(180) Differential predictors of self-reported pain and experimental pain tolerance among treated opioid addicts

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Patients with opioid dependence suffer a high prevalence of chronic pain and demonstrate reduced tolerance to cold pain compared to controls. The factors that predict self-reported pain and experimental pain tolerance are relatively unexplored in this population. This cross-sectional study examined predictors of cold pain tolerance using the cold pressor test and pain interference measured with the Brief Pain Inventory in a sample of 41 opioid dependent adults treated with methadone or buprenorphine. Primary predictors of interest were pain catastrophizing (PCS), discomfort intolerance (DIS), depression (PHQ9) and post-traumatic stress (PCL-C). Additional covariates were age, gender, race, education, marital/partnered status, disability status, homelessness, smoking, duration of opioid agonist therapy (OAT), and use of methadone (versus buprenorphine). Multivariate linear regression models were tested for each outcome and predictor, adjusting for additional covariates that were found to be significant on univariate testing. Participants (n=41) had a mean age 44(SD$\pm$9) years, were 44% female, 30% non-white. The median duration on OAT was 2 years (IQR: 1-3); 22% were on methadone. Nearly all participants (93%) reported pain in the past month, and the majority (83%) reported chronic pain (>6 months). In regression models, DIS was the only significant predictor of cold tolerance (β=0.05, 95%CI: 0.01-0.08, p<0.01). In contrast, PCS and depression were both found to be significantly associated with pain interference (β=0.06; 95%CI: 0.002-0.12, p=0.04 and β=0.12; 95%CI: 0.005-0.24, p=0.04, respectively), and results for PTSD approached statistical significance (β=0.05, 95%CI: -0.005-0.10, p=0.08). In summary, pain catastrophizing and depression predicted pain interference, but not cold pain tolerance, in a sample of opioid addicts treated with methadone or buprenorphine. In contrast, self-reported pain sensitivity (DIS) was associated with cold pain tolerance, but not pain interference. These results suggest that among treated opioid dependent patients, pain experiences and experimental pain tolerance are distinct and shaped by different factors.

(181) Pain intensity mediates the state-trait catastrophizing relationship: a path analysis study

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In accordance with the biopsychosocial model of pain, pain catastrophizing (PCS), fear of pain (FPQ), hyperviligance (somatosensory amplification, SSAS) and negative affect (NA) have all demonstrated significant associations with a variety of experimental and clinical pain conditions. However, the relative influences of state (i.e., situational) versus trait (i.e., dispositional) catastrophizing on pain perception are not well defined. While trait or dispositional catastrophizing can predict subsequent pain and disability, situational or state catastrophizing typically is more strongly correlated with coincident pain report. In accordance with these observations, we assessed several causative pathway models relative to theoretical or experimental pain conditions, in 3 separate studies. We assessed baseline trait PCS, FPQ, SSAS, and NA in all studies and state PCS again following: 1) consideration of three theoretical pain conditions (study 1, N = 193); 2) pain from the cold pressor task (study 2, N = 66); and 3) experimental muscle pain (study 3, N = 156). Using pathway analyses, we assessed the path coefficients for our full model, and two reduced models, testing whether the pain-specific situation (i.e., intensity) mediates the trait and state PCS relationship. The results from both theoretical and experimental studies support our causative model, indicating the pain-related traits influence pain perception and state catastrophzing is influenced by both trait catastrophizing as well as pain intensity. However, the reverse was not well supported, namely that state and trait catastrophizing both influence pain intensity (a significant positive state PCS - pain relationship remained, but the model indicated higher trait PCS actually caused lower pain ratings). Overall, these findings further refine the biopsychosocial model of pain, clarifying the roles of state and trait catastrophizing. This work was supported in part by grants from APS and NIH (K12HD055931; K01AR056134).

(182) Normative values for pain-related psychological traits differ between young and old adults

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Numerous studies have examined the roles of pain catastrophizing (PCS), pain-related fear (FPQ), hypervigilance or somatosensory amplification (SSAS), and/or negative affect (NA), providing normative values for these traits in young adults. However, relatively few studies have assessed these traits in young versus old adults. Thus, it is not clear whether similar normative values should be expected in older adults. To address this question, we performed secondary analyses on two data sets collected separately in young adults (N = 230, mean[SD] age 27.7 [10.7], range 18 – 55 yrs) and old adults (N = 236, 72.8 [5.9], range 65 – 95 yrs). Each cohort was asked to complete several written surveys, including the PCS, FPQ, SSAS and the Positive Affect Negative Affect Schedule (PANAS). No differences were observed in the proportion of men and women in each cohort (64% F), but more older adults reported having pain (39.8% vs. 31.3%, p = 0.02). Using two-way (age, sex) multivariate ANOVA, PCS, SSAS, and NA were all significantly lower in the older adults (effect sizes d = 0.7, 0.5, and 0.7, respectively, p < 0.001) whereas FPQ was not age-dependent (p = 0.065). Fear was higher in females than males (p < 0.001). The only significant interaction between age and sex occurred for catastrophizing (p = 0.013), where the age-related difference in PCS was larger for females. Overall, these findings indicate that despite a higher incidence of pain, older adults report lower levels of pain-related negative-valence traits. Thus, normative values appear to differ between these two aged cohorts for PCS, SSAS and NA, but not for FPQ. This information may be important to consider when assessing for "elevated" levels of these traits in older adults. This work was supported in part by grants from NIH (K01AR056134; F31 AR056175).

(183) Age-associated sex differences in the psychophysical response to experimental thermal pain

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Inadequate pain management is a problem in older adults. Seventy percent of older adults have pain and 38% report pain that interferes with activities of daily living and causes increased suffering. While significant progress has been made in our understanding of pain perception, few studies have examined age-associated sex differences in pain perception. Since pathological changes occur in aging that likely alter pain perception, we hypothesized differences in pain perception between older women and men. To test this hypothesis, we examined the perceived pain intensity and unpleasantness during the presentation of thermal stimuli in a group of healthy older adults ages 65-97(N=34; 15=male). We asked subjects to determine intensity thresholds in C$^\circ$ for warmth, mild, and moderate pain. Using a 0-20 unpleasantness scale, we immediately asked each subject to provide an "unpleasantness" rating for each threshold. Our data shows that thermal thresholds (for warmth and mild pain) were positively correlated with age for women only, with no trend effect in males. In contrast, there was no trend or significant association of sex with affective ratings of the unpleasantness of a stimulus. In both older women and men, ratings of unpleasantness increased with increasing temperatures. The average unpleasantness rating for warmth was 0.022$\pm$1,79; mild pain 2.85$\pm$3.36; moderate pain 6.04$\pm$3.94 (unpleasantness for warmth was significantly lower than for mild or moderate pain; unpleasantness for mild pain was significantly lower than for moderate pain; p<0.05). Importantly, after controlling for temperature and independent of sex, age was negatively associated with subjective reports of unpleasantness. The clinical implications of elevated warm and mild pain thresholds in women and reduced affective response in all older adults may indicate increased risk for late or failed detection of tissue injury—with women potentially at a greater risk. Supported by the John Hartford Foundation & Atlantic Philanthropies Foundation.