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An in-depth look into PTSD-depression comorbidity: A longitudinal study of chronically-exposed Detroit residents

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ABSTRACT

Background: Although PTSD-major depressive disorder (MDD) co-morbidity is well-established, the vast majority of studies have examined comorbidity at the level of PTSD total severity, rather than at the level of specific PTSD symptom clusters. This study aimed to examine the long-term associations between MDD and PTSD symptom clusters (intrusion, avoidance, hyperarousal), and the moderating role of gender in these associations.

Methods: 942 residents of urban Detroit neighborhoods were interviewed at 3 waves, 1 year apart. At each wave, they were assessed for PTSD, depression, trauma exposure, and stressful life events.

Results: At all waves, hyperarousal was the PTSD cluster most strongly correlated with MDD. For the full sample, a reciprocal relationship was found between MDD and all three PTSD clusters across time. Interestingly, the relative strength of associations between MDD and specific PTSD clusters changed over time. Women showed the same bidirectional MDD-PTSD pattern as in the entire sample, while men sometimes showed non-significant associations between early MDD and subsequent PTSD clusters.

Limitations: First, our analyses are based on DSM-IV criteria, as this was the existing edition at the time of this study. Second, although this is a longitudinal study, inferences regarding temporal precedence of one disorder over another must be made with caution.

Conclusions: Early identification of either PTSD or MDD following trauma may be crucial in order to prevent the development of the other disorder over time. The PTSD cluster of hyper-arousal may require special therapeutic attention. Also, professionals are encouraged to develop more gender-specific interventions post-trauma.

1. Introduction

Numerous studies have shown that exposure to trauma often leads to significant psychiatric distress. The most common psychopathological outcome of trauma is post-traumatic stress disorder (PTSD). However, other psychiatric disorders may follow trauma exposure, including substance abuse, somatic disorders, anxiety disorders, and major depression (MDD), the latter found to be the most common post-trauma disorder other than PTSD (e.g. O'Donnell et al., 2004). Studies have shown high rates of PTSD-MDD comorbidity, with lifetime rates ranging from 43–56%, and current rates from 16–37% (Breslau et al., 1997; Kulka et al., 1990; Norris et al., 2004).

Although PTSD-MDD comorbidity is well-established, not much is known about its nature and underlying mechanisms. Several competing models of comorbidity have been suggested. One model posits that PTSD is the "primary", antecedent disorder, which may cause subsequent MDD (Schindel-Allon et al., 2010). A second model, sometimes referred to as "the depressogenic model" (Schindel-Allon et al., 2010), suggests the opposite direction of causality, with initial MDD yielding subsequent PTSD. A third model postulates that both disorders may be independent manifestations of a larger post-traumatic "meta-factor" (e.g., negative affectivity, stress-related biological processes), which

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may yield both disorders (Breslau et al., 2000). Longitudinal studies focusing on various post-trauma samples have shown evidence supporting each of these models, with inconclusive results (e.g., Dekel et al., 2014; Horesh et al., 2015). However, the vast majority of these studies have referred to PTSD as a whole, without differentiating between its individual constituent symptom clusters and their respective associations with MDD over time (e.g., Itzhaky et al., 2014). Thus, while research on PTSD alone has been characterized by an increased focus on micro-level analyses, looking at specific clusters, symptoms and symptom profiles (e.g., Seligowski et al., 2016), the same cannot be said about comorbidity studies. The scarcity of this type of comorbidity studies is particularly apparent in light of the emerging RDoC approach (Insel et al., 2010), which encourages a deeper, trans-diagnostic examination of underlying dimensions of psychopathology.

Several cross-sectional studies have shown differential associations between PTSD symptom clusters and depression symptoms, yet findings have been mixed. For example, in a study by Rubacka et al. (2008), PTSD hyperarousal, but not avoidance or re-experiencing, was associated with chronic MDD. However, other cross-sectional studies have found avoidance/numbing (Gros et al., 2010) and re-experiencing (Post et al., 2011) to be the clusters most strongly associated with MDD symptoms. Thus, it still remains unclear which PTSD cluster is most strongly related to MDD. Not only do these studies present a mixed, unclear picture, they are also limited by their cross-sectional nature. Longitudinal studies on PTSD-MDD comorbidity, particularly at the level of specific symptom clusters, are therefore both rare and much-needed.

In a previous paper published by our group (Horesh et al., 2015), we have longitudinally examined PTSD-MDD comorbidity among residents of urban Detroit, Michigan. For decades Detroit has been struggling with high crime rates and severe financial difficulties (Fisher, 2015). In our previous paper, we have found high rates of lifetime trauma exposure, PTSD and MDD, in line with previous studies of urban American neighborhoods (Galea et al., 2007; Horowitz et al., 1995).

Most studies to date have also failed to examine factors that may moderate PTSD-MDD associations over time. One variable that seems to hold promise in this regard is gender. While female gender was often found to be a risk factor for each of these disorders alone (Hourani et al., 2015), much less in known about its role in their comorbidity, particularly over time. In our previous paper, mentioned above, we reported that Detroit women suffered from higher levels of PTSD and MDD alone, as well as higher comorbidity rates across time. We also showed gender differences in comorbidity patterns over time between men and women.

In the present study, we aimed to expand our work from that previous study, by taking a closer, more in-depth look at PTSD-MDD comorbidity. We did so by examining each PTSD symptom cluster separately, and its temporal associations with MDD. This unique longitudinal examination of comorbidity at the level of symptom clusters aimed to shed light on the underlying mechanisms of comorbidity. More specifically, we addressed two major research questions:

1. What is the pattern (i.e, unidirectional/bidirectional) of long-term associations between MDD and the PTSD symptom clusters of re-experiencing, avoidance and hyperarousal among residents of inner-city Detroit neighborhoods?
2. Is the temporal pattern of associations between MDD and PTSD clusters different for men and women?

We expected to find a complex pattern of findings, wherein the relative predictive dominance of PTSD clusters vis-à-vis MDD would change over time, with different temporal associations for male and female participants.

2. Methods

2.1. Participants and procedure

Data were collected as part of the Detroit Neighborhood Health Study (DNHS), a longitudinal study of predominantly non-Hispanic Black adults living in Detroit. Details on the baseline sampling methodology of DNHS can be found elsewhere (e.g., Uddin et al., 2010). Wave 1 (W1) was conducted between 2008 and 2009, and 1547 participants completed the survey. Approximately a year after W1, 1054 participants from W1 completed the Wave 2 (W2) survey. Wave 3 (W3) occurred approximately a year after W2, and 965 participants from W1 participated. A total of 847 participants completed all three waves, yielding an overall retention rate of 54.8%. At each wave, participants completed a structured telephone survey using standardized instruments. Informed consent was obtained at the beginning of each survey, and participants were offered $25 for their participation.

The current study included 942 participants who reported at least one lifetime traumatic event at W1, and completed the PTSD and MDD questionnaires at W1, and either or both W2 and W3 (N=942; men: n=387 [41.1%]; women: n=555 [58.9%]). The majority of the participants (85.3%) identified as non-Hispanic Black, 10.5% as non-Hispanic White, and 1.2% as Hispanic. On average, participants were 52.63 years old (SD=16.02; range: 18–92) at W1. At W1, 26.0% were married, whereas 25.7% were separated or divorced, 13.4% widowed, and 34.9% single and never married. Participants also reported on their income (from 1= < *$10,000* to 7= > *$75,000*; M =3.84, SD=2.00), highest level of education (from 1=*less than high school* to 5=*graduate degree*; M=2.78, SD=1.08) and employment status (58.7% unemployed) at W1. Bonferroni-corrected independent samples t-tests and chi-square tests showed that retained participants had significantly more lifetime traumatic events and stressors, significantly higher W1 and W2 depression, and were significantly more likely to be divorced or separated and less likely to be single and never married than dropped participants. In addition, for the 942 participants in the analysis, those with complete data (n=269) reported significantly higher W2 re-experiencing, avoidance, and hyperarousal symptoms, and higher W2 and W3 depression than those missing data on any variable (n=673).

2.2. Measures

2.2.1. Lifetime traumatic events and stressors

At W1, participants completed a 20-item trauma inventory, where they indicated whether they had experienced 19 traumatic events (e.g., rape, serious car or motor vehicle crash) in their lifetime (Breslau et al., 1998), as well as an additional item allowing participants to report another traumatic event not on the inventory. A count of affirmative responses was created as an index of lifetime traumatic events exposure. Participants also indicated whether they experienced 10 stressors (e.g., serious financial problem, divorce) in their lifetime, and a count of affirmative responses was included as an index of lifetime stressors. As reported in our previous paper, lifetime trauma exposure rates were very high. For example: 37.7% (men - 47%, women – 31.2%) have been mugged, held up or threatened with a weapon; 32.1% (men – 42.9%, women – 24.5%) have witnessed someone being killed or seriously injured; 11.9% (men – 1.8%, women – 18.9%) were raped; 29% (men – 30.5%, women – 27.9%) were in a serious car or motor vehicle crash. For a comprehensive list of all lifetime traumas and stressors, please see Horesh et al. (2015).

2.2.2. Posttraumatic stress

A modified interview version of the PTSD Checklist-Civilian Version (Weathers et al., 1996), validated by the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995), assessed PTSD symptoms at each wave. The PCL-C includes 17 items, representing criteria B (re-experiencing; five items), C (avoidance; seven items), and D (hyperar-