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Does anxiety sensitivity predict addiction severity in opioid use disorder?

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Abstract

Increased anxiety sensitivity (AS), or the fear of anxiety-related cognitive, social, and physical symptoms which are misinterpreted as having harmful implications, has shown a relationship with substance use disorders. People with substance use disorders also experience addiction-related problems across domains of life functioning. However, few studies have evaluated the relationship between elevated AS and addiction-related problems across specific life areas. We evaluated, first, whether AS predicted addiction-related problems in a sample of treatment-refractory outpatients with opioid use disorders and, second, whether sex moderated the relationship between AS and addiction-related problems in this sample. Participants with treatment-refractory opioid use disorders (n = 92, 53.3% male) completed baseline assessments of AS (the Anxiety Sensitivity Index) and addiction-related problems (the Addiction Severity Index). Baseline AS total score was a significant independent predictor of both baseline Addiction Severity Index medical status (β = .29, t = 2.84, p = .006) and psychiatric status (β = .30, t = 2.99, p =.004) composite scores but was not associated with social, employment or legal difficulties. These findings were maintained when controlling for drug use severity, though baseline AS total score became a significant predictor of baseline legal difficulties (β = –.23, t = –2.25, p = .027). There was no moderating role of sex on the relationship between baseline AS and addiction-related problems. Our findings suggest that, regardless of sex, elevated AS predicts increased addiction-related medical and

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psychiatric problems, and decreased legal problems when accounting for drug use severity, in outpatients with opioid use disorders.

Keywords

anxiety sensitivity; Addiction Severity Index; opioid use disorders

1. Introduction

Numerous studies demonstrate a relationship between increased anxiety sensitivity (AS) - the fear of anxiety-related cognitive, social, and physical symptoms/sensations which are misinterpreted as having harmful implications (Peterson & Reiss, 1992; Reiss, Peterson, Gursky, & McNally, 1986) - and misuse/abuse of substances that alleviate anxiety-based arousal (Hearon et al., 2011; Lejuez, Paulson, Daughters, Bornovalova, & Zvolensky, 2006; McHugh et al., 2017; Rogers et al., 2019; Schmidt, Buckner, & Keough, 2007; Stewart, Karp, Pihl, & Peterson, 1997) and drugs used in response to coping motives more generally (e.g., (Bonn-Miller, Zvolensky, & Bernstein, 2007; Guillot, Leventhal, Raines, Zvolensky, & Schmidt, 2016). One study among adults with opioid use disorders found that AS moderated degree of drug craving in response to induced negative affect (Stathopoulou, Pollack, & Otto, 2018). Few studies have evaluated the relationship between AS and addiction-related problems beyond drug use/craving or likelihood of relapse.

AS has performed well as an index of distress intolerance (McHugh & Otto, 2011; Otto et al., 2016), serving as a transdiagnostic “amplifying factor” and increasing the aversiveness and perceived need to avoid negative affective and somatic experiences (Otto et al., 2016). Consistent with this conceptualization, AS is related to both anxiety and mood pathology (McLaughlin & Hatzenbuehler, 2009; Olatunji & Wolitzky-Taylor, 2009; Stanley et al., 2018) and is associated with heightened fear of medical condition-specific symptoms, avoidance of healthy activities, and engagement in unhealthy behaviors (Horenstein, Potter, & Heimberg, 2018; Otto et al., 2016).

Accordingly, levels of AS may be important not only for understanding drug use patterns (e.g., Hearon et al., 2011; McHugh et al., 2017), but also psychiatric burden and severity of medical complaints that co-occur with drug use disorders. One study investigating these relationships in a substance-abusing sample (Forsyth, Parker, & Finlay, 2003) found that increased AS was associated with increased medical and psychiatric complications associated with substance abuse (as assessed via the Addiction Severity Index (McLellan et al., 1992). This study incorporated a largely male (95.7%) sample of veterans (n = 94), with some having opiate abuse/dependence.

Despite a cohesive literature linking AS with greater psychiatric and medical difficulties in substance-using individuals, prior work evaluating addiction-related problems has generally not parsed apart specific domains of such problems (Dean, Ecker, & Buckner, 2017; Guillot, Blumenthal, Zvolensky, & Schmidt, 2018). AS is a modifiable risk factor (Otto et al., 2016), thus clarifying the relationship between AS and addiction-related problems has the potential

to expand treatment targets for patients with substance use disorders who are particularly sensitive to anxiety-related sensations.

We evaluated AS as a predictor of addiction-related problems across domains of psychiatric status, medical status, family/social status, legal status, and employment status among adults with treatment-refractory opioid use disorders. We hypothesized that AS would be a positive predictor of both psychiatric and medical status. Due to minimal preliminary data, we did not have specific hypotheses for the predictive role of AS in legal status, family/social status, and employment status, because the promotion of avoidance could have a range of effects in these domains (e.g., avoidance reducing the likelihood of criminal activities or high-conflict family interactions, or avoidance leading to missed court dates or avoidance of family problem-solving). Studies in populations with opioid use disorders show that women report more addiction-related medical, psychiatric, family/social, and employment problems relative to men (Brown, Alterman, Rutherford, Cacciola, & Zaballero, 1993; Wu et al., 2010). Hence, we evaluate whether AS has a uniform predictive influence across women and men.

2. Methods

2.1 Participants

Participants (n = 92, mean age = 40.61, SD = 10.58, 53.3% male) with treatment-refractory DSM-IV opioid dependence were recruited from urban-based methadone maintenance treatment centers and enrolled in a randomized, controlled clinical trial (RCT) comparing two psychosocial interventions adjunctive to methadone maintenance treatment. Inclusion criteria were being on a stable dose of methadone for at least 2 weeks and self-report of a current, ongoing stressor (e.g., less than 20 hours of employment/week) or affective disorder. Exclusion criteria included use of a medication that could interfere with methadone metabolism, an unstable medical condition, and current bipolar disorder symptoms or a diagnosed psychotic disorder. For a full description of study procedures, refer to (Otto et al., 2014). Among participants, 66.3% (n = 61) identified as White, 31.5% (n = 29) as Black/African-American, 1.1% (n = 1) as Asian, and 1.1% (n = 1) as Native Hawaiian or other Pacific Islander. Further, 8.7% (n = 8) self-described as Hispanic/Latino. All participants were enrolled in methadone maintenance and group counseling.

2.2 Assessments

Measures were collected at baseline and prior to randomized treatment initiation. This study received Institutional Review Board approval and all participants provided informed consent.

Anxiety Sensitivity Index ––The Anxiety Sensitivity Index is a self-report assessment evaluating fear associated with the undesirable consequences of anxiety-induced sensations (Peterson & Reiss, 1992; Reiss et al., 1986) relevant to cognitive, social, and somatic concerns. Responses to each question are scored on a 5-point Likert scale from “very little” to “very much.” A total score is calculated by summing all items, with higher scores reflecting greater AS.

Addiction Severity Index – Lite Version ——The Addiction Severity Index is a clinician-administered interview evaluating seven substance use-related problem domains (McLellan et al., 1992): alcohol use, drug use, psychiatric status, medical status, legal status, employment/support, and family/social status. A composite score, calculated for each domain, provides a metric of problem severity over the prior 30 days. Composite scores range from 0 to 1, with higher composite scores reflecting greater problem severity.

2.3 Data analysis

Through a series of linear and multiple regression cross-sectional analyses, we evaluated whether baseline AS (total score) was an independent predictor of baseline addiction severity indices of psychiatric status, medical status, legal status, employment/support status, and family/social status. In a subsequent step in the regression model, we evaluated sex (male or female) as a moderator of the relationship between AS and addiction severity. We also replicated these analyses covarying for baseline drug use severity (as assessed via the Addiction Severity Index) to eliminate any potential confounding influence of substance use on our outcomes of interest. Group assignment was collapsed for this secondary data analysis.

3. Results

The mean baseline AS total score was 27.48 (SD = 12.23, range = 5 to 57) with no significant differences in mean scores between women and men (p = .35). Average scores on the addiction severity indices were as follows: medical status composite score mean = .47, SD = .37, range = .00 to 1.00, family/social status composite score mean = .21, SD = .22, range = .00 to .88, employment/support status composite score mean = .81, SD = .24, range = .12 to 1.00, legal status composite score mean = .16, SD = .22, range = .00 to .83, psychiatric status composite score mean = .40, SD = .23, range = .00 to .82, and drug status composite score mean = .22, SD = .11, range = .00 to .46. There were no significant differences in these average scores between men and women, except that men had significantly higher legal status composite scores relative to women (male mean composite = .22, SD = .25, female mean composite = .10, SD = .16, t = –2.88, p = .005).

Baseline AS was a significant independent predictor of both baseline medical status (β = .29, t = 2.84, p = .006) and psychiatric status (β = .30, t = 2.99, p =.004) composite scores. There were trends for baseline AS to predict employment/support status (β = .19, t = 1.78, p = .078) and legal status (β = –.19, t = –1.80, p = .075) composite scores. Baseline AS did not significantly predict the family/social status composite score (β = .16, t = 1.49, p = .139). These findings were maintained after controlling for baseline drug use severity, though baseline AS also became a significant predictor of legal status (β = –.23, t = −2.25, p = .027). Drug use was a significant predictor for legal status (p = .026) and psychiatric status (p < .001), but was not a significant predictor in other models.

Sex did not significantly moderate the relationship between baseline AS and Addiction Severity Index composite scores of medical status (β = –.06, t = –.60, p = .551), psychiatric status (β = –.04, t = –.35, p = .725), employment/support status (β = .11, t = 1.03, p = .305),

legal status (β = –.09, t = –.86, p = .394), or family/social status (β = –.01, t = –.10, p = .922). These findings were maintained when controlling for baseline drug use severity.

4. Discussion

In a series of cross-sectional analyses, we evaluated whether AS significantly predicted addiction-related problems in domains of psychiatric status, medical status, employment/support status, legal status, and family/social status among adults with opioid use disorders. Baseline AS was a significant predictor of both psychiatric status and medical status domains, such that people with higher AS had higher scores in the psychiatric status domain (reflecting more addiction-related psychiatric problems) and higher scores in the medical status domain (reflecting more addiction-related medical problems). When controlling for baseline drug use severity, AS also became a significant predictor of addiction-related problems in the legal status domain such that participants with higher AS had lower scores in the legal status domain (reflecting fewer addiction-related legal problems). Baseline AS did not predict addiction-related problems in other domains.

Our failure to find a moderating effect of sex on the relationship between AS and addiction-related domains is fitting to mixed literature on these relationships. Studies finding a specific effect of elevated AS on sedative use in females with opioid use disorders (Hearon et al., 2011; McHugh et al., 2017) are balanced by studies showing a stronger association between AS and opioid dependence and misuse in males compared to females with chronic pain (Rogers, Manning, Garey, Smit, & Zvolensky, 2020).

Our study is consistent with existing research on associations between both AS and psychiatric comorbidity and AS and medical disability (Horenstein et al., 2018; Naragon-Gainey, 2010; Olatunji & Wolitzky-Taylor, 2009), providing evidence that such associations extend to a sample comprised entirely of adults with opioid use disorders. This study supports calls for evaluation of AS as a transdiagnostic treatment target (e.g., Otto et al., 2016) in opioid use disorders. Although studies have focused on the direct relationship between AS and substance use, suggesting that decreasing AS may have important implications for decreasing substance use (e.g.,Hearon et al., 2011; Rogers et al., 2019; Wolitzky-Taylor et al., 2018), our findings are consistent with the notion that decreasing AS may also have relevance for improving individual reactions to and experience of medical and psychiatric problems associated with substance use, independent of any actual use patterns.

It is worth noting, however, that increased AS could be a partially “protective” factor in some domains for some substance-using individuals with high-risk behaviors, as participants with increased AS were noted to have fewer legal problems when controlling for substance use severity. Forsyth and colleagues (2003) found an inverse relationship between psychological concerns (via the Anxiety Sensitivity Index) and legal problems and, conversely, prior work demonstrates a relationship between decreased arousal states and higher criminality (Raine, Venables, & Williams, 1990). It is thus possible that those who are more sensitive to or avoidant of arousal states (which could characterize those with increased AS; e.g., McWilliams & Asmundson, 2001; Telch, Harrington, Smits, & Powers,

2011) or to loss of control (Forsyth et al., 2003) may be less prone to engagement with illegal activity, independent of any drug use.

This study is limited by its cross-sectional nature, and longitudinal evaluation of these relationships is warranted. Overall, our data are consistent with the suggestion that a comprehensive approach to managing AS in opioid use disorder treatment has implications not only for reducing substance use, but also for enabling people to cope more effectively with functional problems that they experience due to substance use. Future longitudinal studies may wish to evaluate the relationship between specific AS subscales and addiction-related medical, psychiatric, and legal problem domains.

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