Mental health following terrorist attacks

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Summary We review the current literature relating to mental health following terrorist attacks. Studies assessing symptoms of stress in the general population and those assessing the mental health of direct victims are considered. Use of mental health services following an attack is reviewed and recommendations are offered.

Declaration of interest None.

Terrorist activity in the UK reached a peak during the 30 years from the late 1960s to the late 1990s, with hundreds of incidents associated with the political conflict in Northern Ireland. Although terrorist attacks have occurred all over the world, they have been particularly numerous in France, India, Iraq, Israel, Russia, Spain, Sri Lanka and the UK. More recently, Islamic terrorist groups have targeted London, Madrid and New York City, as well as numerous other cities in Europe, Asia and North America. Although the psychiatric impact of terrorist violence has been repeatedly noted, it is only comparatively recently that there has been systematic research into its effects on victims and on the wider community. This evidence now permits some estimate to be made of the mental health consequences of terrorism and of the challenge for psychiatric services.

MENTAL HEALTH OF THE GENERAL POPULATION

Studies conducted in representative samples of the general population following terrorist events can be divided into those that have investigated the prevalence of 'substantial stress' (the presence of a predetermined level of psychological symptoms) and those that have attempted to estimate the prevalence of diagnosable psychiatric disorders. Catchment areas studied vary from city districts, cities, and surrounding regions, to whole countries. Within the first month after the 11 September 2001 attacks, symptoms of stress were evident in individuals geographically far distant from the original incident, and nationally depressive symptoms in the USA rose for 4 weeks only to fall back to previous levels thereafter (Knudsen et al, 2005).

Schuster et al (2001) demonstrated that the proportion of people experiencing substantial stress was negatively associated with distance from the attacks of 11 September. Therefore, for comparison purposes it is easiest to consider studies that have sampled from the city where the incident happened or from the surrounding area (details of these studies are presented as a data supplement to the online version of this editorial). Despite using a variety of different instruments, these studies reveal a close relationship between the time post-incident and the prevalence of 'substantial stress'. Rates are extremely high in the first few days after the incident but are already in decline in the first 2 weeks and by 6–8 weeks have fallen by two-thirds. Thus for the majority of individuals significant stress symptoms are temporary and are unlikely to have lasting mental health implications (Vázquez et al, 2006). However, a significant minority will continue to have symptoms. Over 6 months after the 11 September attacks, 5.3% of New York City residents continued to meet criteria for subsyndromal post-traumatic stress disorder (Galea et al, 2003), a condition associated with substantial functional impairment.

The data on rates of probable acute stress disorder or post-traumatic stress disorder (PTSD) show a similar pattern. Rates of PTSD in the general population attributable to single attacks may be as high as 11–13% in the first 6 weeks but decline sharply with time, with most studies indicating rates below 3% 2 months after the incident.

When considering these studies it is important to bear in mind that stress symptoms measured in the immediate aftermath of an attack are not necessarily 'post-traumatic'. One of the hallmarks of PTSD is a sense of extreme threat that endures despite the danger having passed, something that can rarely be assumed about a terrorist attack. Thus, symptom reporting following the Madrid train bombings was particularly high in regular train passengers (Vázquez et al, 2006). Transient symptoms should in most cases therefore be regarded as a general and not necessarily inappropriate stress response, partly reflecting involvement and concern with one's own safety as well as with the safety of the community, family and friends. Symptom reporting will also be associated with actual losses of people, possessions and employment (Galea et al, 2002; DeLisi et al, 2003).

It should also be remembered that community samples will contain a proportion of people who may have particular reasons to feel threatened by the events. The data suggest that those reporting more symptoms will include members of minority groups (Schuster et al, 2001; Galea et al, 2002; Rubin et al, 2005), people with previous experience of adversity (Galea et al, 2002, 2003) and people who have developed psychiatric disorders in response to past stresses (DeLisi et al, 2003). For these groups the typically intense levels of media coverage and general concern around terrorist attacks may increase general levels of stress by acting as a potent reminder of feared outcomes or of thematically similar experiences from the past. More research is needed into the long-term outcomes for these at-risk groups.

Children

There are fewer studies of children's responses to terrorism. Henry et al (2004) found no significant difference from parental reports in general levels of anxiety and depression in children from Chicago in the 100 days before and after the 11 September attacks. A number of studies have explicitly assessed children's reactions to terrorist events. Close to 1 year after the bombing of the Alfred P. Murrah Federal Building in Oklahoma City, about 5% of elementary schoolchildren reported clinically significant levels of symptoms of PTSD (Gurwitch et al, 2002). A year later, almost 20% of middle schoolchildren living 100 miles from the city reported current bomb-related

symptoms that impaired their functioning at home or at school (Pfefferbaum *et al*, 2000).

Four days after 11 September 2001, 35% of a national sample of American parents reported that their child had at least one of five stress symptoms (Schuster *et al*, 2001). Six weeks later more than 60% of parents in the New York City metropolitan area reported that their child was upset (Schlenger *et al*, 2002) or had moderate post-traumatic stress reactions (Fairbrother *et al*, 2003). Without more normative data it is difficult to assess the significance of these reports. However, two studies have carried out diagnostic assessments in community samples of children after 11 September. One month later, 8% of Seattle children were estimated to have diagnosable levels of PTSD symptoms (Lengua *et al*, 2005). In New York City itself, 6 months later Hoven *et al* (2005) reported that 28.6% of children had at least one probable anxiety/depressive disorder, the most common being agoraphobia (14.8%), separation anxiety (12.3%) and PTSD (10.6%).

MENTAL HEALTH OF DIRECT VICTIMS

Another group of studies have reported on the mental health of people with direct experience of a terrorist attack, typically using diagnostic interviews or screening tools designed to estimate the prevalence of disorder. In these studies PTSD appears to be the most common disorder attributable to the attack, followed by depression (North *et al*, 1999; Miguel-Tobal *et al*, 2005), although other sequelae include traumatic grief, panic, phobias, generalised anxiety disorder and substance misuse (prevalence rates of PTSD in direct victims of a number of major terrorist attacks are presented in the data supplement to the online version of this editorial). Direct victims of terrorist attacks are those most affected, usually by being physically present at the attack site or by having a close family member killed or injured. Despite wide variations in the number killed in the attacks and the timing of assessments, there is remarkable uniformity that within 2 years of the incident 30–40% of the people closest to the site of the attack are likely to develop a clinically diagnosable disorder. Few data are available for longer-term outcomes, but even 2½ years after the Paris attacks the rate of PTSD among direct victims was 25%, and 2 years after the Pentagon

attack on 11 September over 20% of employees who were present and responded to the survey were found to have PTSD. These figures emphasise that many reactions are intense and long-lasting and cannot be dismissed as normal, transient responses to traumatic events.

Studies of emergency workers have usually found considerably lower levels of psychopathology than in direct victims. Retrospective reports by body handlers describing their reactions at the time of the Oklahoma City bombing and 1 year later indicated negligible levels of PTSD and depression (Tucker *et al*, 2002), and North *et al* (2002) reported a PTSD rate of 13% among firefighters 3 years after the bombing. Two months after the Madrid bombings Miguel-Tobal *et al* (2005) found a rate of 1.2% for PTSD and 2% for depression among emergency personnel. Six months after the 11 September attack on the World Trade Center, 14.3% of those involved in the rescue effort in New York City had probable PTSD (Galea *et al*, 2003), but there appeared to be only a small excess of PTSD symptoms in handlers working in canine search and rescue teams who were deployed following 11 September, compared with non-deployed controls (Alvarez & Hunt, 2005).

Studies of emergency workers are hard to compare because response rates varied, and in all of them there was considerable scope for response biases to operate. Although it is not likely that these groups will respond with high levels of disorder, it is important to consider that actual levels of exposure to the attack site, and to scenes of severe injury and grotesque death, are likely to vary enormously, even among individuals attending the same incident. For example, in a study of firefighters who worked in the aftermath of the 1995 Oklahoma bombing, North *et al* (2002) found that time working on the site and time spent in the 'pit', a particularly perilous area of the building, were associated with increased PTSD prevalence. The involvement of trauma and occupational health advisors may be of great importance in ensuring that organisations recognise the potentially toxic effects of high or prolonged levels of exposure and provide appropriate levels of protection and support.

Children

Again there have been fewer systematic studies of child victims. Elbedour *et al* (1999)

found that 50% of the daughters and 23.1% of the sons of those killed in the Hebron massacre were suffering from probable PTSD. Children were more likely to experience post-traumatic symptoms following the Oklahoma City bombing if they had been bereaved (Pfefferbaum *et al*, 1999). Other commentators have drawn attention to a significant risk of psychological disorder in children who are direct victims, suffer bereavement or other losses, or have to witness repeated reminders of the attacks, including parental distress (Fairbrother *et al*, 2003; Hoven *et al*, 2005). Distress and disorder may manifest themselves in different ways depending on the child's developmental stage, and it is likely that children's distress is systematically underestimated by adults (Gurwitch *et al*, 2002; Koplewicz *et al*, 2004).

RECEIPT OF MENTAL HEALTH SERVICES

There is now a substantial evidence base indicating that PTSD can be successfully treated. Six months after the Oklahoma City bombing 69% of survivors had received some form of mental health intervention, although this might only have consisted of psychological debriefing (North *et al*, 1999). Similarly, 74% of survivors of the Paris bombings with PTSD received psychological treatment after the attack (Verger *et al*, 2004). In contrast, receipt of services in the wider population appears to be considerably lower. Three to six months after 11 September only about a quarter of those with the most severe PTSD symptoms in New York City were receiving counselling or mental health treatment (DeLisi *et al*, 2003). By 6–9 months after 11 September about a third of New York City residents with probable PTSD or depression had sought help from professionals, and these overwhelmingly consisted of people who had previously received mental health services (Stuber *et al*, 2006). Virtually nothing is known about the proportion of survivors of terrorist events with PTSD or other disorders who received appropriate, evidence-based treatment for their conditions, or how successful these interventions were at ameliorating their symptoms.

CONCLUSIONS

Terrorist attacks have widespread mental health effects, even on communities geographically distant from the attacks. In the

main these effects will be short-lived but there is a minority of individuals not directly involved in the incidents who will continue to experience clinical or subclinical levels of symptoms, often accompanied by functional impairment. Consistent with data on exposure and risk, 30–40% of people directly affected by terrorist action are likely to develop PTSD, and at least 20% are likely still to be experiencing symptoms 2 years later. Less is known about the mental health impact on children, but this too appears to be considerable (see the data supplement to the online version of this editorial). In contrast, there is less evidence that rescue workers and members of the emergency services are at high risk of developing disorder.

These findings have important implications for health services. Whereas some direct victims are likely to be in contact with providers of psychological services, in New York City following 11 September only around a quarter to a third of adults and children with significant post-traumatic stress symptoms received any treatment at all. Survivors with no previous contact with services were least likely to benefit from what was available. This was despite the strenuous efforts of those involved in Project Liberty, an unprecedented exercise involving over 100 mental health agencies delivering free public education and crisis counselling. If this level of unmet need is replicated elsewhere, it suggests that a targeted, active outreach programme will need to be a major feature of the response, for example using a 'screen and treat' approach. An important future task is to demonstrate that an outreach programme can be effective in identifying individuals with significant symptoms or functional impairment, in facilitating access to evidence-based treatment and in achieving the kind of positive health outcomes typically obtained in treatment trials for PTSD.

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