Social Science & Medicine 146 (2015) 155–163

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Communal bereavement and resilience in the aftermath of a terrorist event: Evidence from a natural experiment

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ARTICLE INFO

Article history:
Received 4 July 2015
Received in revised form
5 October 2015
Accepted 19 October 2015
Available online 22 October 2015

Keywords:
September 11 terrorist attacks
Terrorism
Stress disorders
Post-traumatic
Disasters

ABSTRACT

Rationale: Sociological analyses of the psychological distress experienced by persons indirectly exposed to traumatic stressors have been conceptualized as a form of communal bereavement, defined by Cataland and Hartig (2001) as the experience of distress among persons not attached to the deceased. Their theory predicts communal bereavement responses particularly in the setting of loss of essential state, religious, or economic institutions.
Objective: To estimate the extent to which the September 11, 2001 attacks on the U.S. World Trade Center had a causal effect on psychological distress nationwide.
Methods: We used a difference-in-differences framework applied to repeated cross-sectional data from more than 300,000 participants in the 2000 and 2001 Behavioral Risk Factor Surveillance System surveys. Psychological distress was measured using three questions eliciting days of poor mental health-related quality of life. The September 11 attacks served as our exposure of interest.
Results: The September 11 attacks had a statistically significant, adverse, causal effect on psychological distress nationally. Both the magnitude and statistical significance of the estimated effects were larger in the New York City region compared to the rest of the country. Our estimates were robust to probes of the parallel trends assumption and potential sources of selection bias, as well as to falsification tests. However, these effects had largely resolved within four weeks.
Conclusions: Contrary to findings from the medical and public health literature, we conclude that the September 11 attacks did not have lasting effects on communal bereavement.

1. Introduction

More than a decade after the September 11, 2001 attacks on the U.S. World Trade Center, its health and social consequences continue to be discussed. Both first responders as well as persons who resided in the immediate vicinity experienced a wide range of adverse health and psychosocial sequelae (Brackbill et al., 2006; Galea et al., 2002; Lin et al., 2005; U.S. Centers for Disease Control and Prevention, 2002). The September 11 attacks also led to increases in personal experiences of abuse or discrimination related to race, ethnicity, or religion (Lauderdale, 2006; Padela and Heisler, 2010). The findings of this body of literature are consistent with the documented health and social consequences of other large-scale mass casualty events, such as the 1972 Agnes Flood in the Wyoming Valley region of Pennsylvania (Logue et al., 1979), the bombing of the Alfred P. Murrah Federal Building in Oklahoma City (North et al., 1999), and Hurricane Katrina (Paxson et al., 2012), among others (Galea et al., 2005). Also of relevance to this literature are observational studies linking individual traumatic exposures and emotional distress (Devries et al., 2013; Tsai et al., 2015). In twin studies, stressful life events including violent assault have been shown to be associated with the development of major depressive episodes (Kendler et al., 1999; Kendler et al., 1995; Kendler et al., 2001). Econometric analyses of data obtained from men exposed to violence and other traumatic stressors through military service have demonstrated increases in suicide and motor vehicle accident-related mortality (Hearst et al., 1986); suicidal ideation and self-reported diagnosis of posttraumatic stress

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http://dx.doi.org/10.1016/j.socscimed.2015.10.050
0277-9536/

disorder (Cesur et al., 2013); and smoking, heart disease, and lung cancer (Bedard and Deschênes, 2006). While other studies have yielded less precise estimates (Angrist et al., 2010; Dobkin and Shabani, 2009), the overall thrust of the literature is that exposure to traumatic stressors has a direct, adverse, causal influence on health and mental health.

An important unanswered question is whether the September 11 attacks had a causal influence on psychological distress among people *not directly* affected by the event (Galea and Resnick, 2005). While numerous surveys conducted after the September 11 attacks have documented significant elevations in psychological distress among people not directly affected by the event (Galea et al., 2002; Schlenger et al., 2002; Schuster et al., 2001; Silver et al., 2002), few of these estimates have a casual interpretation given their lack of a counterfactual framework or availability of pre-September 11 measures. To address this gap in the literature, we analyzed repeated cross-sectional data collected nationwide through the 2000 and 2001 Behavioral Risk Factor Surveillance System (BRFSS) surveys, employing a difference-in-differences framework to explore the causal relationship between the September 11 attacks and psychological distress nationwide.

2. Conceptual framework

By definition, the diagnosis of posttraumatic stress disorder requires "exposure to an extreme traumatic stressor," either through "direct personal experience of an event," "witnessing an event," or "learning about" the event (American Psychiatric Association, 2000) (p.463). Indirect exposures to traumatic stressors may be salient to psychotherapists and family members who experience psychological distress as a result of their affiliation with a traumatized person (a concept that has been described as "secondary trauma" (Figley, 1983) or "vicarious trauma" (McCann and Pearlman, 1990)); or they may occur through other channels like word of mouth, witnessing a distressing event from afar, or even viewing media images of a distressing event (Ahern et al., 2002; Bernstein et al., 2007; Holman et al., 2014; Neria and Sullivan, 2011; Silver et al., 2013). Precise classification of the psychological distress resulting from such indirect exposures has so far eluded the field. North and Pfefferbaum (2002) argued that exposure to a distressing event through the viewing of media images is unlikely to meet the diagnostic criteria for "witnessing." Neither the fourth edition, nor the recently published fifth edition, of the *Diagnostic and Statistical Manual of Mental Disorders* provide detailed guidance about the potential mechanisms through which indirect exposure may occur (American Psychiatric Association, 2000, 2013).

Sociological analyses of the psychological distress experienced by persons indirectly exposed to traumatic stressors have conceptualized these spillover impacts as a form of "communal bereavement" (Hawdon, 2009). Catalano and Hartig (2001) defined communal bereavement in response to loss as "the widespread experience of distress among persons who never met the deceased" (p.333), particularly when the loss implicates the "failure of institutions essential to the normal functioning of the community" (p.334). Using an interrupted time-series design, they showed that the incidence of very low birth weight increased in Sweden immediately subsequent to two events of nationwide salience to Swedish citizens. In the U.S., the September 11 attacks provided the most relevant example of a recent event that could provide an occasion for psychological distress on a national scale (Alexander et al., 2004), given that the events crystallized for many Americans the fear that the U.S. could be vulnerable to attack on a scale previously unimagined. The most highly cited studies in the medical literature provide descriptive point prevalence estimates consistent with heightened levels of psychological distress in the days to weeks following the September 11 attacks (Galea et al., 2002; Schlenger et al., 2002; Schuster et al., 2001; Silver et al., 2002). Rates of alcohol and other substance use were similarly elevated (DiMaggio et al., 2009; Vlahov et al., 2002). Other studies in this literature have focused on the extent to which viewing media images (e.g., on television) of the September 11 attacks, and other mass casualty events, may contribute to symptoms of depression or posttraumatic stress (Ahern et al., 2002; Bernstein et al., 2007; Holman et al., 2014; Neria and Sullivan, 2011; Silver et al., 2013). In general, however, we are fairly limited in our ability to draw robust inferences from this literature about the extent to which the September 11 attacks had a *causal* influence on psychological distress among persons indirectly exposed to the event.

This is an important and heretofore unresolved issue of public importance in the study of health and social behavior because mental and substance use disorders account for a large portion of disability-adjusted life years worldwide – with the largest shares attributable to mood and anxiety disorders like major depressive disorder and post-traumatic stress disorder (Murray et al., 2013; Whiteford et al., 2013). The economic burden of these conditions is substantial, with the most recent estimates from 2000 suggesting that depressive and anxiety disorders combined accounted for more than $80 billion in direct costs, mortality costs, and lost productivity (Greenberg et al., 2003, 1999). Even subthreshold symptoms that are clinically significant, but do not meet diagnostic criteria, have important social and economic consequences (Judd et al., 1996; Judd et al., 2002).

Three studies from the literature on the September 11 terrorist attacks and communal bereavement, drawn from public health, sociology, and economics, are most similar to ours. Ford et al. (2003) and Knudsen et al. (2005) conducted cross-sectional analyses of the National Longitudinal Study of Adolescent Health and the National Employee Survey. They sought to assess the extent to which temporal proximity to September 11, 2001 was associated with changes in mental health-related outcomes like psychological distress and substance use. Their key identifying assumption was that the timing of the study interviews relative to September 11 was randomly distributed. While their approach was similar to modern regression-discontinuity designs (Bor et al., 2014), the authors did not follow this literature in formally testing their identifying assumptions. Metcalfe et al. (2011) used panel data from the British Household Panel Survey and applied a difference-in-differences approach with participant fixed effects to estimate the causal influence of the September 11 attacks on psychological distress in the United Kingdom. All three studies found that the September 11 attacks were associated with heightened levels of psychological distress.

The empirical contribution of our study is fourfold. First, in comparison to Ford et al. (2003) and Knudsen et al. (2005), we used a broader sample of data. Ford et al. (2003) analyzed data from a national survey of young adults, while Knudsen et al. (2005) analyzed data from a national survey of employed Americans. The BRFSS surveys are nationally representative, thereby enabling us to generalize our findings beyond young adults or employed persons to the non-institutionalized U.S. population. Second, our use of data from 2000 permitted us not only to examine whether there were differences in psychological distress before and after September 11 in 2001, but also to do so in the context of a differences-in-differences design, which would allay concerns that seasonal effects may have contaminated the findings reported by Ford et al. (2003) and Knudsen et al. (2005). Third, the analysis by Metcalfe et al. (2011), which is methodologically most similar to the present work, focuses mainly on year-by-year and month-by-month comparisons in psychological distress. Our study permitted a