress and aversive mood states. The Positive and Negative Affect Scale has demonstrated good internal consistency in samples of patients with persistent pain.<sup>54,55</sup> Both scales of this measure have demonstrated good reliability among patients with other persistent pain conditions (i.e., rheumatoid arthritis; Cronbach's alpha = 0.82–0.92).<sup>54</sup> In this sample, internal consistency was high ( $\alpha = 0.87$ ).

*Pain Self-Efficacy.* Self-efficacy for persistent pain was measured using the 22-item Chronic Pain Self-Efficacy Scale.<sup>56</sup> This scale consists of three subscales: self-efficacy for pain control, self-efficacy for physical function, and self-efficacy for coping with symptoms. The self-efficacy for pain control subscale consists of five items that ask patients to indicate how certain they are that they can decrease their pain and reduce its interference in their daily lives. The self-efficacy for physical function subscale is made up of nine items that ask patients to indicate how certain they are that they can perform specific physical activities. The self-efficacy for coping with symptoms subscale includes eight items that assess patients' certainty that they can control and cope with their pain-related symptoms. Patients are asked to circle the number that best corresponds with their certainty on a 10-point scale, ranging in 10-point increments from 10 (very uncertain) to 100 (very certain). Scores on the three subscales are averaged to create a total pain self-efficacy score. Higher scores represent stronger self-efficacy for pain. All three subscales have demonstrated good internal reliability in persistent pain populations (i.e., musculoskeletal pain, primary low back pain; Cronbach's alpha = 0.87–0.90<sup>56</sup>), as they did in this sample ( $\alpha = 0.82$ –0.93). The internal reliability of the total pain self-efficacy score was high:  $\alpha = 0.92$ .

*Pain Catastrophizing.* Pain catastrophizing was measured using the brief two-item version of the catastrophizing subscale of the Coping Strategies Questionnaire.<sup>57</sup> The two items were as follows: "It is terrible and I feel it's never going to get any better" and "I feel I can't stand it anymore." Patients were asked

to indicate how often they experienced each item on a seven-point scale, where 0 = never and 6 = always. In this study population, the internal reliability of the catastrophizing subscale was  $\alpha = 0.72$ .

*Pain Disability.* Pain-related disability was measured with the Pain Disability Index (PDI).<sup>58</sup> The PDI is a seven-item scale that measures the degree of a patient's disability within seven life domains (i.e., family/home responsibilities, occupation, social activity, recreation, sexual behavior, self-care, life-support activity). Patients rated each item on an 11-point scale, where 0 = no disability and 10 = total disability. The PDI score is calculated by summing all seven items. A maximum score of 70 indicates the highest level of disability. Item 4 (work-related disability) was dropped in the mean score analysis because of its potential for covariation with an important demographic variable assessing work-related disability (financial compensation for pain). This measure has demonstrated good reliability and validity within persistent pain populations.<sup>58,59</sup> In this sample, the PDI showed good internal consistency (Cronbach's alpha = 0.83).

*Demographics.* Demographic information about age, sex, ethnicity, education, partner status, and financial compensation for pain was collected by self-report. Gender was coded 0 for males and 1 for females; ethnicity was coded 0 for Caucasian Americans and 1 for other ethnicities; education was coded from 1 to 6, with each number representing an increasing level of education (e.g., high school graduate, completed some college, college graduate); marital status was coded 0 for not married and 1 for married or living with a significant other; receiving financial compensation for pain (i.e., disability status) was coded 0 for patients not receiving financial compensation and 1 for patients receiving financial compensation.

*Medical Variables.* Height and weight information was collected using a standard medical office scale. The data were used to calculate patients' BMIs. Relative body weight is defined by BMI, which is calculated by dividing a patient's weight (in kg) by their

height (in m<sup>2</sup>). BMI is considered a better measure of adiposity than weight-for-height tables.<sup>60</sup> The duration of participants' musculoskeletal pain was collected via a self-report question that asked patients to report the number of years they had experienced pain. This question is commonly used in studies of patients with various persistent pain conditions.<sup>61,62</sup>

### Data Analysis

Descriptive statistics were calculated for demographic variables (i.e., age, sex, ethnicity, education, partner status, financial compensation for pain), medical variables (i.e., BMI, years of pain), and measures of self-compassion, pain intensity, pain unpleasantness, negative affect, positive affect, pain self-efficacy, pain catastrophizing, and pain disability. To answer the first aim of this study, internal reliability was calculated for the SCS using Cronbach's alpha. Correlational analyses and hierarchical linear regression (HLR) analyses were conducted to answer the remaining aims of the study. First, correlations were run to examine how the demographic variables (i.e., age, sex, ethnicity, education, partner status, financial compensation for pain) and medical variables (i.e., BMI, years of pain) related to self-compassion and the outcome variables (i.e., pain intensity and unpleasantness, negative and positive affect, pain self-efficacy, pain catastrophizing, pain disability) to determine what variables to control for in the HLR analyses. Correlational analyses also were conducted to determine the association between self-compassion and the outcome variables (i.e., pain intensity and unpleasantness, negative and positive affect, pain self-efficacy, pain catastrophizing, pain disability). Finally, HLR was used to examine the association between self-compassion and the outcome variables after controlling for relevant demographic variables. In each HLR, demographic variables (i.e., age, financial compensation for pain, education) were entered in Step 1 and self-compassion in Step 2. (A second set of HLR analyses also were conducted that controlled for pain intensity in Step 2, and then entered self-compassion in Step 3. These did not impact significant study results.)

## Results

### Descriptive Analyses

Patients' medical and demographic characteristics are displayed in Table 1. The average BMI of patients was 37.35 (standard deviation [SD] = 6.92); all patients met criteria for obesity.<sup>25</sup> The average duration of pain was 11.79 years (SD = 10.23). The average age of patients in the sample was 53.93 years (SD = 9.65); 71.6% were female. Ethnicity self-reports indicated that 55.7% of patients were Caucasian American, 40.9% were African American, 1.1% were American Indian/Alaska Native, and 2.3% identified as another ethnicity. Marital status data showed that 59.1% were

Table 1  
Demographics

Variable	Mean (SD)	% (n)
Age	53.93 (9.65)	
BMI	37.35 (6.92)	
Years of pain	11.79 (10.23)	
Sex		
Female		71.6 (88)
Ethnicity		
African American		40.9 (36)
Caucasian American		55.7 (49)
American Indian/Alaska Native		1.1 (1)
Other		2.3 (2)
Highest education		
Some high school or less		8.0 (7)
High school graduate		17.0 (15)
Some college		39.7 (35)
College graduate or higher		35.3 (31)
Partner status		
Never married		13.6 (10)
Married/living with significant other		59.1 (52)
Divorced		21.6 (19)
Widowed		5.7 (5)
Financial compensation for pain		
Receiving financial compensation		45.5 (40)
Not receiving financial compensation		54.5 (48)
Self-compassion	19.37 (4.12)	
Pain intensity	65.95 (26.16)	
Pain unpleasantness	63.61 (25.14)	
PANAS negative	1.75 (0.85)	
PANAS positive	2.79 (0.89)	
Pain self-efficacy	43.17 (16.42)	
Pain catastrophizing	6.65 (2.96)	
Pain disability	35.89 (11.41)	

SD = standard deviation; BMI = body mass index; PANAS = Positive and Negative Affect Scale.

Note: Descriptive statistics for demographic and medical variables, self-compassion, and outcome measures.

married or living with a significant other, 21.6% were divorced, 13.6% were never married, and 5.7% were widowed. With regard to educational history, 8.0% of patients reported attending some high school, 17.0% reported completing high school, 39.7% reported attending some college, and 35.3% reported completing college or further education. Lastly, 45.5% of patients reported receiving financial compensation for pain (i.e., disability status).

#### *Reliability of the SCS*

The internal reliability of the SCS in this sample was  $\alpha = 0.93$ . This indicates the scale was highly internally consistent.

#### *Correlations of Demographic and Medical Variables to Self-Compassion, and Measures of Pain and Adjustment to Pain*

Correlational analyses were conducted to examine the relation of demographic and medical variables to self-compassion and measures of pain and adjustment to pain. Results revealed that age was significantly correlated with self-compassion ( $r = 0.31, P < 0.01$ ) and pain catastrophizing ( $r = -0.39, P < 0.01$ ), with older patients reporting more self-compassion and less pain catastrophizing. In addition, financial compensation for pain was significantly associated with self-compassion ( $r = -0.25, P < 0.05$ ), positive affect ( $r = -0.23, P < 0.05$ ), pain self-efficacy ( $r = -0.25, P < 0.05$ ), and pain disability ( $r = 0.33, P < 0.01$ ). Patients who reported receiving financial compensation for pain showed lower levels of self-compassion, positive affect, and pain self-efficacy, and higher levels of pain disability. Education level was significantly correlated with negative affect ( $r = -0.38, P < 0.01$ ), with patients who had a higher education level reporting less negative affect. There were no significant associations between medical variables (i.e., BMI, years of pain) and self-compassion or measures of pain adjustment (i.e., pain intensity and unpleasantness, negative and positive affect, pain self-efficacy, pain catastrophizing, pain disability). Based on the significant correlations reported above ( $P < 0.05$ ), age, financial compensation for pain, and education were all controlled for in the HLR.

#### *Correlations of Self-Compassion to Measures of Pain and Adjustment to Pain*

Correlational analyses found that self-compassion was significantly associated with negative affect ( $r = -0.52, P < 0.01$ ), positive affect ( $r = 0.31, P < 0.01$ ), pain self-efficacy ( $r = 0.25, P < 0.05$ ), pain catastrophizing ( $r = -0.40, P < 0.01$ ), and pain disability ( $r = -0.29, P < 0.01$ ). Patients experiencing higher levels of self-compassion reported less negative affect, pain catastrophizing, and pain disability, and higher levels of positive affect and pain self-efficacy. Self-compassion was not found to be significantly related to pain intensity ( $r = -0.18, P = 0.11$ ) or pain unpleasantness ( $r = -0.10, P = 0.36$ ).

#### *Hierarchical Linear Regression*

HLR analyses are summarized in Table 2. HLR was conducted to examine the unique contribution of self-compassion to pain intensity, pain unpleasantness, negative affect, positive affect, pain self-efficacy, pain catastrophizing, and pain disability after controlling for significant demographic variables.

*Pain Intensity and Pain Unpleasantness.* The overall model for pain intensity was not significant ( $F(4, 76) = 0.92; P = 0.46$ ) and the overall model for pain unpleasantness was not significant ( $F(4, 76) = 0.51; P = 0.73$ ). Self-compassion was not a significant independent predictor of pain intensity ( $\beta = -0.16, t = -1.32, P = 0.19$ ) or pain unpleasantness ( $\beta = -0.06, t = -0.48, P = 0.64$ ).

*Psychological Functioning.* The overall model examining negative affect was significant ( $F(4, 77) = 10.16; P < 0.001$ ), with demographic variables (i.e., age, financial compensation for pain, education) accounting for 15% of the variance in negative affect. Self-compassion accounted for an additional 20% of the variance in negative affect over and above demographic variables. Self-compassion was a significant independent predictor of negative affect ( $\beta = -0.48, t = -4.81, P < 0.001$ ). Patients who reported higher levels of self-compassion reported lower levels of negative affect.

The overall model examining positive affect was also significant ( $F(4, 77) = 3.37; P < 0.05$ ), with demographic variables (i.e., age, financial compensation for pain, education) accounting

Table 2  
HLR Analyses of Self-Compassion and Outcome Variables of Interest ( $n = 81$ )

Step and Variables		Statistics by Step		Statistics by Variable		
		Total $R^2$	$R^2$ Change	Final Std. $\beta$	$t$	$P$
Outcome 1.	Negative affect					
	Age			0.01	0.09	0.93
	Financial compensation for pain			0.02	0.24	0.82
2.	Education	0.15	0.15	-0.30	-2.69	0.01
	Self-compassion	0.35	0.20	-0.48	-4.81	<0.001
Outcome 1.	Positive affect					
	Age			-0.01	-0.05	0.96
	Financial compensation for pain			-0.21	-1.86	0.07
2.	Education	0.08	0.08	-0.17	-1.57	0.12
	Self-compassion	0.15	0.07	0.29	2.53	0.01
Outcome 1.	Pain catastrophizing					
	Age			-0.32	-2.92	0.01
	Financial compensation for pain			-0.04	-0.40	0.69
2.	Education	0.16	0.16	0.05	0.43	0.67
	Self-compassion	0.25	0.09	-0.32	-3.02	0.003
Outcome 1.	Pain disability					
	Age			0.03	0.27	0.79
	Financial compensation for pain			0.32	2.86	0.01
2.	Education	0.12	0.12	0.08	0.71	0.48
	Self-compassion	0.17	0.05	-0.24	-2.13	0.04
Outcome 1.	Pain self-efficacy					
	Age			0.10	0.85	0.40
	Financial compensation for pain			-0.23	-2.06	0.04
2.	Education	0.14	0.14	0.12	1.09	0.28
	Self-compassion	0.16	0.02	0.14	1.28	0.21
Outcome 1.	Pain intensity					
	Age			-0.01	-0.02	0.98
	Financial compensation for pain			0.12	1.01	0.32
2.	Education	0.02	0.02	0.05	0.41	0.68
	Self-compassion	0.04	0.02	-0.16	-1.32	0.19
Outcome 1.	Pain unpleasantness					
	Age			-0.12	-0.93	0.35
	Financial compensation for pain			0.05	0.39	0.70
2.	Education	0.02	0.02	0.02	0.16	0.88
	Self-compassion	0.03	0.01	-0.06	-0.48	0.64

Note: Hierarchical Linear Regression (HLR) analyses examining association between self-compassion and outcome measures after controlling for relevant demographic variables.

for 8% of the variance in positive affect. Self-compassion accounted for an additional 7% of the variance in positive affect over and above demographic variables. Self-compassion was a significant independent predictor of positive affect ( $\beta = 0.29$ ,  $t = 2.53$ ,  $P < 0.05$ ). Patients who reported higher levels of self-compassion reported higher levels of positive affect.

*Pain Self-Efficacy.* The overall model was significant ( $F(4, 77) = 3.70$ ;  $P < 0.05$ ), with demographic variables (i.e., age, financial compensation for pain, education) accounting for 14% of the variance in pain self-efficacy. Self-

compassion was not a significant independent predictor of pain self-efficacy ( $\beta = 0.14$ ,  $t = 1.28$ ,  $P = 0.21$ ).

*Pain Catastrophizing.* The overall model was significant ( $F(4, 76) = 6.22$ ;  $P < 0.001$ ), with demographic variables (i.e., age, financial compensation for pain, education) accounting for 16% of the variance in pain catastrophizing. Self-compassion accounted for an additional 9% of the variance over and above demographic variables. Self-compassion was a significant independent predictor of pain catastrophizing ( $\beta = -0.32$ ,  $t = -3.02$ ,  $P < 0.01$ ). Patients who reported higher levels of

self-compassion reported lower levels of pain catastrophizing.

*Pain Disability.* The overall model was significant ( $F(4, 77) = 3.86; P < 0.01$ ), with demographic variables (i.e., age, financial compensation for pain, education) accounting for 12% of the variance in pain disability. Self-compassion accounted for an additional 5% of the variation in pain disability over and above the demographic variables. Self-compassion was a significant independent predictor of pain disability ( $\beta = -0.24, t = -2.13, P < 0.05$ ). Patients who reported higher levels of self-compassion reported lower levels of pain disability.

## Discussion

To our knowledge, this is the first study to examine the construct of self-compassion in a sample of patients with persistent musculoskeletal pain who are obese. The results demonstrated that self-compassion could be reliably assessed in a sample of patients who have persistent musculoskeletal pain and who are obese. Variations in patients' levels of self-compassion were associated with important indices of psychological functioning (i.e., negative affect, positive affect), pain coping (i.e., pain self-efficacy, pain catastrophizing), and pain disability. It was found that patients who reported higher levels of self-compassion had lower levels of negative affect, pain catastrophizing, and pain disability, and higher levels of positive affect and pain self-efficacy.

One of the most noteworthy findings of this study was that higher levels of self-compassion were associated with better psychological functioning, specifically lower levels of negative affect and higher levels of positive affect. Self-compassion explained a significant proportion of the variance in negative affect (20%), even after accounting for the impact of important demographic variables (i.e., age, financial compensation for pain, education). This is an especially important result as negative affect is highly prevalent among populations with musculoskeletal pain<sup>7,43</sup> and obesity,<sup>45</sup> and has been associated with pain onset and exacerbation.<sup>43</sup> Additionally, negative affect has been shown to influence other functioning and quality-of-life factors among patients with

persistent pain and obesity,<sup>63–66</sup> and among other populations with chronic illness (e.g., cancer, arthritis).<sup>67–69</sup>

Secondly, self-compassion explained a significant proportion of variance in positive affect. This is important because recent work has suggested that positive affect may serve as a buffering function to health problems associated with negative emotions<sup>70</sup> in patients with persistent pain conditions. Fredrickson<sup>70</sup> proposes that positive affect may have an “undoing effect” on the negative physiological effects of negative emotions. Positive affect, therefore, could be operating as a protective psychological factor in persons with persistent pain. This suggests that it may be important to examine the role of self-compassion in influencing other important psychological variables (e.g., optimism, well-being). Self-compassion's association with important psychological processes may be key to understanding how this construct can positively affect patient health and functioning. Prior research on positive affect also suggests that it may be important to examine the role of self-compassion in influencing physiological outcomes related to psychological processes such as negative affect (e.g., cardiovascular reactivity, cortisol) among persons having persistent pain or chronic illness.

Our findings suggest that when patients with chronic illnesses (e.g., suffering from persistent pain) have more self-compassion, they may engage in less pain catastrophizing. Specifically, this study demonstrated that patients with persistent musculoskeletal pain who are obese had higher levels of self-compassion and were much less likely to appraise their pain in an overly negative fashion (i.e., pain catastrophizing). The fact that self-compassion explained a significant proportion of variance in pain catastrophizing (9%) is particularly interesting given that pain catastrophizing is one of the best predictors of lower psychological functioning and physical disability in patients with persistent pain.<sup>71</sup> Recent work has indicated that individuals who tend to catastrophize about their pain are likely to engage in behaviors that communicate their pain and distress to others and serve to elicit attention and concern from others.<sup>72,73</sup> Self-compassion may buffer individuals from such negative pain coping strategies because of their perspective that one's

pain condition is a common human experience and their greater sense of social connectedness,<sup>28</sup> both of which likely result in a decreased tendency to catastrophize about pain (i.e., tendency to ruminate about, magnify, and feel helpless about their pain).

Finally, in the present study, self-compassion explained a significant proportion of variance in pain disability (i.e., the degree to which pain interferes with patients' daily activities). One explanation for this association between self-compassion and pain disability may be that inherent in the construct of self-compassion is the notion of self-acceptance.<sup>28,30,74</sup> Individuals who are more self-compassionate are prone to adopt an accepting stance toward all aspects of oneself and one's life,<sup>30</sup> including negative events such as pain conditions. Past research on acceptance among patients with persistent pain has shown that pain acceptance is associated with better adjustment.<sup>75</sup> Thus, self-compassion in the context of persistent pain, or any chronic illness, may increase patients' ability to have a mindful and accepting attitude toward their day-to-day limitations, without ignoring or fixating on them. In effect, self-compassion may be affecting disability by enabling persons with persistent pain to be more accepting of their emotional experiences related to disability, while still maintaining engagement in meaningful day-to-day activities.

The results of this study support the hypothesis that self-compassion is positively associated with patient health and functioning among a sample of patients with chronic illness (i.e., persistent pain, obesity). To date, the vast majority of research on self-compassion has been conducted in healthy samples and has shown that individuals with higher self-compassion have less negative affect, more positive affect, and higher levels of physical and psychological well-being.<sup>28,30,31</sup> Recently, researchers have begun studying self-compassion among populations diagnosed with anxiety and depressive disorders, finding that self-compassion is also associated with enhanced psychological well-being and quality of life and decreased anxiety and depression.<sup>32</sup> The results of the present study, coupled with those of a recent study showing that self-compassion is related to increased pain acceptance,<sup>29</sup> suggest that self-compassion may be related to better adjustment in persons with persistent pain. In sum,

past research and the present study suggest that, in nonclinical and clinical samples, self-compassion can be related to improved physical and psychological well-being.<sup>28-32</sup>

This study has several limitations. First, because of the cross-sectional nature of the study, the observed results can only be interpreted in terms of associations. Thus, it is unclear whether self-compassion leads to better pain adjustment or vice versa. Future experimental studies could provide insight into the causal relationships between self-compassion and pain adjustment. For example, controlled studies could be conducted in a laboratory setting where self-compassion could be manipulated and the effects on key outcomes systematically assessed (e.g., positive affect, negative affect, pain catastrophizing). In addition, the present study relied on self-report measures. Future studies investigating the relationship between self-compassion and pain adjustment should consider integrating self-report measures with direct measures, such as functional performance and observations of pain-related behaviors. Lastly, because the sample was predominantly middle-aged (mean = 53.93; SD = 9.65) and female (71.6%), results cannot be generalized to the more general population of obese patients having persistent musculoskeletal pain.

An interesting future direction for research would be to examine the effects of psychosocial pain management interventions that specifically focus on the cultivation of self-compassion. Although no controlled studies have directly tested such an intervention, controlled studies of mindfulness-based and meditation-based interventions have addressed certain elements of self-compassion (e.g., increasing awareness and acceptance) and have shown positive results. In one randomized controlled study, Shapiro et al.<sup>76</sup> found that a mindfulness-based stress reduction program significantly increased self-compassion levels among participants, which were found to mediate reductions in stress associated with the mindfulness-based stress reduction program. In another controlled study, a loving kindness-based meditation intervention that addressed elements of self-compassion produced decreases in pain among patients with persistent low back pain and improvements in indices of psychological functioning (i.e., anxiety, anger).<sup>17</sup> Such results

indicate the importance of researching the relationship between self-compassion and pain adjustment within a longer-term, intervention-focused paradigm.

Taken together, the findings of this study suggest that self-compassion appears to be meaningfully related to adjustment to persistent pain in patients with persistent musculoskeletal conditions who are obese. Patients in this sample with higher levels of self-compassion were found to report better psychological functioning (i.e., lower negative affect, higher positive affect), more adaptive pain coping (i.e., higher pain self-efficacy, lower pain catastrophizing), and lower levels of pain disability. These findings highlight the importance of examining the role of positive factors, such as self-compassion, in the adjustment to chronic illnesses.

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