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Does perceived injustice correlate with pain intensity and disability in orthopaedic trauma patients?

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ABSTRACT

Introduction: Individuals who experience musculoskeletal trauma may construe the experience as unjust and themselves as victims. Perceived injustice is a cognitive construct comprised by negative appraisals of the severity of loss as a consequence of injury, blame, injury-related loss, and unfairness. It has been associated with worse physical and psychological outcomes in the context of chronic health conditions. The purpose of this study is to explore the association of perceived injustice to pain intensity and physical function in patients with orthopaedic trauma.

Methods: A total of 124 orthopaedic trauma patients completed the Injustice Experience Questionnaire (IEQ), the PROMIS Physical Function Computer Adaptive Testing (CAT), the PROMIS Pain Intensity instruments, the short form Patient Health Questionnaire for depression (PHQ-2), the short form Pain Self-Efficacy Questionnaire (PSEQ-2), and the short form Pain Catastrophizing Scale (PCS-4) on a tablet computer. A stepwise linear regression model was used to identify the best combination of predictors explaining variance in PROMIS Physical Function and PROMIS Pain Intensity.

Results: The IEQ was associated with PROMIS Physical Function ($r = -0.36$; $P < 0.001$) and PROMIS Pain Intensity ($r = 0.43$; $P < 0.001$). In multivariable analysis, however, Caucasian race ($\beta = 5.1$, SE: 2.0, $P = 0.013$, 95% CI: 1.1–9.2), employed work status ($\beta = 5.1$, SE: 1.5, $P = 0.001$, 95% CI: 2.1–8.2), any cause of injury other than sports, mvc, or fall ($\beta = 7.7$, SE: 2.1, $P < 0.001$, 95% CI: 3.5–12), and higher self-efficacy (PSEQ-2; $\beta = 0.93$, SE: 0.23, $P < 0.001$, 95% CI: 0.48–1.4) were selected as part of the best model predicting variance in PROMIS Physical Function. Only a higher degree of catastrophic thinking (PCS-4; $\beta = 1.2$, SE: 0.12, $P < 0.001$, 95% CI: 0.99 to 1.5) was selected as important in predicting higher PROMIS Pain Intensity.

Conclusion: Perceived injustice was associated with both physical function and pain intensity in bivariate correlations, but was not deemed as an important predictor when assessed along with other demographic and psychosocial variables in multivariable analysis. This study confirms prior research on the pivotal role of catastrophic thinking and self-efficacy in reports of pain intensity and physical function in patients with acute traumatic musculoskeletal pain.

Introduction

Musculoskeletal trauma is prevalent and often leads to self-reported disability and pain [1,2], which are to a large degree explained by psychosocial factors [3–5]. Depression [6,7], catastrophic thinking [8,9], and self-efficacy about pain [10,11] have been depicted as the most salient psychosocial factors associated with disability and pain intensity in patients with musculoskeletal trauma.

Recent research aimed at understanding the complexity of recovery after trauma has drawn attention to the fact that some individuals who experience musculoskeletal trauma may construe the experience as unjust and themselves as victims [12]. Perceived injustice, a cognitive construct comprised by negative appraisals of the severity of loss as a consequence of injury, blame, injury related

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loss, and unfairness [13] has been associated with worse physical and psychological outcomes in the context of chronic health conditions [12,14]. Specifically, an association has been reported between higher levels of perceived injustice and higher pain severity, self-reported disability, pain catastrophizing, fear of movement, poor rehabilitation, and prolonged absence from work in patients with chronic pain conditions such as whiplash, fibromyalgia, and rheumatoid arthritis [15–19]. However, it is not currently known whether perceived injustice is a relevant construct for patients with orthopaedic traumatic musculoskeletal pain who are presenting primarily with acute pain conditions.

The purpose of this study is to explore the association of perceived injustice to pain intensity and physical function in patients with orthopaedic trauma. Specifically, we are interested in determining whether perceived injustice is an important predictor of pain intensity and physical function. The primary null hypothesis is that perceived injustice as measured by the Injustice Experiences Questionnaire (IEQ) will not be selected as part of the best combination of predictors accounting for variations in PROMIS Physical Function, in a model that also includes depression, pain catastrophizing, pain self-efficacy and relevant demographic variables. The secondary null hypothesis is that perceived injustice as measured by the Injustice Experiences Questionnaire will not be selected as part of the best combination of predictors accounting for variation in PROMIS pain intensity, in a model that also includes depression, pain catastrophizing, pain self-efficacy and relevant demographic variables.

Patients and methods

Study design and setting

After approval by our institutional review board, 144 consecutive new or follow up adult patients who visited the orthopaedic hand surgery or trauma outpatient clinic at our tertiary care hospital for a traumatic injury between April and June 2015 were approached to participate. Patients were enrolled either before or after their visit with the surgeon. We only approached English speaking patients aged 18 years or older who were able to provide informed consent. After verbal informed consent was provided, patients completed the Injustice Experience Questionnaire [20], the PROMIS Physical Function Computer Adaptive Testing (CAT) [21,22] and PROMIS Pain Intensity instruments, the short form Patient Health Questionnaire for depression (PHQ-2) [23,24], the short form Pain Self-Efficacy Questionnaire (PSEQ-2) [25], and the short form Pain Catastrophizing Scale (PCS-4) [26]. All data was collected through Assessment Center on a tablet computer.

Out of 144 participants approached for participation, 16 declined. The main reason for declining was lack of interest in or time for participation in clinical research. Two additional patients were excluded because after the visit with the surgeon it was determined that they did not have a traumatic condition. One patient did not complete the assessment due to difficulties understanding how to complete the questionnaires on the tablet computer, and one patient withdrew from the study after completing the questionnaires. All analyses were performed on the remaining 124 patients.

Sample size calculation

Sample size calculation showed that a minimum sample size of 124 participants would provide 80% statistical power to detect a correlation of 0.25 on a bivariate correlation model between the IEQ and the PROMIS Physical Function (CAT) questionnaire.

Outcome measures

The IEQ consists of twelve questions that inquire about the frequency of thoughts of injustice that an individual experiences after an injury, on a five point scale ranging from 0 (“not at all”) to 4 (“all the time”) [20]. The total score is the sum of the values for each response. Higher scores depict a higher level of perceived injustice, with a maximum score of 48.

The PROMIS Physical Function CAT instrument measures self-reported disability [22]. The PROMIS Physical Function CAT instrument consists of 121 bank items including 5 response options ranging from 1 (“without any difficulty” or “not at all”) to 5 (“unable to do”). Computerized adaptive testing optimizes the questionnaire administration by distributing only relevant items based on previous responses. The minimum number of questions to be answered is 4 and the maximum number is 12. The resulting t-score is a standardized score with a mean of 50 and a standard deviation of 10. A lower PROMIS Physical Function t-score means more disability.

The PROMIS Pain Intensity instrument consists of three items with 5 response options ranging from 1 (“had no pain”) to 5 (“very severe”) addressing how much pain the person experiences now and in the past 7 days. The raw score is the sum of the values of the response to each question, with a minimum of 3 and a maximum score of 15. The raw score is rescaled into a t-score with a mean of 50 and a standard deviation of 10. A higher PROMIS Pain Intensity t-score means more pain.

The PHQ-2 assesses the frequency of depressed mood and anhedonia over the past two weeks [23,24]. Response options range from 0 (“not at all”) to 3 (“nearly every day”). The maximum score is 6, and a higher score means more depressed mood.

The PSEQ-2 assesses the level of confidence in performing activities at present while experiencing pain on a 7-point scale, from 0 (“not at all confident”) to 6 (“completely confident”) [25]. The maximum score is 12, and a higher score means higher self-efficacy.

The PCS-4 asks individuals to indicate the degree to which they experienced each of four thoughts or feelings in past painful experiences on a 5-point scale, ranging from 0 (“not at all”) to 4 (“all the time”) [26]. The maximum score for the four questions is 16, and a higher score means a higher degree of catastrophic thinking.

Statistical analysis

Categorical variables are presented as frequencies with percentages, and continuous variables as means with standard deviations (SD) and 95% confidence interval (CI) or median with interquartile range (IQR), depending on the distribution. In bivariate analysis, the association with the PROMIS Physical Function and Pain Intensity scores was analyzed using either a Student’s *t*-test for dichotomous explanatory variables – sex, race, fracture, surgery – or an analysis of variance (ANOVA) for categorical explanatory variables–work status, location of injury, and mechanism of injury. The association between continuous variables – IEQ, PCS-4, PHQ-2, PSEQ-2, time since injury, time since surgery, and expectation of recovery – and the PROMIS Physical Function and Pain Intensity scores was analyzed using Pearson’s correlation or Spearman’s rank correlation, depending on the distribution. Variables with a *P*-value of 0.10 or less were included in a stepwise backward multivariable linear regression model. The focus of stepwise regression is to determine what is the best combination of independent (predictor) variables to explain variance in the dependent variable. We reported standardized β-coefficients and *P*-values. The β-coefficient is the slope along the x-axis in a linear regression model and represents the expected change in PROMIS Physical Function or Pain Intensity in response to a 1 unit change in the corresponding explanatory variable, at