The Impact of Job Loss on Posttraumatic Stress Disorder Among Asian Americans: 11–12 Years After the World Trade Center Attack

Debbie Huang[1], **Xiaoran Wang**[2], **Winnie Kung**[2]

[1]Columbia University, Mailman School of Public Health, New York, NY, USA.

[2]Fordham University, Graduate School of Social Service, New York, NY, USA.

Abstract

Adversities following disasters are associated with the delayed onset and persistence of post-traumatic stress disorder (PTSD). In the wake of the World Trade Center attack, a sizeable group of Asian Americans being directly exposed to the disaster had endured job loss during the decade afterwards. Yet, no studies to date have examined the relationship between job loss and long-term PTSD in this group. This study examined the 10–11-year prevalence of probable PTSD (PCL score of 44) among Asian (n=1,712) and Caucasian American (n=25,011) participants of the World Trade Center Health Registry who had completed three waves of survey studies (2003–04, 2006–08, 2011–12). Logistic regression was used to model the relationship between job loss since the disaster and probable PTSD for the two racial groups separately while controlling for sociodemographics, disaster exposure, post-disaster traumatic/stressful events exposure, lower respiratory symptoms, PTSD history since 911, and mental health service use. The long-term prevalence of probable PTSD was 15.1% for Asian Americans and 14.4% for Caucasian Americans, with no significant difference. For both groups, having job loss since 911 was a significant risk factor for probable PTSD (Asian Americans: AOR=1.80; 95% CI=1.19, 2.71; Caucasian Americans: AOR=1.73; 95% CI=1.56, 1.93). While job loss was an important risk factor, employment opportunities were more restricted for Asian Americans given the cultural and language limitations. Current findings highlight the importance of improving employment as part of post-disaster assistance.

Introduction

The World Trade Center attacks (WTC attack or 9/11) on September 11, 2001, left enduring consequences to the residents of New York City. Beyond the physical and psychological

Correspondence concerning this manuscript should be addressed to Debbie Huang, Department of Epidemiology, Mailman School of Public Health, Columbia University, 722 W 168th St, New York, NY 10032. dh2652@cumc.columbia.edu.
Debbie Huang and Xiaoran Wang contributed equally to this work.

effects related to the initial exposure to the attack (e.g. Adams & Boscarino, 2005; Farfel et al., 2008), the disruptive effect on employment left many residents in a prolonged state of economic hardship. Based on the estimate of the Federal Reserve Bank of New York, by June 2002 the private-sector in New York City lost about 28,000 to 55,000 jobs due to 9/11, and the city lost between $3.6–6.4 billion in wage and salary earnings (Bram, Orr, & Rapaport, 2002). The employment disruption was particularly concentrated in lower-Manhattan, where businesses were damaged and transportations were cut off (Bram et al., 2002).

Job loss is a common measure of economic disruption that is associated with subsequent psychological well-being. The term 'job loss' is generally defined as a separation from a job, and can be voluntary (e.g. "quitting") or involuntary (e.g. "firing") (Brand, 2015). Job loss is a discrete event, an exogenous shock that proceeds unemployment—a state where individual is without a job and seeking employment or dropped out of the labor force (Brand, 2015). Empirical evidence from post-9/11 studies indicated that job loss due to WTC attack was associated with PTSD onset and PTSD symptom persistence as indicated in the three waves of survey studies of residents living in Manhattan south of 110th Street (Galea et al., 2003). Another study of recipients of Project Liberty, a mental health intervention program after 9/11, found that job loss had a "pervasive impact" on individuals' ability to return to adequate functioning (Jackson et al., 2006). Despite the fact that 16 to 26 months had passed after the attack and crisis counseling was provided, individuals who lost their jobs were less likely to return to pre-attack functioning (Jackson et al., 2006). Job loss appears to be an important risk factor for long term mental health outcomes among those exposed to the WTC attacks.

The previous studies were in the line of inquiry focusing on job loss as a consequence of 9/11 and treating it as a contributing factor to PTSD in addition to other WTC exposure factors. However, these studies included job loss as one of the covariates but did not fully explain the significance of job loss as a key risk factor. Until recently, only Nandi and colleagues (2004) had parsed out the distinction between the impact of job loss due to 9/11 on PTSD versus unemployment that occurred anytime since 9/11. The authors found that job loss directly due to 9/11 did not predict persistent probable PTSD. They posed two potential explanations. First, this could be due to the short-lived impact of such job loss. Second, individuals attributed the loss to 9/11 might experience less self-blame and thus had less negative psychological effects (Nandi et al., 2004). However, Nandi et al.'s (2004) findings showed that job loss which occurred between 6 and 12 months since 9/11 increased the risk of probable PTSD during this period. Thus job loss during the duration since 9/11 appeared to be associated with later psychological issues. The long-term impact (>5 years) of job loss since 9/11 on PTSD awaits further exploration.

The psychological outcomes among Asian Americans are rarely the target group of interest within the WTC attack literature. In general, race and ethnicity were commonly included as a covariate in WTC attack studies, but they rarely focused on the psychological outcome of particular racial groups. For the affected Asians communities, particular socioeconomic characteristics make this racial group more vulnerable to having PTSD. The WTC disaster site was situated only 10 blocks away from Chinatown and that many South Asians worked

at the collapsed and nearby damaged buildings (Asian American Federation of New York, 2003). Studies on Chinatown's economy indicated that years after the attack, small businesses that were central to the local economy (e.g., garment manufacturing and food services) and primary sources of employment continued to struggle (Asian American Federation, 2008). Despite the fact that Asian Americans suffered significant job loss and psychological distress due to the proximity of Chinatown and Asian-owned businesses to the WTC, Asian Americans have rarely been the sample of interest in WTC studies. This is especially important given the underutilization of mental health services among Asian Americans (Abe-Kim, et al., 2007; Office of the Surgeon General, Center for Mental Health Services, & National Institute of Mental Health, 2001) and to examine the popular perception that Asian Americans are a "model minority" who experience fewer mental health difficulties (Sue, Chu, Cheng & Saad, 2012).

In fact, of the few existing studies that focused on Asian Americans, Kung, Liu, Huang, et al. (2018) found that this group had a higher prevalence of probable PTSD than non-Hispanic Whites 2–3 years after the attack and was more likely to present chronic PTSD 5–6 years after the attack (Kung, Liu, Goldmann, et al., 2018). One longitudinal examination (2004–2005) of 148 Chinese garment workers who lost their jobs due to 9/11 found that the participants tended to display delayed symptom manifestation, with a greater proportion met criteria for probable PTSD in the follow-up study (De Bocanegra, Moskalenko, & Kramer, 2006). Unfortunately, these studies have only examined short-to-medium-term outcomes following the attack and did not sufficiently explore the role of job loss in PTSD onset and persistence. Furthermore, since symptom manifestation and the onset of PTSD is often much delayed after the trauma (Wang, Berglund, Olfson et al., 2005), examining the long-term impact is of value.

To address the research gaps, this study used the WTC Health Registry data to examine the impact of job loss since 9/11 on PTSD 10–11 years after the attack and conducted a racial comparison between Asians and non-Hispanic Whites. Thus the goal of this study is to investigate the impact of the job loss experience in the period between 9/11 and 10–11 years after the event and examine its relationship with PTSD, and we are less interested in job loss directly attributable to the 9/11 event. By comparing the outcome with those of the non-Hispanic Whites, this provides us a reference and context to understand the experience of the Asian American group. We utilized the Conservation of Resources (COR) theory as a framework for our research hypotheses.

Theory and Hypotheses

This study developed two research hypotheses based on the Conservation of Resources (COR) theory (Hobfoll, 2001). First, COR theory (Hobfoll, 2001) posited that individuals are inclined to "obtain, retain, protect, and foster" (p. 341) resources they value in order to survive in society. When individuals lose resources, such as employment and income, emotional distress will occur. In line with this theory, Ironson and colleagues' study indicated that losing resources in a natural disaster was a predictor of PTSD and general psychological distress (Ironson, Wynings, Schneiderman et al., 1997). Norris and colleagues also found on-going resource loss exerted influence on psychological well-being in the long-

term (Norris, Perilla, Riad, Kaniasty, & Lavizzo, 1999). Accordingly, our study hypothesizes that job loss since 9/11 is a risk factor of probable PTSD in the long-term for both Asian Americans and non-Hispanic White WTC survivors.

Second, COR theory postulates that culture could impact on how people rank the importance of certain resources since the value of resource varies among individuals and is tied to their personal experience and situations. Job loss may affect Asian Americans' psychological well-being particularly through accelerating acculturation stress (Fennelly, 2007), or endangering their legal immigrant status (Cheng, 1997). However, prior studies were scant in examining whether job loss carries more weight for Asian Americans than for non-Hispanic Whites in the post-9/11 context. Our study hypothesizes that the strength of the association between job loss and probable PTSD is different between Asian Americans and non-Hispanic Whites.

Methods

WTC Health Registry Study

Data from this study were obtained from the WTC Health Registry Study. The Registry, was funded by the Center for Disease Control and Prevention (CDC)'s National Institute of Occupational Safety and Health (NIOSH) and the Federal Emergency Management Agency (FEMA) to evaluate the long-term health effects of individuals exposed to the WTC attacks (Farfel, DiGrande, Brackbill et al., 2008). Baseline data (Wave 1) was collected in 2003–04 from 71,433 adults. Additional waves of data were collected in 2006–2008 (Wave 2), 2011–12 (Wave 3), and 2015–2016 (Wave 4). Participants were adults (18 years or older) and included rescue and recovery workers, workers in the WTC and nearby buildings, passersby, and residents in lower Manhattan. Full details of the study are described elsewhere (Brackbill et al., 2006). Institutional review board approvals were obtained from CDC, the New York City Department of Health and Mental Hygiene, and Fordham University.

Participants

This study included a total of 26,723 participants who self-identified as Asian American (n=1,712) or non-Hispanic White American (n=25,011) and had probable PTSD outcome for Waves 1, 2, and 3. This sample excluded individuals who were deceased, had a PTSD diagnosis prior to 2001, and were age 90 years or older at Wave 1. For participants who reported their PTSD diagnosis in 2001, we excluded individuals who reported not experiencing WTC-related threats, which suggested the development of PTSD was unlikely related to WTC. Participants aged 90 years or older were excluded since they have a higher risk of cognitive decline and other health factors that may impact their ability to recall and report the experience of trauma (Kaiser, Wachen, Potter, Move, & Davison, 2017).

Measures

Probable PTSD. Probable PTSD (herein referred to as PTSD) was assessed across all three waves using the PTSD Checklist, Civilian Version (PCL-C) (Weathers, Litz, Herman, Huska, & Keane, 1993), specifically adapted to denote the 9/11 event. The scale is a self-reported, 17-item validated measure inquiring about symptomology in the last 30 days,

based on the Diagnostic and Statistical Manual Edition Four (DSM-IV) criteria. Responses ranged from "not at all" (1) to "extremely" (5), with a higher score indicating more PTSD symptomology. Participants who had met the cut-off score of 44 (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996) at Wave 3 was used to suggest long-term PTSD. **Job loss.** Dichotomous exposure variable collected at wave 3 which asked, "Since September 11, 2001, have you ever experienced any of the following situations? - Serious problems at work or lost a job?" **Exposure variables.** A composite of disaster exposure around the attack collected at Wave 1 and Wave 2 was derived by summing up endorsements from the following variables: located in a damaged/collapsed building during the attack, witnessed 3 horrific events (e.g., saw a plane hit a tower), exposed to dust cloud, sustained any injury (excluding eye irritation), was a rescue/recovery worker, feared being injured/killed, lost someone (a relative, friend, or coworker) in the disaster, and tangible loss which included damage to home, workplace, and evacuation from home for 48 hours. This exposure variable was examined as a continuous variable. **Probable PTSD course.** In addition to examining PTSD at Wave 3, cases were classified into PTSD course based on their PTSD status at wave 1 and wave 2. Participants who had not met PCL-C cut-off in both waves were considered "resilient". Those who met criteria in wave 1 but not in wave 2 were considered "remitted". Those who did not meet criteria at wave 1 but did in wave 2 were considered "delayed". Those who met criteria in both waves were considered "chronic".

Lower Respiratory Symptoms (LRS). This dichotomous variable collected at Wave 3 was defined as positive if respondents reported new or worsening symptoms in the last 30 days for one of the following: shortness of breath, persistent coughing, and wheezing. **Post 9/11 trauma events.** This dichotomous variable was defined as positive if respondents endorsed one of the following Wave 3 variables related to life-threatening events that occurred after 9/11: "a natural or human-made disaster"; "a serious accident at work, in a car, or somewhere else"; "an attack with a gun, knife, or some other weapon"; "an attack without weapon but with intent to kill or seriously injure you"; "a situation of forced sexual contact"; witnessing "a situation where you saw someone injured or violently killed"; "a life-threatening illness"; and "any other situation which you were seriously injured or feared you might be killed or seriously injured". **Post 9/11 stressful events.** This dichotomous variable was defined as positive if respondents endorsed one of the following Wave 3 variables related to stressful life events that occurred after 9/11: could not pay for food, housing, or other basic necessities for a period of 3 months or longer; serious family problems involving spouse, child, or parent; took care of a close family member or friend with a serious or life threatening illness; serious legal problem; and/or lost someone close due to accidental death, murder, or suicide. **Pre-existing social support.** A composite of social support/integration activities from Wave 2 indicating pre-existing social support was derived by summing up endorsement of the five domains: have one or more close friend; get together with friends or relative more than once a month; been in communication with a friend or relative more than once a month; attended a religious service more than once a month; and was a very or fairly active member of one or more volunteer groups or organizations. **Prior mental health treatment.** This dichotomous variable was defined as positive if respondents endorsed one of the following Wave 2 variables: 'seen or talked to a professional' or 'took prescribed medication' for a mental or emotional problem during the last 12 months.

To ensure temporality, the majority of the predictors in our model were collected prior to Wave 3. Variables post-911 trauma events and post-911 stressful events were only available at Wave 3. However, since LRS, post-911 trauma events, and post-911 stressful events are assessed retrospectively, the potential for reverse causation is unlikely.

Data Analysis

We first explored sample descriptive statistics between racial groups and the bivariate relationship between each variable and PTSD status using independent t-tests and chi-square tests. To assess the relationship between job loss and PTSD status, we ran logistic regression models for each racial group including pertinent control variables. Adjusted odds ratio (OR) and 95% confidence interval (CI) were derived from the estimated model parameters. We set the significance level at 0.05. All analyses were conducted using SAS 9.4 (SAS Institute, 2014).

Results

Demographic Characteristics

Sample characteristics differed between the Asian American and White American participants (See Table 1). Asian Americans tended to be younger (p<0.0001). Approximately 34.3% of the Asian American participants were between 25–44 years old; 51.2% between 45–64 years old; and 14.4% were 65 years old or above. For White Americans, 24.5% were 25–44 years old; 61.2% between 45–64 years old; and 14.3% were 65 years old or above. There were less male participants among Asians than White (52.8% vs. 67.1%, p<0.0001). Two-thirds of Asian Americans reported being born outside of the United States compared to 7.4% in White Americans. In terms of socio-economic status, Asian Americans had less education, less income, a lower proportion being employed, and a higher proportion having job loss since 9/11.

Racial Comparisons on Associated Factors of Interest and Probable PTSD

Differences in factors of interest and probable PTSD between Asian American and White American participants are also shown in Table 1. Further examination revealed that the average number of exposure to 9/11 events were generally lower among Asians (2.14 vs. 2.51, p<0.001). The proportion of having remitted (5.6% vs. 3.2%), delayed (9.4% vs 9.2%), or chronic (8.3% vs. 7.0%) PTSD course was higher among Asians while Whites had a higher proportion of being resilient (76.8% vs. 80.6%), and the distribution among the groups of PTSD course from wave 1 to wave 2 was significant between race (p<0.001). The PTSD among Asian American participants was 15.1%. The prevalence was not significantly different when compared to White American participants (14.4%, p=0.37). However, the proportion of individuals with no mental health treatment was higher among Asian Americans than White Americans (84.4% vs. 74.2%, p<0.001).

Bivariate Associations within Racial Groups

Many of the factors associated with PTSD in Asian American participants were also significant in the White American participants (See Table 2). Common significant factors included age, income, employment, marital status, job loss since 9/11, immigration status,

exposure to disaster, prior probable PTSD status, lower respiratory symptoms, exposure to post 9/11 traumatic and stressful life events, social support, and mental health treatment. Higher education was associated with lower probable PTSD only in the White group but not in the Asian group.

Logistic Regression Model by Racial Group

All results from logistic regression models are shown in Table 3. For Asian Americans, job loss since 9/11 was significantly associated with an increase in the odds of long-term PTSD (AOR=1.80; 95% CI=1.19, 2.71). Individuals who were of immigrant status had greater odds of having long-term PTSD compared to those born in the United States (AOR=1.94; 95% CI=1.23–3.07). Those who had higher disaster exposure were more likely to have long-term PTSD compared to those with lower exposure (AOR=1.20; 95% CI=1.06, 1.35). Compared to those who never met the criteria for PTSD (resilient) in waves 1 or 2, those with prior PTSD status were more likely to have long-term PTSD (remitted-AOR=5.64; 95% CI=3.19, 10.00; delayed-AOR=7.23; 95% CI=4.54, 11.56; chronic- AOR=33.66; 95% CI=19.51, 58.07). Lastly, lower respiratory symptom (AOR=2.90; 1.97, 4.27) and mental health treatment was significantly associated with higher odds of long-term PTSD (AOR=1.74; 95% CI=1.13, 2.69).

For White Americans, we examined the same set of covariates in relations to long-term PTSD. Similar to Asian Americans, job loss since 9/11 was significantly associated with increased odds of long-term PTSD (AOR=1.73; 95% CI=1.56, 1.93). Also, immigrant status (AOR=1.22; 95% CI=1.03, 1.45), exposure to disaster (AOR=1.17; 95% CI=1.14, 1.20), prior PTSD status (remitted-AOR=4.84; 95% CI=4.03, 5.78; delayed-AOR=7.97; 95% CI=7.11, 8.95; chronic- AOR=21.67; 95% CI=18.83, 24.94), lower respiratory symptom (AOR=2.73; 2.47, 3.00), and mental health treatment (AOR=1.41; 95% CI=1.27, 1.55) were significantly associated with increase odds of having PTSD in the long-term. Unlike Asian Americans, unemployment (AOR=1.85; 95% CI=1.56, 2.20), exposure to post-disaster traumatic events (AOR=1.32; 95% CI=1.20, 1.45), and exposure to post-disaster stressful events (AOR=1.94; 95% CI=1.76, 2.15) were significant risk factors for long-term PTSD among White Americans. Furthermore, older age ('45–64 years old'-AOR=0.81; 95% CI=0.72, 0.90, '65 years or older' – AOR=0.5, 95% CI= 0.42, 0.61), having pre-existing social support ('1–2 Supports'-AOR=0.57; 95% CI=0.40, 0.82; '3+ Supports'-AOR=0.41, 95% CI=0.29, 0.59) and professional/graduate education (AOR=0.79; 95% CI=0.68, 0.92) were significant protective factors of long-term PTSD for White Americans.

Discussion

More than a decade later, PTSD remains an important public health issue for New Yorkers exposed to WTC attack. Approximately 15.1% of the Asian American participants in our study met criteria for probable PTSD. These findings are consistent with previous WTC Registry findings across race/ethnicity groups which indicated probable PTSD at Wave 3 to be 15.2% (Caramanica, Brackbill, Liao, & Stellman, 2014). In contrast to prior Registry investigations of the Asian group 2–3 years after the attack in which Asians had higher PTSD prevalence compared to White American participants (14.6% vs. 11.7%, Kung, Liu,

Huang, et al., 2018), we did not observe such racial difference in the prevalence of long-term PTSD. The divergence may be attributable to the naturalistic course of trauma and indicative of the waning of trauma symptomatology over time (Galea et al. 2003) that is different by race. Alternatively, differential attrition of Asians with long-term PTSD may also play a role. Based on our previous study, we found that Asians had higher attrition than White participants from Waves 1 to 2, and that Whites with better mental health status were more likely to dropout (Kung, Liu, Huang, et al. 2018). While racial difference between Asians and the White group was not observed, the prevalence of PTSD among Asians exposed to the 9/11 attack was still high (15.1%), and was much higher than the 12-month prevalence of PTSD based on a national representative sample in the community (1.1%, Alegria, et al., 2014). Asian Americans have been perceived at the "model minority" who experience fewer mental health issues (Sue, Chu, Cheng & Saad, 2012) as was also suggested by some general epidemiological studies in which Asians were found to have lower proportions of mental health problems (Asnaani, Richey, Dimaite, Hinton, & Hofmann, 2010; Roberts, Gilman, Breslau, Breslau, & Koenen, 2011). However, our finding in this study debunks such a myth since a very high proportion of Asians, similar to the White group, were still living with the psychological consequences of having been exposed to the WTC attack even a decade later.

The major finding of interest in our study was that job loss since 9/11 was a significant predictor of long-term PTSD. In our sample, the odds of PTSD were 1.80 times greater among Asians who lost jobs compared to those who did not; for the White group, the odds of probable PTSD were 1.73 times. The association of job loss with PTSD could be explained using the framework of the COR theory – when job loss was perceived as a specific form of resource loss and even a "key resource" loss, it could have cascading effects on how individuals managed their other resources (ten Brummelhuis & Bakker, 2012) and secured existing and future resources. As suggested by Hobfoll and colleagues (2006), a major resource loss could cause chronic emotional distress and further becomes a chronic stressor for the development of PTSD. In the context of economic decline and employment disruption since 9/11, the loss of a job could precipitate other potential resource loss such as sources of housing, food security, transportation and social support, which could trigger a dynamic process of economic, psychological and social distress (Brand, 2015; Classen & Dunn, 2012). Prior studies examining such shorter-term effect have suggested that tangible resource loss was predictive of PTSD at 12–16 months after the attack (Hobfoll, Tracy, & Galea, 2006). Although the longitudinal study by Zvolensky and colleagues (2015) demonstrated that the post-disaster stress index, which included job loss, was related to long-term PTSD, it did not examine its specific association with PTSD. Our study is the first to examine the explicit relationship between job loss and long-term PTSD providing empirical evidence to support the contextual post-disaster job loss experience as being critical to individuals in the course of PTSD development.

While for both races job loss after the disaster significantly increased the odds of long-term PTSD, for Asian Americans it is possible that it precipitated a series of unique struggles that differ from their White counterpart. First, given the fact that Asian participants in our study were of lower education, and a much higher proportion were immigrants compared to the White group, it is likely that their existing job market potential would be more limited. Their

immigrant status not only could result in cultural and language barrier in their job search, their prior qualifications and work experience may not be recognized in their host country (Kim & Sakamoto, 2010; Zeng & Xie, 2004) thus further limited their employability. In times of low job opportunity individuals may be compelled to take lower level jobs with low wages. Thus the loss of a job may signify a longer-term loss of a good quality job and income. Another circumstance specific to Asians but not the White group is that jobs are integrally tied to an individual's legal status (Cheng, 1997). Based on previous literature, many Asian Americans maintain their legal status through work visas. The loss of a job may signify the loss of citizenship, legal protection, and rights. These unique factors threaten their adaptation to a new culture and society, which may cause psychological distress (Fennelly, 2007; Hwang & Ting, 2008). Thus, although job loss is generally a key resource loss, it is important to consider the specific mechanism of resources loss and psychological distress, which may play out differently for various racial groups.

This study has several limitations and strengths. First, we examined Asian American participants who were exposed to the WTC attack as an aggregate racial group but had no data to differentiate the potential heterogeneity among the various Asian ethnic groups. Second, many variables are self-reported 10–11 years after the WTC such as stress and trauma experienced since 9/11, and recall bias may underestimate experiences. Third, participants may have experienced multiple episodes of job loss since WTC and our measure is unable to capture the cumulative effects of job loss. Averaging the psychological effects from persons who had only one job loss versus multiple job loss, which may have also underestimated our results. Fourth, although the goal of this study was to examine job loss, the Registry question included those who experienced 'serious problems at work' or had 'lost a job' since they wanted to understand work-related stress. To distinguish between the two constructs, we examined the correlations between unemployment status and job loss. Results showed that the majority of those who reported unemployment in Wave 2 (52.5%) and Wave 3 (64.5%) reported job loss or having serious problem at work since 911 at Wave 3. This indicated that a the majority of those who endorsed our predictor had lost a job during the period. Lastly, the WTC Registry has collected a fourth wave of data (2015–2016) since the completion of our analysis and manuscript though not yet publicly available. Examination of the newer wave of data should be the focus of future studies. In terms of strengths, this is one of the few studies that has a sufficiently large sample of Asian Americans after a major disaster and is the only study that examined the long-term impact of job loss on the mental health status of Asian American in the post-9/11 context.

Conclusion

Asian Americans who were directly exposed to the WTC attack are a group in need that has been largely neglected in the PTSD and WTC research. Through our findings, we established that PTSD remains a problem among Asian Americans exposed to the WTC attacks over a decade later, which is similar to White Americans, but in contrast to the model minority portrayal of them having fewer mental health issues. Furthermore, in the investigation of the association between the job loss experiences post-9/11 and long-term psychological outcome we extended the COR theory by including minority populations and expanding the meaning of tangible job loss as an important risk factor for PTSD. Future

post-disaster relief efforts should be inclusive of securing employment as an important target for long-term psychological well-being among disaster survivors, including Asian Americans.

Acknowledgments

References

Abe-Kim J, Takeuchi DT, Hong S, Zane N, Sue S, Spencer MS, …Alegría M (2007). Use of mental health-related services among immigrant and US-born Asian Americans: results from the National Latino and Asian American Study. American journal of public health, 97(1), 91–98. doi:10.2105/AJPH.2006.098541 [PubMed: 17138905]

Adams RE, & Boscarino JA (2005). Stress and well-being in the aftermath of the World Trade Center attack: The continuing effects of a communitywide disaster. Journal of Community Psychology, 33(2), 175–190. doi:10.1002/jcop.20030 [PubMed: 17106484]

Alegría M, Fortuna LR, Lin JY, Norris LF, Gao S, Takeuchi DT, … & Valentine A (2013). Prevalence, risk, and correlates of posttraumatic stress disorder across ethnic and racial minority groups in the US. Medical Care, 51(12), 1114. [PubMed: 24226308]

Asian American Federation. (2008). Revitalizing Chinatown Businesses: Challenges and Opportunities. Retrieved from http://www.aafny.org/publications.asp

Asian American Federation of New York. (2003). Asian American Mental Health: A Post September 11th Needs Assessment. Retrieved from http://www.aafny.org/doc/AsianAmericanMentalHealth.pdf

Asnaani A, Richey JA, Dimaite R, Hinton DE, & Hofmann SG (2010). A cross-ethnic comparison of lifetime prevalence rates of anxiety disorders. The Journal of Nervous and Mental Disease, 198(8), 551. doi:10.1097/NMD.0b013e3181ea169f [PubMed: 20699719]

Blanchard EB, Jones-Alexander J, Buckley TC, & Forneris CA (1996). Psychometric properties of the PTSD Checklist (PCL). Behaviour Research and Therapy, 34(8), 669–673. doi:10.1016/0005-7967(96)00033-2 [PubMed: 8870294]

Brackbill RM, Thorpe LE, DiGrande L, Perrin M, Sapp JH, Wu D, …Pulliam P (2006). Surveillance for World Trade Center disaster health effects among survivors of collapsed and damaged buildings. Morbidity and Mortality Weekly Report: Surveillance Summaries, 55(2), 1–18.

Bram J, Orr J, & Rapaport C (2002). Measuring the effects of the September 11 attack on New York City. Federal Reserve Bank of New York Economic Policy Review, 8(2), 5–20.

Brand JE (2015). The far-reaching impact of job loss and unemployment. Annual Review of Sociology, 41, 359–375. doi: 10.1146/annurev-soc-071913-043237

Caramanica K, Brackbill RM, Liao T, & Stellman SD (2014). Comorbidity of 9/11‐Related PTSD and Depression in the World Trade Center Health Registry 10–11 Years Postdisaster. Journal of Traumatic Stress, 27(6), 680–688. doi:10.1002/jts.21972 [PubMed: 25470556]

Cheng C (1997). Are Asian American employees a model minority or just a minority? The Journal of Applied Behavioral Science, 33(3), 277–290. doi:10.1177/0021886397333002

Classen TJ, & Dunn RA (2012). The effect of job loss and unemployment duration on suicide risk in the United States: A new look using mass-layoffs and unemployment duration. Health Economics, 21(3), 338–350. doi:10.1002/hec.1719 [PubMed: 21322087]

De Bocanegra HT, Moskalenko S, & Kramer EJ (2006). PTSD, depression, prescription drug use, and health care utilization of Chinese workers affected by the WTC attacks. Journal of Immigrant and Minority Health, 8(3), 203–210. doi:10.1007/s10903-006-9323-0 [PubMed: 16791530]

Farfel M, DiGrande L, Brackbill R, Prann A, Cone J, Friedman S, …Galea S (2008). An overview of 9/11 experiences and respiratory and mental health conditions among World Trade Center Health

Registry enrollees. Journal of Urban Health, 85(6), 880–909. doi:doi:10.1007/s11524-008-9317-4 [PubMed: 18785012]

Fennelly K (2007). Health and Wellbeing of Immigrants: The Healthy Migrant Phenomenon In Walker P & Barnett E (Eds.), Immigrant Medicine: A Comprehensive Reference for the Care of Refugees and Immigrants (pp. 19–26). Philadelphia: Elsevier Press.

Galea S, Vlahov D, Resnick H, Ahern J, Susser E, Gold J, …Kilpatrick D (2003). Trends of probable post-traumatic stress disorder in New York City after the September 11 terrorist attacks. American Journal of Epidemiology, 158(6), 514–524. [PubMed: 12965877]

Hobfoll SE (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. Applied Psychology, 50(3), 337–421. doi:10.1111/1464-0597.00062

Hobfoll SE, Tracy M, & Galea S (2006). The impact of resource loss and traumatic growth on probable PTSD and depression following terrorist attacks. Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies, 19(6), 867–878. doi:10.1002/jts.20166

Hwang W-C, & Ting JY (2008). Disaggregating the effects of acculturation and acculturative stress on the mental health of Asian Americans. Cultural Diversity and Ethnic Minority Psychology, 14(2), 147–154. doi:10.1037/1099-9809.14.2.147 [PubMed: 18426287]

Ironson G, Wynings C, Schneiderman N, Baum A, Rodriguez M, Greenwood D, …Huang H-S (1997). Posttraumatic stress symptoms, intrusive thoughts, loss, and immune function after Hurricane Andrew. Psychosomatic Medicine, 59(2), 128–141. doi:10.1097/00006842-199703000-00003 [PubMed: 9088048]

Jackson CT, Covell NH, Shear KM, Zhu C, Donahue SA, Essock SM, & Felton CJ (2006). The road back: predictors of regaining preattack functioning among Project Liberty clients. Psychiatric Services, 57(9), 1283–1290. doi:10.1176/appi.ps.57.9.1283 [PubMed: 16968757]

Kaiser AP, Wachen JS, Potter C, Moye J, & Davison E (2017). Posttraumatic stress symptoms among older adults: A review. Washington, DC: US Department of Veterans Affairs, National Center for PTSD Retrieved from https://www.ptsd.va.gov/professional/treat/specific/symptoms_older_adults.asp

Kim C, & Sakamoto A (2010). Have Asian American Men Achieved Labor Market Parity with White Men? American Sociological Review, 75(6), 934–957. doi:10.1177/0003122410388501

Kung WW, Liu X, Goldmann E, Huang D, Wang X, Kim K, …Yang LH (2018). Posttraumatic stress disorder in the short and medium term following the World Trade Center attack among Asian Americans. Journal of Community Psychology, 46(8), 1075–1091. doi:10.1002/jcop.22092 [PubMed: 30311973]

Kung WW, Liu X, Huang D, Kim P, Wang X, & Yang LH (2018). Factors related to the probable PTSD after the 9/11 World Trade Center attack among Asian Americans. Journal of Urban Health, 95(2), 255–266. doi:10.1007/s11524-017-0223-5 [PubMed: 29450681]

Nandi A, Galea S, Tracy M, Ahern J, Resnick H, Gershon R, & Vlahov D (2004). Job loss, unemployment, work stress, job satisfaction, and the persistence of posttraumatic stress disorder one year after the September 11 attacks. Journal of Occupational and Environmental Medicine, 46(10), 1057–1064. doi:10.1097/01.jom.0000141663.22902.0a [PubMed: 15602180]

Norris FH, Perilla JL, Riad JK, Kaniasty K, & Lavizzo EA (1999). Stability and change in stress, resources, and psychological distress following natural disaster: Findings from Hurricane Andrew. Anxiety, Stress & Coping, 12(4), 363–396. doi:10.1080/10615809908249317

Office of the Surgeon, G., Center for Mental Health, S., & National Institute of Mental, H. (2001). Publications and Reports of the Surgeon General Mental Health: Culture, Race, and Ethnicity: A Supplement to Mental Health: A Report of the Surgeon General. Rockville (MD): Substance Abuse and Mental Health Services Administration (US).

Roberts AL, Gilman SE, Breslau J, Breslau N, & Koenen KC (2011). Race/ethnic differences in exposure to traumatic events, development of post-traumatic stress disorder, and treatment-seeking for post-traumatic stress disorder in the United States. Psychological Medicine, 41(1), 71–83. doi:10.1017/S0033291710000401 [PubMed: 20346193]

Sue S, Yan Cheng JK, Saad CS, & Chu JP (2012). Asian American mental health: a call to action. Am Psychol, 67(7), 532–544. doi:10.1037/a0028900 [PubMed: 23046304]

SAS Insititute. (2012). SAS 9.4 for Windows. Cary, NC: SAS Institue Inc.

ten Brummelhuis LL, & Bakker AB (2012). A resource perspective on the work–home interface: The work–home resources model. American Psychologist, 67(7), 545–556. doi:10.1037/a0027974 [PubMed: 22506688]

Wang PS, Berglund P, Olfson M, Pincus HA, Wells KB, & Kessler RC (2005). Failure and delay in initial treatment contact after first onset of mental disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry, 62(6), 603–613. doi:10.1001/archpsyc.62.6.603 [PubMed: 15939838]

Weathers FW, Litz BT, Herman DS, Huska JA, & Keane TM (1993). The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. Paper presented at the Annual convention of the international society for traumatic stress studies, San Antonio, TX.

Zeng Z, & Xie Y (2004). Asian-Americans's Earnings Disadvantage Reexamined: The Role of Place of Education. American Journal of Sociology, 109(5), 1075–1108. doi:10.1086/381914

Zvolensky MJ, Farris SG, Kotov R, Schechter CB, Bromet E, Gonzalez A, …Luft BJ (2015). World Trade Center disaster and sensitization to subsequent life stress: A longitudinal study of disaster responders. Preventive Medicine, 75, 70–74. doi:10.1016/j.ypmed.2015.03.017 [PubMed: 25840022]

Table 1.

Demographic, Disaster Exposure, and Mental Health Status for W3 Participants by Race

		Asian (n=1712)	Caucasian (n=25011)	Racial difference
		% (n)	% (n)	p-value
Probable PTSD	No	84.9	85.6	0.370
(at W3)	Yes	15.1	14.4	
Age	25–44	34.4	24.5	
(at W3)	45–64	51.2	61.2	<0.0001
	65+	14.4	14.3	
Gender	Male	52.8	67.1	<0.0001
(at W1)	Female	47.2	32.9	
Education	High school or less	20.9	18.4	
(at W1)	Some college/technical school	15.2	23.2	
	College graduate	38.2	34.4	<0.0001
	Professional/graduate school	25.4	23.8	
	Missing	5.1	5.2	
Income	$50K/Less	33.2	15.7	
(at W3)	$50k - <$75k	13.3	14.5	
	$75k- <$150k	29.3	39.3	<0.0001
	$150k/more	19.1	25.2	
	Missing	5.2	3.0	
Employment Status	Unemployed	5.7	5.3	
(at W3)	Employed	68.3	71.1	<0.0001
	Not in Labor Force	20.9	20.5	
	Missing	5.2	3.0	
Marital Status	Married/Living with Partner	68.1	73.5	
(at W3)	Widowed/Divorced/Separated	4.3	2.6	<0.0001
	Never Married	17.1	13.0	
	Missing	10.5	10.9	
Job Loss Since 9/11	No	72.6	76.4	
(at W3)	Yes	25.6	22.9	<0.0001
	Missing	1.9	0.7	
Immigration Status	US Born	31.8	92.6	<0.0001
(at W1)	Immigrant/unreported	68.2	7.4	
Mode	Web/Mail	83.4	87.1	<0.0001
(at W3)	Phone	16.7	12.9	
Collapsed Building	No	84.1	84.9	0.384
(at W1)	Yes	15.9	15.1	
Witness	No	64.6	65.3	0.582
(at W1)	Yes	35.4	34.7	
Dust	No	48.0	51.1	0.014

| | | Asian (n=1712) | Caucasian (n=25011) | Racial difference |
		% (n)	% (n)	p-value
(at W1)	Yes	52.0	48.9	
Any Injury	No	85.8	82.8	
(except eye)	Yes			0.002
(at W1)		14.3	17.2	
Rescue Worker	No	79.4	48.6	
(at W1)	Yes	20.6	51.4	<.0001
Fear of Injury/to be Killed	No	50.5	48.5	
(at W2)	Yes	49.5	51.5	0.121
Lost Someone	No	83.6	70.8	
(at W2)	Yes	16.4	29.2	<.0001
Tangible loss	No	86.5	89.3	
(at W2)	Yes	13.6	10.7	0.000
Exposure	0	14.4	4.1	
	1	23.4	27.6	
	2	23.4	22.3	
	3	19.7	19.0	<.0001
	4	10.8	12.8	
	5–8	8.4	14.2	
	Mean (SD)	*2.14 (1.47)*	*2.51 (1.47)*	
Course PCL	Resilient	76.8	80.6	
(W1 to 2)	Remitted	5.6	3.2	
	Delayed	9.4	9.2	<.0001
	Chronic	8.3	7.0	
LRS	No	80.6	77.6	
(at W3)	Yes	19.5	22.4	0.004
Trauma Events	No	71.7	66.5	
(post 9/11, at W3)	Yes/Probable	28.3	33.5	<.0001
Stressful Events	No	42.5	48.6	
(post 9/11, at W3)	Yes/Probable	57.5	51.4	<.0001
Social Support	0	3.6	1.1	
(at W2)	1–2	31.7	19.9	
	3+	64.7	79.0	<.0001
	Mean (SD)	*1.89 (0.85)*	*2.19 (0.78)*	
Mental Health Treatment	No	84.4	74.2	
(at W2)	Yes	15.7	25.8	<.0001

Table 2.

Probable PTSD at Wave 3 by Predictor and Covariates in Asian and Caucasian

		Asian (n=1712) (c=0.907)			Caucasian(n=25011) (c=0.896)		
	N	% with PCL>=44	p value	N	% with PCL>=44	p value
Age at W3							
25–44	588	12.6	0.001	6123	13.6	<.0001
45–64	877	18.1		15301	15.9	
65+	247	10.5		3587	8.9	
Gender							
Male	904	15.0	0.946	16777	14.1	0.052
Female	808	15.2		8234	15.0	
Education							
High school or less	357	16.5	0.377	4595	19.0	<.0001
Some college/technical school	260	16.9		5812	17.4	
College graduate	654	15.1		8595	13.1	
Professional/graduate school	434	12.7		5958	9.5	
Missing	7	28.6		51	27.5	
Income at W3							
$50K/Less	568	22.2	<.0001	3929	24.0	<.0001
$50k - <$75k	227	15.4		3635	17.5	
$75k- <$150k	502	12.6		9822	13.5	
$150k/more	327	8.0		6314	8.8	
Missing	88	10.2		1311	10.4	
Employment Status at W3							
Unemployed	97	33.0	<.0001	1327	44.4	<.0001
Employed	1169	14.6		17788	11.8	
Not in Labor Force	357	10.9		5136	14.4	
Missing	89	19.1		760	22.8	
Marital status at W3							
Married/Living with Partner	1166	14.3	0.025	18394	12.9	<.0001
Widowed/Divorced/Separated	73	20.6		641	16.7	
Never married	293	13.0		3249	15.9	
Missing	180	21.7		2727	22.2	
Job loss since 9/11 at W3							
No	1242	9.7	<.0001	19103	10.0	<.0001
Yes	438	29.9		5732	28.3	
Missing	32	21.9		176	29.0	
Immigration status:							
US Born	545	8.8	<.0001	23158	14.1	0.0003
Immigrant/unreported	1167	18.1		1853	17.3	
Mode at W3:							

		Asian (n=1712) (c=0.907)			Caucasian(n=25011) (c=0.896)		
	N	% with PCL>=44	p value	N	% with PCL>=44	p value	
Web/Mail	1427	15.6	0.319	21774	14.9	<.0001	
Phone	285	13.0		3237	10.9		
Collapsed Building:							
No	1440	14.2	0.013	21236	13.6	<.0001	
Yes	272	20.2		3775	18.5		
Witness							
No	1106	10.1	<.0001	16325	10.6	<.0001	
Yes	606	24.3		8686	21.5		
Dust							
No	822	10.1	<.0001	12777	10.3	<.0001	
Yes	890	19.8		12234	18.6		
Any Injury (except eye)							
No	1468	11.8	<.0001	20716	11.4	<.0001	
Yes	244	35.3		4295	28.5		
Rescue Worker:							
No	1360	15.2	1.000	12147	13.6	0.001	
Yes	352	15.1		12864	15.1		
Fear of Injury or to be Killed:							
No	864	8.6	<.0001	12133	8.6	<.0001	
Yes	848	21.8		12878	19.8		
Lost Someone							
No	1432	13.8	0.001	17699	11.7	<.0001	
Yes	280	22.1		7312	20.7		
Lost Something Tangible							
No	1480	14.3	0.023	22326	13.6	<.0001	
Yes	232	20.3		2685	20.6		
Exposure							
0	247	4.5	<.0001	1023	3.4	<.0001	
1	400	8.0		6905	6.2		
2	401	12.7		5575	11.1		
3	337	18.1		4755	16.6		
4	184	27.2		3206	21.2		
5–8	143	37.8		3547	29.4		
Mean (SD)		*3.04 (1.45)*			*3.33 (1.41)*		
Prior Probable PTSD W1 to 2							
Resilient	1315	4.5	<.0001	20167	5.1	<.0001	
Remitted	95	28.4		803	28.9		
Delayed	160	36.9		2289	46.1		
Chronic	142	80.3		1752	73.2		

		Asian (n=1712) (c=0.907)			Caucasian(n=25011) (c=0.896)		
		N	% with PCL>=44	p value	N	% with PCL>=44	p value
LRS W3							
	No	1379	9.3	<.0001	19398	8.6	<.0001
	Yes	333	39.3		5613	34.3	
Post 9/11 Trauma Events							
	No	1227	11.6	<.0001	16638	11.2	<.0001
	Yes/Probable	485	24.1		8373	20.6	
Post 9/11 Stress Event							
	No	985	8.6	<.0001	12160	7.0	<.0001
	Yes/Probable	727	23.9		12851	21.3	
Social Support W2							
	0	61	26.2	<.0001	269	46.8	<.0001
	1–2	543	22.1		4976	24.8	
	3+	1108	11.1		19766	11.3	
	Mean (SD)		*1.63 (0.89)*			*1.85 (0.85)*	
Mental Health Treatment							
	No	1444	11.9	<.0001	18569	10.0	<.0001
	Yes	268	32.5		6442	26.7	

Table 3.

Logistic Regression Model of Probable PTSD at Wave 3, by Race

	Asian			Caucasian		
	OR	**95% CI**		**OR**	**95% CI**	
Age (Ref=25–44)						
45–64	0.90	0.59	1.38	0.81	0.72	0.90
65+	0.78	0.37	1.65	0.50	0.42	0.61
Gender (Ref=Female)						
Male	1.05	0.72	1.52	1.10	0.99	1.22
Education (Ref=High School or Less)						
Some College/Technical School	1.43	0.76	2.71	0.98	0.86	1.12
College Graduate	1.50	0.87	2.58	0.89	0.78	1.01
Professional/Graduate School	1.03	0.55	1.95	0.79	0.68	0.92
Missing	1.07	0.08	14.59	2.04	0.90	4.63
Income at W3 (Ref=$50K/Less)						
$50–75K	0.79	0.43	1.44	1.06	0.91	1.24
$75-<150K	0.63	0.38	1.05	1.02	0.89	1.17
$150k/more	0.60	0.32	1.14	0.88	0.75	1.03
Missing	0.56	0.21	1.55	0.90	0.70	1.16
Employment Status at W3 (Ref=Employed)						
Unemployed	0.61	0.30	1.24	1.85	1.56	2.20
Not in Labor Force	0.70	0.39	1.29	1.19	1.05	1.36
Missing	0.78	0.35	1.70	1.32	1.04	1.67
Job loss since 9/11 at W3 (Ref=No)						
Yes	1.80	1.19	2.71	1.73	1.56	1.93
Missing	2.08	0.68	6.34	4.04	2.50	6.54
Immigrant Status (Ref=US born)						
Immigrant/unreported	1.94	1.23	3.07	1.22	1.03	1.45
Mode (Ref=Phone)						
Web/Mail	0.88	0.53	1.46	0.60	0.52	0.70
Exposure	1.20	1.06	1.35	1.17	1.14	1.20
Course PCL W1–2 (Ref=Resilient)						
Remitted	5.64	3.19	10.00	4.82	4.03	5.78
Delayed	7.23	4.54	11.51	7.97	7.11	8.95
Chronic	33.66	19.51	58.07	21.67	18.83	24.94
LRS (Ref=No)						
Yes	2.90	1.97	4.27	2.73	2.47	3.00
Social Support (Ref=0)						
1–2	1.29	0.55	3.00	0.57	0.40	0.82
3+	0.76	0.33	1.76	0.41	0.29	0.59
Post 9/11 Traumatic Event (Ref=No)						

		Asian			Caucasian	
	OR	**95% CI**		**OR**	**95% CI**	
Yes/Probable	1.44	0.98	2.13	1.32	1.20	1.45
Post 9/11 Stressful Event (Ref=No)						
Yes/Probable	1.11	0.74	1.65	1.94	1.76	2.15
Mental Health Treatment at W2						
Yes	1.74	1.13	2.69	1.41	1.27	1.55