

Suicide and fatal drug overdose in child sexual abuse victims: a historical cohort study

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Child sexual abuse (CSA) is common, and evidence suggests that 5%–10% of boys and girls experience severe abuse involving sexual penetration.¹ CSA is associated with an array of deleterious outcomes, including problems related to mental health, interpersonal functioning and substance use.^{1–3} Studies of community samples have consistently shown a substantial association between reports of CSA and suicide attempts and other self-destructive behaviour in young people^{4–8} and adults.^{1–3,9–14} A major shortcoming of such studies is the reliance on self-report during adulthood of abuse that occurred during childhood, often using samples of individuals who have attempted suicide. To our knowledge, two prospective studies of CSA and self-destructive behaviour have been published to date, but these have yielded inconsistent findings. In one study, the sample size was small (183 CSA cases);¹⁵ in the other, data on CSA victims were combined with those for victims of other forms of child abuse.¹⁶ Neither study controlled for psychopathological conditions or followed patients into the peak ages for suicide.

The aim of our study was to investigate the rate and risk of suicide and accidental fatal drug overdose in more than 2000 individuals — up to 44 years after experiencing CSA — and to examine other characteristics among CSA victims who die from self-harm.

METHODS

Child sexual abuse population

Records of children who were assessed between 1964 and 1995 following allegations of sexual abuse were obtained from the Victorian Institute of Forensic Medicine (VIFM) and medically ascertained as having been sexually abused during childhood. The VIFM is a statutory body that provides a forensic medical service, including examinations for cases of suspected CSA referred by the police or child welfare and protection services in Victoria (population about 5 million).

Data linkage

Under Australian law, all unnatural deaths of a sudden, traumatic or unexplained manner

ABSTRACT

Objective: To determine the rate and risk of suicide and accidental fatal drug overdose (ie, overdose deemed not to have been suicide) in individuals who had been medically ascertained as having been sexually abused during childhood.

Design: A historical cohort linkage study of suicide and accidental drug-induced death among victims of child sexual abuse (CSA).

Setting and patients: Forensic medical records of 2759 victims of CSA who were assessed between 1964 and 1995 were obtained from the Victorian Institute of Forensic Medicine and linked with coronial data representing a follow-up period of up to 44 years.

Main outcome measures: Rates of suicide and accidental fatal drug overdose recorded in coronial databases between 1991 and 2008, and rates of psychiatric disorders and substance use recorded in public mental health databases.

Results: Twenty-one cases of fatal self-harm were recorded. Relative risks for suicide and accidental fatal overdose among CSA victims, compared with age-limited national data for the general population, were 18.09 (95% CI, 10.96–29.85; population-attributable risk, 0.37%), and 49.22 (95% CI, 36.11–67.09; population-attributable risk, 0.01%) respectively. Relative risks were higher for female victims. Similar to the general population, CSA victims who died as a result of self-harm were predominantly aged in their 30s at time of death. Most had contact with the public mental health system and half were recorded as being diagnosed with an anxiety disorder.

Conclusion: Our data highlight that CSA victims are at increased risk of suicide and accidental fatal drug overdose. CSA is a risk factor that mediates suicide and fatal overdose.

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must be reported to the coroner for investigation. For a death to be classified as a suicide, it must be established by a coroner to have resulted from the deliberate actions of the deceased to end his or her own life.¹⁷ A high threshold is used to exclude all deaths except those with incontrovertible evidence of suicidal intent.

The CSA cohort was linked with cases of reportable deaths in the National Coroners Information System (NCIS) — a national internet-based data storage and retrieval system containing every death in Australia reported to a coroner since July 2000. Unnatural deaths that occurred before the establishment of the NCIS were ascertained from the Victorian Coronial Information Database (VCID), where deaths had been entered between 1989 and 2000.

The surname, first name and date of birth for each CSA victim was cross-referenced with the coronial databases manually and then using an SQL database, extracting exact matches only. Data linkage was performed in 2008 and covers the period July 1991 to June 2000 for the VCID (Victoria only), and July

2000 to August 2008 for the NCIS (Australia-wide). Data on intent, mechanism or manner, and cause of death were obtained for all victims of CSA who were identified in the coronial databases as having died as a result of suicide or fatal drug overdose. Fatal drug overdose that was not concluded to be suicidal was included and coded as accidental fatal overdose. Where intent of drug-related deaths was not determined, cases were coded as accidental fatal overdose, rather than suicide. Psychiatric disorders for the CSA cohort were ascertained from data linkage with two Victorian public mental health databases: the Victorian Psychiatric Case Register and the Redevelopment of Acute Psychiatric Information Database. Both databases contain records of all public inpatient admissions and contact with public mental health services in Victoria, but exclude contact with the private health sector.

Comparison group

Australian national population data and rates of suicide and accidental drug-induced deaths were obtained from the Australian

Rates of suicide and accidental fatal drug overdose in male and female victims of child sexual abuse compared with general population comparison groups

Death	Male comparison group (n = 6 424 461)*	Abused males (n = 558)*	Female comparison group (n = 6 383 534)*	Abused females (n = 2201)*	Abused males v male comparison group†	Abused females v female comparison group†
Suicide	1622 (0.0252%)	2 (0.36%)	431 (0.0068%)	6 (0.27%)	14.20‡ (4.97–40.61)	40.38§ (24.97–65.31)
Accidental fatal drug overdose	898 (0.0140%)	3 (0.54%)	328 (0.0051%)	10 (0.45%)	38.46§ (19.39–76.27)	88.42§ (65.28–119.27)

* Data are number (%). † Data are relative risk (95% CI). ‡ $P = 0.01$. § $P < 0.001$.

Bureau of Statistics (ABS).^{17–19} National data for the year 2000 were used for comparison, as this approximates the median point of the study follow-up period. To ensure valid comparisons to the CSA cohort, the national population data and rates of suicide and accidental drug-induced death were age-limited to 15–64 years. Moreover, classifications and methodology for obtaining death statistics were similar for both sets of data, as the ABS statistics on suicide and accidental drug-induced deaths are based on NCIS data.

Statistical analysis

Relative risks and 95% confidence intervals for suicide and fatal drug overdose in the CSA cohort, relative to the comparison group, were calculated; cross tabulations and calculation of Fisher's exact statistic were used to determine significance of relative risks, with significance set at a P value of 0.05. Confidence intervals were calculated using Miettinen's test-based approach.²⁰ Population-attributable risks were calculated to estimate the excess rates of suicide and fatal overdose in the general population with and without known CSA, thus enabling estimation of the degree to which fatal self-harm could be prevented if CSA was eliminated. Data analysis was undertaken using Stata statistical software, release 10.0 (StataCorp, College Station, Tex, USA).

Ethics approval

Ethics approval was granted from four independent committees: the Monash University Standing Committee on Ethics in Research Involving Humans; and the Human Research Ethics Committees of the VIFM, the Department of Justice, Victoria, and Department of Human Services, Victoria. The study involved accessing the records of a large number of CSA victims without their consent, as seeking their consent would have risked rekindling memories of abuse or

exposing them to painful information that they no longer recalled. As soon as data linkage was completed, all identifiers relating to the CSA victims were removed, thus ensuring anonymity. In our view and that of the sanctioning ethics committees, documenting the nature and extent of the association between CSA and fatal self-harm and mental health was of sufficient public interest and importance to justify the methods employed.

RESULTS

Child sexual abuse population

Records of 2759 CSA victims (2201 girls, 558 boys) were obtained from the VIFM. Of these, 63% involved complete, partial or attempted penetration of an orifice by a penis, finger or object. The remaining 37% involved non-penetrative sexual contact. The CSA victims were aged 16 years or younger (mean age, 10.2 [SD, 4.4] years) at the time of examination. The mean age at the time of data linkage was 34.4 (SD, 11.1) years — 31.4 (SD, 9.3) years for males and 35.2 (SD, 11.3) years for females. The follow-up period ranged from 13 to 44 years (mean follow-up period, 24.2 [SD, 8.2] years).

Deaths

Twenty-one reportable deaths were recorded among the CSA cohort (0.76%); these occurred between 1991 and 2008. Eight (0.29%) were identified as suicide and 13 (0.47%) as accidental fatal overdose.

For the CSA cohort, the age at time of fatal self-harm ranged from 15 to 50 years, with a mean period of 18.6 years from the time of examination for CSA (range, 5–36 years; SD, 10.1 years). Death as a result of self-harm predominantly occurred when CSA victims were aged in their 30s; the mean age at time of suicide was 31.1 (SD, 11.7) years, and the mean age at time of

accidental fatal overdose was 31.4 (SD, 9.7) years. For the comparison group ($n = 12\,807\,995$), the mean age at suicide was 37.0 (SD, 12.0) years, and mean age at accidental fatal overdose was 33.4 (SD, 9.8) years.

In terms of mechanism or manner of suicide in the CSA cohort, women died as a result of carbon monoxide poisoning (3), hanging (1), decapitation (1) and drug overdose (1), and men by hanging (1) and drug overdose (1).

The rate of suicide for the CSA cohort was significantly higher than for the comparison group (relative risk, 18.09; 95% CI, 10.96–29.85; $P < 0.001$). This held true for both males (relative risk, 14.20 [95% CI, 4.97–40.61]; $P = 0.01$) and females (relative risk, 40.38 [95% CI, 24.97–65.31]; $P < 0.001$). The rate of accidental fatal overdose was also significantly higher for the CSA cohort (relative risk, 49.22 [95% CI, 36.11–67.09]; $P < 0.001$), and this held true for males (relative risk, 38.46 [95% CI, 19.39–76.27]; $P < 0.001$) and females (relative risk, 88.42 [95% CI, 65.28–119.27]; $P < 0.001$) (Box). There were no significant differences between abused males and abused females with respect to rates of suicide and accidental fatal overdose ($P = 0.67$ for suicide; $P > 0.99$ for overdose).

The excess rates of suicide and accidental fatal overdose in the general population that were attributable to CSA (population-attributable risks) were 0.37% and 0.01%, respectively.

Psychiatric histories

Psychiatric information on 20 of the 21 CSA victims for whom reportable death was recorded revealed that 16 individuals (80%) had a record of contact with public mental health services in Victoria (suicide occurred outside of Victoria for one individual). Anxiety disorder was the most commonly recorded diagnosis; it was recorded for 10 of

the 20 individuals (50%), and occurred at a higher rate than for CSA victims with no reportable death recorded ($P=0.39$). With respect to rates of affective ($P=0.64$) and psychotic ($P>0.99$) disorders, there were no significant differences between victims of CSA for whom reportable death was recorded and those with no reportable death recorded. Of the 15 CSA victims for whom reportable death from overdose (accidental or intentional) was recorded, three had a mental health record of substance use. Time between separation from last recorded contact with a Victorian public psychiatric service and fatal self-harm ranged from less than 1 month to 12 years for the 20 CSA victims for whom reportable death occurred in Victoria.

DISCUSSION

In our study, individuals who were identified as victims of CSA were significantly more likely to die from suicide or accidental drug overdose than individuals in the general population. This is consistent with findings of an Australian prospective study of 183 CSA cases in which there were three suicides — a significantly higher suicide rate than for the general population.¹⁵ Female CSA victims in our study were shown to be at 40 times higher risk of suicide and 88 times higher risk of accidental fatal overdose. Male CSA victims were also at increased risk, being 14 times more likely to commit suicide and 38 times more likely to die from accidental overdose. Although males are at significantly greater risk of fatal self-harm in the general population than females,^{17,21} within the CSA cohort the rates of suicide and overdose for females are similar to those for males. This created greater differences between CSA victims and the general population for females than for males. As the rates of fatal self-harm were similar between male and female victims, gender does not appear to be a risk factor for suicide or accidental fatal overdose among CSA victims.

The increased risks of suicide and accidental fatal overdose in our study are statistically significant, and increases in mortality are always clinically relevant, but it is not possible to reliably attribute the association entirely to the experience of CSA. Children who come to the attention of child protection services and the police do not represent a random sample. Instead, they are predominantly from disorganised and disadvantaged families — in part because CSA is more common in these families, and in part

because these families are more likely to attract official scrutiny when abuse occurs. The greater probable exposure to a range of childhood disadvantages, in addition to CSA, in many victims makes it difficult to know how much of the risk may be directly attributable to the effects of CSA. On average, almost 20 years had passed from examination for CSA to death, indicating that CSA is not an immediate precipitant to fatal self-harm. Myriad proximal risk factors play a significant role in suicide; nonetheless, the finding that large differences exist between CSA and non-CSA groups indicates that CSA plays an important role in later suicide. The potential contribution of CSA to suicide at a population level is suggested by the population-attributable risk of 0.37%.

A strength of this study is the 44-year follow-up period, which is sufficiently long to capture the peak time during early middle age for suicide^{17,21} and fatal overdose.¹⁸ Contact with psychiatric services was common among CSA victims in our study who died as a result of self-harm. Unpublished results from our study group also show that rates of psychiatric disorders were significantly higher in our cohort of CSA victims compared with matched controls from the general population whose history of abuse was unknown, and even higher than rates found in the wider community. Psychopathological conditions recorded for CSA victims who died as a result of self-harm differed from those expected. Depression and psychosis have been consistently shown to be strong predictors of suicide;^{21,22} however, most of the CSA victims in our study who died from self-harm had a recorded diagnosis of anxiety disorder. Overall, our results are in contrast to previous findings showing that females with an anxiety disorder are least likely to die from suicide.²¹ Together, these findings suggest that victims of CSA who die from self-harm have a different psychopathological profile to non-abused individuals who die from self-harm. Alternatively, being diagnosed with an anxiety disorder may be an artefact of abuse history.

Suicide is the fatal end point of accumulative exposure to risk factors over the course of life.^{4,22} Other risk factors that contribute to suicidal behaviour include low income, poor education, social isolation, personality deficits, substance use and recent stressors.^{4,21,22} These risk factors overlap with the negative life events that victims of CSA tend to experience.¹⁻³ It has been proposed that exposure to childhood adversity

increases the victim's susceptibility to mental illness and stressful life events, which in turn mediates the risks of suicidal behaviour.²² Future research involving review of psychiatric and medical records of identified victims of CSA who died as a result of self-harm may help to elucidate overlapping factors associated with CSA and suicide and further our understanding of the interplay between CSA and fatal self-harm.

This historical cohort study overcomes many potential limitations by using official records and objective measurements of sexual abuse and fatal outcomes. Moreover, this study is unique, as the study population comprised a large complete set of CSA victims from three decades, with a long follow-up period and enough power to detect fatal outcomes that occur at low rates in the general population. However, comparing data on CSA victims with ABS statistics introduces a systematic bias, as the ABS also utilises the NCIS as a source for their death statistics; therefore, CSA victims in our sample who had died from suicide or accidental overdose would also have been included in the ABS statistics. Furthermore, members of the general population may have also experienced sexual abuse during childhood. Another systematic bias relates to data linkage methodology, whereby positive matches in the CSA cohort may have been missed due to possible incorrect data entry (eg, letter or number substitutions or deletions recorded in coronial databases by forensic medical examiners, or during the linkage process), and people changing their surnames (particularly women) or moving out of Victoria (therefore being missed on the coronial search before introduction of the NCIS database). In contrast, the comparison group — which was derived from national statistics of all known cases of fatal self-harm — did not involve any loss of data. All of these systematic biases reduce the likelihood of finding a significant difference between CSA victims and the general population for suicide and fatal drug overdose. It is therefore likely that our results are an underestimate of the true rate of fatal self-harm among CSA victims.

The implications of our findings underscore the importance of thorough assessments of both males and females to screen for CSA and identify those at increased risk of fatal self-harm. Closer monitoring of and early interventions for victims of recognised CSA, particularly those suffering from less severe psychopathological conditions such as anxiety states, is clearly warranted. The

finding that victims of CSA did not die from self-harm until many years after the abuse that they experienced offers hope that interventions to reduce the fatal risks of self-harm can be implemented within a considerable window of opportunity. As sexual abuse in childhood appears to be one of several major factors contributing to fatal self-harm, management and treatment interventions need to focus on a range of risk factors, of which CSA should be considered an established factor.

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COMPETING INTERESTS

None identified.

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