

Stress-Related Disorders and History of Childhood Trauma in Women Opioid Users

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DESCRIPTION

United States is going through an opioid crisis. Dire consequences of heroin and opiate analgesic misuse including overdose increased more than 400% among females compared to 237% among males from 2002-2013. This brief review emphasizes the importance of examining the neural mechanisms in childhood trauma-exposed women with concurrent opioid use and stress disorders. The authors highlight the need for examining the efficacy of a Mindfulness-Based Stress Reduction (MBSR) intervention on women opioid users' brain functioning, mental health, as well as drug craving and relapse. If MBSR is found to be efficacious, this particular behavioral intervention can be added to the existing treatment protocol for women with opioid use and stress related affective disorders.

Opioid abuse continues to be a growing public health concern globally due to its unprecedented increase in morbidity and mortality [1]. Over 750,000 people in the U.S. have died since 1999 from drug overdose, with 2 out of every 3 of those deaths involving an opioid [2-4]. While men are more likely to die from opioid overdose than women, the (2013) reports an increasing rate of Opioid Use Disorder (OUD) among women in the U.S. (up 100% in women versus 50% in men for heroin use from 1999-2010). In New Jersey, opioid overdose deaths have increased more than 210% among females compared to 154% among males from 1999 to 2015 [5].

According to studies published that analyze the impact gender differences have on risk factors for and outcomes of opioid use, women with OUD (compared with men) were more likely to have personal or family history of psychiatric illness, and were more likely to have been victims of violence and trauma in their lifetime [6-8]. Najavits (2009) reports that women with history of childhood trauma (compared to men) experience a higher rate of Substance Use Disorders (SUD) and stress-related affective disorders (SAD; anxiety or PTSD) in adulthood [9]. Childhood traumatic stress has broadly been identified as an underlying causal factor for substance use [10,11], and it has also been linked to emotional dysregulation and SAD in adulthood that

can help maintain substance use [12]. Perry and Pollard (1998) suggest that traumatic events in childhood have greater potential to influence the brain, disrupting emotional, behavioral, cognitive, and social functioning, as the brain is developing and organizing at such a rapid rate in the first years of life [13]. Two decades of research clearly document the negative health and treatment outcomes associated with traumatic stress-related PTSD/substance use comorbidity.

Despite a strong relationship in women between childhood trauma, SUD, and SAD, to the best of our knowledge no study has examined the neural mechanisms in childhood trauma-exposed women with concurrent opioid use and stress disorders. A limited imaging literature reports that sexual trauma history is associated with a reduced brain orbitofrontal control network functioning in women with polysubstance use disorders and a trauma-focused treatment results in favorable changes in brain network involved in emotional regulation in PTSD patients [14,15].

Organizations, including the Office on Women's Health (2017) [16,17], have made calls promoting the research and development of interventions/treatments to address the gender-specific needs of women with OUDs, tailoring interventions to go beyond addressing treatment as usual and medication alone. An intervention of interest within the scientific community is a neuroscience-informed behavioral exercise called mindfulness meditation. Mindfulness involves practice in volitional shifting of attention from "mind wandering" to present-moment attention to sensations, and cultivating acceptance [18]. Mindfulness meditation has been demonstrated to improve mental and physiological health and well-being including enhanced emotional regulation, attention, memory, and mood, as well as decreased stress, pain, depression, anxiety, and blood pressure above and beyond treatment as usual [19-23]. Mindfulness meditation is believed to improve these cognitive and psychological functions by modulating brain structure and function [24-26]. As shown in studies performed by Zeidan and colleagues (2011, 2019), 10 hours of practicing mindfulness-based mental exercises can lead to activation and regulation of

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Received: 05-Jul-2022, Manuscript No. JALDD-20-001-PreQc-22; **Editor assigned:** 07-Jul-2022, PreQC No. JALDD-20-001-PreQc-22 (PQ); **Reviewed:** 21-Jul-2022, QC No. JALDD-20-001-PreQc-22; **Revised:** 26-Jul-2022, Manuscript No JALDD-20-001-PreQc-22 (R); **Published:** 05-Aug-2022, DOI: 10.35248/2329-6488.22.10.367.

Citation: Ray S, Budhi A (2022) Stress-Related Disorders and History of Childhood Trauma in Women Opioid Users. J Alcohol Drug Depend. 10:367.

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the orbitofrontal cortex and rostral anterior cingulate cortex, higher order brain regions implicated in cognitive regulation of nociceptive processing and reframing perception of sensory events [27,28]. Brief mindfulness meditation training has also been shown to decrease food cravings after smoking cessation [29], decrease smoking and reduce stress response in healthy controls [30,31].

With the increase in prevalence over the past two decades of women developing OUD, especially in women with concurrent history of childhood trauma and SAD, it is crucial to utilize an intervention that can target the maladaptive processing and response this population has to stressful events while also decreasing opioid craving and relapse with the ultimate goal of eliminating opioid addiction. Mindfulness-Based Stress Reduction [32,33], which has shown to improve emotional regulation, decrease stress responses, reduce PTSD symptoms, improve depression, and decrease drug craving and relapse [34-37], can be used as a foundation for developing a personalized program for opioid using women with SAD by experts from various fields, including addiction neuroimaging, trauma and addiction, and addiction psychiatry.

CONCLUSION

To conclude, research should be conducted to understand the neural mechanisms including the emotional regulation and stress related brain networks in women opioid users with comorbid stress-related disorders and history of childhood trauma. A multisystem approach may be utilized to examine the effects of MBSR intervention of a given duration has on women opioid users' brain functioning, stress response, PTSD, anxiety and depression symptoms and drug craving and relapse. If MBSR is found to be efficacious in this population, this particular behavioral intervention can be added to the existing treatment protocol for women with opioid use and stress related affective disorders. In addition, the proposed research will have the potential to identify new brain biomarkers that can be targeted to develop new pharmacotherapy, cognitive and psychosocial therapies for trauma-exposed women with concurrent opioid use and stress disorders. Furthermore, it is essential to understand whether an acute MBSR intervention, for example, a 15-min long MBSR impacts brain regions that contribute to drug craving. If the acute MBSR intervention is proven to be efficacious, a brief (5-min long) MBSR intervention can be developed and validated in the future in order to serve as a rescue from the moment capture from substance craving and distress. The priority of Ray's laboratory is to carry out the above proposed research with the goal of reducing opioid use and relapse in women with opioid use disorder.

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