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Chapter 3

Mental healthcare status and psychiatric diagnoses of train suicides

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ABSTRACT

Background

The objective of this study is to investigate mental healthcare status and psychiatric disorders in train suicides.

Methods

Data of 4 published train suicide studies were combined with a study of 57 train suicides in the Netherlands.

Results

53 % of all train suicides received psychiatric care at the time of suicide, with 49 % of them being inpatients. These values are higher than those found in general suicides. When compared to general suicides, functional non-affective psychoses are overrepresented by 25 % vs 14 %. The percentage of affective disorders approximates that of general suicides namely: 39 % vs 42 %. "Other diagnoses" are underrepresented by 23 % vs 40 %.

Limitations

All psychiatric diagnoses were based on clinical data, which may not accurately reflect the patient's psychiatric condition at the time of suicide.

Conclusions

Train suicides receive mental healthcare more often than general suicides and are more often characterized by severe psychopathology. The study indicates that patients with affective and psychotic disorders in particular should be targeted in order to prevent train suicide.

1. INTRODUCTION

Relatively little is known about train suicides. In the Netherlands, train suicides account for 12 % of all suicides. Each train suicide disrupts train traffic to an extent comparable to that of a bomb-alert (Griffioen and Van den Tweel, 1996).

Knowing more about the psychopathology of this population might contribute to a better understanding of this type of suicidal behaviour.

A literature search was performed to analyse information on mental healthcare and psychiatric diagnoses of train suicides. In addition, the connection between train suicide and mental disorder was investigated in Drenthe, a Dutch province.

2. MATERIALS AND METHODS

Over the period 1966 to May 2006 the databases Embase, PsycINFO and Medline were screened for literature on overground train suicides by means of the keywords rail, railway, railroad and suicide. Publications were selected that contained quantitative information on mental healthcare status and mental disorders.

For the second part of the study demographic data on train suicides in the Netherlands over the period 1986-1998 were obtained from the archives of the Department of Corporate Communications of the Netherlands Railways. The archives contained 2503 cases, 57 (2.3%) of which could be identified as residents of the province of Drenthe. These 57 cases were characterized on the basis of place of residence, date of birth, gender, date of death and the first letter of the suicide's last name (if available). Subsequently, these characteristics were used to match these cases with identical cases registered by the Groningen Psychiatric Case-Register (PCR). The Groningen PCR has registered all contacts of residents of the province of Drenthe with mental health services since 1-1-1986 by means of a probability record linkage method (Brook, 1996). The treatment history and principal diagnoses (ICD-9) were investigated. Any cases not recognised by the PCR were concluded not to have received mental healthcare after 1-1-1986.

Drenthe covers 6.5 % of the Netherlands. In the period of study Drenthe had a population of about 450,000 inhabitants, or 2.96 % of the national population. The province can be characterized as a rural area. In terms of mental healthcare consumption, Drenthe is representative of the Netherlands (Ten Have et al, 1996).

The railway tracks in Drenthe measure 100 km or 3.6 % of the total Dutch track length. The province has three psychiatric hospitals, two of which are situated immediately next to the railway track.

3. RESULTS

Only four studies have dealt quantitatively with clinical aspects of overground train suicides. Symonds reported on the diagnostic characteristics of 82 cases in 1979 and 1980 (Symonds, 1985). A Danish study focused on 16 train suicides in a delimited area (population approx. 44,000), in the period of 1979-82 (Lindekilde and Wang, 1985). In Brisbane, Australia, a survey was done of 23 train suicides between 1980 and 1986 (Emmerson and Cantor, 1993). Most recently, the British SOVRN Project has investigated psychiatric diagnoses of 84 train suicides at their time of death in the period of 1994-2002 (Abbott et al, 2003).

3.1. Mental healthcare status

3.1.1. Four studies

Table 1 shows the numbers of suicides with a known psychiatric history as well as those receiving mental healthcare at the time of suicide. The average percentages are 64 % and 50 % respectively. 44 % of the suicides that received mental healthcare at the time of suicide were inpatients.

3.1.2. Dutch study

40 cases (70%) out of the Dutch sample of 57 cases were identified by the Groningen Psychiatric Case-Register as having had psychiatric treatment in the period starting on 1 January 1986. Demographic characteristics are presented in Table 2. m/f ratios of the identified and unidentified cases are not significantly different (Fisher's Exact Test (2 sided; $P = 0.576$), but the unidentified cases are younger (Mann-Whitney test statistic = 177; $P = 0.004$).

Table 2 also presents age and gender characteristics of the entire sample as well as those of the national population of train suicides. The m/f ratios of the populations differ (1.1 and 1.8 respectively). However, no significant relationship between m/f ratio and the two populations could be found (Fisher's Exact Test (2 sided; $P = 0.069$)). Nor did we find any significant relationship between populations and age (Mann-Whitney test statistic = 62069.5; $P = 0.31$). The same applied when age was classified in 4 age groups ($\text{Chi}^2 = 0.696$; $\text{df} = 3$; $P = 0.87$).

36 out of the 57 cases (63%) received mental healthcare at the time of suicide. 23 (64%) of them received inpatient care. 11 (31%) received outpatient care, one received daycare-treatment and one person lived in community-staffed housing.

Table 1. Care status and main diagnostic categories of train suicides (4 + 1 studies)

	n	Care status at time of death				Diagnoses			
		Known psychiatric history	Received mental healthcare ^b	In-patient status of those receiving care	Valid diagnostic data	No psychiatric diagnosis	Non-affective psychoses	Affective disorders	Other psychiatric diagnoses
Lindekilde and Wang, 1985. Denmark	16	13 (81%)	8 (50%)	7 (88%)	16	3 (19%)	5 (31%)	4 (25%)	4 (25%)
Symonds, 1985. UK	82	49 (60%)	40 (49%)	12 (30%)	75	9 (12%)	12 (16%)	34 (45%)	20 (27%)
Emmerson and Cantor, 1993. Australia	23	19 (83%)	17 (74%)	13 (76%)	19	0 (0%)	13 (68%)	4 (21%)	2 (11%)
Abbott et al, 2003. UK ^a	84	50 (60%)	37 (44%)	13 (35%)	66	16 (24%)	12 (18%)	26 (39%)	12 (18%)
Subtotal	205	131 (64%)	102 (50%)	45 (44%)	176	28 (16%)	42 (24%)	68 (39%)	38 (22%)
Present study, the Netherlands	57	40 (70%)	36 (63%)	23 (64%)	36	0 (0%)	12 (33%)	14 (39%)	10 (28%)
Total	262	171 (65%)	138 (53%)	68 (49%)	212	28 (13%)	54 (25%)	82 (39%)	48 (23%)

^a SOVRN Project.^b Mental health care provided by a general practitioner not included; percentage of study population.

Table 2. Age and gender of train suicides of the Dutch study

	n	Age, mean (SD)	Median	Age min-max	m/f ratio
1. Train suicides identified in Case Register	40	40.9 (15.6)	38.5	19 - 78	1
2. Train suicides not identified in Case Register	17	28.5 (10.7)	26	16 - 49	1.43
3. Train suicides of residents of Drenthe (1 + 2)	57	37.2 (15.3)	36	16 - 78	1.11
4. All train suicides in the Netherlands between 1986 and 1998	2503	39.1 (15.5)	36	11 - 88	1.80

3.2. Psychiatric diagnoses

3.2.1. Four studies

The diagnostic characteristics were grouped in 3 main diagnostic categories of principal diagnoses and showed the following distribution: I. functional non-affective psychoses 24 %, II. affective disorders 39 % and III. other diagnoses (including personality disorders) 22 %. In 16 % no psychiatric diagnosis was evident (Table 1).

3.2.2. Dutch study

In the Groningen PCR no diagnostic information was available on 4 cases. Of the remaining 36 cases, the last known psychiatric diagnosis was used. This dated back to the time of most recent referral for outpatient care or to the time of the most recent admission to hospital. In 7 cases the diagnosis at administrative discharge could be used. The time interval between diagnosis and suicide varied considerably, values being between 0 and 3064 days, with a median of 57. The last known diagnoses showed the following distribution: schizophrenic psychoses 10, other nonorganic psychoses 2, affective psychoses 9 (manic type 3, depressed type 4, unspecified 2), depressive disorder NOS 1, neurotic depression 4, neurotic disorders 5 (incl. anxiety states 3), personality disorder 1, alcohol dependence 1, drug dependence 1, acute reaction to stress 1 and mixed disturbance of conduct and emotions 1. The diagnoses were grouped in 3 main diagnostic categories for subgroup analyses: I. functional non-affective psychoses, II. affective disorders and III. other diagnoses. Results are presented in Table 1.

The diagnostic distribution in main categories turned out to be dependent on age group, ≤ 39 years or ≥ 40 years ($\chi^2 = 15.8$; $df = 2$; $P = 0.000$). 11/12 cases of category I (functional non-affective psychoses) were younger than 40 and 12/14 cases of category II (affective disorders) were 40 or over.

4. DISCUSSION

Together, the Dutch study and the 4 reported studies demonstrate that a considerable proportion (65%) of train suicides has a psychiatric treatment history. This is slightly higher than the proportion of general suicides with a lifetime history of contact with mental health services (58%) reported by Foster (Foster et al, 1997).

At least half of the train suicides (Table 1) received care from mental health services at the time of suicide. This proportion is substantially higher than in populations of general suicides (14 - 35%) (Booth and Owens, 2000; Appleby et al, 2001).

The difference with general suicides is even more robust when the percentages of inpatient suicides are taken into account (Table 1). On average, nearly half of the train suicides receiving mental healthcare at the time of the incident are inpatients. This is 3 times higher than the 16 % reported on general suicides in the UK, who had been in contact with services the year before death (Appleby et al, 2001). It follows that, as a population, train suicides are more severely ill than general suicides.

In the Dutch study, most cases with a functional non-affective psychosis belong to the age group of under 40. This is in accordance with the observation that patients with schizophrenia usually commit suicide before age 45 (Drake et al, 1985).

When comparing the diagnostic categories of the 5 train suicide studies (Table 1) to that found in populations of general suicides, clear differences are found in the categories of functional non-affective psychoses and other psychiatric diagnoses. The combined data of two European psychological autopsy studies on known principal diagnoses (Foster et al, 1997; Henriksson et al, 1993) shows a distribution of 14 % of functional non-affective psychoses, 42 % of affective disorders and 40 % of other psychiatric diagnoses. A meta-analysis of 27 psychological autopsy studies from different regions of the world on average showed a distribution of 9.2 % of psychotic disorders, 43.2 % of affective disorders (including bipolar disorders), 25.7 % of substance abuse-related problems and 16.2 % of personality disorders (Arsenault-Lapierre et al, 2004). These findings all indicate that there is an overrepresentation of functional non-affective psychoses and an underrepresentation of other diagnoses in train suicides. The percentages of affective disorders in this study (39%) and that of the 5 train suicide studies (39%; Table 1) come close to that of general suicides, however (Foster et al, 1997; Henriksson et al, 1993).

A limitation of the study is that, in the majority of cases, the diagnostic information describes the clinical picture at the time of the most recent referral for outpatient care or most recent admission to hospital. Consequently, the quality of the diagnostic descriptives in this study relies on the stability of the diagnoses over time. Nor do we know whether psychosocial factors or co-morbidity may have played a role at the time of suicide.

Why is it that subjects with severe psychopathology have a preference for this method?

There is some evidence that type of suicide method and mental disorders involved are interdependent. Patients with schizophrenia spectrum psychoses use methods that result in physical injuries more often than patients with affective psychoses (Radomsky et al, 1999). As this might explain for the relative overrepresentation of functional non-affective psychoses in train suicides, the majority however, have different diagnoses. In the SOVRN study the so-called proximity factor was investigated for various violent methods. The authors concluded that proximity is not a "rail" factor per se, but that people rather tend to die close to where they live with knowledge of local surroundings being important (Abbott et al, 2003). It might be that in severely ill patients, being familiar with and having easy access to a nearby railway track may compensate for the presence of disabling functional and cognitive deficits and therefore lead to using these means. Furthermore, it should not be overlooked that the supervised intake of psychopharmalogical drugs in a clinical setting and the use of depot medication may limit the access to less violent means, with the unfavourable outcome of patients resorting to more violent methods that are more easily accessible.

This study reveals that at least 50% of train suicides were in contact with mental health services at the time of suicide. When dealing with patients it is of vital importance to systematically and explicitly seek the dialogue about their suicide wishes and to discuss the negative consequences of a train suicide for themselves, the people close to them and numberless commuters.