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Spinal cord injuries and attempted suicide: a retrospective review

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Study design: A retrospective review examining the cases of 137 individuals with spinal cord injury (SCI) as a result of a suicide attempt between 1951–1992.
Objective: To ascertain demographic details of this participant sample, explore and identify the type of psychiatric condition evident around the time of injury, and to review outcome information of this sample with specific focus on mortality, especially further evidence of deliberate self harm.
Summary of background data: Research examining suicide rates in SCI populations has found such numbers to be significantly higher than in the general population. However, these studies have typically relied on small samples of individuals and have often failed to distinguish between those individuals who sustained SCI as a result of attempted suicide, and those who first attempted suicide following SCI.
Methods: An established database comprising details of 137 people with SCI as a result of attempted suicide was reviewed and updated using patient admission records. The subsequent database comprised: cause, level and completeness of injury; height fallen; psychiatric history; psychiatric diagnosis; date of last contact; further suicide attempts; religious affiliation; previous and present employment; date and cause of death; date and place of discharge; and any other relevant details. From this database the three primary objectives of the study were ascertained: demographic detail; psychiatric condition; and outcome information.
Results: The ratio of males to females was 1 : 1 with a mean age of 32. Almost half (48.9%) were single, around a third (32.8%) had children and 42.3% were employed. Schizophrenia and depression were evident in 32.8% and 27% of cases respectively. Previous suicide attempts had been made by 23% ($n=32$). The cause of injury in 85% of cases was 'falls'. Thirty-three people are known to have died, of whom eight (24%) committed suicide. During the period between the first and last spinal cord injury examined within this study (1951–1992) 1.6% ($n=137$) of the total sample of patients treated at the rehabilitation centre ($n=8347$) sustained a spinal cord injury as a result of a suicide attempt.
Conclusion: Significant findings include; a high proportion of patients with schizophrenia; similar findings concerning age profile and level of injuries with previous research, but different sex ratio; and information on longer-term outcomes. Recommendations for further research include an adaptation of the psychological autopsy approach which would provide information beyond that normally available in actual suicides.

Keywords: spinal cord injury; attempted suicide; retrospective review

Introduction

It is estimated that suicide accounts for 2% of all male deaths and 1% of all female deaths within the general population.[1] Recent research suggests that the age distribution of suicide has changed, whereby males under the age of 45 years are now at a greater risk than older males.[1] In SCI populations, death as a result of suicide is two to six times more prevalent than in the general population[2] and approximately five times more prevalent than in age-gender-race matched populations.[3,4] Moreover, it has been suggested by some, that these figures are underestimates of the actual numbers since a number of deaths declared accidental are actually suicide or self-neglect.[5] Indeed, Macleod (1988)[6] suggests that self-neglect is a frequently observed occurrence in SCI patients, and plays an aetiological role in certain medical complications. Precise figures of suicide in SCI range from 5.7%[7] to 6.3%[4] of deaths, and have been found to be as high as 11.1% in younger age groups.[7]

The demographic details of those individuals who commit suicide following SCI have been widely

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researched and risk factors have been proposed as predictors of suicide.[2] Less well studied however, are the demographic details of individuals who have sustained SCI as a result of a suicide attempt. In an attempt to redress the balance, Biering-Sørensen *et al*[8] examined the demographic details of 45 patients admitted to the Rehabilitation Hospital in Hornbaek, Denmark between 1965 and 1987. The median age at injury for this sample was 31 years, and the male to female ratio was 6 : 1. In 84% of cases, SCI was as a result of jumps from buildings. The neurological level of the lesion was 15.5% cervical, 17.7% thoracic, 48.8% lumbar and 17.7% cauda equina. At the time of injury, 62% were unemployed or receiving an early pension, 60% were living without a partner, and 31% had previously attempted suicide. At follow-up, of 11 patients who had died, three were as a result of a suicide, and of the 34 still alive, seven had attempted suicide.

Psychiatric condition has been indicated as a recurrent factor in suicide attempts, with current or former psychiatric patients accounting for 50% of total suicides in England and Wales.[9] Schizophrenia alone carries a 10% risk of suicide, and Affective Disorder a 15% risk.[10] With specific reference to SCI, a qualitative analysis of 11 SCI patients who attempted suicide identified that mental disorders were apparent in all.[11] Cause of death also appears to be closely linked with psychiatric illness. In a study examining 22 recorded attempted suicides by jumping, 21 were linked to psychiatric illness.[12] This finding is corroborated by Kontaxakis *et al*[13] who identified that of a sample of individuals who attempted suicide by jumping, 72% demonstrated either 'affective psychosis-depressive type' or 'schizophrenic psychosis'. Certainly jumping is an extremely violent means of suicide, and it has been suggested that individuals using it should be considered as having high suicidal intention.[13] In a 3 year prospective study of suicidal attempts by jumping, Bostman[14] found that 11% of the sample acquired spinal cord injuries and 16% died within 24 h.

As existing research has typically relied on small samples of individuals and has often failed to distinguish between those individuals who sustained SCI as a result of attempted suicide and those who first attempted suicide following SCI, the primary aims of this study were: to ascertain the demographic details of 137 individuals who had acquired their SCI as a result of deliberate self harm; explore and identify the type of psychiatric condition evident around the time of the attempt; and to review outcome information of the sample, with specific focus on mortality, especially further evidence of suicide or suicide attempt.

Methods

Participants

One hundred and thirty-seven patients admitted to the National Spinal Injuries Centre (NSIC) with a SCI caused by a suicide attempt in the years between 1951–1992 were included in the study. The sample comprised 68 males and 69 females with a mean age of 32 years.

Procedure

The original data, on which this study is based, was drawn from an established database examining SCI and attempted suicide. The inclusion criteria for this database selected individuals who had acquired SCI as a result of deliberate self-harm between 1951–1992, and were subsequently treated at the NSIC.

In order to update the original database, the admission records of each patient were systematically reviewed by the Department of Clinical Psychology in the NSIC. Information relevant to the study, such as gender, age, marital status, religion, previous employment and cause of death was recorded. The Office of National Statistics (England and Wales) and the Registrar General (Scotland) who informed the NSIC of the survival status of former patients, provided a death certificate documenting cause of death for all deaths in the identified sample. The information extracted from the original database was subsequently compiled with the data taken from each of the patient's admission records. Psychiatric diagnosis was ascertained following careful review of the diagnoses presented in the original database, and case notes from the time of admission. Diagnoses were made using broad ICD categories using as far as possible ICD criteria.

A comprehensive database was subsequently created from this information. The database included; gender; date of birth; marital status; previous and present employment; religious affiliation; age at injury; date of injury; date of admission; cause of injury; level and completeness of injury; method used; reason given; height fallen; psychiatric history; psychiatric diagnosis; date and reason for last contact; date and place of discharge; family; home status; further suicide attempts; if appropriate date and cause of death; and any other relevant details.

Results

Demographic variables

The sample comprises 68 male and 69 female participants. The mean age of participants at injury was 32 years, with an age range of 14–65 years. At the time of injury, 49% ($n=67$) were single, 40.1% ($n=55$) of the sample were married, with those divorced (4.4%, $n=6$) and widowed (1.5%, $n=2$) making up a small percentage. It was not possible to ascertain marital status in 5.1% of participants.

During the period between the first and last spinal cord injury sustained as a result of a suicide attempt a total of 8347 patients were treated for a spinal cord injury at the same rehabilitation centre. Thus, 1.6%

($n=137$) of patients in this time period sustained a spinal cord injury as a result of a suicide attempt.

Other demographic details are presented in Table 1, and include information on employment, religious affiliation and family.

Details of injury

The primary cause of injury within the sample was deceleration as a result of falls, accounting for 85% ($n=116$) of injuries. The height of the fall is known for 58% of the sample. Most were a result of jumping from windows, bridges (although to a lesser extent) and the roofs of buildings. The majority of injuries sustained resulted in paraplegia and most were complete, comprehensive detail of injuries are presented in Table 2.

Background to injuries and psychiatric diagnosis

Schizophrenia and depression accounted for the largest proportion of psychiatric illness identified (32.8%, $n=45$ and 27%, $n=37$ respectively (see Figure 1). The remaining categories identified were drug/alcohol abuse (7.3%, $n=10$), personality disorder (5.1%, $n=7$), manic depression (3.6%, $n=5$), and other psychiatric conditions (5.1%, $n=7$). Previous suicide attempts were reported in 3% ($n=4$) of cases. This is exceptionally low and unlikely to be a reliable indication of pre-injury psychiatric illness. Of those patients for whom a psychiatric diagnosis was made, the method of suicide resulting in SCI was predominately 94% ($n=80$) by jumping. Information was not available for 1.2% ($n=1$) of this group, and 4.7% ($n=4$) attempted suicide using an alternative method including self inflicted stab and shot wounds, overdose, and jumping in front of a tube train. Situational distress (generally marital or work related) accounted for 12% of cases. There was insufficient source material to clarify the degree of co-morbidity.

Outcome information

Twenty-one per cent of patients ($n=30$) were discharged to another hospital or into residential care and 25.5% ($n=35$) were discharged home to their families. The database did not possess information concerning discharge location for the remaining 53.3% ($n=73$) of the sample.

Eleven patients (8%) received their last contact during the first 3 years post-injury, 5.1% ($n=7$) between years 3–5, 9.5% ($n=13$) between years 5–10, and 14.3% ($n=20$) over 10 years post-injury. Routine check-ups accounted for 56.9% ($n=29$) of the known reasons for last contact whilst health issues accounted for 23.5 ($n=12$). For 63% ($n=86$) of the sample, there was no record of any contact following discharge.

A total of 33 participants have died since injury. Suicide accounted for 24.24% ($n=8$) of these deaths, whilst medical complications such as bladder infections accounted for 60.61% ($n=20$). Only one accidental death was recorded (3.03%), and cause of death could not be established for 12.12% ($n=4$) of the sample. Of those individuals still alive, it is known

Table 1 Demographic details

	n	*Percentage*
Previous employment		
Employed	58	42.3
Housewife	27	19.7
Unemployed	12	8.8
Student/Pupil	14	10.2
Various	8	5.8
None stated	18	13.1
Religion		
Church of England	59	43.1
Roman Catholic	25	18.2
Jewish	2	1.5
Moslem	2	1.5
Buddhist	1	0.7
Others	7	5.1
None stated	41	29.9
Family		
Children	45	32.8
Parents and/or siblings	32	23.4
Parents only	22	16.1
Spouse only	11	8.0
Step-family	5	3.6
Parents and children	2	1.5
Parents divorced	3	2.2
No family	3	2.2
None stated	14	10.2

Table 2 Details of injury

	n	*Percentage*
Cause of injury		
Fall from window	78	57.0
Fall from bridge	11	8.0
Fall from roof	10	7.3
Fall from railway bridge	8	5.8
Fall from cliff	3	2.2
Fall from building	3	2.2
Fall from tree	1	0.7
Shotgun	1	0.7
Stabbing	1	0.7
Fall inside house	2	1.5
None stated	19	13.9
Level of injury		
Cervical level	21	15.3
Thoracic level	63	46.0
Lumbar level	51	37.3
Sacral vertebrae	1	0.7
None stated	1	0.7
Completeness of injury		
Complete	52	38.0
Incomplete	43	31.4
None stated	42	30.7

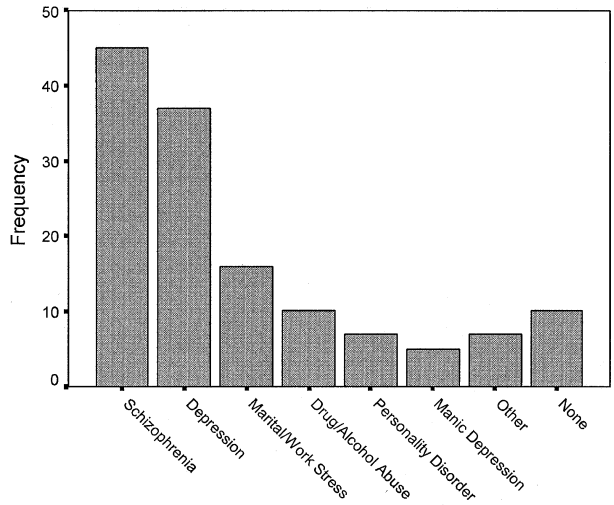

Figure 1 Background factors and psychiatric illness

that 3% ($n=4$) have made a further unsuccessful suicide attempt. Of those individuals who have died as a result of suicide, two had a psychiatric diagnosis; whilst of those individuals still alive who had made an unsuccessful suicide attempt, half had been given a psychiatric diagnosis.

Of those individuals who died, 12.1% ($n=4$) died during the first year following injury, 27.3% ($n=9$) died during years 1–3, and 6% ($n=2$) died during years 3–5. Between years 5–10, 18.2% ($n=6$) died, and those individuals who died 10 years or more post injury accounted for 24.3% ($n=8$). Accurate dates of injury or death were not available for 12.1% ($n=4$) of the participants, and so were excluded from the results.

Discussion

The results of this retrospective review present a number of significant findings including the high proportion of patients with schizophrenia in the sample the comparable gender ratio and findings concerning longer term outcome issues. A more thorough analysis was hindered by the incomplete nature of the source material and recommendations for further data collection are proposed.

The high percentage of patients in this sample with psychiatric disorders further supports the link between such disorders and suicide. However, the proportion of patients with schizophrenia (33%) is far higher than that found in general suicide attempts where estimates range from 5%[15] to 10%.[16] Estimates of those people who have schizophrenia from the population of those that actually commit suicide range from 7%[17] to 10%.[18] One possible explanation for the higher representation of people in this study who have schizophrenia concerns the method of attempted suicide, whereby individuals who have schizophrenia are over represented in a population of people who 'jump or fall'.[13] Within this sample, 85% of people had sustained a spinal cord injury as a result of deceleration. However, whilst psychiatric diagnoses were made for 81% ($n=111$) of the sample, these diagnoses were identified in reports and case notes dating between 1951 and 1992. During this period a number of revisions have been made in clinical diagnoses which present some inconsistency in diagnoses. Further analysis of data sources other than the medical notes, such as social work and nursing records, may help with a further retrospective review of historical material, the authors are examining these options.

The finding that the majority of those individuals who sustain a SCI as a result of a suicide attempt do not re-attempt suicide suggests that these people have been able to overcome the problems which led them to attempt to take their own lives. Indeed, the majority of people had some form of psychiatric condition and had seriously attempted to kill themselves, mostly by falls or jumping which resulted in a significant acquired disability. Despite this, following treatment and rehabilitation, the majority of patients did not make further attempts. However, the fact that a small yet significant proportion (7.3%, $n=10$) of individuals do re-attempt suicide is a cause for concern. Since it has been reported that suicide figures are underestimates of actual numbers due to the under-reporting of suicides, we might expect that within this study, there are a higher number of suicides than actually reported in death certificates. Indeed, inspection of medical notes and death certificates reveals a proportion of cases in which the primary cause of death might be interpreted as a death resulting from self neglect. A crucial detail which emerges from these original patient records and death certificates, is the need to identify a category which illustrates those deaths which, although recorded as either 'natural causes' or 'ill health', are as a result of self neglect or the refusal of necessary care.

The results of this study raise a number of findings which support those identified by Biering-Sørensen *et al*.[8] Primarily, the proportion of those jumping in this sample and Biering-Sørensen's is remarkably similar. Furthermore, the age range identified by Biering-Sørensen *et al*[8] of 17–59 years, and in general terms the level of injuries are comparable to this study. However, within this study there was no difference between the ratio of males and females, whereas in Biering-Sørensen *et al*'s, the ratio was one female to six males. It is possible that males were more likely to make a more dangerous jump that increased their mortality, or that there was a change in the gender related incidence over the 41 years of the investigation.

The findings discussed in this study present a number of practical implications for quality standards in the care of SCI patients. The fact that most individuals appeared to have responded to treatment indicates that all admissions following self harm should have access to appropriate psychiatric and

psychological treatment. The finding that 7.3% of patients within this study attempted suicide following SCI suggests that a small, if significant number of people who have attempted suicide will re-attempt. Routine screening for suicide and risk assessments might highlight those individuals who are most at risk of re-attempting suicide, allowing healthcare professionals to be made aware of these individuals and adopt appropriate strategies to address suicidal ideation and behaviour. Moreover, the presence of mental health problems may influence the rehabilitation of the individual either by contributing to self-neglect leading to an increase in secondary complications such as pressure sores, or by active psychotic symptoms preventing participation in activities of daily living. Thus, the treatment and re-integration of patients with mental health problems should be regarded as a fundamental aspect of their rehabilitation. The prevalence of psychiatric and mental health problems illustrated in this sample highlights the importance of educating staff about the psychiatric issues associated with suicide, and the necessity of employing staff members within SCI Centres who are fully trained in the care of patients with mental health problems.

The primary methodological limitation faced by this study is the incomplete nature of data fields within the database. Subsequent interpretation of the results presented should therefore account for the incomplete nature of these data fields. More detailed clinical information is required concerning the nature of the situational distress and/or psychiatric illness at the time of onset. Information concerning psychiatric co-morbidity and accounts of the self-harm incident should also be collected. In view of the special needs of these individuals services should ensure regular follow up to prevent deterioration and monitor progress. The majority of this population are 'failed suicides' and therefore present a critical opportunity for implementing an adaptation of the psychological autopsy approach[19,20] which would reconstruct the events preceding the act which would allow access to information beyond that normally available in a psychological autopsy of actual suicides. Indeed, specific presuicidal behaviour patterns such as constriction, inhibited aggression towards the self and suicidal fantasies as identified by Ringel[21] may provide key behaviours which can be identified as indicators of suicidal risk. Moreover, future clinical research should also evaluate the specific problems of people who have both spinal cord injuries and a psychiatric diagnosis. For example, the effects of psychiatric diagnosis on rehabilitation and subsequent care on discharge. Indeed, the percentage of people who are not admitted to rehabilitation centres because of an existing psychiatric diagnosis might be examined. Finally, the frequency of relapse and further attempts at self-harm in this sample should also be assessed.

In conclusion, the findings of this study present a specific sub-group of individuals who have sustained a spinal cord injury. The close link between attempted suicide and psychiatric disorders supports existing findings whilst the demographic, injury, background and outcome data provides critical information concerning those individuals who have attempted suicide and suggests future methods for the identification of suicidal indicators.

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