

Traumatic events and their relative PTSD burden in Northern Ireland: a consideration of the impact of the ‘Troubles’

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Abstract

Purpose Over a 30-year period in its recent history, daily life in Northern Ireland (NI) was characterised by civil violence, colloquially termed as the ‘Troubles’. The current report examines exposure to 29 traumatic event types and the associated conditional prevalence of post-traumatic stress disorder (PTSD) among the Northern Ireland population, with a focus on the impact of traumatic events that were characteristic of the NI ‘Troubles’.

Method Results presented are based on analysis of data from the Northern Ireland Study of Health and Stress (NISHS). The NISHS is a representative epidemiological study of mental health among the NI adult population ($N = 4,340$) and part of the World Mental Health Survey Initiative.

Results Perpetration of violence, physical assault by a spouse or partner and private events were the event types associated with the highest conditional prevalence of PTSD. Despite this elevated risk, collectively these events

accounted for just 16.8 % of the overall public burden of PTSD, given their low prevalence among the general population. Events that were characteristic of civil conflict, including unexpected death of a loved one, witnessing death or a dead body or someone seriously injured and being mugged or threatened with a weapon accounted for the highest proportion of the overall public health burden of PTSD (18.6, 9.4 and 7.8 %, respectively). These findings are a feature of the higher prevalence of these events among the general population coupled with their moderate to above average risk of PTSD.

Conclusions Despite the formal end to conflict in NI in 1999, a substantial proportion of the adult population continue to suffer the adverse mental health effects of chronic trauma exposure. Given rates of recovery of PTSD in the absence of evidence-based treatments, it is likely that the legacy of mental ill health associated with conflict, if not adequately addressed, will endure for many years.

Keywords PTSD · Mental health · Trauma · Conflict · Northern Ireland

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Background

Northern Ireland (NI) is a small western European country of some 1.7 million inhabitants [1] with a turbulent recent history. While situated on the island of Ireland, NI is currently part of the United Kingdom. From 1969, the country was embroiled in a bitter civil conflict between Irish republicans (predominantly from the Catholic community) opposed to British rule and aggrieved at denial of civil rights, and British loyalists (predominantly from the Protestant community, committed to the union of NI with the United Kingdom). Over a 30-year period daily life in many

areas of NI was characterised by riots, shootings, bombings, kidnappings, punishment beatings and torture among other violent traumatic events until the formal end to violence marked by the ‘Good Friday Agreement’ in 1999. This period of sustained conflict has been colloquially termed as the ‘Troubles’.

As summarised in a review of literature focusing on the experience and mental health impact of ‘Troubles-related’ trauma by Ferry et al. [2], a number of community and general population studies point to the substantial adverse impact of the conflict in NI on psychological well-being [3–6]. The NI Study of Health and Stress (NISHS), which is the largest epidemiological study of mental health in NI and part of the World Mental Health (WMH) Survey Initiative, [7] afforded the first opportunity to estimate the level of exposure to traumatic life events and the prevalence of post-traumatic stress disorder (PTSD) and has a methodological advantage over the majority of previous epidemiological studies of PTSD, which focus on PTSD associated with an individual’s self-reported *worst event* [8]. This standard approach does not permit inferences about PTSD risk associated with *typical* traumas because *worst* traumas are atypical and risk of PTSD presumably higher than for more typical traumas [9–11]. The methods used in the present study addressed this issue by assessing PTSD in relation to both the *worst* trauma, as done typically, and then selecting one trauma for each respondent at random from all the lifetime traumas they reported experiencing and assessing PTSD associated with those *random* traumas. The unique methodology of the NISHS, therefore, allows the more accurate estimation of the population burden of typical traumatic events among the NI population. A previous report based on the NISHS estimates that just over 60 % of the NI adult population have experienced a traumatic event at some point in their lifetime. This figure is somewhat lower than the average exposure figure of two-thirds from other national studies [12]. Despite this, 12-month and lifetime estimates of DSM-IV PTSD [13] from NI (5.1 and 8.8 %, respectively) are notably higher than comparable estimates from other Western European countries [14].

One obvious explanation for these elevated rates of PTSD is the mental health legacy of conflict, with individuals in many communities being repeatedly exposed to violence over many years. A number of Israeli studies have examined the mental health impact of exposure to such conflict-related traumatic events over a prolonged period [15–17]. Shalev et al. [17], for example, in their consideration of PTSD as a result of chronic exposure to violence suggest that mass violence caused by malicious intent may be a more virulent precursor to PTSD than other types of trauma. An alternative explanation may be the nature of traumatic events experienced by the NI population, with a

high conditional prevalence or risk of PTSD. The current paper extends analysis of the initial NI report by examining the public health burden of 29 traumatic event types and associated conditional prevalence of PTSD. The paper will consider in particular whether elevated rates of PTSD among the NI population are accounted for by those event types that were persistently experienced during the years of the Troubles.

Method

Sample

The NISHS is the first epidemiological survey of mental health to produce unbiased estimates of a range of mental health and behavioural disorders according to validated international diagnostic criteria, namely DSM-IV and ICD 10 [13, 18]. The NISHS is part of a major international programme of mental health surveys, the WMH Survey Initiative, which is a project of the Assessment, Classification, and Epidemiology (ACE) Group at the World Health Organization (WHO). This collaboration of studies has conducted rigorously implemented representative population studies of mental health, behavioural and substance disorders across the world using the same survey instrument, the Composite International Diagnostic Interview (CIDI) and standardised measures of sampling, assessment and analysis [19].

The NISHS is a representative survey of English-speaking household residents aged 18 years and older in NI. Face-to-face interviews were undertaken by professional interviewers between February 2004 and August 2008 with an overall response rate of 68.4 %. The survey was administered in two parts. Part 1 included a core diagnostic assessment of all respondents ($N = 4,340$). Part 2 included questions about risk factors, correlates, treatment and additional disorders and was administered to all Part 1 respondents with a ‘core’ lifetime disorder plus a probability subsample of other respondents ($n = 1,986$).

The sample was selected under a multi-stage area sample design based on a probability proportional to size (PPS) selection strategy. To achieve an equal probability sample of households, a three-stage area probability sample design was used. In the primary stage, Wards were selected from within each Local Government District (LGD). Within each of the respective Wards two Census Output Areas (COAs) were selected. Finally, a sample of ten dwellings was selected from within each sample COA. The selection of individuals within each household was achieved using Kish tables on household listings [20].

Sample weights

Based on the sample design and information from the NI census, case specific weights were computed to minimise the effects of bias. These weights included information relating to sample selection, non-response and post-stratification factors such as age, sex, and geographical region. An additional weight was applied to adjust for differential selection into Part 2 of the survey. Information on weights and stratification were incorporated into all analyses included in the current paper.

Measures

Experience of lifetime traumatic events

The NISHS assessed the prevalence and correlates of mental and behavioural disorders using the WMH-CIDI version 3.0, [21] a fully structured lay-administered diagnostic interview. Experience of lifetime traumatic events was assessed in a comprehensive PTSD section, which was administered in part 2 of the WMH-CIDI interview. At the beginning of this section, participants were presented with 29 types of traumatic events and asked whether they had experienced them during their lifetime. These 29 individual traumatic event types were categorised into seven broad groupings as follows: ‘war events’ (combat, relief worker in a war zone, civilian in a war zone, civilian in a region of terror, refugee, purposely injured, tortured or killed someone and saw atrocities), ‘physical violence’ (physical abuse by caregiver, physical assault by spouse or romantic partner, physical assault by someone else, mugged or threatened with a weapon, and kidnapped), ‘sexual violence’ (raped, sexually assaulted and stalked), ‘accidents’ (toxic chemical exposure, automobile accident, other life-threatening accident, natural disaster, man-made disaster, and a life-threatening illness), death (unexpected death of a loved one), ‘network events’ involving others (having a child with a serious illness, traumatic event occurring to a loved one, and accidentally causing serious injury or death, witnessing a death, seeing a dead body or someone seriously hurt and witnessing physical fights at home) and ‘other’ (‘other’ event and ‘private’ event).

PTSD assessment

PTSD was assessed in relation to two traumatic events in the PTSD section of the WMH-CIDI. Subsequent to the series of questions on experience of traumatic events, respondents were asked to indicate their ‘worst’ lifetime traumatic experience. In addition, a ‘random event’ was selected from the list of traumatic events reported by each respondent.

Respondents were then asked a series of follow-up questions on PTSD symptomatology (according to DSM-IV criteria) [13] in relation to both their self-reported ‘worst event’ and the ‘random event’. The PTSD A2 criterion was satisfied if an individual responded positively to any one of three questions about whether he/she felt terrified or very frightened, helpless, shocked or horrified or numb at the time of the traumatic event. Individuals were then asked a series of structured questions relating to the three symptom clusters that characterise PTSD, duration of symptoms and levels of functional impairment. This paper specifically reports on the ‘conditional prevalence’ of PTSD associated with a range of traumatic event types. ‘Conditional prevalence’ represents the percentage of individuals that experienced a particular event that subsequently develop PTSD associated with that event.

Socio-demographic correlates

The experience of any lifetime traumatic event and the prevalence of lifetime PTSD were examined in relation to a series of key socio-demographic characteristics. These included sex, age-at-interview (18–29, 30–34, 45–59 and 60+), marital status (married/cohabiting, previously married and never married), educational attainment (low, low-average, high-average and high) and employment status [working, student, homemaker, retired and other (including unemployed)].

Methods of analysis

The number of PTSD episodes was calculated as the mean number of episodes among individuals that had experienced each individual event type or broad event grouping. Similarly, the average duration of PTSD was calculated as the mean duration of the PTSD episode (or residual symptoms, in months) for episodes associated with each individual event type or broad event grouping.

Four logistic regression models [22] were used to explore the association of key socio-demographic characteristics with both the experience of lifetime traumatic events and the prevalence of lifetime PTSD. Logistic regression coefficients and their associated standard errors are presented in the current report as odds-ratios (ORs) with 95 % of confidence intervals. Standard errors were obtained using the Taylor Series linearization method [23] and implemented in the SUDAAN software system [24] to adjust for the clustering of NISHS and applied weighting procedures as described earlier. Multivariate significance was estimated using Wald χ^2 tests based on design-corrected variance-covariance matrices. Statistical significance was determined based on two-sided tests at the 0.05 level.

Results

Experience of traumatic life events

Table 1 shows the prevalence of each of the 29 traumatic life events as well as the prevalence of broad event categories. Almost two-thirds of respondents [60.6 % (1.67)] in the NISHS reported experience of at least one traumatic event during their lifetime. In terms of individual event types, unexpected death of a loved one was the most prevalent [26.7 % (1.23)], followed by civilian in a region of terror [20.8 % (1.27)] and witnessed death/dead body or saw someone seriously hurt [19.1 % (1.22)]. When the 29 specific events are examined as a proportion of all events experienced by the NI population, these three traumatic experiences also account for the highest proportion (unexpected death of a loved one 16.9 %; witnessed death/dead body or saw someone seriously hurt 13.9 % and civilian in a region of terror 8.3 %). Turning to the experience of broad event categories, 28.3 % of respondents experienced a network event (a traumatic event involving loved ones or others), while 26.7 % experienced death of loved one and 26.1 % a war event. Network events accounted for the highest proportion of traumatic events in the population (Table 1; Fig. 1; 22.0 %) followed by accidents (20.6 %) and war events (15.4 %). Among individuals who experienced any traumatic event, the mean number of traumatic event occurrences was 4.1.

The prevalence of lifetime PTSD associated with specific traumatic event types

As reported in a previous paper based on the NISHS data, the lifetime prevalence of PTSD among the NI adult population was 8.8 %. [25] Table 2 shows estimates of the conditional prevalence of PTSD, number of PTSD episodes, the relative PTSD burden and average duration of PTSD in relation to specific event types and broad event groupings. The event associated with the highest conditional prevalence of PTSD was purposely injured, tortured or killed someone (100 %) followed by beaten by a spouse or romantic partner (56.7 %), private event (52.2) and raped (47.8 %). Despite the high level of PTSD risk represented by these events, due to their lower prevalence among the overall population (as reported in Table 1), they jointly account for just 16.8 % of the burden of PTSD. Unexpected death of a loved one accounted for the highest proportion of the overall burden of PTSD (18.6 % of the overall burden), followed by witnessed death/dead body or saw someone seriously hurt (9.4 %) and mugged or threatened with a weapon (7.8 %).

Events categorised as other were associated with the highest conditional prevalence of PTSD (52.2 %) while

33.2 % of individuals that experienced sexual violence had lifetime PTSD. Despite this trend, network events and death accounted for the highest proportion of the overall population burden of PTSD (Table 2; Fig. 2; 20.9 and 18.6 %, respectively), given the higher prevalence of these event categories among the population. The overall conditional prevalence of PTSD (17.6 %) is notably higher than estimates from previous epidemiological studies [26].

Table 2 also highlights statistically significant differences in the mean duration of PTSD ($p < 0.001$) with respect to individual traumatic event types. The event associated with the longest duration of PTSD was refugee with an average duration of 384 months, while stalked was associated with the shortest PTSD duration (9.8 months). Table 2 and Fig. 3 also indicate significant differences in the duration of PTSD associated with traumatic event categories. It was estimated that sexual violence was associated with the longest duration of PTSD with an average of 148.5 months. War events were also related to persistent PTSD with an average duration of 114.6 months. This finding may be a feature of the enduring nature of civil conflict in NI and constant threat of violence over 40 years, as suggested in previous follow-up qualitative studies based on the NISHS [27, 28].

Socio-demographic predictors of lifetime PTSD

Table 3 extends previous results presented from the NISHS on socio-demographic risk factors associated with lifetime PTSD [20].

Experience of any lifetime traumatic event

Considering the first model in Table 3, a limited number of socio-demographic characteristics were significantly associated with the experience of any traumatic event. Sex was significantly predictive of trauma with females less likely than males to have experienced any event (OR = 0.72). Individuals with a low (OR = 0.51) and low-average (OR = 0.60) level of income were significantly less likely to have experienced trauma compared to individuals in the highest income bracket. Finally, employment status was significantly associated with trauma, with individuals in an employment category of other (which includes the unemployed) more than twice as likely to have experienced trauma, compared to the employed.

Lifetime PTSD

In contrast to findings in relation to experience of trauma, females were significantly more likely to have lifetime PTSD among the overall sample (OR = 0 1.91) and among the subsample of individuals who experienced trauma

Table 1 Prevalence of traumatic life events in the Northern Ireland Study of Health and Stress ($N = 1986$)

Event type	Observed <i>N</i>	% Of respondents with event	SE	Mean number of occurrences ^a	SE	Events in this class as percentage of all traumatic events ^b	SE
War events	555	26.1	1.31	1.5	0.06	15.4	0.61
Combat experience	71	3.1	0.45	1	0	1.3	0.17
Relief worker in war zone	36	1.8	0.39	1	0	0.7	0.16
Civilian in war zone	82	3.5	0.56	1	0	1.4	0.21
Civilian in region of terror	441	20.8	1.27	1	0	8.3	0.47
Refugee	30	1.6	0.46	1	0	0.6	0.17
Purposely injured, tortured, or killed someone	7	0.3	0.11	2.7	0.72	0.3	0.13
Saw atrocities	91	3.6	0.48	2	0.16	2.8	0.46
Accidents	509	22.4	1.24	2.3	0.1	20.6	0.89
Toxic chemical exposure	59	2.1	0.37	3.5	0.22	2.9	0.52
Automobile accident	172	8.5	0.89	1.4	0.08	4.7	0.44
Other life-threatening accident	90	4	0.38	1.4	0.11	2.3	0.27
Natural disaster	31	1.4	0.57	1.3	0.15	0.7	0.25
Man-made disaster	163	7	0.64	2.1	0.14	5.8	0.53
Life-threatening illness	196	7.8	0.74	1.4	0.07	4.2	0.44
Physical violence	403	18.3	1.22	1.8	0.09	13.3	0.74
Beaten up by caregiver	57	2.9	0.5	1	0	1.1	0.19
Beaten up by spouse or romantic partner	81	2.6	0.4	1	0	1	0.15
Beaten up by someone else	153	7.3	0.82	1.7	0.1	4.9	0.44
Mugged or threatened with a weapon	219	9.8	0.79	1.5	0.08	5.7	0.5
Kidnapped	33	1.4	0.3	1	0	0.5	0.12
Sexual violence	211	7.8	0.53	2.6	0.24	8.3	0.86
Raped	75	2.8	0.38	2.1	0.23	2.4	0.42
Sexually assaulted	128	4.8	0.42	2	0.24	3.9	0.46
Stalked	77	2.8	0.39	1.8	0.15	2	0.35
Death	591	26.7	1.23	1.6	0.06	16.9	0.87
Unexpected death of loved one	591	26.7	1.23	1.6	0.06	16.9	0.87
Network events	619	28.3	1.43	2	0.07	22	0.8
Child with serious illness	143	5.8	0.61	1.1	0.03	2.6	0.27
Traumatic event to loved one	110	4.9	0.43	1.5	0.13	2.9	0.33
Witnessed death/dead body, or saw someone seriously hurt	403	19.1	1.22	1.8	0.07	13.9	0.68
Accidentally caused serious injury or death	16	0.5	0.14	2.4	0.87	0.5	0.24
Witnessed physical fight at home	121	5.2	0.67	1	0	2.1	0.26
Other	195	8.4	0.7	1.1	0.02	3.6	0.27
Some other event	106	4.4	0.51	1	0	1.7	0.19
Private event	104	4.6	0.55	1	0	1.8	0.22
Total with any event	1,287	60.6	1.67	4.1	0.14	100	0

^a Mean number of occurrences among respondents with any event. For 7 event groupings, $\chi^2 = 365.1$, $p < 0.001$. For individual events, $\chi^2 = 344.9$, $p < 0.001$

^b Events in this class as a percentage of all traumatic events

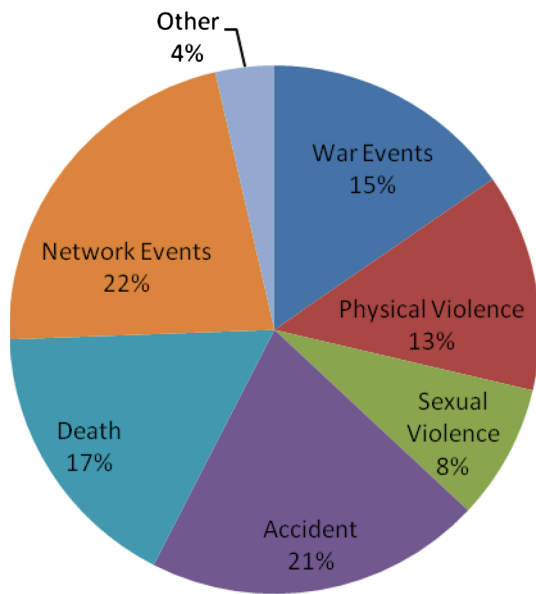


Fig. 1 Proportional breakdown of all traumatic events by event category

(OR = 1.94), even after controlling for events (OR = 1.73). Age-group similarly displayed consistent predictive patterns across all three PTSD models. Individuals in all age-groups were significantly more likely to have lifetime PTSD compared to those aged 65+. Marital status also represented a significant risk factor for PTSD. Specifically, among the overall sample, those who were previously married were almost twice as likely to have lifetime PTSD (OR = 1.87). Considering the subsequent models examining PTSD among individuals who experienced trauma, these odds increased to 2.42 and 2.64, respectively. Finally, in addition to increased risk of trauma exposure, respondents with an employment status of other are shown to be at particular risk of PTSD. The final PTSD model also shows that among those who experienced trauma, retirees were almost three times as likely (OR = 2.61) to have lifetime PTSD (having controlled for events).

Discussion

The current paper extends the initial PTSD report based on the NISHS by examining a comprehensive range of traumatic event types and their relative PTSD impact. The paper also includes a focused consideration of the potential PTSD burden associated with traumatic events that was characteristic of the ‘Troubles’ and thus enriches the discussion about the reasons explaining elevated rates of PTSD in NI and also contributes to the literature on the mental health effects of chronic exposure to civil conflict.

The study has important clinical implications by identifying the types of traumatic events most prominent among the NI population and those associated with the highest conditional prevalence and greatest public health burden. Furthermore, through examination of socio-demographic indicators and their association with trauma exposure and PTSD, this report highlights the characteristics of individuals who are most at risk of trauma exposure and PTSD, and who may benefit from targeted interventions and provision of trauma-related services.

Among NISHS respondents, the most prevalent individual traumatic events types were unexpected death of a loved one, civilian in a region of terror and witnessed death/dead body, or saw someone seriously hurt. These events types characterised daily life for many communities in NI during more than 30 years of civil conflict [3, 29] and in terms of their relative public health impact, collectively they accounted for almost 40 % of all event types experienced. The most prevalent broad event grouping was network events, experienced by 28.3 % of respondents and accounting for 22 % of all events experienced. The elevated prevalence of unexpected death and witnessing death/dead body, or saw someone seriously hurt mirrors findings from other epidemiological studies [30–32]. Despite these similarities, the high prevalence of being a civilian in a region of terror found in the NISHS does not coincide with results from other studies. For example, Darvez-Bornoz et al. [14] found that just 2.3 % of respondents reported experiencing this event type during their lifetime.

The overall conditional prevalence of PTSD in NI (17.6 %) is notably higher than estimates from previous studies [10, 11, 33]. Therefore, while a moderate proportion of the population have experienced at least one lifetime traumatic event, adults in the NI population are more likely to go on to develop PTSD following exposure to trauma. As alluded to previously, this finding may reflect the cumulative impact of mass exposure of the NI adult population to chronic trauma for numerous decades. In a study conducted in two communities in Israel following 10 months of escalating hostilities against civilians, Shalev et al. [16] found elevated rates of PTSD among civilians directly and indirectly exposed to terror-related events. While the duration of conflict or time lapse since conflict in the current study is not directly comparable to period of violence considered in the aforementioned Israeli study, findings presented in this paper suggest that the adverse mental health effects of such mass exposure to conflict may endure for more than a decade following formal cessation of violence. Using survival analysis based on a representative study of the US population, Kessler et al. [33] confirm that a substantial proportion of individuals with PTSD fail to recover even after many years. Coinciding with

Table 2 Risk of lifetime PTSD, number of PTSD episodes, population burden and duration of PTSD associated with traumatic life events in the Northern Ireland Study of Health and Stress ($N = 1,986$)

Event type	% PTSD probability ^a	SE	PTSD episodes ^b	SE	% Relative PTSD burden ^c	SE	Mean PTSD Duration (months) ^d	SE
War events	10.5	3.7	4.1	1.49	9.2	3.21	114.6	38.36
Combat experience	34.3	16.73	1.1	0.6	2.4	1.34	125.2	6.17
Relief worker in war zone	0	0	–	–	–	–	–	–
Civilian in war zone	2.2	1.7	0.1	0.02	0.2	0.06	96	0
Civilian in region of terror	2.9	1.83	0.6	0.38	1.4	0.85	56.9	52.85
Refugee	7.8	8.5	0.1	0.16	0.3	0.36	384	0
Purposely injured, tortured, or killed someone	100	0	0.7	0.3	1.6	0.69	240	0
Saw atrocities	20.6	10.84	1.4	0.87	3.3	1.92	45.9	19.08
Accidents	10	3.31	5.1	1.71	11.7	3.93	88.8	44.84
Toxic chemical exposure	0	0	–	–	–	–	–	–
Automobile accident	9	5.88	1.1	0.68	2.4	1.56	58.2	11.32
Other life-threatening accident	19.8	16.86	1.1	1.02	2.6	2.32	46.3	55.05
Natural disaster	0	0	–	–	–	–	–	–
Man-made disaster	16.1	6.61	2.3	0.94	5.3	2.21	138.6	63.7
Life-threatening illness	5.9	2.6	0.6	0.25	1.4	0.56	33.9	14.91
Physical violence	21.8	6.47	7.3	2.14	16.5	4.02	81.4	23.69
Beaten up by caregiver	21.3	16.11	0.6	0.55	1.4	1.13	182.4	114.47
Beaten up by spouse or romantic partner	56.7	14.62	1.5	0.36	3.3	0.83	71.2	30.76
Beaten up by someone else	12.6	8.1	1.5	1.07	3.5	2.36	25.6	7.86
Mugged or threatened with a weapon	23.8	11.5	3.4	1.58	7.8	3.29	80.5	36.24
Kidnapped	17.4	15.07	0.2	0.2	0.5	0.43	260.1	58.84
Sexual violence	33.2	6.07	6.9	1.39	15.6	2.31	148.5	37.21
Raped	47.8	9.5	2.8	0.58	6.4	1.24	178.7	89.04
Sexually assaulted	21.8	7.53	2.1	0.75	4.8	1.55	231.7	46.47
Stalked	38	17.47	1.9	0.9	4.3	1.79	9.8	5.06
Death	19.4	3.84	8.2	1.53	18.6	3.53	69.5	16.11
Unexpected death of loved one	19.4	3.87	8.2	1.53	18.6	3.53	69.5	17.22
Network events	16.7	4.31	9.2	2.49	20.9	4.5	74.7	17.66
Child with serious illness	18.4	5.2	1.2	0.38	2.7	0.86	48.2	16.08
Traumatic event to loved one	42.2	16.53	3	1.15	6.9	2.29	75.9	27.19
Witnessed death/dead body, or saw someone seriously hurt	11.8	4.81	4.1	1.9	9.4	3.86	34.1	11.56
Accidentally caused serious injury or death	0	0	–	–	–	–	–	–
Witnessed physical fight at home	16.5	7.26	0.9	0.34	1.9	0.76	302.1	134.8
Other	35.7	8.28	3.4	0.63	7.6	1.5	69.2	17.95
Some other event	21.7	7.1	0.9	0.28	2.1	0.67	91.1	21.46
Private event	52.2	11.88	2.4	0.62	5.5	1.38	58.5	22.75
Total with any event	17.6	3.87	44.2	9.8	100	0	91.1	22.44

^a Probability of PTSD among events of this class ($\chi^2 = 3.0$, $p = 0.015$) and individual trauma type ($\chi^2 = 13.5$, $p < 0.001$)

^b Number of lifetime-to-date episodes of PTSD associated with this class of events and individual type of trauma per 100 respondents

^c Percentage of all PTSD cases associated with events in this class and individual type of trauma

^d Mean duration of PTSD episode (or residual symptoms, in months) for episodes associated with events in this class ($\chi^2 = 4.9$, $p = 0.552$) and individual trauma type ($\chi^2 = 315.9$, $p < 0.001$)

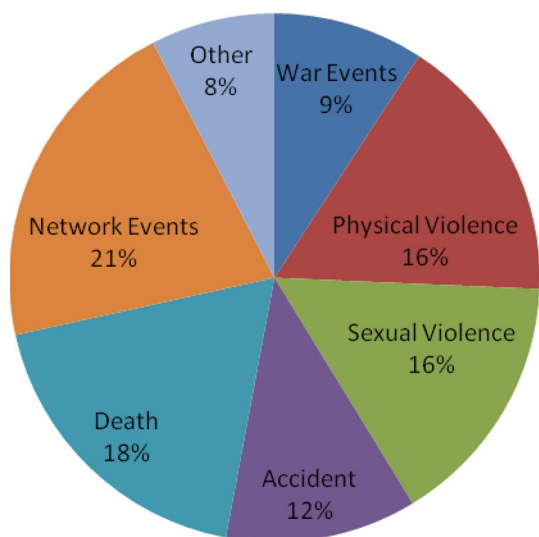


Fig. 2 Percentage of all lifetime PTSD cases associated with traumatic event categories

previous findings, the relative risk of PTSD varied substantially with respect to traumatic event type. Purposely injured, tortured, or killed someone, domestic violence (i.e. beaten by spouse or romantic partner), private event and rape were associated with a high conditional prevalence of PTSD (100, 56.7, 52.2 and 47.8 %, respectively). The broad trauma groupings with the highest risk of PTSD were other events and sexual violence. Findings in relation to domestic violence and rape are again consistent with previous studies [34]. It should be highlighted, however, that relative risk of PTSD associated with specific events has been shown to vary substantially by gender [35] and therefore an extension to the current report may be an examination of the differential experience and impact of traumatic event types by gender.

The finding in relation to perpetration of violence (purposely injured, tortured or killed someone), which has also been reported in a number of previous studies, [36, 37] is particularly important within the NI context. Over the course of 30 years of civil conflict, there were almost 4,000 deaths directly linked to the violence. Sutton’s index on ‘Troubles-related’ deaths [38] highlights that the majority of these deaths were perpetrated by organised groupings, namely republican and loyalist paramilitary organisations and British security. While no available information exists on the extent of paramilitary group membership, these estimates of ‘Troubles-related’ deaths and the group responsible, as well as the extent of shootings, bombings and riots also perpetrated by these organisations over many years may well explain the high conditional risk of PTSD linked to this event type. The high conditional prevalence of PTSD associated with perpetration is consistent with the work by Litz et al. [39] on moral injury and PTSD, specifically that doing ‘evil’ has negative mental health consequences for those who admit to doing ‘evil’. This finding emphasizes the issue of mental health needs among perpetrators of violence and whether these individuals merit the same resources/treatments as those who were ‘victims’.

While the aforementioned event types reflect those associated with the highest conditional prevalence of PTSD, the overall burden of PTSD among the population is determined by a combination of the prevalence of exposure to event types and their conditional risk. Given their high/moderate prevalence among the population coupled with a moderate to high-average risk of PTSD, events that were characteristic of the ‘Troubles’ including unexpected death, witnessing death/dead body or saw someone seriously hurt and mugged or threatened with a weapon accounted for the greatest proportion of PTSD burden.

Fig. 3 Mean duration of PTSD symptoms by traumatic event category

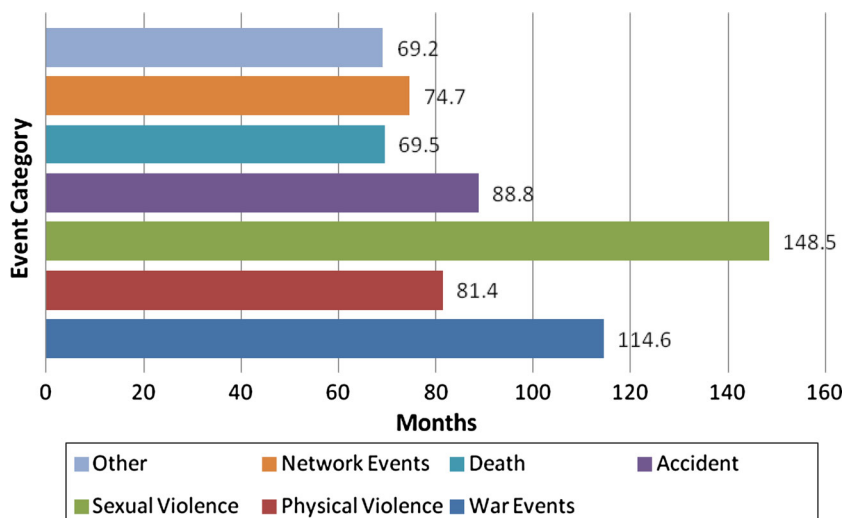


Table 3 The association of socio-demographic risk factors with experience of traumatic life events and lifetime PTSD in the Northern Ireland Study of Health and Stress

Variable	Experience of any traumatic life event			Lifetime PTSD OR (OR range)								
				Among total sample			Among those who experienced trauma			Among those who experienced trauma, controlling for events		
	OR	Lower OR	Upper OR	OR	Lower OR	Upper OR	OR	Lower OR	Upper OR	OR	Lower OR	Upper OR
Sex												
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.72*	0.57	0.92	1.91*	1.19	3.05	1.94*	1.27	2.97	1.73*	1.10	2.72
Age (years)												
18–29	0.72	0.38	1.37	2.65*	1.14	6.18	5.38*	1.72	16.82	5.80*	1.83	18.37
30–44	0.90	0.55	1.47	2.44*	1.40	4.23	3.58*	1.35	9.51	3.74*	1.17	12.00
45–59	1.16	0.73	1.82	2.82*	1.79	4.43	2.42*	1.07	5.46	2.64*	1.04	6.72
60+	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Marital status												
Married	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Previously married	1.07	0.75	1.54	1.87*	1.19	2.94	2.24*	1.31	3.82	2.44*	1.38	4.30
Never married	0.88	0.65	1.18	1.13	0.66	1.91	1.33	0.69	2.56	1.42	0.71	2.84
Education country-specific												
Low	0.51*	0.28	0.94	0.87	0.32	2.35	1.23	0.40	3.84	1.32	0.42	4.13
Low-average	0.72	0.50	1.02	1.02	0.50	2.11	1.46	0.62	3.41	1.39	0.56	3.44
High-average	0.60*	0.43	0.86	0.82	0.48	1.39	1.19	0.59	2.42	1.12	0.53	2.35
High	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Employment status												
Working	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Student	0.53	0.24	1.16	0.70	0.25	1.98	1.61	0.38	6.83	0.85	0.21	3.39
Homemaker	0.83	0.51	1.35	0.98	0.54	1.80	1.04	0.44	2.44	1.01	0.41	2.49
Retired	1.14	0.71	1.85	1.60	0.96	2.67	2.10	0.97	4.56	2.61*	1.11	6.12
Other incl unemployed	2.10*	1.28	3.42	4.21*	2.34	7.58	2.85*	1.32	6.16	2.41*	1.11	5.25

OR odds ratio

* Statistically significant ($p < 0.05$)

In relation to experience of lifetime traumatic events, few socio-demographic predictors were identified. As consistently reported in previous studies, males were significantly more likely than females to have experienced a lifetime trauma [11, 14] although this overall finding may well mask important gender variations with respect to type of trauma experienced [35]. Lower levels of income were associated with a decreased risk of trauma exposure compared to those with the highest income level. This finding is somewhat surprising given previous findings with respect to the association of socio-economic status (SES) and trauma [40] and also given the concentration of ‘Troubles-related’ violence in areas of relative deprivation [3, 41]. It may, however, be partly explained by the fact that ‘Troubles-related’ violence affected many members of the security forces and medical personnel for example, [42, 43]

representing professionals in higher income brackets. Exposure to trauma, however, was also significantly associated with an employment status of other (which includes those who were unemployed), which is not consistent with these arguments in relation to SES. Further research into the relationship between income, employment status and experience of trauma is required to disentangle this series of findings.

While risk of trauma exposure was higher among males, females displayed a higher risk of PTSD across all models considered, even after controlling for trauma exposure. Once again, these results reflect consistent previous findings with respect to gender differences and PTSD [44, 45]. The association of PTSD with younger age-groups reflects wider findings on the relationship between age-group and mental health disorders. A range of previous studies has

shown significantly lower levels of mental ill health among individuals in the oldest age category [46–48]. A number of potential factors may be related to this trend including the potential effects of recall bias, the exclusion of individuals living in residential and nursing homes and premature mortality among individuals with mental health disorders such as PTSD among this age-group, accounting for lower levels of PTSD. The current report also confirms findings suggested in a previous report regarding marital status as a risk factor for lifetime PTSD [25]. This series of associations may reflect the protective nature of marriage against mental ill health [49] or trauma exposure as an influencing factor in marital strife [50].

Results presented within the current report should be considered with a number of limitations in mind. First there are limitations relevant to all WMH Survey Initiative studies, which have been reported by Wang et al. [51] and also documented in previous NISHS reports [52, 53]. There are also a number of potential limitations relating to reporting of trauma exposure. The first relates to retrospective reporting of lifetime traumatic events. It is possible for example, where individuals have experienced multiple traumatic events, that they may be more likely to report those events that were most severe or distressing with the omission of others. In addition, with specific relevance to NI, due to the standardised nature of the WMH-CIDI, questions about traumatic event types did not elicit information on whether traumatic experiences were associated with the NI ‘Troubles’. It is therefore difficult to determine how NISHS respondents interpreted the 29 pre-defined event types.

Implications

Findings in the current report reflect the fact that the overall population burden of PTSD is shaped by both the prevalence of traumatic events and their associated risk of PTSD development. Events that are most typically associated with PTSD such as rape and sexual assault and other assaultive violence represent high risk events in terms of PTSD development among the NI population, but account for just a small proportion of the overall burden given their relatively lower prevalence compared to events involving higher exposure levels such as violence associated with the NI ‘Troubles’. These key findings have potential implications for different levels of prevention and intervention among individuals with or at risk of PTSD. First, targeted strategies may be required for the relatively small number of people who experience ‘*high risk*’ traumas. Second, there are large numbers of individuals among the NI population exposed to common events with a lower risk of PTSD development. These individuals may well benefit from psychological first

aid or psychological education so that the relatively lower proportion that develops moderate or severe mental health problems can self-identify and access treatment. Finally, provision must be made for the large number of individuals within communities in NI that experienced repeated traumatisation, both directly and indirectly, for numerous decades during the conflict. Services must be tailored to meet the needs of these individuals who currently suffer chronic PTSD and potentially other chronic mental health disorders as a result of their past experience.

There has been substantial debate within the trauma research community in recent years about the PTSD Criterion A issue and whether or not the range of qualifying traumatic events has become too inclusive, incorporating *normal* life events [54–56]. Bensimon et al. [57] in their consideration of the relevance of Criterion A changes for nations exposed to persistent and constant terror, suggest that the criteria for PTSD appear largely to be influenced by North American or European cultures, which fail to take account of such persistent terror. While the release of DSM-V in May 2013 brought the removal of the PTSD A2 criteria, Bensimon et al. argue that for nations such as Israel that have been exposed to persistent terror, subjective element of Criterion A (A2) may in fact be more relevant than the specific event types experienced (A1). The current study reinforces the need for a global perspective, which considers the cultural context within which events are experienced.

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Ethical standard This study was approved by the University of Ulster Research Ethics and Governance Committee. All participants in the NISHS gave written informed consent before taking part.

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

1. Northern Ireland Statistics and Research Agency (NISRA) (2010). Historical Mid-Year Population Estimate Publications.

- Home Population by sex & single year of age. NISRA. <http://www.nisra.gov.uk/demography/default.asp17.htm>. Accessed 17 July 2012
2. Ferry FR, Bolton D, Bunting BP, O'Neill SM, Murphy SD (2010) The experience and psychological impact of 'Troubles' related trauma in Northern Ireland: a review. *Ir J Psychol* 31:95–110
 3. Fay MT, Morrissey M, Smyth M, Wong T (1999) The cost of the troubles study: report on the Northern Ireland survey. The experience and impact of the Troubles. INCORE, Belfast
 4. Cairns E, Mallett J, Lewis C, Wilson R (2003) Who are the Victims? Self-assessed victimhood and the Northern Irish conflict. NIO Statistics and Research Branch
 5. Muldoon O, Schmid K, Downes C, Kremer J, Trew K (2005) The legacy of the Troubles: experience of the Troubles, mental health and social attitudes. Queen's University, Belfast
 6. O'Reilly D, Stevenson M (2003) Mental health in Northern Ireland: have "the troubles" made it worse? *J Epid Comm Health* 57:488–492
 7. Kessler RC, Üstün TB (2008) The WHO world mental health Surveys: global perspectives on the epidemiology of mental disorders. Cambridge University Press, New York
 8. Breslau N (2002) Epidemiological studies of posttraumatic stress disorder, and other psychiatric disorders. *Can J Psychiatry* 47:923–929
 9. Stein MB, Walker JR, Hazen AL, Forde DR (1998) Full and partial posttraumatic stress disorder: findings from a community survey. *Arch Gen Psychiatry* 55:626–632
 10. Breslau N, Kessler RC, Chilcoat HD, Schultz L, Davis GC, Andreski P (1998) Trauma and posttraumatic stress disorder in the community: The 1996 Detroit Area Survey of Trauma. *Arch Gen Psychiatry* 55:626–632
 11. Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB, Breslau N (1999) Epidemiological risk factors for trauma and PTSD. In: Yehuda R (ed) Risk factors for posttraumatic stress disorder. American Psychiatric Press, Washington DC
 12. Galea S, Nandi A, Vlahov D (2005) The epidemiology of post-traumatic stress disorder after disasters. *Epidem Rev* 27:78–91
 13. American Psychiatric Association (1994) Diagnostic and statistical manual of mental disorders, 4th edn. American Psychiatric Association, Washington DC
 14. Darves-Bornoz J-M, Alonso J, de Girolamo G, de Graaf R, Haro J-M, Kovess-Mastefy V et al (2008) Main traumatic events in Europe: PTSD in the European Study of the Epidemiology of Mental Disorders Survey. *J Trauma Stress* 21:455–462
 15. Bleich A, Gelkoph M, Melamed Y, Solomon Z (2006) Mental health and resiliency following 4 months of terrorism: a survey of an Israeli national representative sample. *BMC Med* 4:21
 16. Shalev AY, Tuval R, Frenkiel-Fishman S, Hadar H, Eth S (2006) Psychological responses to continuous terror: a study of two communities in Israel. *Am J Psychiatry* 163:667–673
 17. Shalev AY, Tuval-Mashiach R, Hadar H (2004) Posttraumatic stress disorder as a result of mass trauma. *J Clin Psychiatry* 65(Suppl 1):4–10
 18. World Health Organization (1992) The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines. WHO, Geneva
 19. Kessler RC, Berglund P, Chiu WT, Demler O, Heeringa S, Hiripi E et al (2004) The US national comorbidity survey replication (NCS-R): design and field procedures. *Int J Methods Psychiatr Res* 13:69–92
 20. Kish L (1965) Survey sampling. Wiley, New York
 21. Kessler RC, Üstün TB (2008) The world health organization composite international diagnostic interview. In: Kessler R, Üstün T (eds) The WHO world mental health Surveys: global perspectives on the epidemiology of mental disorders. Cambridge University Press, New York, pp 58–90
 22. Hosmer DW, Lemeshow S (1989) Applied logistic regression. Wiley, New York
 23. Wolter KM (1985) Introduction to variance estimation. Springer, New York
 24. SUDAAN (2002) Version 8.01. Research Triangle Institute, Research Triangle Park, NC
 25. Bunting BP, Ferry FR, Murphy SD, O'Neill SM, Bolton D (2013) Conflict-related trauma and the epidemiology of posttraumatic stress disorder in Northern Ireland: evidence from the Northern Ireland Study of Health and Stress. *J Trauma Stress* 26:134–141. doi:10.1002/jts.21766
 26. Frans O, Rimmo PA, Aberg L, Friedrikson M (2005) Trauma exposure and post-traumatic stress disorder in the general population. *Acta Psychiatr Scand* 111:291–299
 27. Ferry FR, Bolton D, Bunting BP, O'Neill SM, Murphy SD, Devine B (2012) Ageing, Health and Conflict. An investigation of the experience and health impact of 'Troubles-related' trauma among older adults in Northern Ireland. Bamford Centre for Mental Health and Wellbeing and the Northern Ireland Centre for Trauma and Transformation, Londonderry
 28. Ferry F, Bolton D, Bunting B, Devine B, McCann S, Murphy S (2008) Trauma, health and conflict in Northern Ireland. A study of the epidemiology of trauma related disorders and qualitative investigation of the impact of trauma on the individual. Northern Ireland Centre for Trauma and Transformation and University of Ulster Psychology Research Institute, Londonderry
 29. Northern Ireland Statistics & Research Agency (2010) Northern Ireland Omnibus Survey. The Northern Ireland Statistics & Research Agency, Belfast
 30. Perkonig A, Kessler RC, Storz S, Wittchen H (2000) Traumatic events and post-traumatic stress disorder in the community: prevalence, risk factors and comorbidity. *Acta Psychiatr Scand* 101:46–59
 31. Norris FH (1992) Epidemiology of trauma—frequency and impact of different potentially traumatic events on different demographic groups. *J Consult Clin Psychol* 60:409–418
 32. Breslau N, Davis GC, Andreski P, Peterson E (1991) Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Arch Gen Psychiatry* 48:216–222
 33. Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB (1995) Posttraumatic stress disorder in the national comorbidity survey. *Arch Gen Psychiatry* 52:1048–1060
 34. Creamer M, Burgess P, McFarlane AC (2001) Post-traumatic stress disorder: findings from the Australian National Survey of Mental Health and Well-being. *Psychol Med* 31:1237–1247
 35. Tolin DF, Foa EB (2006) Sex differences in trauma and post-traumatic stress disorder: a quantitative review of 25 years of research. *Psychol Bull* 132:959–992
 36. Stein DJ, Williams SL, Jackson PB, Seedat S, Myer L, Herman A et al (2009) Perpetration of gross human rights violations in South Africa: association with psychiatric disorders. *S Afr Med* 99:390–395
 37. Orcutt HK, King LA, King DW (2003) Male-perpetrated violence among Vietnam veteran couples: relationships with veteran's early life characteristics, trauma history, and PTSD symptomatology. *J Trauma Stress* 16:81–390
 38. Sutton M (2001) Bear in mind these dead. An Index of Deaths from the Conflict in Ireland 1969–1993. Updated database of Troubles-related deaths. CAIN: Beyond the Pale Publications, <http://cain.ulst.ac.uk/sutton/updates.html>. Accessed 17 July 2012
 39. Litz BT, Stein N, Delaney E, Lebowitz L, Nash WP, Silva C et al (2009) Moral injury and moral repair in war veterans: a

- preliminary model and intervention strategy. *Clin Psychol Rev* 29:695–706
40. Hatch SL, Dohrenwend BO (2007) Distribution of traumatic and other stressful life events by race/ethnicity, gender, SES and age: a review of the research. *Am J Community Psychol* 40:313–332
 41. Smyth M, Morrissey M, Hamilton J (2001) *Caring through the Troubles: Health and Social Services in Northern and West Belfast*. North & West Belfast Health and Social Services Trust
 42. Luce A, Firth-Cozens J (2002) Effects of the Omagh bombing on medical staff working in the local NHS trust: a longitudinal survey. *Hosp Med* 63:44–47
 43. Luce A, Firth-Cozens J, Midgley S, Burges C (2002) After the Omagh bomb: posttraumatic stress disorder in health service staff. *J Trauma Stress* 15:27–30
 44. Stein MB, Walker JR, Forde DR (2000) Gender differences in susceptibility to posttraumatic stress disorder. *Behav Res Ther* 38:619–628
 45. Breslau N (2002) Gender differences in trauma and posttraumatic stress disorder, and other psychiatric disorders. *Can J Psychiatry* 47:923–929
 46. Bijl RV, Ravelli A, van Zessen G (1998) Prevalence of psychiatric disorder in the general population: results of The Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Soc Psychiatry Psychiatr Epid* 33:587–595
 47. Arababzadeh-Bouchez S, Gasquet I, Kovess-Masfety V, Negres-Pages L, Lépine J-P (2008) The prevalence of mental disorders and service use in France: results from a national survey 2001–2002. In: Kessler R, Üstün T (eds) *The WHO world mental health Surveys: global perspectives on the epidemiology of mental disorders*. Cambridge University Press, New York, pp 305–330
 48. Kessler RC, Berglund PA, Chiu WT, Demlar O, Glantz M, Lane MC et al (2008) The national comorbidity survey replication (NCS-R): the cornerstone in improving mental health and mental health care in the United States. In: Kessler R, Üstün T (eds) *The WHO world mental health Surveys: global perspectives on the epidemiology of mental disorders*. Cambridge University Press, New York, pp 165–210
 49. Wade TJ, Pevalin DJ (2004) Marital transitions and mental health. *J Health Soc Behav* 45:155–170
 50. Broman CL, Riba ML, Trahan MR (1996) Traumatic events and marital wellbeing. *J Marriage Fam* 58(4):908–916
 51. Wang PS, Lane M, Olfson M, Pincus HA, Wells KB, Kessler RC (2005) Twelve-month use of mental health services in the United States; results from the national comorbidity survey replication. *Arch Gen Psychiatry* 62:629–640
 52. Bunting BP, Murphy SD, O’Neill SM, Ferry FR (2012) Lifetime prevalence of mental disorders and delay in treatment following initial onset: evidence from the Northern Ireland Study of Health and Stress. *Psychol Med* 42:1727–1739
 53. Bunting BP, Murphy SD, O’Neill SM, Ferry FR (2012) Prevalence and treatment of 12-month DSM-IV disorders in the Northern Ireland Study of Health and Stress: an epidemiological study. *Soc Psychiatry Psychiatr Epidemiol*. doi:10.1007/s00127-012-0518-5
 54. Breslau N, Kessler RC (2001) The stressor criterion in DSM-IV posttraumatic stress disorder: an empirical investigation. *Biol Psychiatry* 50:699–704
 55. Brewin CR, Laniou RA, Novac A, Schnyder U, Galea S (2009) Reformulating PTSD for DSM-V: life after Criterion A. *J Trauma Stress* 22:366–373
 56. Kilpatrick DG, Resnick HS, Acierno R (2009) Should PTSD Criterion A be Retained? *J Trauma Stress* 22:374–387
 57. Bensimon M, Horesh D, Solomon Z (in print) The utility of Criterion A under chronic national terror. *Israel J Psychiatry*