Trauma and Posttraumatic Stress Disorder
Emerging Risk Factors for Cardiovascular Disease in Women?

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Although prevalence estimates vary, national data indicate that ≈50% of women in the United States will experience at least one form of extreme, or traumatic, stress at some point in their lives.1 Commonly reported traumas include, but are not limited to, sexual or physical assault, life-threatening accidents, fires or natural disasters, losing a close friend or family member to violence, witnessing a traumatic injury or death, and combat. Although the overall prevalence of exposure to trauma is somewhat lower among women compared with men, women are 2 to 3 times more likely to develop posttraumatic stress disorder (PTSD) after a traumatic event.1,2 Thus, despite its historical linkages to war-related traumas in male combat veterans,3 PTSD is, from a prevalence perspective, largely a woman’s disease.4 Yet, with few exceptions,5-6 much of the emerging research on trauma, PTSD, and cardiovascular disease (CVD) has been conducted in predominantly male cohorts.7-10

In this issue of Circulation, Sumner and colleagues11 document linkages among trauma, PTSD, and incident CVD in a sample of 49,978 women from the Nurses Health Study. The researchers categorized women into 4 distinct groups: no trauma, exposure to trauma but no PTSD, exposure to trauma with 1 to 3 symptoms of PTSD, and exposure to trauma with ≥4 symptoms of PTSD (ie, probable PTSD). The authors found that women with both a history of trauma and probable PTSD had a higher rate of incident myocardial infarction and stroke than women with no prior trauma exposure. Interestingly, compared with women with no trauma, women who reported a history of trauma without PTSD also had higher rates of incident CVD, and the effect of trauma alone on incident CVD was similar to the effect of trauma with probable PTSD.11 There was no appreciable increase in incident CVD for women who reported trauma and had 1 to 3 symptoms of PTSD, and it is possible that examining PTSD symptoms rather than actual clinical PTSD may have affected the results in some way. Nonetheless, the observed findings are intriguing because they suggest that, for women, the experience of trauma itself may lead to adverse CVD outcomes, regardless of PTSD. At least 1 other study has documented similar associations in men.8

From a mental health perspective, trauma-exposed women (and men) without PTSD would be considered by some to be psychologically “resilient,”12 but results from the present study indicate that they may not be physiologically resilient. In fact, they appear to be just as vulnerable to adverse CVD outcomes as their counterparts with PTSD. Furthermore, findings suggest that the pathways through which trauma and PTSD exert their effects on CVD may differ somewhat for trauma-exposed women with versus without PTSD. In mediation analyses, Sumner et al11 found that health behaviors and medical risk factors mediated almost half (47%) of the association of trauma/PTSD with incident CVD but only 14% of the association of trauma/no PTSD with incident CVD. Thus, it is possible that the intense psychological distress associated with PTSD results in greater self-medicating via poor health behaviors for trauma-exposed women with PTSD. However, other pathways may play a larger role for women with trauma only.

Both trauma and PTSD have been linked to physiological processes that may ultimately affect clinical CVD. As outlined by Sumner and colleagues,11 Vaccarino and Bremner,13 and others,14,15 these include dysregulations in the hypothalamic-pituitary-adrenal axis and the autonomic nervous system, which could lead to hypersecretions or hyposecretions of cortisol, elevations in blood pressure, disruptions in heart rate, or increased secretion of catecholamines.13,14 Repeated or prolonged activation of the hypothalamic-pituitary-adrenal axis and autonomic nervous system has also been linked to inflammation,10 which could further increase the risk of CVD. Although the hyperarousal and re-experiencing aspects of PTSD present clear pathways through which PTSD might lead to consistent stimulation of the hypothalamic-pituitary-adrenal axis and autonomic nervous system in trauma-exposed women with PTSD, the mechanisms linking trauma alone to physiological dysregulation and CVD remain to be determined.

The authors analyzed trauma exposure as a presence/absence variable and ran sensitivity analyses after adjusting for child sexual abuse as a potential confounder of the observed associations.11 This is justifiable, but given the high prevalence of revictimization in women with abuse histories,10 it may be equally important for future studies to examine the cumulative effects of trauma on CVD. Because multiple forms of trauma often co-occur (eg, child abuse, witnessing violence, and experiencing an assault as an adult), it is possible that some women experience repeated exposure to traumas, which could create more physiological “wear and tear”
and increase their vulnerability to CVD even in the absence of PTSD. This might explain some of the increased risk of CVD observed in women who experienced trauma only in the present study. At least 1 prior study found a dose-response association between the number of separate traumatic events and self-reported chronic conditions that was independent of PTSD and other mental disorders. Additional research is needed to determine whether these results would extend to objective CVD outcomes in women.

It is important to note that although there was no direct comparison of women with men in the present study, the effect sizes observed by Sumner et al are comparable to those found in studies of men. Establishing an actual effect within women is an important first step. However, without a direct comparison, it is unclear whether there are sex-specific mechanisms through which trauma and PTSD affect incident CVD. For example, there are known sex differences in the prevalence of depression, and across studies, PTSD is highly comorbid with depression, particularly for women. In sensitivity analyses from the present study, adjusting for depressive symptoms yielded effect sizes that were similar to those in the primary analyses, although the results for trauma-exposed women with PTSD fell slightly short of statistical significance. Conversely, studies of objective CVD in men with PTSD have observed associations that remain fairly robust after adjustment for depression. This may simply be a result of differences in measurement, that is, symptoms versus clinical diagnosis. However, it may also indicate that depression is more salient in the study of trauma and PTSD in women compared with men and that both forms of distress may be important to consider in future studies examining CVD risk in trauma-exposed women. Other factors that may be uniquely important to consider in studies of trauma, PTSD, and CVD risk in women (versus men) include trauma and PTSD-related interruptions in social roles and social support and sex differences in autonomic and neuroendocrine pathways. Furthermore, it is unclear whether certain types of traumas (eg, sexual or physical assault) are more strongly associated with incident CVD risk in women compared with men.

The role of race/ethnicity and socioeconomic status will also be important to consider in future research on trauma, PTSD, and CVD in women. As noted by the authors, the Nurses Health Study is made up of predominantly white, educated women. However, epidemiological data indicate that PTSD is more prevalent among lower–socioeconomic status individuals and African Americans compared with whites, Hispanics, and Asians, even when exposure to trauma is more comparable. Prior studies have found that African Americans may be more vulnerable to the effects of psychological distress on incident CVD, and there are known racial/ethnic and socioeconomic status disparities in CVD risk for women. Thus, it is possible that the effects of trauma and PTSD on incident CVD will be particularly pronounced for African American women and women of low socioeconomic status. Studies in this area are greatly needed.

Results from the present study add to the growing evidence base linking trauma and PTSD to CVD risk across a range of populations. Although additional prospective studies are needed to better understand the mechanisms through which traumatic experiences and PTSD increase CVD risk, particularly for women, both are potential risk factors for later CVD. Furthermore, although trauma exposure itself is nonmodifiable, similar to other nonmodifiable risk factors such as family history or genetic vulnerability, screening for prior trauma exposure and PTSD may ultimately prove useful for CVD prevention in women (and men). For those with actual PTSD, which is modifiable, clinical trials examining the effects of PTSD treatment on both PTSD and physiological parameters linked to later CVD may be warranted.

Disclosures

None.

References


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