

Psychological morbidity among suicide-bereaved and non-bereaved parents: a nationwide population survey

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To cite: Omerov P, Steineck G, Nyberg T, *et al*. Psychological morbidity among suicide-bereaved and non-bereaved parents: a nationwide population survey. *BMJ Open* 2013;**3**:e003108. doi:10.1136/bmjopen-2013-003108

► Prepublication history for this paper is available online. To view these files please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2013-003108>).

Received 23 April 2013

Revised 1 July 2013

Accepted 19 July 2013

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ABSTRACT

Objective: To determine how psychological premorbidity affects the risk of depression in parents who lost a child through suicide.

Design: Population-based survey.

Setting: Sweden, between 2009 and 2010.

Participants: All parents who lost a child, age 15–30, through suicide between 2004 and 2007 according to National population registries. Non-bereaved parents matched for age, sex, living area, marital status, number of children. Exclusion criteria: born outside a Nordic country, not Swedish speaking, contact details missing. Participants: 666 of 915 (73%) suicide-bereaved and 377 of 508 (74%) non-bereaved parents.

Main outcome measures: Depression measured by the nine-item depression scale of the Patient Health Questionnaire (PHQ-9) and study-specific questions to assess psychological premorbidity and experience of the child's presuicidal morbidity.

Results: In all, 94 (14%) suicide-bereaved and 51 (14%) non-bereaved parents (relative risk 1.0; 95% CI 0.8 to 1.4) had received their first treatment for psychological problems or had been given a psychiatric diagnosis more than 10 years earlier. The prevalence of moderate-to-severe depression was 115 (18%) in suicide-bereaved versus 28 (7%) in non-bereaved parents (RR 2.3; 95% CI 1.6 to 3.5). For those without psychological premorbidity, the relative risk was 2.3 (95% CI 1.4 to 3.6). 339 (51%) suicide-bereaved parents expressed worry over the child's psychological health during the month preceding the suicide and 259 (39%) had anticipated the suicide.

Conclusions: In parents who lost a child through suicide in Sweden we did not find a higher prevalence of long-term psychological premorbidity than among parents who had not lost a child; the more than twofold risk of depression among the bereaved can probably be explained by the suicide and the stressful time preceding the suicide.

INTRODUCTION

Suicide-bereaved parents are at risk of developing mental disorders that might become long-lasting and life-threatening.^{1–6} The

ARTICLE SUMMARY

Article focus

- Depression is common in parents who have lost a child through suicide and the condition might become long-lasting and life-threatening.
- As yet, we do not know to what extent psychological premorbidity influences the outcomes of the bereavement.
- Previous studies have not disentangled long-term psychological premorbidity such as psychiatric diseases from short-term psychological premorbidity due to stress related to parenting a suicidal child.

Key messages

- Our study suggests that suicide-bereaved and non-bereaved parents' prevalence of long-term psychological premorbidity does not differ if measured more than 10 years prior to the suicide and that the more than twofold risk of depression in bereaved parents can be found regardless of long-term psychological premorbidity.
- The elevated risk of depression can probably be explained by the suicide and the stressful time preceding the suicide rather than psychological premorbidity. This adds important information for further intervention studies on the treatment of grief-related depression.

Strengths and limitations of this study

- The study relies on a large sample of suicide-bereaved parents and matched controls, all identified through nationwide registers. The data collection includes psychometric measurements as well as study-specific data that cannot be retrieved from patient registers. The participation rate was high among suicide-bereaved and non-bereaved men and women.
- The questions regarding psychological premorbidity cover a large time-span and the answers might be affected by recall-induced problems. The questions do not measure the severity of the psychological premorbidity.

bereavement-outcome is affected by factors related to the traumatic loss and to factors related to the bereaved individual.^{7–11}

Suicide-bereaved family members may have an increased vulnerability for psychological morbidity due to genetic and environmental factors such as psychiatric illness, personality traits and suicidal behaviour.^{12–14} The majority of suicide-bereaved parents do not suffer from mental disorders prior to the child's suicide, but there is a subgroup that does.^{15 16} In a recent Canadian register study, previous psychological morbidity was found to be more prevalent among suicide-bereaved parents than non-bereaved control parents¹⁶; we do not know if these results are relevant to European communities.

Grief-related depression might be successfully treated.¹⁷ The occurrence and aetiology of depression of suicide-bereaved parents are, however, yet to be studied carefully. In this population-based study, we examine the long-term risk of depression among suicide-bereaved and non-bereaved parents, with and without psychological premorbidity. We hypothesised that suicide-bereaved parents had a higher prevalence of psychological premorbidity in comparison with non-bereaved parents. We also examine the suicide-bereaved parents experience of the child's presuicidal morbidity during the year preceding the suicide. The parents were identified by nationwide registries and data were collected by a detailed questionnaire.¹⁸

METHODS

Subjects

We identified all individuals, 15–30 years old, who died through suicide (ICD 10: X60–X84) between 2004 and 2007 and whose deaths were registered in the nationwide Swedish Cause of Death Register. We thereafter used the unique personal identity numbers and the nationwide Multigeneration Register to identify the bereaved parents.¹⁹ To be included in the study, the parent had to be born in one of the Nordic countries, be able to communicate in Swedish and have an identifiable address and telephone number. Furthermore, parents that had lost more than one child were excluded. A random sample of non-bereaved parents matched for age, sex, living area, marital status, number of children and with a child that was born in the same year as the deceased child was identified through the Swedish Population Register. The ratio of one non-bereaved to two suicide-bereaved gave sufficient statistical power to test our hypotheses regarding depression and anxiety according to a power calculation. The inclusion criteria for the non-bereaved parents were identical to those for the bereaved parents, except that they were not allowed to have lost a child. In total, 915 suicide-bereaved and 508 non-bereaved parents were identified as eligible. The participants gave informed consent before taking part.

Data collection and measurements

We developed the study design from routines established by the Division of Clinical Cancer Epidemiology.^{18 20–22} Our study-specific questionnaires were constructed in a

preparatory study using mixed methods including 46 suicide-bereaved persons. In this study, we tested all questions, including the psychometric scales described below.¹⁸ We used four questions with a follow-up question to measure psychological premorbidity: (1) 'Have you ever received treatment for psychological problems such as depression, anxiety, psychosis or personality disorder?' Treatment was defined as treatment prescribed by a physician, for example, medication, electroconvulsive therapy (ECT) or conversational therapy. 'If yes, when did you receive your first treatment?' (2) 'Have you ever been given a psychiatric diagnosis, for example, depression, panic disorder, psychosis or personality disorder?' 'If yes, when were you given your first diagnosis?' (3) 'Have you during a period of your life medicated against anxiety?' 'If yes, when did you take your first medication?' (4) 'Have you during a period of your life medicated against low mood or depression?' 'If yes, when did you take your first medication?' The answer categories were 'more than 10 years earlier' and 'during the last 10 years' for the non-bereaved and 'more than 10 years earlier', 'during the last 10 years, before my child's death' and 'during the last 10 years, after my child's death' for the bereaved. We used psychometric scales for three of our psychological outcomes: the two-item Generalised Anxiety Disorder scale (GAD-2),²³ the nine-item depression scale of the Patient Health Questionnaire (PHQ-9)²⁴ and the Alcohol Use Disorders Identification Test (AUDIT).²⁵ Symptoms of anxiety and depression were also assessed by questions based on the Diagnostic and Statistical Manual Fourth Edition (DSM-IV) criteria.²⁶ We contacted all eligible parents by sending them an introductory letter and thereafter by telephone and asked for consent to send a questionnaire. We started the data collection in August 2009 and the last questionnaire was returned in December 2010.¹⁸

Statistical analysis

We tested for differences in characteristics using Pearson's χ^2 test and Wilcoxon-Mann-Whitney's test. We dichotomised scores derived from the psychometric scales using recommended cut-offs.^{27–29} We used log-binomial regression to calculate the relative risks (RR) shown in tables 1–4. We thereafter present RR of the different outcomes adjusting for potential confounders, one variable at a time. For modelling involving more than two explanatory variables, we had to use OR estimated through logistic regression, since log-binomial regression did not converge and failed to produce estimates. We performed a variable selection among the possible confounders, using logistic regression with forward selection in order to identify those variables most strongly related to the main outcomes (PHQ-9, GAD-2, AUDIT) in each group. We made the selection among parents without any psychological premorbidity according to answers to the four questions asked, separately within the groups of suicide-bereaved and non-

Table 1 History of psychological premorbidity among suicide-bereaved and non-bereaved parents

Psychological morbidity with first appearance more than 10 years earlier	Suicide-bereaved Number/total number (%)	Non-bereaved Number/total number (%)	Relative risks (CI 95%)
Psychological problems*,†	71/659 (11)	38/373 (10)	1.0 (0.7 to 1.5)
Psychiatric diagnosis†,‡	45/651 (7)	18/373 (5)	1.4 (0.8 to 2.4)
Medication against anxiety†,§	52/657 (8)	24/377 (6)	1.2 (0.8 to 2.0)
Medication against low mood †,¶	61/655 (9)	23/373 (6)	1.5 (1.0** to 2.4)
Any of the above††	94/663 (14)	51/377 (14)	1.0 (0.8 to 1.4)

*Have you ever received treatment for psychological problems such as depression, anxiety, psychosis or personality disorder? (treatment was defined as treatment prescribed by a physician, eg, medication, electroconvulsive therapy (ECT) or conversational therapy). If yes, when did you receive your first treatment?

†The answer categories were 'more than 10 years earlier' and 'during the last 10 years' for the non-bereaved and 'more than 10 years earlier', 'during the last 10 years, before my child's death' and 'during the last 10 years, after my child's death' for the bereaved.

‡Have you ever been given a psychiatric diagnosis, for example, depression, panic disorder, psychosis or personality disorder? If yes, when were you given your first diagnosis?

§Have you during a period of your life medicated against anxiety? If yes, when did you take your first medication?

¶Have you during a period of your life medicated against low mood or depression? If yes, when did you take your first medication?

**The exact confidence limit is 0.95.

††Referred to as with premorbidity in table 3.

bereaved parents. Since we wanted to maximise the possibility of finding other explanatory factors that could potentially disprove the assumed effect of bereavement, we used a liberal inclusion criterion allowing variables up to the 15% significance level entry. For those with

and without psychological premorbidity, we then formed one final model for each outcome utilising all variables that had been identified as associated with the outcome within at least one of the suicide-bereaved or non-bereaved groups and report the resulting adjusted ORs.

Table 2 Psychological morbidity among suicide-bereaved and non-bereaved parents

	Suicide-bereaved Number/total number (%)	Non-bereaved Number/total number (%)	Relative risks RR (CI 95%)
<i>Anxiety and depressive symptoms</i>			
Single item questions*			
Persisting anxiety†	41/664 (6)	4/377 (1)	5.8 (2.1 to 16.1)
Anxiety attacks‡	53/664 (8)	5/377 (1)	6.0 (2.4 to 14.9)
Awakening with anxiety during night‡	40/663 (6)	5/377 (1)	4.5 (1.8 to 11.4)
Awakening with anxiety in the morning‡	46/664 (7)	2/377 (<1)	13.0 (3.2 to 53.5)
Low or depressive mood†	141/663 (21)	21/377 (6)	3.8 (2.5 to 5.9)
Psychometric scales			
Depression (PHQ-9)§	115/655 (18)	28/374 (7)	2.3 (1.6 to 3.5)
Anxiety (GAD-2)¶	139/658 (21)	22/374 (6)	3.6 (2.3 to 5.5)
Hazardous alcohol consumption (AUDIT) **	76/643 (12)	28/375 (7)	1.6 (1.0 to 2.4)
Medication single item questions* and PHQ-9			
Sleeping medication†	82/664 (12)	20/377 (5)	2.3 (1.5 to 3.7)
Antidepressant medication†	99/664 (15)	13/375 (3)	4.3 (2.4 to 7.6)
Anxiolytic medication†	49/662 (7)	8/375 (2)	3.5 (1.7 to 7.2)
Antidepressant medication and/or depression†,§	167/665 (25)	35/377 (9)	2.7 (1.9 to 3.8)

*Self-rated prevalence of symptoms during the preceding month with answering alternatives ranging from 'no', 'yes occasionally', 'yes 1–3 times or days a week', 'yes 4–5 times or days a week', and 'yes 6–7 times or days a week'.

†'Yes 1 day a week' or more often.

‡'Yes 1 time a week' or more often.

§The nine-item depression scale (PHQ-9), score 10 or higher (range from 0 to 27). The answering categories were slightly modified from 'not at all', 'several days', 'more than half the days', 'nearly every day' to 'not at all', '1–3 days a week', '4–5 days a week', and '6–7 days a week', using the same system for scoring. The calculated scores were based on self-reported data.

¶The two-item Generalised Anxiety Disorder scale (GAD-2) score 2 or higher (range from 0 to 6). The answering categories were slightly modified as described above, using the same system for scoring. The calculated scores were based on self-reported data.

**The Alcohol Use Disorders Identification Test (AUDIT) scores 8 or higher (range from 0 to 40). The calculated scores were based on self-reported data.

AUDIT, alcohol use disorders identification test; GAD, generalised anxiety disorder; PHQ, Patient Health Questionnaire.

Table 3 Unadjusted and adjusted relative risks and ORs for outcome of depression (PHQ-9), anxiety (GAD-2) and hazardous alcohol consumption (AUDIT) among suicide-bereaved and non-bereaved parents, with and without psychological premorbidty

	RR (95% CI) adjusted for									OR (95% CI)	
	RR (95% CI) Unadjusted	Sex	Age	Residence area	Civil status	Level of education	Source of income	Physical activity	Social activity	Unadjusted	Adjusted for multiple*
With premorbidty†											
PHQ-9	2.6	2.6	2.8	2.5	2.5	2.5	2.3	2.3	2.2	3.5	2.8‡
≥10	(1.2 to 5.4)	(1.2 to 5.3)	(1.3 to 5.8)	(1.2 to 5.3)	(1.2 to 5.2)	(1.2 to 5.2)	(1.1 to 4.9)	(1.1 to 4.7)	(1.1 to 4.7)	(1.4 to 8.5)	(1.0 to 7.4)
GAD-2	3.8	3.8	3.7	3.7	3.5	3.8	3.3	3.4	4.2	5.5	4.7§
≥2	(1.6 to 9.0)	(1.6 to 9.0)	(1.5 to 9.0)	(1.6 to 9.0)	(1.5 to 8.4)	(1.6 to 9.1)	(1.4 to 8.0)	(1.4 to 8.2)	(1.6 to 11.0)	(2.0 to 15.0)	(1.5 to 15.2)
AUDIT	1.4	1.4	1.2	1.5	1.3	1.4	1.6	1.1	1.2	1.5	1.0¶
≥8	(0.5 to 3.8)	(0.5 to 3.6)	(0.5 to 3.3)	(0.6 to 3.8)	(0.5 to 3.5)	(0.5 to 3.7)	(0.6 to 4.2)	(0.4 to 3.1)	(0.4 to 3.2)	(0.5 to 4.5)	(0.3 to 3.5)
Without premorbidty											
PHQ-9	2.3	2.2	2.3	2.3	2.3	2.3	2.1	2.3	2.1	2.5	2.2‡
≥10	(1.4 to 3.6)	(1.4 to 3.5)	(1.4 to 3.6)	(1.4 to 3.6)	(1.4 to 3.6)	(1.4 to 3.6)	(1.3 to 3.4)	(1.5 to 3.6)	(1.3 to 3.3)	(1.5 to 4.0)	(1.3 to 3.7)
GAD-2	3.5	3.4	3.5	3.5	3.5	3.5	3.3	3.5	3.3	4.0	3.7§
≥2	(2.1 to 5.7)	(2.1 to 5.6)	(2.1 to 5.7)	(2.2 to 5.8)	(2.2 to 5.8)	(2.1 to 5.8)	(2.0 to 5.5)	(2.1 to 5.7)	(2.0 to 5.4)	(2.4 to 6.9)	(2.2 to 6.4)
AUDIT	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.7	1.7‡
≥8	(1.0 to 2.6)	(1.0 to 2.5)	(1.0 to 2.5)	(1.0 to 2.6)	(1.0 to 2.6)	(1.0 to 2.5)	(1.0 to 2.6)	(1.0 to 2.5)	(1.0 to 2.5)	(1.0 to 2.8)	(1.0 to 2.8)

*ORs adjusted for multiple variables selected by logistic regression with forward selection. The selection was done among those without psychological premorbidty, separately within the groups of bereaved and non-bereaved parents. The variables sex and age were forced into each model.

†Participants were categorised 'With premorbidty' if they, more than 10 years earlier: had their first treatment for psychological morbidity such as depression, anxiety, psychosis or personality disorder (treatment defined as treatment prescribed by a physician such as medication, electroconvulsive therapy (ECT) or conversational therapy) or, had been given their first psychiatric diagnosis such as depression, panic attacks, psychosis or personality disorder or used medication against anxiety or depression.

‡Variables selected in both bereaved and non-bereaved: (sex, age), source of income, social activity.

§Variables selected within the bereaved group: (sex, age), source of income, physical activity, social activity.

¶Variables selected in both bereaved and non-bereaved: (sex, age), source of income. Variables selected within the bereaved group: education, physical activity. Variables selected within the non-bereaved group: social activity.

AUDIT, alcohol Use disorders identification test; GAD, generalised anxiety disorder; PHQ, Patient Health Questionnaire; RR, relative risk.

Table 4 General health and well-being among suicide-bereaved and non-bereaved parents

	Suicide-bereaved Number/total number (%)	Non-bereaved Number/total number (%)	Relative risk (95% CI)
Quality of life during the last month*			
None to low	126/662 (19)	31/376 (8)	2.3 (1.6 to 3.3)
Well-being during the last month†			
No to yes, a little	228/660 (35)	53/377 (14)	2.5 (1.9 to 3.2)
Meaningful life during the last month‡			
No to yes, a little	190/658 (29)	37/377 (10)	2.9 (2.1 to 4.0)
Psychological health during the last month*			
None to low	136/662 (21)	29/377 (8)	2.7 (1.8 to 3.9)
Physical health during the last month*			
None to low	148/661 (22)	61/376 (16)	1.4 (1.0 to 1.8)
Feelings of guilt*			
Yes, 1–3 days a week or more	110/666 (17)	10/374 (3)	6.2 (3.3 to 11.7)
Fear of next-of-kin's death†			
Yes, 1–3 days a week or more	96/666 (14)	14/373 (4)	3.8 (2.2 to 6.6)

*Self-rated experiences during the preceding month with answering alternatives ranging from 'none', 'low', 'moderate' and 'high'.

†Self-reported prevalence of symptoms during the preceding month with answering alternatives ranging from 'no', 'yes occasionally', 'yes 1–3 days a week', 'yes 4–5 days a week', and 'yes 6–7 days a week'.

‡Self-rated experiences during the preceding month with answering alternatives ranging from 'no', 'yes a little', 'yes moderate', and 'yes much'.

We performed statistical tests at the 5% significance level, unless otherwise stated, and excluded individuals with missing data in each respective calculation. All statistical analyses were performed with the IBM SPSS Statistics software, V.19.0.

RESULTS

Participants

The questionnaires were returned by 666 of the 915 (73%) suicide-bereaved parents and 377 of the 508 (74%) non-bereaved parents. The suicide-bereaved and non-bereaved parents had similar background characteristics concerning: age, gender, residence area, family constellation, number of children, country of birth, level of education, source of income, yearly income and religiosity (table 5).

Primary outcomes

Psychological premorbidity, as measured by answers to single-item questions, did not differ significantly between the groups of suicide-bereaved and non-bereaved parents. In total 94 of 663 (14%) suicide-bereaved and 51 of 377 (14%) non-bereaved parents (RR 1.0; 95% CI 0.8 to 1.4) reported that they had received their first treatment for psychological problems or had been given a psychiatric diagnosis more than 10 years earlier, although the bereaved parents had somewhat higher prevalences for all the individual single-item questions (table 1).

Self-reported anxiety and depressive symptoms

The prevalence of moderate-to-severe depression, as measured by PHQ-9, was 115 of 655 (18%) among suicide-bereaved parents in comparison with 28 of 374 (7%)

non-bereaved parents, resulting in a relative risk of 2.3 (95% CI 1.6 to 3.5; table 2). Split by sex, the prevalence of moderate-to-severe depression was 87 of 375 (23%) in suicide-bereaved mothers, 22 of 186 (12%) in non-bereaved mothers, 28 of 280 (10%) in suicide-bereaved fathers and 6 of 160 (4%) in non-bereaved fathers (data not shown in tables). When stratified according to psychological premorbidity, the prevalence of moderate-to-severe depression among those with premorbidity was 33 of 93 (35%) among the bereaved versus 7 of 51 (14%) among the non-bereaved (RR 2.6; 95% CI 1.2 to 5.4), while among those without premorbidity the corresponding prevalences were 82 of 560 (15%) among the bereaved versus 21 of 323 (7%) among the non-bereaved (RR 2.3; 95% CI 1.4 to 3.6). The statistically significant difference between bereaved and non-bereaved parents remained after adjusting for the following known risk-factors for depression: sex, age, residential area, civil status, level of education, source of income, physical activity and social activity (table 3).

Secondary outcomes

In comparison with the non-bereaved parents, the suicide-bereaved parents showed a higher prevalence of all negative outcomes, for which all differences except harmful alcohol consumption and physical health were statistically significant (tables 2–4). We found the risk of feelings of guilt (without a specified cause) to be more than six times higher among suicide-bereaved parents, and the risk of fear of next-of-kin's death to be about four times higher (table 4). Among the suicide-bereaved, 457 of 651 (70%) reported feelings of guilt for the child's death and 372 of 642 (58%) believed that they could have prevented the suicide. One of 4, 164 of 666 (25%) reported that their child had self-harmed

Table 5 Participation and characteristics of suicide-bereaved and non-bereaved parents

Participants	Suicide-bereaved n=666	Non-bereaved n=377	p Value
Sex—n (%)			0.630*
Fathers	283 (42)	166 (44)	
Mothers	383 (58)	211 (56)	
Age—year			
Fathers, median (IQR)	58 (53–62)	59 (54–62)	0.667†
Mothers, median (IQR)	55 (51–59)	54 (50–59)	0.161†
Children—n (%)‡			0.887*
One child	71 (11)	43 (11)	
Two children	241 (36)	139 (37)	
Three or more children	350 (53)	193 (51)	
Not stated	4 (<1)	2 (<1)	
Family constellation at time of study—n (%)			0.964*
Living with a partner	477 (72)	271 (72)	
Has partner but lives alone	44 (7)	28 (7)	
Single	121 (18)	67 (18)	
Widow, widower	18 (3)	11 (3)	
Not stated	6 (<1)	0 (0)	
Residence area—n (%)			0.365*
Rural	162 (24)	77 (20)	
Village (population <10 000)	153 (23)	97 (26)	
Small town (population <50 000)	128 (19)	73 (19)	
Town (population <200 000)	117 (18)	62 (16)	
Larger town (population >200 000)	97 (15)	68 (18)	
Not stated	9 (1)	0 (0)	
Country of birth—n (%)			0.003*
Born in Sweden	629 (94)	371 (98)	
Born in other Nordic country	36 (6)	6 (2)	
Not stated	1 (<1)	0 (0)	
Level of education—n (%)			0.625*
Elementary school or less	146 (22)	73 (19)	
Junior college	271 (41)	158 (42)	
College or university (<3 years)	82 (12)	55 (15)	
College or university (>3 years)	159 (24)	91 (24)	
Not stated	8 (1)	0 (0)	
Source of income—n (%)			0.060*
Employed or self-employed	498 (75)	303 (80)	
Old-age pension	59 (9)	38 (10)	
Disability pension	61 (9)	21 (6)	
Unemployment fund	25 (4)	6 (2)	
Other	16 (2)	9 (2)	
Not stated	7 (1)	0 (0)	
Yearly income in Swedish crowns—n (%)			0.189*
0–99 000 SEK	34 (5)	10 (3)	
100 000–199 000 SEK	120 (18)	64 (17)	
200 000–39 9000 SEK	388 (58)	240 (64)	
400 000 SEK or more	109 (16)	59 (16)	
Not stated	15 (2)	4 (1)	
Religion—n (%)			0.252*
Do not believe in God	355 (53)	216 (57)	
Believes in God	287 (43)	150 (40)	
Not stated	24 (4)	11 (3)	

*Pearson's χ^2 test.

†Wilcoxon-Mann-Whitney's test.

‡The suicide-bereaved parents' dead child is included in the figures.

and 150 of 666 (23%) that their child had tried to commit suicide during the year prior to the suicide. Seventy-nine of 666 (12%) also reported that their child

had been in contact with the healthcare system several times as a result of suicide-attempts during the year prior to the suicide. One of 2, 339 of 666 (51%) were

anxious over the child's psychological health and 294 of 666 (44%) had worried that their child might commit suicide during the month prior to the suicide. The suicide was perceived as somewhat expected by 259 of 666 (39%) parents and 424 of 666 (64%) believed that their child suffered from a psychiatric disease such as depression, anxiety disorder, personality disorder, psychosis or substance abuse. We found that the majority of suicides were made by violent means such as hanging, strangulation and suffocation (53%), by moving vehicles (13%), jumping from a height (7%) or by firearm discharge (7%) (data not shown in the tables).

DISCUSSION

In our nationwide survey of 666 suicide-bereaved and 377 non-bereaved parents, the bereaved did not have a higher prevalence of psychological premorbidities than the non-bereaved. However, the 14% of the bereaved with premorbidities more often reported several forms of premorbidities as compared to the 14% of the non-bereaved with premorbidities, possibly reflecting more severe afflictions. Among those without premorbidities, the bereaved parents had a more than twofold higher risk of moderate-to-severe depression 2–5 years after the loss, as measured by PHQ-9. The same was found for the more than threefold higher risk of anxiety, as measured by GAD-2 (table 3). We found an increased risk of depression and anxiety in both groups of suicide-bereaved, those with psychological premorbidities and those without.

Comparison with other studies

We found two population-based studies that investigated psychological premorbidities among suicide-bereaved and non-bereaved parents using registries on psychiatric admissions and diagnoses: Stenager and Qin's¹⁵ study on 4142 individuals aged 9–35 years who committed suicide in Denmark during the period 1981 to 1997 and Bolton *et al*'s¹⁶ study of 1415 suicide-bereaved parents in Manitoba, Canada between 1997 and 2007. Stenager and Qin¹⁵ found that about 6% of the suicide-bereaved parents and about 3% of the non-bereaved controls had been admitted to a psychiatric hospital 10 years prior to the suicide and about 1.1% of the suicide-bereaved and 0.5% of the non-bereaved had been admitted within the past 3 years. In Bolton *et al*'s¹⁶ study, 28% of the suicide-bereaved parents had had a mental disorder 2 years prior to the suicide, according to the registers. Bolton *et al* also showed that 15% of the suicide-bereaved parents had been diagnosed with depression 2 years prior to the suicide in comparison to 11% of the control parents who had been diagnosed with depression at the same time. Two years after the suicide, the prevalence rose to 31% among the suicide-bereaved parents, while the control parents' prevalence barely changed (10%). Bolton *et al* suggest that the suicide-bereaved parents have a premorbidities due to shared genetic and environmental factors as one part of the explanation, but they

also recognise that the parents might have stress-related psychopathology due to factors that preceded the suicide. In our study, one of two suicide-bereaved parents had experienced anxiety over their child's psychological health and risk for suicide (44%) during the year prior to the suicide. Also, one of four had experienced that their child self-harmed and tried to commit suicide (23%), sometimes repeatedly during a long period of time prior to the suicide. To diminish the risk of capturing effects directly related to a stressful time of parenting during the years preceding the suicide, we chose to measure the debut of psychological premorbidities in the period ending more than 10 years before the suicide. The discrepancy in results might be related to the measurements as well as differences among populations. Our results are nationwide and self-reported. We included psychological treatments and psychotropic drugs prescribed by a physician in addition to psychiatric diagnoses, cases not always registered in inpatient or outpatient registers. One may hypothesise that cases of psychological morbidity reported in registers might be more severe and that severe psychiatric conditions are more prevalent among a subpopulation of the suicide-bereaved parents compared to controls.

Two longitudinal surveys found that while a history of depression is associated with recurrence of depression, one brief bereavement-related depressive episode is not.^{30 31} In a sample from a longitudinal survey including the US general population,³⁰ 865 of 43 093 participants with a lifetime history of one brief bereavement-related depressive episode reported major depression 3 years later. In comparison, 2320 of 27 074 participants with no history of depression reported major depression at follow-up, resulting in a non-significant difference (RR 0.85; 95% CI 0.52 to 1.59). Similar results were found in Wakefield's longitudinal survey.³¹ In contrast, our data suggest an elevated risk of depression 2–5 years after the loss among suicide-bereaved parents compared to non-bereaved parents, regardless of psychological premorbidities. One explanation for this discrepancy might be that our participants had lost a child and that death by suicide like other traumatic deaths often is associated with a particularly difficult grieving process.³² This is supported by Kessler *et al*'s² case-control study on major life events and first-time admission for depression, which included 13 006 depressed patients and 260 108 age-matched and sex-matched controls. In this study, suicide of a family member was associated with 1.95 relative risk (95% CI 1.30 to 2.92) of being first-time admitted for depression, whereas death of a family member by causes other than suicide was associated with a non-significant relative risk of 1.11 (95% CI 0.91 to 1.35). We found a high risk of depression after parental bereavement in two register-based studies, both only including parents without previous psychiatric admissions. Li *et al*⁸ followed more than 1 million parents during 1970 to 1999 and found that parents who lost a child, age 6 years or older, had a higher relative risk of being

hospitalised for affective disorder; 2.72 (95% CI 1.54 to 4.81) among mothers and 1.85 (95% CI 0.59 to 5.75) among fathers. Kessling *et al*'s² case-control study stated that 26 of 13 006 individuals admitted with depression had experienced a child's suicide in comparison with 257 of 260 108 individuals who were not admitted, giving a relative risk of 1.95 (95% CI 1.30 to 2.92).

Strengths and limitations

Our study has several strengths: one is the large sample of suicide-bereaved parents and matched controls, all identified through nationwide high-quality registers. Another is the high participation rate among suicide-bereaved and non-bereaved men and women. The background characteristics among the respondents were remarkably similar among the bereaved and non-bereaved. We matched the group of suicide-bereaved with the group of non-bereaved on important, possible confounding sociodemographic variables and the responding groups were similar also on factors that we did not match for (table 5). Our study also has limitations. The questions regarding psychological premorbidity cover a large time-span and the answers might be affected by recall-induced problems due to time and informants' experiences. To reduce this risk, we asked specific questions about medication, psychiatric diagnoses and treatments prescribed by a physician rather than general questions about psychological morbidity. We also lack information about possible confounders related to personality, since questions on personality were perceived as difficult to grasp by the parents in the preparatory study.¹⁸ We chose not to include personality inventories in the questionnaire due to their size. Our main outcome psychological morbidity is common in the general population and we wanted a demographically relevant group of parents for comparison of psychological premorbidity as well as current psychological morbidity. Using a comparison group of only non-bereaved parents not including parents bereaved by other death causes can be disputed. A disadvantage is that we cannot disentangle how much of the elevated psychological morbidity can be explained by loss of a son or daughter in general, and loss to suicide specifically. We lack information about the prevalence of psychological morbidity among non-participants and consequently about whether their participation would have affected our findings. We addressed the threats to validity by employing epidemiological methods as transferred to this field by the hierarchical step-model for study design, analysis and data interpretation.³³ Efforts to reduce the problem of misclassification included a thorough prestudy, developing and testing the questions and the psychometric scales in close collaboration with parents from the study population.¹⁸ Our main outcomes were measured by psychometric as well as study-specific questions based on DSM-IV with similar results, and we have no reason to believe that the suicide-bereaved and non-bereaved differ systematically in their

response to these questions. It is likely that the fundamental manifestations of grief are universal, but still, generalisation to other populations may be compromised by culture-specific issues.

CONCLUSION

Depression can be prevented and treated, but it is yet to be established if the methods used are as effective in the subgroups of parents who are suicide-bereaved and depressed. Our finding that the suicide-bereaved parents' prevalence of psychological premorbidity was not higher than the non-bereaved parents' prevalence adds important information for further intervention studies. The knowledge is also valuable for contradicting the prejudiced assumption that suicide primarily occurs in especially vulnerable families.

Acknowledgements The authors would like to thank the parents who participated in the study for their willingness and bravery, they also thank Else Lundin and Jonna Lindsjö at Karolinska Institutet for their administrative support in the study, and Lawrence Lundgren PhD, Professor Emeritus, University of Rochester, for linguistic revision of the manuscript.

Contributors PO, BR, UN and GS designed the study. PO performed the data collection supervised by GS and UN. TN and PO analysed the data. PO wrote the first draft of the report. UN, GS, BR and TN commented on the report, which PO and UN revised. All authors contributed to the discussion and have seen the final version of the paper. PO (guarantor) and all the coauthors had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Funding The study was supported by The Swedish Council for Working Life Social Research (FAS), ALF Grants, County Council of Stockholm and Swedish Lundbeck foundation. The researchers conducted this study totally independent of the funding body.

Competing interests PO and UN have received research grants from The Swedish Council for Working Life Social Research (FAS), ALF Grants, County Council of Stockholm and Swedish Lundbeck foundation for the submitted work; BR has been paid for developing and delivering educational presentations for Lundbeck and AstraZeneca.

Ethics approval The regional ethics review board in Stockholm approved of the study (Dnr: 2006/284-31).

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available.

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