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The postdisaster prevalence of major depression relative to PTSD in survivors of the 9/11 attacks on the world trade center selected from affected workplaces

Carol S. North[a,b,*], David E. Pollio[c], Barry A. Hong[d], Anand Pandya[e], Rebecca P. Smith[f], Betty Pfefferbaum[g]

[a]*Program in Trauma and Disaster and Staff Psychiatrist, VA North Texas Health Care System, Dallas, TX, USA*
[b]*Departments of Psychiatry and Emergency Medicine, The University of Texas Southwestern Medical Center, 6363 Forest Park Rd., Dallas, TX 75390–8828, USA*
[c]*The University of Alabama at Birmingham, Department of Social Work, College of Arts and Sciences, Birmingham, AL, USA*
[d]*Washington University School of Medicine, Department of Psychiatry, St. Louis, MO, USA*
[e]*Keck School of Medicine, Department of Psychiatry and Behavioral Sciences, University of California, Los Angeles, CA, USA*
[f]*Ichan School of Medicine at Mt. Sinai and The New York Harbor Health Care System – Manhattan VA, New York, NY, USA*
[g]*The University of Oklahoma College of Medicine, Department of Psychiatry and Behavioral Sciences, College of Medicine, Oklahoma City, OK, USA*

Abstract

Background: Studies of survivors of the September 11, 2001 attacks on the World Trade Center in New York City suggest that postdisaster depressive disorders may be at least as prevalent, or even more prevalent, than posttraumatic stress disorder (PTSD), unlike findings from most other disaster studies. The relative prevalence and incidence of major depressive disorder (MDD) and PTSD were examined after the 9/11 attacks relative to trauma exposures.
Methods: This study used full diagnostic assessment methods and careful categorization of exposure groups based on *DSM-IV-TR* criteria for PTSD to examine 373 employees of 9/11-affected New York City workplaces.
Results: Postdisaster new MDD episode (26%) in the entire sample was significantly more prevalent ($p < .001$) than 9/11-related PTSD (14%). Limiting the comparison to participants with 9/11 trauma exposures, the prevalence of postdisaster new MDD episode and 9/11-related PTSD did not differ ($p = .446$). The only 9/11 trauma exposure group with a significant difference in relative prevalence of MDD and PTSD were those with a 9/11 trauma-exposed close associate, for whom postdisaster new MDD episode (45%) was more prevalent ($p = .046$) than 9/11-related PTSD (31%).
Conclusions: Because of the conditional definition of PTSD requiring trauma exposure that is not part of MDD criteria, prevalence comparisons of these two disorders must be limited to groups with qualifying trauma exposures to be meaningful. Findings from this study suggest distinct mechanisms underlying these two disorders that differentially relate to direct exposure to trauma vs. the magnitude of the disaster and personal connectedness to disaster and community-wide effects.

1. Introduction

Most disaster mental health research has focused on posttraumatic stress disorder (PTSD) [1–3]. PTSD is a conditional disorder that cannot occur without a qualifying trauma exposure (i.e., threat to life or limb) [4–6]. By definition, PTSD in relation to disaster trauma is limited to those physically endangered, who directly witnessed disaster trauma, or whose close associates were disaster trauma-exposed. PTSD is usually the most prevalent disaster-related psychiatric disorder and major depression is generally second in prevalence [1,7–9], although this diagnostic prevalence order has not been universally reported [10–14].

The conditional requirement of trauma exposure for PTSD creates complexities for comparing prevalence of disaster-specific PTSD and other postdisaster disorders that are not conditionally based on trauma exposure such as major depressive disorder (MDD). This is especially true if relatively

* Corresponding author at: Departments of Psychiatry and Emergency Medicine, The University of Texas Southwestern Medical Center, 6363 Forest Park Rd., Dallas, TX 75390–8828, USA. Tel.: +1 214 648 5375; fax: +1 214 648 5376.
E-mail address: carol.north@utsouthwestern.edu (C.S. North).

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few members of a population had qualifying disaster trauma exposures, as was the case with geographically broad groups examined after the September 11, 2001 (9/11) attacks [15–17]. Comparing PTSD and MDD prevalence in relation to specific trauma exposure thus introduces bias when few members of a sample are potential candidates for PTSD yet are all potential candidates for MDD. Comparing PTSD and MDD incidence may thus be most logically conducted with a universally trauma-exposed sample. If, however, comparisons to be made are concerned only with numbers of cases without considering exposure as part of the equation (e.g., counting the total number of people with PTSD in a circumscribed population for purposes of estimating needed resources to serve them), then mixed-exposure populations can be informative.

The magnitude of the attacks and the scope of the disruption to New York City [18,19] uniquely introduced new considerations of trauma exposure into disaster mental health research [8,20,21]. The mental health effects of this unprecedented incident extended far beyond the geographical areas of human endangerment [15–17,22].

A few studies assessed PTSD and depression/mood disorders in community members after the 9/11 attacks on the World Trade Center (WTC) in New York City, finding mood disorders to be more prevalent than PTSD. A structured telephone interview study by Galea et al. [15] of largely unexposed Manhattan residents 1–2 months after the attacks found the prevalence of "symptoms consistent with" the diagnosis to be 7.5% for PTSD and 9.5% for MDD. Among those who lived closer to the attack site, PTSD was more prevalent, but among those who lost friends or relatives, MDD was more prevalent. Two studies [23,24] examining PTSD and depression/mood disorders among survivors with "direct" exposure to 9/11 WTC trauma at approximately one year [23] or between three and four years [24] post disaster respectively found postdisaster depression/mood disorders to be more prevalent than 9/11-related PTSD. The Neria et al. [23] study used symptom screeners not providing diagnostic assessment, but the Henriksen et al. [24] study used face-to-face structured diagnostic interviews. The exposure categories in these two studies were "arbitrarily created" (p. 998) [24] either through reliance on participants' categorization of their own exposures (e.g., "in the immediate area" of the 9/11 attack without specification of how close) [24] or based on 9/11-related experiences that would not necessarily meet PTSD trauma exposure criteria, e.g., location below 14th Street in New York City (approximately 1.7 miles minimum distance from Ground Zero) or witnessing smoke (which could be seen from miles away) after the attacks [23]. Our prior work determining that most qualifying direct exposures occurred within 0.1 mile of Ground Zero and all were within 0.75 mile [20] suggests that unknown but potentially substantial proportions of these samples lacked qualifying 9/11 trauma exposures for a *DSM-IV-TR* diagnosis of PTSD.

Research using full diagnostic assessment and careful categorization of trauma exposure in relation to the 9/11 attacks is therefore needed to confirm impressions from other reports that postdisaster depressive disorders appear to be more prevalent than PTSD after this disaster, unlike most disaster studies. The current study examined the prevalence of 9/11-related PTSD and MDD after the 9/11 attacks among variously 9/11 trauma-exposed groups in New York City, using full diagnostic assessment methods and careful categorization of 9/11 trauma exposures based on the *DSM-IV-TR* definition of trauma for the diagnosis of PTSD.

2. Methods

Approximately three years after the 9/11 attacks, structured interviews were conducted with 379 study participants who provided informed consent. The cooperating academic institutions all provided Institutional Review Board approval of the study. A volunteer sample of participants was recruited from eight companies substantially affected through employee exposures to the attacks or as part of 9/11 rescue and recovery operations. In this sample, 176 participants were from three companies located in the World Trade Center (WTC) towers on 9/11 and 203 were from five companies not in the towers. More details about this study's methods are provided in a previous publication [20].

Lifetime predisaster (any time before 9/11) and postdisaster (any time since 9/11) prevalence of 9/11-related PTSD and MDD were assessed with the Diagnostic Interview Schedule for *DSM-IV* (DIS) [25] administered by mental health professionals formally trained on this interview. Because the MDD diagnosis was missing or indeterminate for six, analyses for this report were conducted with 373 participants with complete diagnosis data. Timing of onset and recency of MDD was queried in relation to the 9/11 attacks (i.e., predisaster vs. postdisaster). Incident MDD was defined as postdisaster MDD without a predisaster history of MDD. Participants with a history of predisaster MDD were asked if they had experienced an episode of MDD during the month before the 9/11 attacks, permitting differentiation of new MDD episodes occurring after the disaster from episodes that were continuous with pre-existing MDD.

The Disaster Supplement [26] to the DIS was modified for *DSM-IV-TR*-qualifying 9/11 WTC trauma exposures to determine physical endangerment in the attacks, witnessing trauma to others, and indirect exposure through exposured close associates, using a series of questions about specific experiences related to the terrorist attacks. Direct personal exposures included injury in the attacks or later at the rescue/recovery sites and physical endangerment when the planes hit the towers or the towers collapsed. Witnessed exposures included seeing people being injured or killed or injured people or dead bodies or body parts during the attacks or later at the recovery sites. Indirect exposure through the experience of a close associate was defined as having an immediate family member or close friend who was physically endangered, injured, or killed in the attacks.