



Original Article

Evaluation of post traumatic distress in the first 6 months following SCI

P Kennedy*¹ and MJ Evans¹

¹Department of Clinical Psychology, National Spinal Injuries Centre, Stoke Mandeville Hospital, Bucks, UK

Study design: Cross-sectional questionnaire.

Objectives: To assess the degree of post traumatic stress symptomatology and its correlates amongst a group of new spinal cord injured patients.

Setting: The National Spinal Injuries Centre, Stoke Mandeville Hospital NHS Trust.

Method: Eighty-five participants with an average age of 32.6 years were assessed between 6 and 24 weeks post injury. Seventeen participants were female. Seventy per cent had complete lesions. Forty per cent had paraplegia and 60% had tetraplegia. Road traffic accidents were the most common cause of injury followed by falls and then sporting accidents. The Impact of Event Scale was used to measure the experience of intrusive thoughts about the trauma and avoidance of trauma related stimuli. Anxiety (SAI), depression (BDI) and dependency (FIM) were also measured.

Results: High levels of distress were evident in 14% of the sample. Trauma-related distress was significantly higher in female patients or patients with high levels of anxiety or depression.

Conclusion: In this sample, the rates of trauma-related distress following spinal cord injury were comparable to those found following other traumas and are of clinical significance.

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Introduction

The behavioural and emotional problems following exposure to trauma have been extensively studied since the inclusion of Post Traumatic Stress Disorder (PTSD) as a diagnostic category in the DSM-III in 1980.¹ The key features of PTSD, as detailed in DSM-IV,² are hyperarousal, re-experiencing of the trauma and avoidance and numbing in response to trauma-related stimuli. PTSD is unusual in having a specified aetiology, which involves the person experiencing, witnessing or being confronted with 'an event or events that involved actual or threatened death, serious injury, or a threat to the physical integrity of self or others'.² Given that a spinal cord injury (SCI) is one of the most serious physical injuries that can be sustained, PTSD can be expected to be a common sequelae. DSM-IV also stipulates however that the person's response to the traumatic event must involve 'intense fear, helplessness or horror' for PTSD to occur. The likelihood of such a response occurring will be influenced greatly by the nature of the traumatic event. As well as increasing with event severity, PTSD

symptoms are more likely if the event is sudden, intense, dangerous, and is perceived to be uncontrollable and unpredictable.³

The aetiology of SCI is quite variable with 50% of SCIs in the UK being caused by road traffic accidents (RTAs), 25% by falls, 20% through sporting injuries and 5% resulting from various other causes.⁴ Road traffic accidents account for the majority of spinal cord injuries in the USA (44.5%). A substantial proportion of SCIs in North America are caused by acts of violence (16.6%), with sports (12.7%) and falls (18.1%) again accounting for a large number of injuries.⁵ Despite this variety in aetiology it seems likely that most traumatic events associated with sustaining a SCI could be responded to with 'intense fear, helplessness or horror' as specified in the diagnostic criteria for PTSD.

Accidental injuries other than SCI have been linked to subsequent psychological impairment. In a study of 137 people who had severe injuries resulting from road accidents, falls, pedestrian accidents, stabbings and gunshot wounds, Landsman⁶ found a high level of intrusive images and memories and psychiatric symptomatology. Church and Vincent⁷ found in their sample of 29 individuals who had suffered a medical

*Correspondence: P Kennedy, Department of Clinical Psychology, National Spinal Injuries Centre, Stoke Mandeville Hospital NHS Trust, Aylesbury, Bucks HP21 8AL, UK

accident that 50% had clinically relevant levels of intrusion and 32% avoidance. The incidence of PTSD following RTAs has been studied extensively. Large unexplained variations in estimates makes the establishment of the true extent of PTSD following RTAs difficult however (see Blaszczynski for a review).⁸

The enormity and necessity of individual adaptation required following a SCI differentiates it from other types of accidents. The greater severity of spinal cord injuries and the necessity for spinal cord injured patients to remain in a rehabilitative environment for a substantial period post trauma is likely to influence the expression of trauma-related distress in the spinal cord injured population relative to that in other accident victim populations.

It has been shown that PTSD can be very persistent if left untreated and is thought to carry risks of 'morbidity, increased physical and psychiatric disturbances, and impairment in interpersonal and professional function'.⁹ Given that SCI requires a great degree of adaptation and re-evaluation of beliefs and attitudes, trauma-related distress is likely to jeopardise a person's ability to cope with their injury and impact further on their quality of life. The psychological impact of trauma is therefore likely to have important clinical implications for people with SCI.

Amongst American veterans with SCI, Radnitz *et al*¹⁰ found that of their sample of 125, 12% met the diagnostic criteria for current PTSD and 29% for lifetime PTSD. Examination of possible predictive factors for PTSD revealed that veterans with paraplegia experienced more severe post traumatic symptoms than did those with tetraplegia. Binks *et al*¹¹ found that the prevalence of current PTSD in veterans with paraplegia was comparable to that of veterans who had sustained a traumatic injury other than SCI (22% and 21% respectively), but much greater than that for veterans with tetraplegia (2%). It is unclear whether the findings of Radnitz and her colleagues^{10,11} generalise to non-American, non-veteran spinal cord injured populations.

Other factors that Radnitz *et al*¹⁰ found to be associated with a greater likelihood of post traumatic symptoms were experiencing the trauma recently and sustaining a concurrent head injury. One possible explanation for this, is that loss of consciousness disrupted subsequent processing of the trauma by individuals who sustained a head injury.¹⁰ Another factor that could affect subsequent processing of the traumatic event and is fairly common with SCI is Post Traumatic Amnesia (PTA). The level of PTA was measured in the present sample to determine whether PTA would be associated with greater trauma-related distress.

The nature of the traumatic experience, when considered in isolation is insufficient to explain the aetiology of PTSD. In the general population only about 9% of people who are exposed to a trauma that fulfils the DSM-IV criteria develop PTSD.¹² Clearly, environmental and constitutional factors play an

important part in the aetiology of PTSD. A history of psychiatric disorders particularly anxiety and depression have been found to be risk factors for developing PTSD symptoms in other populations,¹³ so the existence of comorbid anxiety or depression with post traumatic responses will be examined in this sample. The relationship between post traumatic stress responses and various demographic factors will also be examined.

The aim of this study is principally to ascertain the levels of post traumatic distress amongst non-veteran spinal cord injured individuals who are participating in rehabilitation in a British health care setting. Further exploratory analysis will be carried out to investigate any factors relating to its occurrence, in particular, PTA and comorbid anxiety and depression.

Method

Participants

This study utilised data collected from 85 in-patients who had suffered a spinal injury and were at the time of the study being treated at the National Spinal Injuries Centre at Stoke Mandeville. This represented 74% of those people who were originally approached to participate. Patients were only included if they were: between 16 and 65 when injured; and had experienced a traumatic onset of the spinal cord injury. Data was collected between 6 and 24 weeks post injury.

Demographics

The sample was predominantly male (80%). The average age at injury was 32.6 years. Sixty-four per cent were single, 19% were married and 17% were either divorced or separated. The participants were spread evenly across social classes. Twenty-eight per cent were in social class A/B, 24% were in class C1, 22% class C2 and 26% class D/E. The majority of the sample had complete lesions (70%). Tetraplegia was present for 40% of participants with the remaining 60% having paraplegia. RTAs accounted for 44.6% of spinal cord injuries, 20.5% were caused by sporting accidents, 30.1% through falling, with other causes accounting for 4.8%.

Measures

Scores are taken from measures that formed part of a larger questionnaire used in a longitudinal study of coping strategy utilisation in SCI patients. Findings from that study are reported elsewhere.¹⁴

- (i) Post Traumatic Distress: Impact of Events Scale (IES).¹⁵ Participants have to rate the frequency with which they have experienced each 'symptom' (Not at all = 0, Rarely = 1, Sometimes = 3, Often = 5) over the past week. The scores form two subscales, one 7-item scale measuring intrusive thoughts (IESI) and an 8-item scale measuring

avoidance (IESA). Internal consistency of the IES has been found to range from 0.79 to 0.92.^{16,17} Test-retest reliability, using a 1 week interval, was 0.87.¹⁵ Additionally the scale has been shown to detect changes in individuals' level of psychological distress.¹⁵

It is not possible on the basis of IES scores to make a diagnosis of PTSD, but the scale has been used as an analogue to diagnostic tests⁸ on the basis that it assesses two of the key aspects of PTSD (intrusion and avoidance), has been shown to be highly significant correlated with PTSD severity¹⁰ and can discriminate individuals who are being treated for post traumatic reactions from those who are not being treated but have experienced similar levels of objective trauma.^{15,18}

- (ii) Concurrent Mental Health Difficulties: Anxiety was measured using the State Anxiety Inventory (SAI)¹⁹ and depression was measured using the Beck Depression Inventory (BDI).²⁰ These scales have been successfully used in the literature to assess psychological adjustment to injury and trauma^{14,21,22} and while there is some indication that the BDI may inflate estimates in patients with SCI because of some somatic-based items,²³ it has been shown to be generally reliable with this population.²⁴
- (iii) Dependency: Functional Independence Measure (FIM).²⁵ It has 18 items which are scored from 7 (completely independent) to 1 (completely dependent). The areas of function covered are self care, bladder management, bowel management, mobility, locomotion, communication and social cognition.
- (iv) Demographical Information; Single item self-report questions were used to obtain information on:
- Cause of injury (RTA, sport, fall, other)
 - Marital status (single, courting, married, divorced/separated)
 - Social status (social class A/B, C1, C2, D/E)²⁶
 - Completeness of injury (complete/incomplete)
 - Injury Level (tetraplegia/paraplegia)
- Additionally length of stay was calculated from medical notes.

Procedure

All patients were interviewed, whilst in hospital, by a research psychologist at 6 weeks and/or 24 weeks post-injury. In cases where complete measures were taken at both 6 and 24 weeks only the scores at 24 weeks were used as symptoms at this stage are more likely to be indicative of trauma related distress.

Results

T-tests were used with the continuous variables (length of stay, age, intrusion, avoidance, functional independence, anxiety and depression) and χ^2 tests were carried out with the categorical data (level of injury,

completeness of injury, cause of injury, sex, marital and social status) to determine if the demographic and dependent variables differed between data collected at 6 weeks and data collected at 24 weeks. Significant differences were found between the two groups for length of stay, level of injury and FIM scores. When the relationships of level of injury, length of stay and FIM scores to IES scores were investigated it was found that length of stay was significantly correlated with IESI ($r=0.286$, $P<0.05$).

Prevalence of post traumatic distress

Mean intrusion and avoidance scores as measured on the IES are shown in Table 1. Scores above 20 were considered indicative of a high level of distress for both sub-scales.²⁷ Fourteen per cent of the sample ($n=12$) scored above the cut off on both the IESI and IESA. On the intrusion sub-scale high distress levels were apparent for 20% ($n=17$) of the sample ($n=85$). 22.4% ($n=19$) of participants achieved a high score on the avoidance sub-scale.

The occurrence of intrusive and avoidance symptoms was unrelated to whether PTA had been experienced or not. Sixteen per cent of the 25 participants who experienced PTA were in the high distress group relative to 16% of the 31 participants who were known not to have experienced PTA. Mean IESA and IESI scores did not differ significantly between those participants who experienced PTA and those who did not.

Scores on the IES at 6 weeks were very similar to those at 24 weeks. Thirteen per cent of the participants were experiencing high levels of distress at 6 weeks and 15% at 24 weeks. This difference was not significant.

Occurrence of comorbid depression and anxiety

A cut-off of 42 on the SAI was used as an indication of high anxiety and a score of 14 or above on the BDI^{24,28} was seen as indicative of a high level of depression. Both depression and anxiety were closely related to post traumatic distress symptoms.

Depression scores were significantly correlated with both intrusion ($r=0.640$, $P<0.001$) and avoidance scores ($r=0.493$, $P<0.001$), as was anxiety ($r=0.578$, $P<0.001$ and $r=0.499$, $P<0.001$, respectively).

Ninety-two per cent (11 out of 12) of the high distress group met the cut-off for depression relative to 22% (16 out of 73) of the rest of the sample. A χ^2 analysis confirmed that this difference was highly significant ($P<0.001$, using Fisher's Exact). A similar pattern was found for anxiety with 75% (nine out of 12) of the high distress group reaching the cut-off for the SAI relative to 29% (21 out of 73) of the rest of the sample. This result was also highly significant ($P<0.005$, using Fisher's exact).

Overall, there were no differences in prevalence of avoidance and intrusion or comorbidity with anxiety

Table 1 Mean post traumatic distress scores in relation to the presence of post traumatic amnesia (PTA), anxiety or depression

	Mean	Intrusion Score n	Std.Dev.	Mean	Avoidance Score n	Std.Dev.
Whole Sample	10.53	85	9.1	10.88	85	9.48
Post traumatic amnesia						
Present	10.04	25	9.07	9.88	25	8.7
Absent	11.24	33	8.94	13.52	33	11
Depression						
High	18.52	27	9.08	18.37	27	10.33
Low	6.81	58	6.34	7.4	58	6.7
Anxiety						
High	16.33	30	9.86	17.57	30	9.86
Low	7.36	55	6.91	7.24	55	7.02

or depression between the scores taken at 6 weeks and those taken at 24 weeks.

Relationship between distress and other factors

The relationship between IES scores and income, length of stay, age and functional independence scores were examined. Age was significantly negatively correlated and length of stay significantly positively correlated with intrusion scores ($r = -0.292$, $P < 0.01$ and $r = 0.286$, $P < 0.05$, respectively). There were not however any significant differences in these variables between the high and the low distress groups.

ANOVA were used to see if there were differences in intrusion and avoidance scores when participants were grouped according to the categorical variables: level of injury; completeness of injury; sex; social status and marital status. Patients with complete injuries showed significantly higher intrusion scores than those with incomplete injuries ($t = 2.6$, $df = 72.9$, $P < 0.05$; using Welch's test to adjust for inequalities of variances). Intrusion and avoidance scores were significantly higher for female participants than male ones ($t = 3.0$, $df = 20.3$, $P < 0.01$ and $t = 3.1$, $df = 81$, $P < 0.01$; using Welch's test). Finally, marital groups differed significantly in their avoidance scores ($F = 4.5$, $P < 0.01$). Participants with a current partner (married, courting) had lower IESA scores (mean = 6.2 and 8.0 respectively) than participants who were single or divorced/separated (mean = 14.8 and 12.8 respectively).

Of the above factors only being female was associated with an increased likelihood of being in the high distress group ($P < 0.005$, using Fisher's Exact).

Discussion

In this sample, 14% of participants exhibited a high level of trauma-related distress at the time of assessment. Levels of anxiety and depression were also elevated in those individuals experiencing high levels of distress. The only other factor that was related to high levels of both intrusion and avoidance scores was sex, with females experiencing more distress than

males. Being young, having a long stay in hospital and having a complete injury were related to high intrusion scores. High avoidance scores were associated with not having a current partner.

For the purposes of this study the IES was a useful measure of trauma-related distress. It is quick and easy to administer and has also been shown to have good validity and sensitivity. It is not however a diagnostic tool for PTSD, so caution is needed in the interpretation of the results and the exploratory nature of the study requires recognition.

Analyses of factors relating to trauma-related distress were primarily exploratory and consisted of multiple comparisons with no correction of significance. The associations between being female, having concurrent depression or having concurrent anxiety and high levels of trauma-related distress appear to be the most robust of the findings. This is consistent with previous literature where links between post traumatic distress and anxiety, depression and being female are well documented in non-spinally injured populations.^{13,29}

The degree of distress does seem slightly low amongst this sample relative to other accident victim populations however. Fifty per cent of a sample questioned after experiencing a medical accident received high distress scores on the intrusion subscale of the IES and 15% for the avoidance subscale.⁷ In a sample of people with SCI, Radnitz *et al*³⁰ found that 28% of their sample displayed high scores on at least two of the three characteristic symptoms of PTSD as measured on the IES (re-experiencing the trauma, avoiding trauma related stimuli and persistent increased arousal) and that 12% met the more stringent diagnostic criteria for both the SCID and CAPS. In the present sample 20% reached the cut-off on the intrusion scale and 22.4% reached the cut-off on the avoidance scale, with 14% being above the cut-off for both.

There are several differences between Radnitz *et al*'s³⁰ study and the present one that could explain the discrepancy between findings. Radnitz *et al*'s³⁰ findings come from patients being treated in a different service context. Cause of injury could also have contributed

to the high incidence of post traumatic symptomatology found in Radnitz *et al's*³⁰ study as a larger percentage of the participants in that study had sustained their injury through a violent act than in this study. This suggestion is supported by findings that indicate assaultive violence is associated with a particularly high conditional risk of developing PTSD.¹²

The level of trauma-related distress in this sample was higher than might be expected amongst populations who had experienced mild trauma. The mean intrusion and avoidance scores in the present sample were 10.5 (SD 9.1) and 10.9 (SD 9.5) respectively. In comparison, Horowitz³¹ found mean intrusion and avoidance scores of 2.5 (SD 3.0) and 4.4 (SD 5.3) amongst a group of male medical students who had recently experienced their first confrontation with cadaver dissection. Mean intrusion and avoidance scores amongst female students were 6.1 (5.3) and 6.6 (SD 7.0) respectively. IES scores in the present sample were quite high relative to this population. The mean level of trauma-related distress found amongst acute patients at an emergency community psychiatric service is more comparable with the level found in the present sample.³² The mean intrusion and avoidance scores for that group were 11.4 (SD 7.5) and 11.5 (SD 6.9) respectively. The traumas experienced ranged from 'bereavement or severe illness to relationship, employment or financial problems' (p 335).³²

Information about prior traumatic experiences and/or the stressor would enhance hypothesis generation and comparisons with other studies. Assessments of people's appraisals and attributions regarding the accident and its sequelae are likely to have been particularly informative.³³ There is also quite often more than one stressor associated with SCIs that could have resulted in or contributed to post traumatic reactions, for example the trauma of being in a car crash and the trauma of finding out that you are permanently paralysed. Future research should try to define more precisely the way that different stressors interact during the development of post traumatic reactions. The lack of significant differences in intrusion scores in this study between those people who experienced PTA and those that did not indicates that potentially people with SCI can experience intrusive thoughts about events following their injury rather than just the causal event.

Interestingly, in this study the degree of trauma-related distress among individuals assessed at 6 weeks was very similar to that found amongst individuals assessed at 24 weeks post injury. Ideally future studies should trace the development of post traumatic symptoms over time in patients with SCI and investigate the prevalence of delayed onset PTSD. Comparisons of the level of post traumatic distress before and after mobilisation and pre- and post-discharge might be particularly informative as these points represent significant changes in context for the patient.

Another aspect of the context surrounding post traumatic reactions that has not been addressed is the sufferer's family and social support. A SCI is a very traumatic experience for the family of the person who sustained the injury. According to the DSM-IV criteria, PTSD can occur following 'an event or events that involved actual or threatened death, serious injury, or a threat to the physical integrity of self or others'. It is therefore likely that some family members suffer post traumatic reactions following the injury. Literature suggests that high levels of social support are associated with better adjustment to injury in persons with a SCI^{34,35} and social support is also hypothesised to attenuate post traumatic reactions.³³ An adverse psychological reaction in close family members could therefore be expected to have negative consequences for the patient's adjustment. The prevalence of PTSD in family members and its impact on the patient's rehabilitation is an area for future research.

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