

Self-injury in Teenagers Who Lost a Parent to Cancer

A Nationwide, Population-Based, Long-term Follow-up

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Objective: To investigate the risk of self-injury in parentally cancer-bereaved youth compared with their non-bereaved peers.

Design: Population-based study of cancer-bereaved youth and a random sample of matched population controls.

Setting: Sweden in 2009 and 2010.

Participants: A total of 952 youth (74.8%) confirmed to be eligible for the study returned the questionnaire: 622 (73.1%) of 851 eligible young adults who lost a parent to cancer between the ages of 13 and 16 years, in 2000 to 2003, and 330 (78.4%) of 451 nonbereaved peers.

Main Exposure: Cancer bereavement or nonbereavement during the teenage years.

Main Outcome Measures: Unadjusted and adjusted odds ratios (ORs) of self-injury after January 1, 2000.

Results: Among cancer-bereaved youth, 120 (19.5%) reported self-injury compared with 35 (10.6%) of their nonbereaved peers, yielding an OR of 2.0 (95% CI, 1.4-3.0). After controlling for potential confounding factors in childhood (eg, having engaged in self-destructive behavior, having been bullied, having been sexually or physically abused, having no one to share joys and sorrows with, and sex), the adjusted OR was 2.3 (95% CI, 1.4-3.7). The OR for suicide attempts was 1.6 (95% CI, 0.8-3.0).

Conclusions: One-fifth of cancer-bereaved youth reported self-injury, representing twice the odds for self-injury in their nonbereaved peers, regardless of any of the adjustments we made. Raised awareness on a broad basis in health care and allied disciplines would enable identification and support provision to this vulnerable group.

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THE EARLY DEATH OF A PARENT is among the most traumatic events that can happen to a child.¹ The death of a parent may alone or in addition to factors related to bereavement, such as family and disease-related factors, have an effect on the child's long-term mental health.²⁻⁶ In large observational studies with control groups, parentally bereaved school-aged children have more psychiatric problems,⁷ major depression,² substance abuse,^{2,4} anxiety and social withdrawal, and low self-esteem and self-efficacy issues⁸ several years after the loss. In addition, register-based studies^{9,10} indicate that bereaved youth are at increased risk for completed suicide and registered suicide attempt. Teenagers and young adults in the community (ie, nonpatients) are high-risk populations for self-injury.^{11,12} *Self-injury* can be defined as deliberate self-inflicted destruction of body tissue and ranges from mild and transient to

severe repeated behavior.^{13,14} In association with many suicide attempts, there is a history of previous self-injurious acts.¹⁵⁻¹⁷ Nevertheless, suicidal intent is infrequent in self-assessed self-injury.¹⁴ The reported prevalence of self-assessed self-injury varies from 6% to 40%,^{12,18-23} but the precise prevalence cannot be determined because self-assessed self-injury often is a concealed behavior, and consensus regarding its definition is lacking.^{18,24} Sex,^{11,19,22,23,25} depression and anxiety,^{21,26,27} and experiences such as bullying,^{12,19,21} deliberate maltreatment (sexual and physical abuse),^{19,22,23} and parental separation^{19,21,25,28,29} are prominent risk factors for suicidal phenomena, including self-injury. However, in studies of risk factors of self-assessed self-injury in young people, death of a parent is indistinguishable from categories broadly labeled as "not living with both parents,"^{19,21,25,26,28,30} "death of a family member,"¹² "completed suicide in friend or family member,"^{12,27} and "unexpected death

of someone important.”³¹ In preparatory semistructured interviews, self-injuring and other self-destructive behavior in bereaved children were described by widowed fathers and parentally bereaved young adults. In this population-based, nationwide study, we explored the risk and possible predictors of self-injury in bereaved young adults who had lost a parent to cancer when they were between the ages of 13 and 16 years compared with a random sample of matched nonbereaved peers. We focused on predictors that could be measured in both groups (ie, excluding bereavement-related variables).

METHODS

STUDY PARTICIPANTS

Individuals born between 1936 and 1973 who had died between January 1, 2000, and December 31, 2003, of cancer (*International Classification of Diseases, 10th Revision* code C:00-96) and who had a date of cancer diagnosis at least 14 days before death were identified by the Swedish National Causes of Death Register. Deceased parent was linked to bereaved offspring by the Multi-Generation Register at Statistics Sweden. Children were eligible for the study if they were between the ages of 13 and 16 years at the time of loss, if they were registered to have been living with both parents at the time of loss (ie, parents were not divorced), and if, at follow-up in 2009 to 2010, the other parent was alive. A random sample of nonbereaved individuals, matched for age, sex, and residency, was supplied in a ratio of 1:2. Nonbereaved peers were eligible if both parents were living at the same street address. All had to have been born in one of the Nordic countries, reside in Sweden during data collection, and have an identifiable, active telephone number.

DATA COLLECTION PROCEDURE

A total of 1272 youth met the study inclusion criteria. From February 19, 2009, through March 2, 2010, we successively, avoiding anniversaries and holidays, sent these youth an introductory letter explaining the study objectives and inviting them to participate. A research assistant subsequently called the young adults and asked for oral consent and group affiliation (cancer bereaved or nonbereaved). Those who agreed to participate were sent a questionnaire and a reply card. To ensure anonymity, the reply card was returned separately from the questionnaire. After approximately 2 weeks, a combined thank you and reminder card was mailed. The assistant called those whose reply cards had not been returned. The study was approved by the Regional Ethical Review Board of Karolinska Institutet, Stockholm, Sweden.

QUESTIONNAIRE DEVELOPMENT

Questionnaire construction followed routines established by Rådestad et al³² and described in several articles from the research group.³³⁻³⁵ Hypotheses and study-specific questions were formulated based on simple content analysis of semistructured interviews with cancer-bereaved children and palliative care professionals, the research groups' previous questionnaires, and bereavement literature. Initially, 16 cancer-bereaved youth were interviewed. The consequently formulated questions and response options were then tested for face validity by 15 bereaved and 2 nonbereaved young adults.

OUTCOME AND PREDICTOR MEASURES

The questionnaire contained questions regarding both the present and past. Self-injury was measured with the question, “Have you ever had a period in your life during which you deliberately injured yourself (eg, by cutting or burning yourself)?” To enable comparison between groups despite lack of a time point definable as before or after parental loss in the nonbereaved group, the following response options were offered: “No, never,” “Yes, before December 31, 1999,” “Yes, after January 1, 2000,” or “Yes, both before and after January 1, 2000.” A person was considered to have self-injured after 2000 if he or she had ticked either the “Yes, after January 1, 2000,” or “Yes, both before and after January 1, 2000,” box. The procedure was identical regarding suicide attempts, assessed by the question, “Have you ever tried to commit suicide?” “Have you ever”-type questions were used to assess sibling loss; bullying; abuse; assault; whether any of the parents had been depressed, addicted to drugs, alcohol, or gambling, unemployed, or had trouble at work; whether the young adult child had been diagnosed as having depression or prescribed antidepressants, sedatives, or sleeping pills; and whether there had been a period during which the young adult deliberately had tried to harm others or endangered his or her own life. Response options were “No, never,” “Yes, before December 31, 1999,” “Yes, after January 1, 2000,” “Yes, both before and after January 1, 2000,” or “no/yes,” followed by “If yes, how old were you at that time?” The question, “If needed, was there anyone with whom you could share joys and sorrows during childhood?” was answered with “no” or “yes,” and “Did your family have good cohesion during childhood?” had response options of “No, not at all,” “Yes, a little,” “Yes, moderately,” or “Yes, very much.”

STATISTICAL ANALYSIS

We present the crude odds ratios (ORs) and corresponding 95% CIs of self-injury and suicide attempts, defined as the odds of bereaved youth reporting each outcome divided by the corresponding odds among nonbereaved peers (**Figure**). The ORs were calculated using logistic regression.³⁶ We give crude ORs for self-injury calculated between the possible predictor categories, combining the bereaved and nonbereaved groups, to estimate the effect of the possible risk factors. To ensure a temporal relationship between exposure and outcome, possible predictors had to have occurred in the time frame roughly corresponding to the childhood years (before 13 years of age or before January 1, 2000). We tested for interaction between bereavement and each of the possible confounders using logistic regression with likelihood ratio tests for relevant interaction terms (data not shown). We then performed exploratory forward selection within the cancer-bereaved and nonbereaved groups separately to identify those variables most strongly related to the outcome in each group. To maximize the possibility of finding other explanatory factors that could potentially disprove the assumed main effect of bereavement, we allowed inclusion of variables up to the .20 significance level into the model. We then formed a final model that used all risk factors identified within the cancer-bereaved or nonbereaved group in the 2 multivariable models and bereavement status and present the resulting final multivariable model. Statistical tests were performed at the .05 significance level unless otherwise stated. Individuals with missing data were excluded in each calculation. All statistical analyses were performed using SAS statistical software, version 9.2 (SAS Institute, Inc).

RESULTS

Completed questionnaires were returned from 622 (participation rate, 73.1%) of the 851 eligible young adults who, between the ages of 13 and 16 years, lost a parent to cancer and 330 (participation rate, 78.4%) of their 421 nonbereaved peers. With the exception of birth order and parental birth year, background characteristics were generally equally distributed. A higher proportion of the cancer-bereaved group were the youngest child, had older parents, and had mothers with educational levels that tended to be lower compared with their nonbereaved peers (**Table 1**).

The Figure shows the prevalence and OR for self-injury and for suicide attempts after January 1, 2000, in the cancer-bereaved vs the nonbereaved groups overall and in sons and daughters separately. One hundred twenty (19.5%) of the cancer-bereaved and 35 (10.6%) of the nonbereaved youth reported a period of self-injury after January 1, 2000, yielding an unadjusted OR of 2.0 (95% CI, 1.4-3.0). Among the 120 self-injuring cancer-bereaved youth, 94 (78.8%) reported self-injury to have occurred only after bereavement, 24 (20.0%) reported to have self-injured both before and after bereavement, and 2 (1.7%) self-injured only before bereavement (data not shown). Thirty-eight (6.2%) of the cancer-bereaved youth compared with 13 (4.0%) of their nonbereaved peers reported suicide attempts after January 1, 2000 (OR, 1.6; 95% CI, 0.8-3.0) (Figure). Among the 120 self-injuring, cancer-bereaved youth, 36 (30.0%) also reported a suicide attempt. In the 495 participants who reported no self-injury after January 1, 2000, only 2 participants (0.4%) reported a suicide attempt. In the nonbereaved youth, 10 of 35 who reported self-injuring (28.6%) also reported a suicide attempt, whereas 3 of 294 (0.1%) who did not report self-injury reported a suicide attempt.

Table 2 presents the ORs with the 95% CIs of self-injury after January 1, 2000, among cancer-bereaved and nonbereaved youth combined by possible predictive factors. Predictive factors (95% CIs not including 1.0) for self-injury after January 1, 2000, in cancer-bereaved and nonbereaved youth, respectively, were being female (OR, 3.2) and reporting, before 13 years of age, having been bullied (OR, 2.8), having been physically assaulted and/or sexually violated (combined) (OR, 6.5), having had low family cohesion (OR, 3.2), and not having had anyone with whom to share joys and sorrows (OR, 1.8). Furthermore, statistically significant associations with self-injury were found for all childhood psychiatric morbidity variables, all reported from the period before 2000: having had a medical diagnosis of depression and/or been prescribed antidepressants, sedatives, and/or sleeping pills (combined) (OR, 9.0); having had a period while deliberately trying to harm others (OR, 2.9); having attempted suicide and/or endangering one's life (combined) (OR, 6.0); and having self-injured before the year 2000 (OR, 11.7).

The loss of a mother was not found to be a risk factor for self-injury (OR, 1.2; 95% CI, 0.8-1.8). All variables considered for prediction of self-injury (Table 2) were also tested for potential effect modification, with none being statistically significant (data not shown).

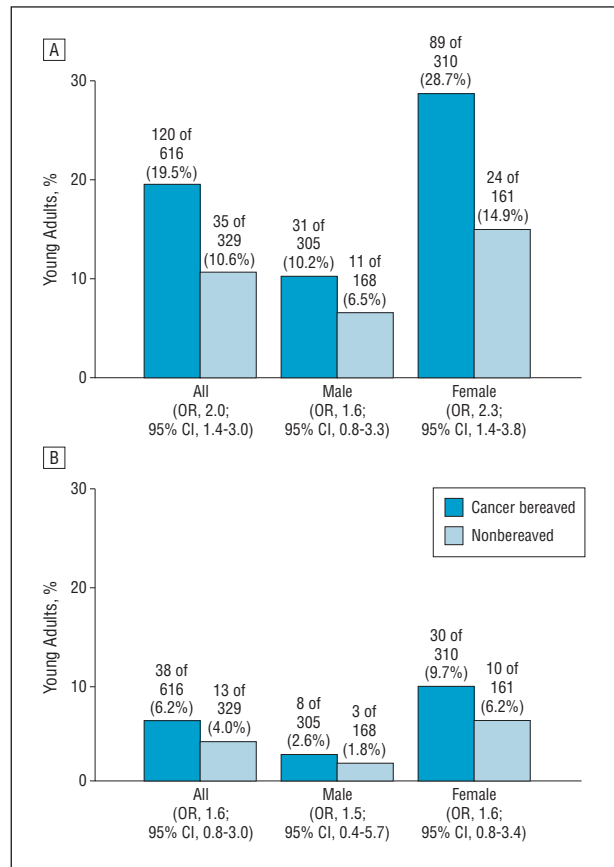


Figure. Prevalence and odds ratios (ORs) of self-injury and suicide attempts after January 1, 2000. A, Self-injury; B, suicide attempt.

Sex; periods of endangering one's life and/or attempting suicide (combined); bullying; physical and/or sexual assault (combined); someone to share joys and sorrows with; age; parental depression, abuse, and/or work-life troubles (combined); diagnosis of depression and/or prescribed antidepressants, sedatives, and/or sleeping pills (combined); and mother's age were the variables chosen by forward selection within the cancer-bereaved group. In the nonbereaved group, sex; physical and/or sexual assault (combined); parental depression, abuse, and/or work-life troubles (combined); father's age; and bullying were the variables selected up to the .20 significance level. Results from adjustments for multiple variables in a final logistic regression model are presented in **Table 3**. The OR for self-injury by bereavement status was 2.0 (95% CI, 1.4-3.0) when unadjusted and 2.3 (95% CI, 1.4-3.7) when adjusted. We have 11 measures of self-assessed symptoms of anxiety, depression, sleeping problems, and emotional numbness at the time of follow-up (ie, the last weeks) or since January 1, 2000, considered not as predictors but as possible mediating factors. For 9 of these, the ORs ranged from 1.1 to 1.7 for cancer-bereaved compared with nonbereaved youth. Two were significant (ie, possible mediators for the effect): to have been diagnosed as having depression after January 1, 2000 (OR, 1.7; 95% CI, 1.0-2.7) and having felt emotionally numb at the time of follow-up (OR, 1.7; 95% CI, 1.1-2.7) (data not shown).

Table 1. Characteristics of Study Population

Characteristic	No. (%) of Young Adults			P Value ^c
	Cancer Bereaved ^a	Nonbereaved ^b	Total	
Confirmed eligible	851	421	1272	
Not reachable	55 (6.5)	24 (5.7)	79 (6.2)	
Declined to participate	66 (7.8)	28 (6.6)	94 (7.4)	
Agreed but did not return questionnaire	108 (12.7)	39 (9.3)	147 (11.6)	
Providing information	622 (73.1)	330 (78.4)	952 (74.8)	
Sex				
Sons	309 (49.8)	169 (51.2)]	.68
Daughters	312 (50.2)	161 (48.8)		
Not stated ^d	1			
Year of birth				
1988-1990	210 (33.9)	119 (36.2)]	.78
1986-1987	286 (46.2)	146 (44.4)		
1984-1985	123 (19.9)	64 (19.4)		
Not stated	3	1		
Birth order				
Oldest child	144 (23.2)	104 (31.7)]	.007
Middle child	148 (23.8)	87 (26.5)		
Youngest child	302 (48.6)	127 (38.7)		
No siblings	27 (4.4)	10 (3.1)		
Not stated	1	2		
Current employment status, >1 alternative possible				
Studying at secondary school level	24/614 (3.9)	13/325 (4.0)		>.99
Adult education at secondary school level	31/613 (5.1)	18/325 (5.6)		.76
Studying at university level	187/613 (30.5)	112/327 (34.2)		.24
Employed or self-employed	355/616 (57.6)	182/326 (55.8)		.63
Unemployed	91/616 (14.8)	53/323 (16.4)		.51
On parental leave	9/613 (1.5)	2/324 (0.6)		.35
On sick leave	7/613 (1.1)	4/324 (1.2)		>.99
Religious or spiritual				
No, not at all	432 (69.7)	229 (70.9)]	.85
Yes, a little	102 (16.4)	54 (16.7)		
Yes, moderately	46 (7.4)	24 (7.4)		
Yes, much	40 (6.5)	16 (5.0)		
Not stated	2	7		
Father's year of birth				
1960-1969	60 (10.0)	63 (19.4)]	<.001
1955-1959	162 (26.9)	111 (34.3)		
1950-1954	176 (29.3)	93 (28.7)		
1936-1949	203 (33.8)	57 (17.6)		
Not stated	21	6		
Mother's year of birth				
1960-1969	125 (21.1)	112 (35.2)]	<.001
1955-1959	205 (34.6)	118 (37.1)		
1950-1954	184 (31.1)	64 (20.1)		
1936-1949	78 (13.2)	24 (7.6)		
Not stated	30	12		
Father's level of education				
Primary school	131 (22.2)	66 (20.4)]	.49
Secondary school	244 (41.4)	147 (45.5)		
University	215 (36.4)	110 (34.1)		
Not stated	32	7		
Mother's level of education				
Primary school	94 (15.9)	33 (10.2)]	.051
Secondary school	245 (41.5)	138 (42.7)		
University	252 (42.6)	152 (47.1)		
Not stated	31	7		

^aYoung adults who lost a nondivorced parent to cancer between the ages of 13 and 16 years in Sweden in 2000 to 2003.

^bA random sample from the Swedish Population Register, matched for age, sex, and residency to the cancer-bereaved young adults.

^cP values calculated according to the Fisher exact test (extended formulation, Monte Carlo approximation with 10⁷ iterations).

^dThe group "not stated" is not included in tests for significance or in calculations of proportions.

Table 2. Possible Predictors for Self-injury in Cancer Bereaved and Nonbereaved Young Adults Combined^a

Predictor	No. (%) of Young Adults		OR (95% CI)
	Self-injury (n = 155)	No Self-injury (n = 790)	
Bereavement status			
Cancer bereaved	120 (19.5)	496 (80.5)	2.0 (1.4-3.0)
Nonbereaved	35 (10.6)	294 (89.4)	1.0 [Reference]
Background Variables			
Sex			
Daughters	113 (24.0)	358 (76.0)	3.2 (2.2-4.7)
Sons	42 (8.9)	431 (91.1)	1.0 [Reference]
Year of birth			
1988-1990	52 (15.9)	275 (84.1)	1.2 (0.7-2.0)
1986-1987	78 (18.1)	352 (81.9)	1.4 (0.9-2.3)
1984-1985	25 (13.6)	159 (86.4)	1.0 [Reference]
Birth order			
Oldest child	39 (16.2)	206 (83.8)	1.0 [Reference]
Middle child	33 (14.1)	201 (85.9)	0.9 (0.5-1.4)
Youngest child	76 (17.8)	350 (82.2)	1.1 (0.7-1.8)
No siblings	6 (16.2)	31 (83.8)	1.0 (0.4-2.6)
Father's year of birth			
1960-1969	24 (19.8)	97 (80.2)	1.3 (0.8-2.3)
1955-1959	42 (15.6)	228 (84.4)	1.0 (0.6-1.6)
1950-1954	42 (15.6)	227 (84.4)	1.0 [Reference]
1936-1949	40 (15.5)	218 (84.5)	1.0 (0.6-1.6)
Mother's year of birth			
1960-1969	43 (18.3)	192 (81.7)	1.2 (0.7-1.9)
1955-1959	48 (15.0)	273 (85.0)	0.9 (0.6-1.4)
1950-1954	40 (16.2)	207 (83.8)	1.0 [Reference]
1936-1949	16 (15.8)	85 (84.2)	1.0 (0.5-1.8)
Father's level of education			
Primary school	29 (14.9)	166 (85.1)	1.0 [Reference]
Secondary school	60 (15.5)	328 (84.5)	1.0 (0.6-1.7)
University	55 (17.0)	286 (83.0)	1.2 (0.7-1.9)
Mother's level of education			
Primary school	24 (18.9)	103 (81.1)	1.0 [Reference]
Secondary school	58 (15.3)	321 (84.7)	0.8 (0.5-1.3)
University	65 (16.2)	336 (83.8)	0.8 (0.5-1.4)
Residential region			
Rural	11 (13.4)	71 (86.6)	0.8 (0.4-1.6)
Small village or town	31 (18.1)	140 (81.8)	1.2 (0.7-1.9)
Medium-sized town	69 (15.8)	367 (84.2)	1.0 [Reference]
City of >500 000	43 (17.3)	205 (82.7)	1.1 (0.7-0.7)
Religious or spiritual			
No, not at all	99 (15.0)	559 (85.0)	0.7 (0.4-1.1)
Yes, a little	30 (19.2)	126 (80.8)	0.9 (0.5-1.6)
Yes, moderately or much	26 (21.0)	98 (79.0)	1.0 [Reference]
Childhood Adversity Variables			
Bereaved of a sibling before the age of 13 years			
Yes	1 (9.1)	10 (90.9)	Not done ^b
No, only after the age of 13 years	1 (11.1)	8 (88.9)	Not done ^b
No, never	153 (16.7)	766 (83.3)	1.0 [Reference]
Bullied before the age of 13 years			
Yes	48 (27.4)	127 (72.6)	2.8 (1.8-4.2)
No, only after the age of 13 years	21 (27.3)	56 (72.7)	2.8 (1.6-4.8)
No, never	80 (12.0)	589 (88.0)	1.0 [Reference]
Physically assaulted or sexually violated before the age of 13 years			
Yes	8 (50.0)	8 (50.0)	6.5 (2.3-17.7)
No, only after the age of 13 years	36 (39.1)	56 (60.9)	4.2 (2.6-6.6)
No, never	110 (13.4)	714 (86.6)	1.0 [Reference]
At least 1 parent was depressed; had alcohol, drug, or gambling abuse; or had trouble in work life before child's age of 13 years			
Yes	16 (18.8)	69 (81.2)	1.5 (0.8-2.7)
No, only after the age of 13 years	41 (26.8)	112 (73.2)	2.4 (1.6-3.6)
No, never	87 (13.3)	568 (86.7)	1.0 [Reference]

(continued)

Table 2. Possible Predictors for Self-injury in Cancer Bereaved and Nonbereaved Young Adults Combined^a (continued)

Predictor	No. (%) of Young Adults		OR (95% CI)
	Self-injury (n = 155)	No Self-injury (n = 790)	
Childhood Psychiatric Morbidity Variables			
Had a medical diagnosis of depression, or was prescribed antidepressants, sedatives, or sleeping pills before 2000			
Yes	8 (53.3)	7 (46.7)	9.0 (3.2-25.4)
No, only after January 1, 2000	55 (47.8)	60 (52.2)	7.2 (4.7-11.1)
No, never	91 (11.2)	718 (88.8)	1.0 [Reference]
Period deliberately trying to harm others before 2000			
Yes	7 (33.3)	14 (66.7)	2.9 (1.2-7.4)
No, only after January 1, 2000	17 (51.5)	16 (48.5)	6.3 (3.0-12.7)
No, never	129 (14.5)	759 (85.5)	1.0 [Reference]
Period either deliberately endangering one's life or attempting suicide before 2000			
Yes	13 (38.2)	21 (61.8)	6.0 (2.9-13.4)
No, only after January 1, 2000	68 (55.3)	55 (44.7)	11.9 (7.8-18.3)
No, never	74 (9.4)	712 (90.6)	1.0 [Reference]
Period of deliberate self-injury before 2000			
Yes	22 (66.7)	11 (33.3)	11.7 (5.6-24.7)
Never or only after January 1, 2000	133 (14.6)	779 (85.4)	1.0 [Reference]
Childhood Social Relations Variables			
If needed, had someone with whom to share joys and sorrows, before the age of 13 years			
No	29 (24.8)	88 (75.2)	1.8 (1.2-2.9)
Yes	124 (15.2)	691 (84.8)	1.0 [Reference]
Family cohesion before the age of 13 years			
No or a little cohesion	16 (37.2)	27 (62.8)	3.2 (1.7-6.2)
Moderate or much cohesion	139 (15.4)	761 (84.6)	1.0 [Reference]

Abbreviation: OR, odds ratio.

^aIndividuals with missing data were excluded in each calculation.

^bNot calculated because of small numbers.

COMMENT

This Swedish population-based, nationwide study reveals a 2-fold odds of self-injury among young adults who, as teenagers between 2000 and 2003, had lost a parent to cancer compared with their nonbereaved peers. Cancer-bereaved and nonbereaved youth had similar childhood risk factors for self-injury (ie, having engaged in self-destructive behavior, been bullied, been sexually or physically abused, having no one to share joys and sorrows with, and sex). When these risk factors were controlled for in multivariable analysis, bereavement remained a significant risk factor for self-injury.

The major strengths of this study, which was nationwide and population based, pertain to its size and high participation rate. To address threats to validity, we used epidemiologic methods adapted to this field by the hierarchical step-model for study design, analysis, and data interpretation.³⁷ We matched the groups beforehand on important, possible confounding factors, such as age, sex, and place of residence. We measured 30 more or less well-documented^{11,38,39} possible confounders to enable adjustment and multivariable modeling. These analyses yielded only a minor change in OR, indicating that the association between bereavement and self-injury is unlikely to be explained by any of the possible confounders considered. Nevertheless, the possibility of residual confounding (eg, unmeasured factors) in the effect measure can-

not be excluded. We have no information about the prevalence of self-injury among nonparticipants and consequently no information about whether their participation would have affected our main finding. Efforts to reduce the problem of misclassification included developing and testing the questions for face validity in close collaboration with those concerned. A PubMed search in November 2011 combining the keywords (*bereavement* OR *grief* OR *loss*) AND (*self-injury* OR *self-harm* OR *self-mutilation*) yielded no nationwide, population-based study addressing parental cancer bereavement in teenagers and young adults and subsequent self-injury in community samples. Regarding the related outcome of health care-registered suicide attempts in parentally bereaved youth, 2 recent, Nordic register-based, case-control studies^{9,10} have been published. Jakobsen and Christiansen⁹ studied 3465 Danish individuals 17 to 23 years of age who had attempted suicide and compared them with matched controls of nonsuicide attempters. They found 4% of suicide attempters to have lost a parent to death from natural causes compared with 2.6% such losses among nonsuicide attempters (OR, 1.6; 95% CI, 1.38-1.96).⁹ In the study by Niederkrotenthaler et al,¹⁰ 17 159 hospitalized young adults who had attempted suicide were compared with matched controls who had not attempted suicide. The risk of having lost a parent to causes of death other than suicide was significantly higher in those who had attempted suicide compared with those who had not

attempted suicide (adjusted OR, 1.3). One study⁴⁰ of risk factors for self-assessed self-injury in 133 undergraduate psychology students specifically addressed parental death as a risk factor for self-injury but was underpowered to study the association. In sum, these studies lend support to our main finding of an association between parental cancer bereavement and self-injury. However, unlike these cited register studies,^{9,10} our finding of an elevated risk of suicide attempt was not statistically significant.

Why would cancer bereavement be associated with an increase in the risk of self-injury? Our data reveal that depression and emotional numbness are potentially mediating factors for self-injury in cancer-bereaved youth. The association between self-injury and depression is well documented,^{11,38} and the most frequently cited reasons to engage in self-injury are to regulate affect (feeling overwhelmed or anxious) and dissociation (feeling numb or unreal).⁴¹⁻⁴³ Numbness is indeed recognized as an acute emotional response to loss.⁴⁴ It is also among symptoms found in grief-related, long-term distress, such as traumatic grief or prolonged grief disorder,⁴⁵ and in our recent, nationwide, population-based study, widowers who experienced low preparedness before their wife's death from cancer reported persistent emotional numbness 4 to 5 years after the loss.⁴⁶ Another explanation could be that the loss of a parent means the loss of a caretaker who could notice and act on the emotional suffering of the child, thus possibly preventing an escalation into more serious behaviors. Self-inflicted wounding has been emphasized as an expression of grief that is unknown to the modern world but documented in the ethnographic literature and in ancient writings as part of the mourning ritual.^{47,48} Different from the traditional aboriginal self-wounding that is described as a required social and monitored ritualistic behavior, confined to the funeral,⁴⁸ the self-injury described by cancer-bereaved youth most often seemed to be concealed and could last or be delayed for years.

Notably, bereavement is not an isolated trauma. Varying with the cause of death, there are associated additional stressors that possibly influence the outcome. For bereaved children, research to date has been directed toward adverse changes in the family after loss (eg, in parental care)^{3,5} and to cohesion, which has been found to be negatively associated with suicidal phenomena.^{40,49-51} Just as in adult cancer bereavement research,^{34,46,52} research on children losing a parent to cancer could well expand its focus to include the effect of additional and modifiable disease-related and care-related factors (eg, awareness, preparedness, information, communication, and trust in health care).

To prevent self-injury or alleviate the suffering that elicits it in cancer-bereaved youth, we should focus on care-related factors that can be altered and develop interventions that target the teenager, or the teenager's family, before and after the death of a parent to cancer.

Self-injury was almost twice as prevalent in the cancer-bereaved youth included in our study. Raised awareness in health care professionals not only in oncology and palliative care but also in emergency departments, psychiatry, family medicine, and school would

Table 3. Multivariable Model

Variable	OR (95% CI)
Cancer bereaved vs nonbereaved	2.3 (1.4-3.7)
Daughter vs son	3.8 (2.3-6.1)
Period of endangering one's life or attempting suicide (combined), yes vs no, never ^a	4.4 (1.7-11.2)
Bullied, yes vs no, never ^{a,b}	2.3 (1.4-3.7)
Physically assaulted or sexually violated (combined), yes vs no, never ^{a,b}	5.1 (1.5-17.1)
If needed, had someone with whom to share joys and sorrows, no vs yes ^a	1.9 (1.1-3.3)
Year of birth ^a	
1988-1990 vs 1984-1985	1.2 (0.6-2.4)
1986-1987 vs 1984-1985	1.7 (0.9-3.1)
At least 1 parent was depressed; had alcohol, drug, or gambling abuse; or had trouble in work life (combined), yes vs no, never ^{a,b}	1.0 (0.5-1.9)
Had a medical diagnosis of depression or was prescribed antidepressants, sedatives, or sleeping pills (combined), yes vs no, never ^a	3.0 (0.8-11.5)
Mother's year of birth ^a	
1960-1969 vs 1950-1954	1.1 (0.6-2.3)
1955-1959 vs 1950-1954	0.8 (0.4-1.5)
1936-1949 vs 1950-1954	1.1 (0.5-2.4)
Father's year of birth ^b	
1960-1969 vs 1950-1954	1.4 (0.7-3.1)
1955-1959 vs 1950-1954	1.1 (0.6-1.9)
1936-1949 vs 1950-1954	0.8 (0.4-1.5)

Abbreviation: OR, odds ratio.

^aVariables selected by forward selection up to the 20% significance level within the cancer-bereaved group.

^bVariables selected by forward selection up to the 20% significance level within the nonbereaved group.

enable early detection and support provision to this vulnerable group.

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