Terrorism, Disasters and Mental Health

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1 Introduction

Terrorism is psychological warfare[1], and behavioral disturbance is the primary intent of terrorists. As Lenin stated The object of terrorism is to terrorize, and as long ago as the 4th century BCE Sun Tzu advised, Kill one to terrorize ten thousand.[2] The more incomprehensible the event, the greater the potential mental health effects. Human intent, as seen in terrorist incidents, may be associated with the greatest risk of behavioral disturbance.[3]

Definitions of terrorism vary. According to the US Department of State, terrorism is premeditated, politically motivated violence perpetrated against non-combatant targets by sub-national groups or clandestine agents usually intended to influence an audience".[4] A broader definition proposed by public health practitioners states that it is The intentional use of violence–real or threatened–against one or more non-combatants and/or those services essential for or protective of their health, resulting in adverse health effects in those immediately affected and their community, ranging from a loss of well-being or security to injury, illness, or death.[5]

Neither definition captures the sense of chilling brutality associated with what is commonly accepted as terrorism. Perhaps closer to the mark is an evocative description of terrorist violence in Northern Ireland: One atrocity provoked another, equally inhumane and gruesome, and the whole 20-year history has been pockmarked by some particular incidents of quite indescribable cruelty as man has visited his inhumanity upon his fellow man in some utterly barbaric ways. [6] It is notable that, prior to 1964, Northern Ireland was one of the most peaceful societies in Europe, with only one murder reported in Belfast between 1960-1964.[6]

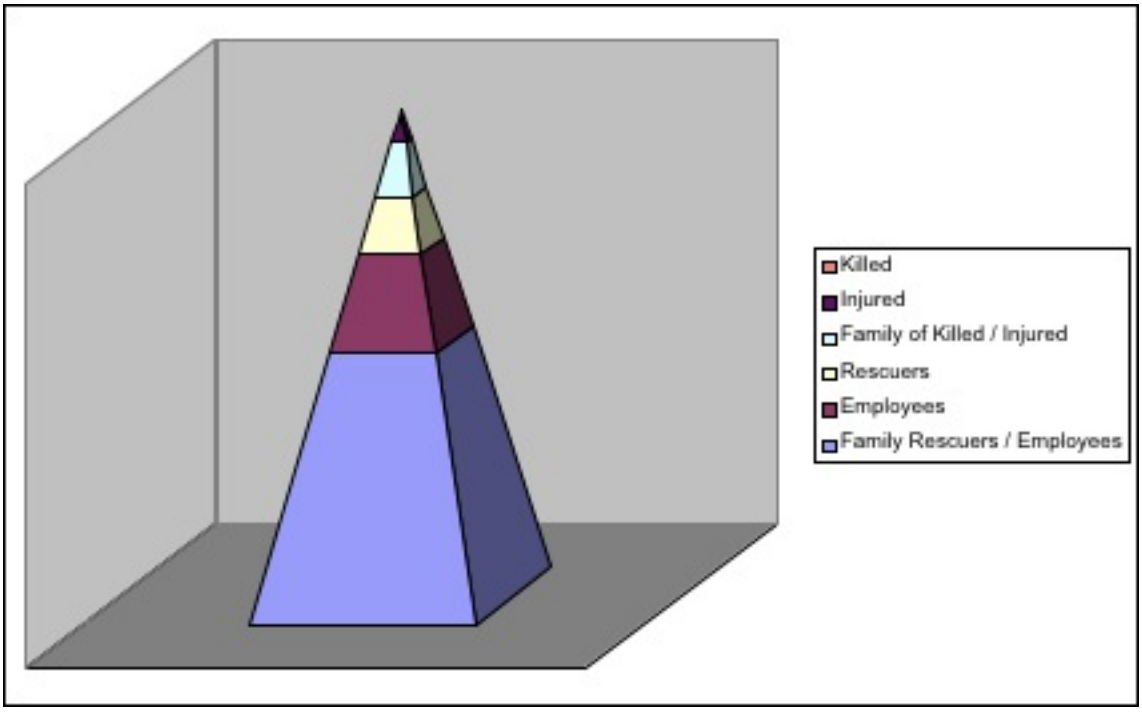

Figure 1: Relative relationship persons affected by trauma of September 11th, 2001, New York City World Trade Center terrorist attacks.

The intended consequences of terrorist acts extend beyond those immediately affected. Exposure may be defined in terms of physical proximity to incidents, level of threat and personal loss or injury to family or friends. [7]

Two thousand seven hundred ninety five people were killed at the World Trade Center on September 11th; an additional 7,467 persons were injured. They had 17,642 family members. Seventeen thousand eight hundred fifty nine rescuers were exposed to the attack as were 32,361 employees and their 87,383 family members. [7] All told, 164,710 persons were directly exposed to this terrorist attack. For every individual killed an additional 59 persons were traumatized. (Figure 1) An additional 4,800,000 residents of the surrounding 10 counties in ways large and small coped with the events of that day. It should be no surprise then, that twenty percent of New York City residents living below Canal Street, in close proximity to the events, met the criteria for PTSD at some point in the two month period following September 11, 2001.[8]

Analogously, the 467 terrorist deaths in Northern Ireland in 19726 directly or indirectly affected an additional 27,000 people or 18 per 1000 population. The 472 deaths attributed to the intifada in Israel in the 19 months between 2000 and 20039,

affected 4 persons per 1000 population.

2 Post-Traumatic Stress Disorder

Post Traumatic Stress Disorder (PTSD) is likely the most prevalent and debilitating consequence of disasters.[10] The choice of PTSD as an area of interest for researchers also likely reflects, the availability of validated screening tools amenable to research settings, the increasing consensus that PTSD is a likely outcome of post-terrorist environments, and the sense that PTSD is a marker or covariate for other behavioral disturbances. Although the behavioral consequences of terrorist incidents have received considerable recent attention, much of it driven by the Oklahoma City bombings and the attacks of September 11th in the United States, most of the information on disaster-related PTSD comes from the general disaster literature.

First described in the 1980s and included in the Diagnostic and Statistical Manual Third Edition (DSM-III) [11] the diagnosis of PTSD arose largely in response to the experiences of war veterans. To qualify for a diagnosis an individual required at least one eligible traumatic event (gateway criteria), a symptom of re-experiencing the trauma (intrusion), a numbing or blunting of affect (avoidance) and at least 2 symptoms of hypervigilance and startling (arousal). The diagnostic criteria underwent revision in the 1987 DSM-III-R[12] when the requirement of at least one months duration was added and again, in DSM-IV[13] when the individuals perception of the event was added to the criteria.

Work impairment associated with PTSD is as great or greater than that seen in major depressive disorder, and is associated with increased rates of medical utilization.[14] The general population rate of PTSD has been estimated at between 5.4%14 and 7.8%.[1]5 Left untreated, it lasts 36 to 64 months, but can persist for as long as a decade; time to remission can be reduced by half with treatment. [14,16] One half of the general population will meet a Criteria A stressor at some point in their life time; 1/3 of these individuals will develop PTSD.[16]

Reports of the prevalence of PTSD among victims of man-made disasters vary greatly. Rates are highest for victims and survivors, from 25% of individuals exposed to a 1991 Killeen, Texas, mass shooting up to 75% of individuals in a 1988 oil rig fire. Prevalence rates among rescuers vary from 5 to 40%. Thirteen percent of Oklahoma City firefighters met criteria for PTSD several months later. Nearly half of the Australian firefighters involved in battling a bush fire in 1993 had PTSD at some point in the first two years following the incident. General population prevalence are lowest. Seven to 11% of New York City residents met criteria for PTSD after September 11th and 9% of Alaskans were reported to have PTSD after the Exxon Valdez incident.[10]

In the first weeks following 9/11, 1 in 10 New York area residents met the criteria for Post Traumatic Stress Disorder (PTSD). [17] There were estimates that 520,000 people in New York and the surrounding areas would experience symptoms of PTSD and that 129,000 would seek treatment.[7] 7.6% of New York City residents reported using mental health services in the 30-day period 5 months after September 11th.[18] A year later, NYC residents continued to be very concerned about future terrorist attacks.[19]

Yet, while some researchers have found evidence of persistently elevated prevalence of psychological distress many months after and at long distances from the events of September 11th, [20] others have commented on a notable lack of the expected onslaught of psychiatric illness. [14,21] Among US military veterans, there was no significant increase in the utilization of mental health services for the treatment of PTSD in the New York City area, [22] and among a national sample of veterans with a pre-existing diagnosis of PTSD, there was, in fact, evidence of less severe symptoms on admission after September 11th than before.[23]

3 Correlates of PTSD

In one review, 94% of studies that looked at gender found that being female was associated with an increased risk of post-disaster behavioral health disturbance,[3] with women reported as being twice as likely to develop PTSD. [16] Marriage and parenthood are also associated with increased risk. [24] Taken together, these associations point to the potential common mediating factor of an imbalance of resources, or the stress of caring for others and being obligated to provide more resources than are received. [3] The only behavioral outcome associated with males in one review was alcohol abuse.[3]

While minority status and lower socioeconomic status are associated with increased risk of post-disaster behavioral diagnoses, this is likely due, at least in part, to increased risk of exposure. [24] After the events of 9/11, New York City residents of lower socioeconomic status were two and half times more likely to develop PTSD 8 and there were reports of increased alcohol and tobacco use among drug users, although there was no change in heroin or cocaine use.[25]

Human intent is associated with increased risk of behavioral disturbances. [3] Kidnappings and torture are associated with the highest rates of PTSD, flooding with the lowest. [16] Severe behavioral effects are also seen where there is extreme and intensive property damage, serious and ongoing financial problems, or a high prevalence of trauma and death.[3] In New York City after 9/11, those who lived closest to the World Trade Center area had a 3 times greater risk of developing PTSD. [8] That 43% of residents near the Exxon Valdez disaster had psychiatric impairments

indicates that deaths are not necessary for there to be behavioral health effects. [24]

Loss of psycho-social resources, such as family, friends and jobs as well as relocation and disruption of neighborhood patterns are key mediators of post-disaster behavioral disturbances, and pre-existing psychiatric conditions predispose individuals to post-disaster PTSD. [24] While associations with media exposure are reported, since many of the studies are cross-sectional, the direction of the association is unclear.

Risk for developing post-disaster PTSD varies by age with an increase during school age, followed by a second more prominent increase during middle age. [24] In a study of PTSD among 7,000 children 7 weeks after the bombing in Oklahoma City, physical, interpersonal and TV exposure together accounted for 12% of variance while peri-traumatic response alone accounted for 25%. The authors concluded that a childs subjective response to trauma is a key predictor of PTSD, and should be included in the diagnostic criteria for PTSD in children.[26]

Studies of children most often report symptoms rather than diagnoses which may account, in part for such high rates as the reported 95% of children who had symptoms of PTSD after the Armenian earthquakes.[1]0 In one study of the psychological sequelae of September 11th, there was a 46% increase in the diagnosis of PTSD in children in the months following September 11th, compared to the previous months. The increase for adults was 12%. Notably, there was no increase in the diagnosis of depression or substance abuse.[27]

Although mass violence is associated with the highest level of mental health disturbances,[7] the relative impact of different kinds of exposures on children varies. Kuwaiti children were relatively unaffected by interpersonal exposure during the Gulf War, but those whose friends were killed in a non-war related bus crash were. [26] While there may actually be a decrease in disruptive behavior among youth following a disaster, 51% of children exposed to Hurricane Andrew were reported to have a new onset behavioral disorder; 33% had PTDS and 56% remained impaired months after the events. [24]

4 Other Post-Disaster Behavior

Other post-disaster disturbances are reported to varying degrees. There were a reported 99 hate crimes against middle easterners in the US in the month following 9/11 compared to 93 such crimes in all of 2001 and 12 in 2000.[28] Some of this increase may be attributed to increased surveillance. Yet, there was no increase in divorces following the Oklahoma City Bombing.[29] And, while Project Liberty in New York City reported 42,000 patient encounters in the 4 months after 9/11, 30 concerns about an inundation of post September 11th, PTSD claims has not materialized.[14] Post-terrorism alcohol use among military veterans with

a pre-existing diagnosis of PTSD hare been shown to increase, but has not been demonstrated among civilians.[31]

There are reports from war zones that patients with depressive disorders, obsessive compulsive disorders and phobias may show symptomatic improvement. [6] Civil disorder can paradoxically have a beneficial psychological effect possibly through collective forces including increasing social cohesion. [6] Some will invariably develop psychiatric illness after being subjected to or witnessing trauma, but many in the general population may actually improve psychologically. This has been demonstrated during race riots in the 1960s and in London during the blitz, [6] and in the nationwide decline in chronic fatigue syndrome seen in the United States following September 11th. [32] Between 1969 and 1975, the suicide rate in Northern Ireland decreased by 50%. [2]

There have been conflicting reports on the effect of September 11th on suicide rates,[33,34] but the incidence of such stress-related dermatologic disorders such as lichen planus dropped by half in Northern Ireland during the height of terrorist activity,[2] and a broad review of the effects of two decades of home-grown terrorism concluded the general population (of Northern Ireland) is largely unaffected from the psychiatric point of viewwhilst the victims of violence do suffer emotional reactionsthose reactions are often comparatively short-lived.[6]

Reports of resiliency in the face of terror must be balanced against the growing literature on medically unexplained symptoms and physical diagnoses following terrorism and disasters. Medically unexplained symptoms are physical symptoms that provoke care seeking but have no clinically determined pathogenesis. Research suggests that at least 1/3 of symptoms in both clinical and population-based studies are medically unexplained. [35] At times these constellations of symptoms are characterized as physical, at other times as primarily physical. This may have more to do with the background, training and prior assumptions of the investigators than with the illness itself. [35] It is rare, though to have a truly new disease; similar constellations of symptoms are given new names based on the event from which they arose. [35]

Such syndromes have followed vaccination programs for US and UK military personnel, and have been a prominent feature of Gulf War syndrome among US troops. Other instances include: Canadian troops concerned about exposure to red soil in Croatia; a so-called Balkan War Syndrome attributed to exposure to depleted uranium; a mystery syndrome after a jetliner crashed into a populated area of Amsterdam, and jungle fever among Dutch peace keepers in Cambodia in the 1980s. [36]

Non-injury physical diagnoses reported following disasters have often been cardiac in nature. There was a greater than three-fold increase in myocardial infarctions in Japan following the Honshin Awerjuu earthquake. This was attributed to increased

hematocrit, fibrinogen and other coagulation factors, with the elderly perhaps most at risk. [37] In animal models, acute stress decreases the arrhythmia threshold by up to 40%. This effect has been shown to be interrupted by the administration of beta blockers. [37]

5 Methodological and Research Issues

In one review, approximately two thirds of disaster-related behavioral studies were cross-sectional. [24] Such studies are likely to pick up more long-standing cases of disease and may explain, at least in part, reports of extended chronicity,[38] Those studies that have attempted a longitudinal approach, though often based on two data points, have demonstrated rapid declines in PTSD prevalence. [24] .. Most studies are prospective, but retrospective approaches, such as interrupted time series analyses, may yield informative results. [29]

The majority of studies are individual level rather than ecologic Some investigators who set out to study individual-level responses to September 11th, instead reported that we have seen fascinating cross-community differences in response.[39] It is of note, that of 160 studies in a recent meta-analysis of post-disaster psychiatric disturbance, only 8 specifically addressed terrorism.[24]

Post-terrorism studies are likely to detect other, non-disaster related chronic, conditions. Approximately half of the Oklahoma City firefighters in one sample met lifetime criteria for alcohol abuse or dependency.[40] Ninety percent of one sample of children studied after the 1998 US Embassy Bombing in Kenya were deemed exposed to other crimes or human-caused violence.[41] The exposure under study may also be confounded by other events that occurred during the same time period. For example, the 2001 attacks on New Yorks World Trade Center were quickly followed by both anthrax-laced mail attacks and a passenger jet crash.

Resource utilization may be particularly difficult to measure during times of crisis. Fear of violence may cause people to stay home decreasing hospitalization numbers.[2] Psychiatric admission rates may not capture successful outpatient treatments, and there may be changes in available services over time. Some psychiatric conditions may be overshadowed by physical complaints.[6]

PTSD continues to be a focus of attention. In one extensive review of all post-disaster behavioral research, 68% of studies addressed PTSD, 36% included major depressive disorder and 20% generalized anxiety.24 Behavioral diagnoses such as alcohol abuse and somatic disorders are not commonly studied. [24] But, changes in diagnostic and screening instruments for PTSD over time [11,12,13] and the myriad available screening instruments available for assessing PTSD[42,43,44,45,46] make comparisons difficult even within the same geographic region. The number of studies

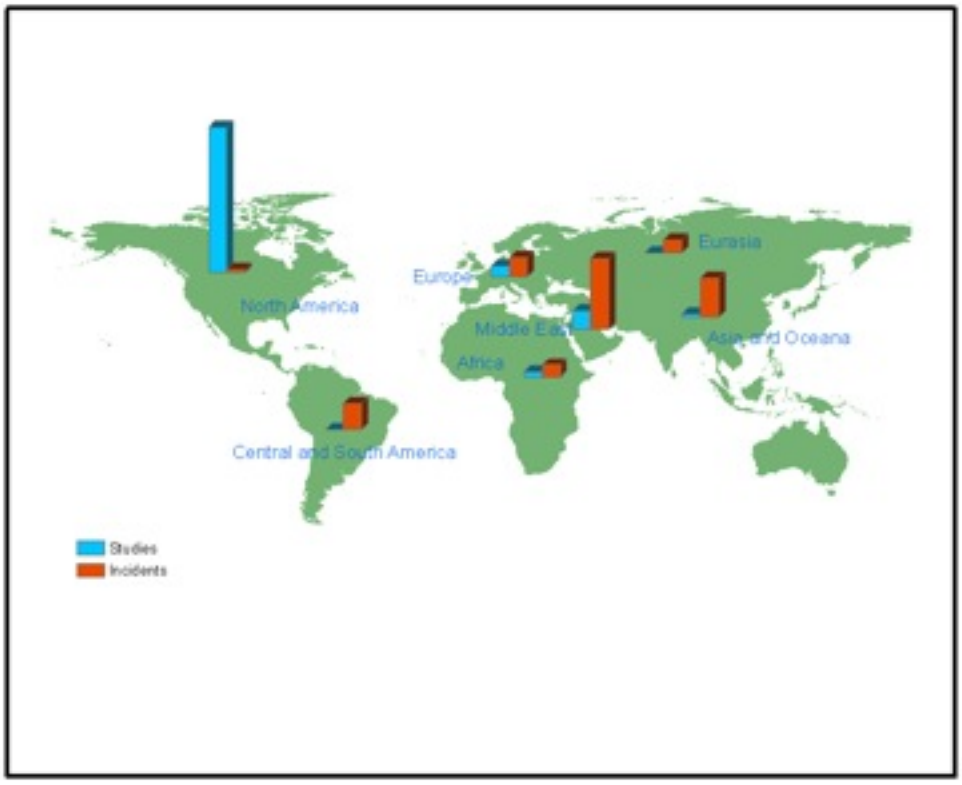

Figure 2: Comparison of proportion of post-terrorism behavioral health studies (blue) to proportion of reported terrorist incidents since 1980 by region of the world

conducted in a geographic region do not represent the overall risk in that region. Figure 2 represents the number of post-terrorism behavioral health studies conducted since 1980 compared to the number of reported terrorist incidents in the region.[47]

6 Prevention, Treatment and Resiliency

While "a first line of defense is to prevent people from becoming terrorists", ascribing suicide terrorism to individual characteristics may be an instance of the Fundamental Attribution Error. [4] Psychopathology, poverty and lack of education are not reliable indicators: "suicide terrorists have no appreciable psychopathology and are at least as educated and economically well off as their surrounding populations".[4] In fact, there may be a slight positive correlation with education, and although relative

economic loss may be a factor, there is no real association with poverty. The only distinguishing characteristics of suicide bombers are that they tend to be single, male, and religious. [4] Attempts at pre-emptive screening, identification and removal may be impossible.

It has been argued that interventions are needed at the community (ecologic) level. An effective approach may be to target moderates within a community and address the issues of discontent so as to encourage the communities themselves to abandon support for such terrorist activities. [4] Given the scant data on suicide bombers, it is difficult to support sweeping recommendations. Yet, although suicide bombers themselves may not be poor or uneducated, decreasing poverty and increasing education are just the kinds of tangible ecologic-level interventions that may sway moderates within a community.

Primary prevention of behavioral health effects among first responders may be feasible in the form of training as well as control of the post-terrorist environment. The mental health effects of disasters on recovery workers can be mitigated by training and experience.[24] Training must be tailored to the type of likely exposure. Fire fighters and other first responders are exposed to personal risk; medical workers must confront death and horror; counselors risk vicarious trauma. [3] Rescuers with realistic expectations of what to expect may experience fewer behavioral breakdowns. [35] It has been seen that soldiers with higher rank and esprit de corps have fewer behavioral conditions during times of war and that isolated support troops sometimes have higher rates of illness than front-line forces. [35] Cultivating a culture of collegiality and common purpose may also control post-disaster pathology.

Individual pre-event screening among the civilian population may look for individuals at risk of developing behavioral symptoms. Once identified, interventions may include cognitive-behavioral therapy. [35] But, studies are needed of the predictive power of screening instruments and the cost-effectiveness of individual versus community level interventions.

Secondary prevention, in the form of early identification and quick intervention is also possible. The onset of PTSD is fairly early after an incident, so interventions should start early with triage to identify those most at risk due to pre-existing psychiatric disease[16] and other risk factors such as proximity to the event. There is little evidence to endorse any particular treatment approach. While there have been no randomized clinical trials of post-disaster behavioral interventions [3]6, there is no evidence that critical stress debriefing is effective, [35,36] although identifying high-risk individuals and providing several sessions of cognitive-behavioral therapy can prevent PTSD. [35] There have been few studies of the effects of drug regiments. [3] Interventional trials with drugs that have an acceptable safety profile, such as beta blockers, may be warranted.

Since most individuals experiencing medically unexplained symptoms will get better

spontaneously, [35] public health messages reminding people that most symptoms will resolve may be helpful. Efforts should be directed at symptom management and not establishing a hard diagnosis. [35] It is important, though, on both the individual and community level to avoid trivializing peoples concerns.

Perceptions of self-efficacy may be a key to resiliency. What matters, apparently, is not so much how people actually cope, but rather how they perceive their capacities to cope and control outcomes. [24] Resiliency may reside as much in the community as in the individual. Resource dynamics "undoubtedly account for the overall resilience many, if not most, people show in the face of-even quite serious stress".[3] Collective interventions should replace valued resources as quickly as possible, emphasize self-empowerment and reinforce indigenous networks. If relocation is necessary, people should be kept in natural groups and be encouraged to return to normal activities as soon as possible. [3]

Community and neighborhood interventions such as public education, capacity building and a return to normalcy should receive higher priority than individual interventions.[3] Disasters are characterized by a loss of community services just at the time they are most needed. [3] Social support can be defined as both the perceived support as well as the goods and services that are actually delivered. Interventions thought to be effective improve community cohesion provide appropriate direction and high quality leadership and build a sense of individual responsibility and control. [35]

7 Conclusion

Effective post-terrorist public health interventions require the recognition that behavioral consequences are, in fact, the intent of terrorists. The behavioral consequences of terrorist incidents have received considerable recent attention, much of it driven by the Oklahoma City bombings and the attacks of September 11th in the United States. Post-traumatic stress disorder continues to attract most attention from behavioral researchers, with survivors of terrorist incidents consistently suffering the highest rates of PTSD. Prevalence estimates of disorders such as PTSD may mask great variability depending on who is being studied, who is conducting the study and where the event occurred. Rescuers and first responders were at next highest risk.

The results of such studies have implications for treatment and public health control. It appears that terrorism-related behavioral diagnoses such as PTSD behave similarly to that seen after other incidents such as natural disasters. The accumulated evidence on interventions following natural disasters is likely to be appropriate for the post-terrorist environment. Prior psychiatric diagnoses are strongly associated

with subsequent PTSD and may be a useful triage factor, particularly when taken with such factors as female gender and direct exposure to events as either a survivor or rescuer. These associations are consistent across study types and environments, and represent important variables to consider when developing triage, outreach and treatment programs.

Although most people in the general population can be expected to recover spontaneously within several months to a year, there are potential population-level interventions to perhaps facilitate and speed the process. These include recognition of honest appraisals of behavioral health effects in community health announcements, preserving as much as possible community, family and social networks and returning individuals to normal activities as soon as feasible. Finally, some individuals such as survivors, rescuers and those with a prior psychiatric history are at increased risk of conditions such as PTSD and may require individual interventions. These persons should be identified and referred for counseling.

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