

Mental Disorders after Terrorist Attacks

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There is no widely agreed upon definition of terrorism. In general terms, it is defined as an act of violence that is used to further a political goal by instilling fear into the public. Though acts that could be defined as “terrorism” have occurred since the Roman Empire, the term was coined during the French Revolution. Since the terrorist attack in New York City on 11 September 2001 (9/11), it is difficult to imagine a topic that has shaped global discourse as much as terrorism. It is a violent act that has been shown to have longstanding effects on the mental health of those who witness it.

terrorism

post traumatic stress disorder

1. Posttraumatic Stress Disorder

1.1. Prevalence and Risk Factors

Post-traumatic stress disorder is an outcome that is commonly explored throughout research on terrorism. In the general American and European population, 1-year prevalence is between 0.9–3.5% ^[1]. The articles featured in this review identify a higher prevalence of PTSD in individuals both directly and indirectly exposed to terrorist attacks. Given the increase in terrorism research that occurred post 9/11, the majority of the articles featured in this review assessed those populations. In direct survivors, the prevalence of PTSD has been found to be around 30% ^[2]. It reaches approximately 39% in the first 6 months, and slowly decreases to about 22% after 1 year ^[2]. The prevalence of PTSD without any comorbidities in survivors was found to be about 4.1%, even 14–15 years after the attack ^[3]. In traditional relief workers, such as first responders and rescue workers, prevalence for PTSD is lower in the first 3 years, and slowly climbs up to 10%, peaking approximately 5–6 years post-attack ^{[4][5]}. In non-traditional relief workers, such as volunteer workers, rates of PTSD are much higher, climbing to 21.9% ^[4]. The prevalence is about 23% in relatives or close friends of victims who were injured or killed in terrorist attacks ^[2].

Though there is not an abundance of articles examining the mental health effects of terrorism set in countries other than the U.S.A., some of these have been reviewed for this article. Certain communities showed higher proportions of PTSD, others lower. However, it can be challenging to compare the prevalence rates given that the level of exposure of the populations studied is heterogenous. In Nairobi, the prevalence of PTSD in survivors and rescue workers following the 1998 U.S. Embassy bombing was 22% which was found to be 2–4 times the rates following the Oklahoma City bombings ^[6]. In the 4–6 weeks following the Bardo museum attack in Tunis in 2015, one study found that 68.6% of museum works displayed posttraumatic stress symptoms ^[7]. Similarly, 5 months following the Qissa Khwani Bazaar bombing in Pakistan, 77% of direct survivors suffered moderate to severe PTSD ^[8].

Following the 2015 Ankara bombings in Turkey, one study found that PTSD prevalence in direct survivors was 24.7% [9]. In contrast, following the 2011 Oslo bombing, only 2% of trained professionals and 15% of unaffiliated volunteers developed PTSD [10]. In the first 10 to 34 months, individuals who were directly exposed showed a prevalence of PTSD evolving from 24% to 17%, while for those who were indirectly exposed it went from 4% to 2% [11]. In France, following the November 2015 Paris terrorist attacks, prevalence amongst resident physicians was 12.4% [12] and between 3.4–9.5% in other first responders [13].

Pre-attack risk factors to developing PTSD include being a woman, being of Asian or Hispanic decent (in the American context), having been exposed to a previous terror attack, experiencing a traumatic event in childhood or adulthood, having low social and educational status and having pre-existing psychiatric comorbidities [14][7][15][16][17][18][19]. One study found that a genetic polymorphism of the serotonin transporter (5-HTT (5-hydroxy tryptamine)) gene) may have led to higher rates of PTSD post 9/11 [20]. Personality characteristics associated with PTSD include negative affectivity, detachment and psychoticism, as well as less perceived self-efficacy [21][3]. In first responders, having only basic life-saving training versus more intermediate or advanced training, was found to be a risk factor for PTSD [22]. During the terrorist attack, the main predictors for developing PTSD are level of exposure [23][5], including experiencing high perceived threat and having witnessed a life-threatening injury [9][24]. Higher perceived threat is a predictor for developing PTSD even in individuals who did not directly witness the attacks [24]. Following the terrorist attack, having low social supports, comorbid depression, anxiety and alcohol use have been shown to be risk factors for developing PTSD [14][7]. Suffering a physical injury secondary to the terrorist attack, regardless of the severity of the injury, is one of the biggest predictors of developing severe PTSD [16].

Regarding first responders, having had only basic life-saving training, as opposed to intermediate or advanced training, as well as having to intervene on unsecured crime scenes, likely leading to higher fear of death, were found to be risk factors for developing PTSD [22][13]. Certain studies also commented on risk factors associated with increased severity of PTSD. These include low social integration into the community, higher level of exposure to the attack, job loss following the event, marital status, unmet mental health needs, low education and socio-economic status, being a female and being of Hispanic descent [25][26][27][28]. In regard to symptomatology and comorbidities, risk factors for more severe PTSD include having severe hyperarousal symptoms, experiencing bereavement, being injured by the attack, having a history of PTSD, depression or anxiety pre-attack, having other medical conditions diagnosed post-attack, higher levels of exposure to the attack and a lifetime trauma burden, especially post attack [25][26][28]. Finally, from a temperament perspective, using coping strategies such as substance use and avoidance, as well as callousness and perceptual dysregulation personality traits, can worsen the trajectory of the illness [21][28].

1.2. Protective Factors

When individuals and communities are exposed to terrorism, certain factors have been shown to protect against the development of mental illness. With regard to other forms of trauma, the general understanding is that adaptive coping strategies, greater social support and a sense of purpose are linked to lower PTSD symptoms [1]. These have similarly been shown to be protective factors in the context of terrorism exposure [28]. For first-line workers,

feeling well prepared prior to the event, higher levels of training, feeling supported by leadership, lower role conflict, higher role clarity and predictability have shown to lead to lower rates of PTSD and less psychological distress [29][30][28]. More optimistic personality styles, benign styles of humour, perceived self-efficacy and the belief of having a life purpose all were traits that were associated with lower rates of psychological distress and post-traumatic symptomatology [3][31][32][28]. Individuals who employ problem solving and cognitive restructuring coping strategies were associated with fewer post-traumatic reactions and active coping skills distinguished between improving and chronic trajectories [28][33]. Finally, less severe emotional numbing symptoms was associated with higher rates of symptom recovery [25].

1.3. Symptom Clusters and Course of Illnesses

PTSD is often a chronic and highly disabling illness with an 18–50% recovery rate within the first 3–7 years. The four symptom clusters of PTSD include continuously reliving the traumatic event, persistent avoidance of stimuli related to the event, symptoms of emotional numbing and increased arousal response [1][34]. In first-line workers who intervened during terrorist attacks, especially volunteers, studies have shown that rates of PTSD continue to increase until a peak at 5–6 years post event. With regard to PTSD related to terrorism, even 6–7 years after the attack, 15–26% of direct victims continue to report PTSD symptoms [2]. Compared to other sources of PTSD, terrorism leads to a longer duration of illness (202 versus 92 months), with non-traditional workers showing the highest rates of chronic symptoms [35][36]. In one study, there was no statistically significant difference in the severity of symptoms between PTSD related to terrorism versus other forms of PTSD; however, higher avoidance symptoms were found, which is generally a severity marker [35]. However, one study out of Italy showed higher severity scores on the CAPS scale in terrorism than other forms of trauma [36]. When examining symptoms related to reliving the trauma, auditory reminders were the most frequently encountered and the most distressing [37][38]. One study found that the most central symptom seen in PTSD in the context of terrorism is feeling emotionally numb [39].

2. Major Depressive Disorder

Prevalence and Risk Factors

There are less studies available that look into the impacts of terrorism on rates of MDD. Rates of new-onset MDD post 9/11 were 26% amongst individuals who were in the vicinity of the attacks, and 45% amongst those with a trauma-exposed close associate [40]. Rates of MDD amongst community members and rescue workers alike were found to be 15.3% 10–15 years post attack [41]. Prevalence of MDD 12 years post attack was found to be 17.2% for non-traditional rescue workers and 30.3% for police officers [4]. Another study suggested that the majority of individuals directly exposed to terrorism, do not suffer from MDD in isolation. Even 14–15 years after the attack, 6.8% had MDD alone while 8.9% had comorbid MDD and PTSD [3]. When looking at individuals meeting criteria for PTSD following a terrorist attack, 68.2% also had comorbid MDD [3]. Another study showed similar numbers, with a prevalence of MDD 14–15 years post-attack being 18.6%, and over half those cases being associated with a diagnosis of PTSD [42]. Once again, prevalence can vary when looking into communities around the world. In

Tunisia, following the Bardo Museum terrorist attacks, 40.6% of museum employees endorsed depressive symptoms after 4–6 weeks [7]. Conversely, only 2.4% of resident physicians reported depressive symptoms after the 2015 terrorist attack in Paris [12].

There are a number of factors identified in the literature which may lead to certain individuals having a higher likelihood of developing MDD after a terrorist attack. In general, for those who were directly exposed or who lived in the vicinity of a terrorist attack, being less educated, of lower socio-economic status, unemployed and having lower social integration and support increase their risk [42]. Those factors, along with traumatic life events post terrorist attack and chronic physical illness decreased the likelihood of recovering from MDD [42]. In a Tunisian study, low social support seemed to be the best predictor for both PTSD and MDD symptoms in directly exposed individuals [7]. Regarding chronic symptoms of MDD in the American context, less social support as well as less perceived self-efficacy were risk factors [3].

Regarding the level of exposure, some evidence suggests that individuals who lost a loved one to a terrorist act are more than twice as likely as direct witnesses to develop MDD [40]. In Norway, parents of victims of the attack were three times more likely to develop MDD and anxiety than the general population [43]. Furthermore, parental emotional reaction worsened the more symptomatic their child became [44]. MDD appears to be related to the magnitude of the attack's impact on daily life, as well as how connected an individual is to the community affected [40]. In those who are not directly exposed to the attack, some evidence suggests that MDD can manifest only when an individual identifies the victims as being similar to their loved ones [45]. In those who were neither directly exposed nor had a loved one who was exposed, increased TV viewing related to the attack increased the likelihood of developing MDD, but only when it was associated with a decrease in perceived safety [46]. Similarly, in Nigeria, individuals who scored higher on the Terrorism Catastrophizing Scale were more likely to express symptoms of MDD and anxiety [47].

3. Anxiety Disorders

Prevalence and Risk Factors

Individuals having survived a terrorist attack, especially those having suffered physical injuries, appear to report higher rates of anxiety disorders than the general population [48]. In the 10–11 years following the 9/11 attacks, 5.8% of police officers at the scene displayed comorbid anxiety and PTSD, and 47.7% had comorbid MDD and anxiety disorder [14]. Following the 13 November 2015 terrorist attacks which took place in Paris, 11.2% of resident physicians reported anxiety disorders [12]. In Denmark, rates of anxiety disorders saw a 16% increase following the Oslo bombings, and a 4% increase following 9/11 [49][50].

As with MDD, a multitude of factors can increase a person's chances of developing an anxiety disorder following a terrorist attack. Some factors, such as scoring high on the Terrorism Catastrophizing Scale or having a loved one who was exposed to the attack overlap with the risk of developing MDD [47][43]. In Europe following an ISIS truck attack, physical proximity to the event, ISIS anxiety and perception of danger increased the risk for psychological

distress in general [51]. Not only is physical proximity an important factor, one study found that cultural proximity also led to increases in trauma and stressor related disorders following terrorism. After the Oslo attack, the population of Denmark saw a spike in these disorders, independent to media coverage, possibly because of cultural and geographic proximity to the victims [50]. Regarding symptom severity, the frequency of exposures to reminders of the attack can lead to a worsening of MDD and anxiety disorders, as well as a global decline in functioning [38]. Those who endured traumatic experiences in their adulthood, as well as recent life stressors, were at higher risk of worrying about future terrorist attacks [18].

4. Interventions

Prior to beginning this section, it is important to note that this paper is not a review of all treatment modalities. Comments on interventions are based off of the treatment modalities detailed in the articles sampled. Following a terrorist attack, one study showed that over 25% of individuals with PTSD or MDD had unmet mental healthcare needs over the last year [41]. Individuals who were more likely to seek out counselling were Caucasians, Hispanics, children at the time of the attack, those with higher levels of exposure, those who experienced peri-event panic attacks and those who had accessed counseling prior to the attack [52]. Individuals who were least likely to seek out mental health support after 9/11 were found to be African Americans, Asian Americans, those of lower educational or economic status, and those without a regular physician [52]. Similarly, a study out of the U.K. highlighted that 2/3 of individuals exposed to terrorism who were connected to mental health supports, did so via their family physician [53]. Of those who accessed mental healthcare, individuals who rated counseling to be helpful were likely female, African American, over the age of 65 or those with very high exposure [52]. A study following the Utoya massacre noted that early outreach programs provided benefit to exposed individuals with and without PTSD, MDD and anxiety disorders [54]. However, it highlighted challenges in reaching certain populations, specifically individuals in modern family structures and ethnic minorities [54]. It is important to consider new and innovative means of connecting both the population at large and hard to reach populations to services and supports following trauma. One such means that has been recently described in the literature is supportive text messaging [55]. By providing personalized support to patients, mobile phone technologies have been found to potentially improve the outcomes of a number of mental health conditions such as MDD and possibly PTSD [55][56][57][58][59][60][61]. Similarly, a study from the U.K. highlighted the benefits in a general screening program for PTSD, MDD, anxiety disorders and alcohol use following a terrorist attack [53].

Trauma-focused cognitive-behavioural therapy (T-f CBT) has been found to be the therapy of choice for PTSD in victims of terrorism [62]. According to the articles sampled in this review, there is less evidence available regarding treatments of other mental disorders in victims of terrorism, as well as in non-developed, non-Western countries [62]. One study from Madrid examined a sample of survivors of terrorist attacks that occurred an average of 23 years prior. After a course of t-f CBT, prevalence of PTSD went from 23% to 3.2%, and anxiety disorders went from 14% to 9.7% [63]. Following the course of t-f CBT, no participants were expressing symptoms of MDD or panic attacks [63]. Significant decreases in symptoms were still present at a 1-year follow-up [63].

Improving one's tendency to forgive and social supports, as well as working on other positive coping strategies, have been noted as possible therapeutic interventions following a terrorist attack, as these have been found to lower levels of PTSD symptoms [64]. Debriefing, and other crisis interventions in the first 24–72 h following terrorist attacks have been shown to lower quality of life and lead to worsening of MDD and PTSD symptoms [65][66]. According to the reviews sampled in this study, it was noted that there is limited information on treatment of mental illness following a terrorist attack. There is especially a lack of randomized–controlled trials in this area. However, there is some evidence highlighting the benefits of exposure-based approaches including virtual reality (VR) technology, as well as the use of SSRI medications [5].

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