Journal of Traumatic Stress
June 2015, *28,* 191–197

ISTSS International Society for Traumatic Stress Studies

The Economic Burden of PTSD in Northern Ireland

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The objective of this study was to estimate the economic costs of posttraumatic stress disorder (PTSD) among the Northern Ireland (NI) adult population. The authors present a prevalence-based, bottom-up study based primarily on data from 1,986 participants in the Northern Ireland Study of Health and Stress (NISHS). Both direct costs of treatment and indirect costs of productivity losses were included. Units of service and medication resource use were obtained from the NISHS and combined with their relevant unit costs from the Personal Social Services Research Unit and Prescription Costs Analysis data for NI. Indirect costs included the costs of incapacity days due to PTSD and presenteeism costs, with gender-specific wage rates used as the relevant unit costs. The total direct and indirect cost of PTSD in NI (2008) was £172,756,062. This figure is likely to be conservative due to the exclusion of a number of cost categories. Nevertheless, comparison of estimates of the burden of PTSD with the estimated cost of treating all adults with PTSD with the recommended treatments shows the potential for substantial economic gains to be made through extension and investment in effective evidence-based treatments.

In recent years there has been an increasing body of research into the economic impact of mental health disorders. The majority of studies in this area have, however, focused on depression, broad categories of anxiety disorders, or mental illness in general (McCrone, Dhanasiri, Patel, Knapp, & Lawton-Smith, 2008; London School of Economics and Political Science, 2006; Northern Ireland Association for Mental Health, 2004; Stoudemire, Frank, Hedemark, Kamlet, & Blazer, 1986; Thomas & Morris, 2003). In 2003, McCrone and colleagues noted that there had been no health economic cost-of-illness studies specifically focusing on the economic impact of posttraumatic stress disorder (PTSD) on the general population (McCrone, Knapp, & Cawkill, 2003). The literature review for this study confirmed that since 2003, no studies had been published that we could locate in relation to the economic costs of PTSD in the general population, or other special populations.

The study of PTSD and its associated societal economic impact is particularly relevant for NI, given the recent history of over three decades of violent civil conflict, primarily centered on nationalist and unionist tensions. During this period of civil unrest, known as "The Troubles," shootings, bombings, and riots were a daily occurrence in many communities, resulting in a high proportion of the population experiencing the effects of violence either directly or indirectly over many years (Fay, Morrissey, Smyth, & Wong, 1999). Even though the civil conflict officially ended with the signing of the Good Friday agreement in 1998, further sporadic violent attacks have continued in the ensuing decades. These decades of persistent violence and exposure to psychological trauma have left a legacy of mental ill health among individuals and families in NI.

Based on an analysis of data from the Northern Ireland Study of Health and Stress (NISHS), Bunting and colleagues provided the first representative estimates of traumatic experiences, PTSD, and other mental health disorders associated with trauma among the NI adult population (Bunting, Ferry, Murphy, O'Neill, & Bolton, 2013; Bunting, Murphy, O'Neill, & Ferry, 2013). The study showed that 61% of the population had experienced a traumatic event at some point in their lifetime,

The research team gratefully acknowledge the financial support and guidance provided by Dr. Peter Warrian and the Lupina Foundation in the completion of this study. The study draws upon primary data derived from the Northern Ireland Study of Health and Stress (NISHS) and is based on findings from the report, The Economic Impact of Post Traumatic Stress in Northern Ireland (Ferry, Bolton, Bunting, O'Neill, Murphy, & Devine, 2011). The support of the Research & Development Office of Northern Ireland in funding the original NISHS is gratefully acknowledged. Thanks are also extended by the research partnership to the following individuals and departments who have contributed data and information to the report and provided analytical advice: Sandy Fitzpatrick and Ricky McLoughlin, HSC Business Services Organisation; Carol Brunton, Department for Social Development, Analytical Services Unit; and Professor John Brazier, University of Sheffield.

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DOI: 10.1002/jts.22008

and 39% have had one or more traumatic experiences linked to the conflict. One of the most striking findings to emerge from this initial investigation was that NI had the highest rates of PTSD among comparable estimates from other countries around the world. Over 5% of the population were estimated to have had PTSD in the previous 12-months, and 8.8% of adults to have had PTSD at some point in their life. Lifetime prevalence estimates from other countries range from 1.5% in Israel (Levinson, Lerner, Zilber, Levav, & Polakiewicz, 2008) and Mexico (Medina-Mora et al., 2008) to 6.8% in the United States (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995).

Despite the comparatively high rate of PTSD among the adult population, 51.9% of individuals with 12-month PTSD received treatment from any healthcare professional (Bunting et al., 2013a). Additionally, though people with depression and other mood disorders on average seek help within 12 months of the onset of their symptoms, people with anxiety disorders (such as PTSD) wait an average of 22 years before seeking help (Bunting et al., 2012).

This series of figures provides an insight into the scale and chronicity of mental health needs associated with PTSD and related disorders and a strong rationale for the examination of the economic consequences of psychological trauma and PTSD. Given the elevated rates of PTSD, delays in help-seeking and evidence of a low proportion of individuals receiving effective services, it is clear there are substantial levels of unmet and chronic need. This combination undoubtedly has major enduring and aggregating economic implications for individuals, families, employers, government, and wider society due to lost productivity at home and in the workplace.

Here we present the first cost-of-illness study specifically focusing on the societal economic burden of PTSD among the general adult population of NI using nationally representative data. Aside from contribution to the literature, this study aimed to increase awareness among policy makers, planners, commissioners, service providers, service users, and the wider public of the extent of the public health burden of PTSD among the general population and the associated adverse economic implications.

The current study adopts a similar methodology to a previous study by Thomas and Morris (2003), in their estimation of the economic cost of depression in England, which represents a standardised approach to cost-of-illness analysis widely used in similar research.

A prevalence-based, bottom-up approach was used to estimate the total cost of PTSD among adults aged 18 and over years in NI within a 1-year period. Specifically, this cost-of-illness study estimated the direct and indirect economic burden of all prevalent cases of PTSD in NI in 2008 (the year in which the data collection took place). Direct costs incorporated the cost of visits to service providers and the cost of medication among individuals who met criteria according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., *DSM-IV*; American Psychiatric Association, 1994) for 12-month PTSD. Indirect costs captured the cost of reduced productivity associated with incapacity days among this subgroup and also the cost of presenteeism or reduced productivity while at work.

Method

Participants and Procedure

The data for analysis came largely from the NISHS, one of over 30 national World Mental Health (WMH) Survey Initiative studies being undertaken under the auspices of the World Health Organisation (WHO; Kessler & Üstün, 2008a). All studies were coordinated and supervised by Harvard University. Households were selected using a multistage, clustered, area probability sample based on the structure and information from the 2001 NI Census. The total number of participants was 4,340 and the response rate was 68.4%. Face-to-face interviews were undertaken by trained interviewers from February 2004 to August 2008. Case-specific weights, including information on sample selection, nonresponse, and poststratification demographic variables, were applied to the data to minimize the effects of bias.

The WMH Composite International Diagnostic Interview (WMH-CIDI; Kessler & Üstün, 2008b) was used to investigate the prevalence of mental disorders based on validated diagnostic criteria. The WMH-CIDI used to elicit information from NISHS participants included a detailed PTSD section administered to a subsample of 1,986 participants. At the beginning of this section, participants were asked about 29 traumatic events that they may have experienced in their lifetime. If an individual endorsed a specific traumatic event, she or he was subsequently asked more detailed questions about symptoms, duration of symptoms, and impact on functionality. Responses were processed using statistical algorithms that identified individuals who met the criteria for 12-month and lifetime *DSM-IV* PTSD.

Measures

The NISHS dataset also contained detailed information on service use and medication, work performance, and rates of employment among individuals with 12-month PTSD. The service use section of the NISHS provided information on the number of visits to general practitioners, counsellors, social workers, psychiatrists, psychologists, other mental health and medical professionals, healers, and number of hospital stays for problems with emotions, nerves, or mental health. Comprehensive information on the types of medication taken by each individual for problems with emotions, nerves, or mental health was provided in the pharmacoepidemiology section.

Rates of presenteeism among those who met the criteria for PTSD were estimated based on responses to a question on work performance. Specifically, individuals were asked: "On a scale from 0 to 10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, what number describes your overall job performance on the days you

worked during the past 30 days?" A more detailed description of the NISHS survey and relevant methodology is provided elsewhere (Bunting, Murphy, O'Neill, & Ferry, 2013; Bunting, Murphy, O'Neill, & Ferry, 2012; Ferry et al., 2012).

Information and data from a variety of other sources were used to produce economic cost estimates. The number of incapacity days as a result of PTSD and other acute stress disorders was obtained from the Analytical Services Unit of the Department for Social Development NI (DSDNI; 2008). In NI, eligibility for incapacity benefit is based on a medical assessment. The maximum incapacity coverage age is 60 for women and 65 for men because state pension age starts at 60 for women and 65 for men. The relevant unit costs of service visits were derived from the Personal Social Services Research Unit (PSSRU; Curtis, 2008). Average annual dosage estimates for each specific medication types reported in the NISHS and their associated unit costs were taken from prescription cost analysis (PCA) data provided by the Health and Social Care (HSC) Business Services Organisation (HSCNI; 2008). Gender and age-specific wage rates and employment rates were derived from the Annual Survey of Hours and Earnings (ASHE) and the Labour Force Survey, both conducted by the Department of Enterprise, Trade and Investment (DETINI; 2008a, 2008b). Mid-year adult population estimates were obtained from the NI Statistics and Research Agency (NISRA, 2010).

Data Analysis

Total economic costs of 12-month cases of PTSD within the NI population were estimated by multiplying the units of resources used and lost among individuals with 12-month PTSD with the relevant unit cost estimates. Costs were separated into direct and indirect categories.

Direct costs included costs of visits to service providers in the previous year and costs of medication. The cost of service visits was obtained by multiplying the estimated number of visits to each provided among individuals with PTSD with the relevant unit costs from the PSSRY (Curtis, 2008). The total costs of medication were obtained by multiplying the number of people with 12-month PTSD taking each medication (estimated from the NISHS data) by the unit cost of the average annual dosage. The cost estimates represent an aggregation of these individual costs according to their relevant BNF category (Prescription Cost Analysis data for Northern Ireland; HSCNI, 2008).

The calculation of indirect costs was based on the human capital approach, which assumes that an individual's wage rate is an indication of marginal productivity (Becker, 1964). The cost of lost productivity associated with PTSD was obtained by combining age and gender-specific incapacity benefit data (DSDNI, 2008) with age and gender-specific wage rates for 2008 (DETINI, 2008a). The average number of incapacity benefit days relating to PTSD and other acute stress reactions (converted to estimated percentage of the working year lost) was multiplied by the relevant age and gender-specific annual wage rate. Data from the Department for Social Development (NI) suggested that 6,278 individuals were in receipt of an Incapacity Benefit as a result of PTSD or acute stress reactions.

Table 1
Estimated Cases of PTSD in Northern Ireland in 2008

	Males		Females	
Age (years)	*n*	%	*n*	%
18–24	2,919	3.24	3,916	4.43
25–34	3,834	3.25	9,458	7.72
35–44	5,130	3.97	8,562	6.41
45–54	10,648	9.24	8,066	6.91
55–64	2,525	2.73	3,781	3.96
65+	7,708	0.73	8,387	5.91
Total	32,765	3.99	42,170	6.07

Note. $N = 1{,}986$. Entries are weighted values. PTSD = posttraumatic stress disorder.

The average cost of presenteeism was calculated by multiplying the presenteeism rate (% of the year lost based on self-reported productivity rate) among individuals with PTSD (who were employed at the time of the interview) by the relevant gender-specific average salary for 2008 (DETINI, 2008a). Age-specific average annual salary information could not be used in relation to presenteeism cost calculations given limited numbers answering questions on work performance in the NISHS sample. Therefore, the total estimated cost of presenteeism among those with PTSD was calculated by multiplying this average cost figure with gender-specific population figures, rates of PTSD, and employment rates for 2008 (DETINI, 2008b).

All analyses were implemented using Stata statistical software version 10.0 (StataCorp, 2007).

Results

The estimated prevalence of 12-month PTSD was 5.1% (approximately 74,935 adults). Table 1 provides the prevalence rates for PTSD in 2008 for males and females by 10-year age bands. Females reported a significantly higher rate of 12-month PTSD than males, although males aged 45–54 years had the highest rate of PTSD with a prevalence of 9.2%.

One important feature of PTSD, which will have implications for both direct health care resource use and levels of productivity, is that the disorder is often accompanied by other comorbid mental health disorders. Analysis of levels of comorbidity suggested that 41.3% of individuals with 12-month PTSD had another mood disorder; 43.0% another anxiety disorder, and 7.9% an additional substance disorder within the same period.

Table 2 summarises the costs of service visits in 2008 among the 74,935 individuals with PTSD. Hospital stays (given their relatively higher unit cost) represent the highest cost among individuals with PTSD followed by GP visits and psychiatrist

Table 2
Estimated Cost of Service Visits for Individuals With PTSD in Northern Ireland in 2008

Service provider	Total visits	Unit cost (£)	Total cost (£)
Hospital	37,458	219	8,203,409
Psychiatrist	16,735	316	5,288,240
GP/family doctor	118,341	52	6,153,707
Psychologist	10,415	72	749,893
Social worker (mental health)	7,125	89	634,096
Social worker (health service)	2,691	138	371,412
Counsellor (mental health)	37,602	40	1,504,093
Counsellor (health service)	79,027	40	3,161,071
Other mental health professional	10,627	57	605,751
Other health professional	8,999	42	337,451
Healer	7,335	37.5	308,061

Note. $N = 1{,}986$; PTSD = posttraumatic stress disorder; GP = General practitioner.

visits. The total estimated costs of service visits among this cohort were £27,317,184.

Table 3 provides estimates of the cost of medication among individuals who met the criteria for PTSD in the previous 12 months (according to British National Formulary [BNF] categorisation of medication types). The total cost of medication among individuals with PTSD in 2008 was estimated to be £5,658,406.

The second major cost category to be considered was indirect costs, namely the cost of lost productivity among individuals with PTSD, which is summarised in Table 4. Despite females being significantly more likely than males to meet the criteria for 12-month PTSD, total work loss days and total cost associated with PTSD were higher among males. These findings undoubtedly reflect gender differences in retirement age (men retire later than women) among other influencing factors. In total, an estimated 2,283,130 working days were lost as a result of PTSD and other acute stress disorders, representing an estimated total economic burden of £113,564,751, which far exceeds the direct costs of medication and service use.

Table 3
Estimated Cost of Medication for Individuals With PTSD in Northern Ireland in 2008

Medication category	Cost (£)
Hypnotics and anxiolytics	911,311
Antipsychotics and related agents	958,521
Antidepressants	3,214,504
CNS stimulants	74,352
Drugs used in nausea and vertigo	8,199
Antiepileptics	430,885
Antiparkinsonian and related agents	60,634

Note. $N = 1{,}986$. PTSD = posttraumatic stress disorder; CNS = central nervous system.

In addition to lost productivity associated with incapacity days, individuals with mental health disorders were less productive while in the workplace compared to their healthy counterparts (Alonso et al., 2011). Males who met the criteria for PTSD showed a presenteeism rate of almost 2% compared to those who did not meet the criteria for PTSD. The corresponding presenteeism rate for females who met the criteria for PTSD was just over 5.5%. It was estimated that the total costs of presenteeism among individuals who met the criteria for PTSD and who were employed was approximately £26.2 million in 2008 (£6,831,316 for males and £19,384,405 for females).

Considering both the cost of lost productivity as a result of incapacity and the cost of presenteeism, it was estimated the total indirect costs associated with PTSD were approximately £139.8 million in 2008. Productivity losses from days out of work accounted for 81% of these total indirect costs, whereas presenteeism accounted for 19%.

By combining direct and indirect costs we provided an estimate of the total economic burden of resources used (service use and medication) and resources lost (productivity losses and presenteeism) among individuals with PTSD (Table 5). These combined costs were estimated to have been £172.8 million in 2008. Table 5 also provides a breakdown of these total costs in terms of each of the elements considered previously. Productivity losses accounted for the largest proportion of overall costs (65.7%) followed by service visits (15.8%), presenteeism (15.2%), and finally medication (3.3%). The equivalent 2013 costs are also presented (£200,779,165 total costs), as well total 2013 costs in U.S. dollars and Euros for comparison purposes.

Discussion

Our results suggest that the economic burden associated with PTSD is substantial. Recovery from chronic PTSD is unlikely if sufferers do not have access to effective evidence-based trauma focussed treatment (Kessler et al., 1995). The National Institute for Health & Clinical Excellence recommends access to either trauma-focussed cognitive behavioural therapy (CBT) or eye movement desensitization and reprocessing (EMDR) therapy for the effective treatment of PTSD (National Collaborating Centre for Mental Health [NCCMH], 2005). The effectiveness of evidence-based treatments is also borne out by the experience acquired by the clinical team at the Northern Ireland Centre for Trauma and Transformation between 2002 and 2011, which

Table 4
Cost (£) of Lost Working Days Associated With PTSD in Northern Ireland in 2008

	Lost working days		AVG annual earnings		Total costs	
Age (years)	Males	Females	Males	Females	Males	Females
≤ 21	52,925	48,860	11,164	8,440	1,618,780	1,129,827
22–29	139,065	119,700	16,552	14,420	6,306,312	4,728,970
30–39	226,960	193,480	20,166	17,087	12,539,385	9,057,514
40–49	312,020	335,365	24,024	16,084	20,536,900	14,778,111
50–59	296,720	413,545	23,561	15,096	19,153,479	17,103,768
60–65	144,490	–	16,702	7,270	6,611,704	–
Total	1,172,180	1,110,950	–	–	66,766,560	46,798,191

Note. Information on females aged 60–65 years is missing because females are eligible for the state pension at age 60. PTSD = posttraumatic stress disorder; NI = Northern Ireland.

provided specialist trauma-focussed cognitive therapy (Ehlers & Clark, 2000) for chronic trauma sufferers (Duffy, Gillespie, & Clark, 2007).

Adopting a similar approach to Layard and colleagues in The Depression Report (London School of Economics and Political Science, 2006), it can be argued that investment in these effective treatments for PTSD and associated disorders will pay for themselves. Taking trauma-focused CBT as an example of the National Institute for Health and Clinical Excellence- (NICE-) approved effective treatment for PTSD, NICE recommends a course of 8–12 weeks of treatment for individuals with chronic PTSD (NCCMH, 2005). It is estimated from the NICTT that an average course of CBT for an individual who suffers chronic PTSD is approximately £1,500, which means that it would theoretically cost approximately £102 million to treat all individuals with 12-month PTSD in Northern Ireland. Although treatment success rates and the costs of training also need to be taken into account, the costs of incapacity days alone exceeds this figure, suggesting that economic gains can be made in the long run by developing effective services and treatments for PTSD such as CBT and EMDR. The economic implications of psychological trauma, including those that have arisen as a consequence of the civil conflict, strengthens the argument in the case for strategic service development to sit alongside the humanitarian goal of reducing suffering and improving the quality of life for individuals, families, and the wider community.

The implications of our findings should be drawn with a number of limitations in mind. First, given the constraints of the NISHS dataset, some cost estimates represent the economic burden among individuals with PTSD in Northern Ireland rather than the costs specifically linked to PTSD itself. To expand on this point, individuals with PTSD often have other comorbid mental health disorders (as our data demonstrated) and we would expect that these conditions would have an additional impact on cost estimates and also the ability to effectively treat PTSD. A larger dataset would facilitate the isolation of costs specifically associated with PTSD through more sophisticated analyses that control for comorbid mental health disorders, social deprivation, and other important factors. That said, PTSD is seldom found alone particularly in its chronic state, and proper assessments of costs should take account of comorbid disorders of PTSD.

A further limitation relates to the exclusion of a number of cost categories in relation to PTSD: The NISHS did not include individuals who were living in institutions such as hospitals, prisons, and care homes. In addition, the NISHS focused

Table 5
Total Direct and Indirect Estimated Costs for Individuals With 12-Month PTSD in Northern Ireland in 2008 and Estimates for 2013 in Various Currencies

Cost category	%	2008 £	2013 £	2013 $	2013 €
Direct costs					
Service visits	16	27,317,184	31,748,359	38,999,684	50,194,155
Medication	3	5,658,406	6,576,267	8,078,287	1,0397,079
Indirect					
Productivity losses	66	113,564,751	131,986,314	162,131,988	208,670,363
Presenteeism	15	26,215,721	30,468,225	37,427,168	48,170,264
Total		172,756,062	200,779,165	246,637,126	317,431,860

Note. 2013 costs were calculated based on UK Consumer Price Index data. Equivalent US $ and euro costs were calculated using average annual exchange rate information available from HM Revenue and Customs.

exclusively on the adult population. The prevalence of mental health disorders such as PTSD and associated costs among individuals living in institutions and those aged under 18 years were therefore not included. Due to the lack of available information on the proportion of suicides associated with PTSD, the cost of premature mortality associated with PTSD-related suicide was not included. For similar reasons, costs associated with short-term sickness absence due to PTSD were also excluded. Furthermore, this report does not provide an estimate of caregiver burden associated with PTSD. Those who suffer with mental health problems generally do not exist in isolation and rely on practical support from family, friends, and caregivers. Given the aforementioned exclusions, it may well be that the economic cost estimates presented were an underestimation.

Finally, the current study did not consider the human costs associated with PTSD, namely the cost of reduced health-related quality of life. In a meta-analytic review of quality of life among patients with anxiety disorders (including generalised anxiety disorder, phobias, obsessive–compulsive disorder, panic disorder, and PTSD among others), Olantunji, Cisler, and Tolin (2007) found particular prominent impairments among individuals with PTSD.

Individuals suffering from anxiety disorders such as PTSD, in NI, wait on average 22 years from disorder onset before they seek professional help for their symptoms (Bunting et al., 2012). In addition, just over half (51.9%) of individuals with PTSD sought treatment from any healthcare provider in the past year (Bunting et al., 2013b) with just 20.3% seeking help from a mental health specialist. This combination of lengthy delays in treatment seeking and the lack of access to effective treatments may help explain the substantial costs of productivity losses we showed; coupled with the elevated rate of PTSD among the adult population of Northern Ireland, this points to substantial levels of unmet need in the community and the need for strategic service developments. With a lack of readily available services and treatments capable of identifying and effectively treating PTSD and related disorders as early as possible (rather than just controlling and managing symptoms), the costs of increasingly chronic PTSD and associated disorders are recurring year on year and are mounting, given the chronicity and the acquisition of comorbid mental health disorders. In summary, people with chronic PTSD and associated multiple disorders are likely to have increasing needs and therefore increasing patterns of service usage (direct costs) with increased indirect costs. This will continue as they seek to manage enduring and mounting distressing symptoms and problems, unless they can access effective services that would effectively address their underlying trauma-related disorders.

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