

# The Impact of Parental Status on the Risk of Completed Suicide

Ping Qin, MD, PhD; Preben Bo Mortensen, DrMedSc

**Background:** Although some studies suggest that parenthood is associated with a reduced suicide risk, the impact of children on parental suicide has rarely been documented.

**Methods:** This study investigates the impact of parental status on the risk of completed suicide in the context of other risk factors. A nested case-control design is used, matching for age, sex, and calendar time. The study is based on 4 Danish longitudinal registers, including 18611 suicides of individuals aged 18 to 75 years from January 1, 1981, to December 31, 1997, and 372 220 matched control subjects. Information about children and subject's individual background is retrieved and merged. Data are analyzed using conditional logistic regression, yielding odds ratios interpreted as incidence rate ratios.

**Results:** The presence of children is protective against suicide in parents in terms of having children and, to a

higher degree, having a young child; these effects exist even when adjusted for marital, socioeconomic, and psychiatric status; and their influences are much stronger in women than in men. At the same time, parents of children with a hospitalized psychiatric disorder and parents of children who have died are at an increased risk for suicide. A child dying during early childhood has a strong effect on suicide in parents, and a suicidal death of a child increases the risk of parental suicide more than a nonsuicidal death. The suicide risk is particularly high in the first month after losing a child.

**Conclusions:** The impact of children on parental suicide can be protective because of having children. It can also be negative, for example, when losing a child, particularly if the child dies during early childhood; the risk is particularly high during the first month after the loss.

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THE THEORY of parenthood and suicide proposed by Durkheim<sup>1</sup> and the theory of attachment raised by Adam<sup>2</sup> suggest that the presence of children is protective against suicide. However, the impact of children on parental suicide has been poorly documented in the literature. In a Norwegian follow-up study, Hoyer and Lund<sup>3</sup> found a decreasing risk of suicide with increasing number of children for women. Previous studies indicated that being a parent of a child younger than 2 years reduced suicide risk in the general population,<sup>4</sup> and this effect significantly differed between men and women.<sup>5</sup> Although, to our knowledge, no study has directly addressed the impact of losing a child on parental suicide, a few studies<sup>6,7</sup> have demonstrated that the parents bereaved through the loss of a child showed a higher level of mental distress or psychiatric problems. The results from the previously mentioned studies suggest that parenthood could be either protective against suicide because of

having children or leading to distress associated with suicide because of losing a child; however, to our knowledge, no study has taken both aspects of information regarding children into account and estimated their relative importance. Moreover, some research<sup>8-10</sup> has documented that parental psychopathological features are predictive for suicidal behaviors in young people, whereas little is known about the impact of psychiatric illness in children on parental suicide. Furthermore, it remains unclear if, and to what extent, the effects associated with parental status can be explained by differences in marital, socioeconomic, and mental health status.

In this study, we extract information about children and other individual data from Danish longitudinal registers, specifically focusing on investigating the impact of parental status on the risk of completed suicide in the context of other risk factors by taking into account information such as number of children, age of the youngest child, psychiatric status

From the National Center for Register-Based Research, Aarhus University, Aarhus, Denmark.

among children, death mode and age of a child, and the timing since the loss of a child.

## METHODS

We retrieved individual data from 4 Danish longitudinal register databases and merged them by means of the personal identifier, the so-called central personal registration number. The first register is the Cause-of-Death Register,<sup>11</sup> which records the causes and dates of all deaths in Denmark and has been computerized since 1969. Suicide was coded as E950 to E959 (using the *International Classification of Diseases, Eighth Revision [ICD-8]*) from 1969 to 1993 and as X60 to X84 (using the *International Classification of Diseases, 10th Revision [ICD-10]*) afterwards. The second is the Danish Civil Registration System,<sup>12</sup> which contains a personal identifier for all individuals residing in Denmark and their links to parents and children. The third register is the IDA Database,<sup>13</sup> a Danish acronym for the Integrated Database for Labour Market Research, which contains longitudinal information on labor market conditions for all persons in the population and their sociodemographic data. The last one is The Danish Psychiatric Central Register,<sup>14</sup> which covers all psychiatric inpatient facilities in Denmark and cumulatively records all admission and discharge information, and has been computerized since 1969. Approval of this study was obtained from the Danish Data Protection Agency.

## SUBJECTS

### Cases

We obtained 18611 suicides from January 1, 1981, to December 31, 1997, from the Cause-of-Death Register, with a restriction that the individuals were aged 18 to 75 years and residing in Denmark on January 1 of the year of suicide so that they were likely to have registered links to children and had complete socioeconomic information in the IDA Database.

### Control Subjects

By using a nested case-control design matching for age, sex, and calendar time, we randomly selected 20 controls per case from a 5% random sample of the national population in the IDA Database, in which each suicide was matched to a random subsample of all individuals of the same birth year and sex who were alive and observed in the 5% sample of the national population in the IDA Database at the particular time of the suicide. This procedure was conducted for each suicide, resulting in 372220 controls matched to 18611 suicide cases.

## INFORMATION ABOUT CHILDREN

To obtain the information about children, we linked the personal identifier of study subjects to the Danish Civil Registration System to identify their children, and retrieved the birth date and personal identification number of each child. In Denmark, every live birth is assigned a personal identifier and is registered, with links to legal mother and father at the time of birth. However, many people born before 1960 have no registered links to their parents because of some reasons during the establishment of registration. People were often not registered with links to parents if they were not living with at least one parent in 1969, if they were themselves parents in 1969, if their parents emigrated from Denmark before 1979, or if they immigrated to Denmark as adults.

We then linked the personal identifier of these children with the Cause-of-Death Register and The Danish Psychiatric

Central Register to see whether they were present on the records of the 2 databases. Detailed information about children for each subject was finally summarized into 4 main variables.

1. The number of children. This refers to the total number of children with registered links to each subject at the date of suicide or matching, and was divided into no children, 1 child, 2 children, 3 to 4 children, or 5 and more children.

2. The age of the youngest child. This means the age of the youngest child at the suicide or matching time, and was categorized as follows: older than 18 years, 7 to 18 years, 4 to 6 years, 2 to 3 years, from birth to 1 year, or no link to a child.

3. Psychiatric illness in children. This indicates whether any of the children had ever been admitted for a psychiatric disorder from April 1, 1969, to the matching time, and was classified into no child admitted, 1 child ever admitted, 2 or more children ever admitted, or no link to a child.

4. Deaths in children. This contains the age and cause of death of children dying from January 1, 1970, to the matching time. Because few persons had 2 or more children who had died, only 2 persons had a child who died of a completed suicide at an age younger than 18 years, and no subject had a child who died of suicide while another child died of other causes, we grouped this variable into mutually exclusive categories according to the age and death mode of the youngest dead child (ie, no death among children, loss of a child aged <1 year, loss of a child aged 1-6 years, loss of a child aged 7-17 years, non-suicidal death of a child aged ≥18 years, suicidal death of a child aged ≥18 years, or no link to a child). In addition, the duration between the death of a child and the date of suicide or matching was also constructed, and was grouped into within 1 month, 1 to 12 months, 1 to 5 years, or more than 5 years.

## ADJUSTING VARIABLES

We adjusted data for the confounding variables that were highly associated with suicide in Denmark.<sup>4,5</sup> We extracted socioeconomic and demographic data from the IDA Database for the year before the year of suicide or matching and psychiatric admission status, updated to the date of suicide or matching, from The Danish Psychiatric Central Register. The data studied were as follows: (1) marital status, being single or cohabiting vs married; (2) labor market status, unemployed for less than 20% of total weeks, unemployed for between 20% and 80% of total weeks, unemployed for more than 80% of total weeks, disability pensioner, retired because of age, receipt of other social benefits, or out of the labor market vs fully employed; (3) annual income, the first, second, or third quartile vs the highest quartile; (4) ethnicity, Danish citizens born abroad or non-Danish citizens vs Danish citizens born in Denmark; (5) place of residence, the capital area or cities with more than 100000 inhabitants vs other areas; (6) sickness-related absence from work, away from a job because of illness for more than 3 consecutive weeks vs no sickness-related absence; and (7) psychiatric admission status, currently admitted to a psychiatric hospital or 1 month, 2 to 6 months, 7 to 12 months, or more than 1 year since the latest discharge vs never admitted to a psychiatric hospital.

## STATISTICAL ANALYSIS

We conducted all analyses using SAS statistical software, version 8.<sup>15</sup> The relative risk of suicide was estimated by a conditional logistic regression model using the PHREG procedure in SAS. Conditional risk ratios and their 95% confidence limits were estimated. The Wald test was used to examine whether the risk ratio in various categories was significantly different from the reference.

P values of the interaction test were based on the likelihood ratio test; for instance, the interaction between a speci-

**Table 1. Distribution of Information About Children for the Cases and Controls\***

Variable	Total		Men		Women	
	Cases (N = 18 611)	Controls (N = 372 220)	Cases (n = 12 111)	Controls (n = 242 220)	Cases (n = 6500)	Controls (n = 130 000)
No. of children						
0	8733 (46.92)	144 207 (38.74)	5522 (45.59)	89 330 (36.88)	3211 (49.40)	54 877 (42.21)
1	3285 (17.65)	65 023 (17.47)	2156 (17.80)	44 156 (18.23)	1129 (17.37)	20 867 (16.05)
2	4151 (22.30)	101 580 (27.29)	2728 (22.52)	67 998 (28.07)	1423 (21.89)	33 582 (25.83)
3-4	2276 (12.23)	56 960 (15.30)	1575 (13.00)	37 796 (15.60)	701 (10.78)	19 164 (14.74)
≥5	166 (0.89)	4450 (1.20)	130 (1.07)	2940 (1.21)	36 (0.55)	1510 (1.16)
Age of the youngest child, y						
>18	4457 (23.95)	95 721 (25.72)	2690 (22.21)	61 139 (25.24)	1767 (27.18)	34 582 (26.60)
7-18	3790 (20.36)	83 768 (22.50)	2610 (21.55)	55 749 (23.02)	1180 (18.15)	28 019 (21.55)
4-6	735 (3.95)	18 394 (4.94)	551 (4.55)	13 364 (5.52)	184 (2.83)	5030 (3.87)
2-3	480 (2.58)	14 026 (3.77)	405 (3.34)	10 409 (4.30)	75 (1.15)	3617 (2.78)
<2	416 (2.24)	16 104 (4.33)	333 (2.75)	12 229 (5.05)	83 (1.28)	3875 (2.98)
No child	8733 (46.92)	144 207 (38.74)	5522 (45.59)	89 330 (36.88)	3211 (49.40)	54 877 (42.21)
Children admitted to a psychiatric hospital						
0	9212 (49.50)	220 549 (59.25)	6229 (51.43)	148 533 (61.32)	2983 (45.89)	72 016 (55.40)
1	610 (3.28)	7055 (1.90)	327 (2.70)	4111 (1.70)	283 (4.35)	2944 (2.26)
≥2	56 (0.30)	409 (0.11)	33 (0.27)	246 (0.10)	23 (0.35)	163 (0.13)
No child	8733 (46.92)	144 207 (38.74)	5522 (45.59)	89 330 (36.88)	3211 (49.40)	54 877 (42.21)
Death age and mode of a child						
No child dead	9628 (51.73)	225 259 (60.52)	6449 (53.25)	151 120 (62.39)	3179 (48.91)	74 139 (57.03)
Death of a child	42 (0.23)	672 (0.18)	23 (0.19)	452 (0.19)	19 (0.29)	220 (0.17)
Aged <1 y						
Aged 1-6 y	34 (0.18)	239 (0.06)	22 (0.18)	146 (0.06)	12 (0.18)	93 (0.07)
Aged 7-17 y	40 (0.21)	376 (0.10)	22 (0.18)	243 (0.10)	18 (0.28)	133 (0.10)
Nonsuicidal death of a child aged ≥18 y	77 (0.41)	1194 (0.32)	50 (0.41)	791 (0.33)	27 (0.42)	403 (0.31)
Suicidal death of a child aged ≥18 y	57 (0.31)	273 (0.07)	23 (0.19)	138 (0.06)	34 (0.52)	135 (0.10)
No child	8733 (46.92)	144 207 (38.74)	5522 (45.59)	89 330 (36.88)	3211 (49.40)	54 877 (42.21)
Timing since the loss of a child						
No child dead	9628 (51.73)	225 259 (60.52)	6449 (53.25)	151 120 (62.39)	3179 (48.91)	74 139 (57.03)
Within 1 mo	47 (0.25)	33 (0.01)	33 (0.27)	24 (0.01)	14 (0.22)	9 (0.01)
1-12 mo	33 (0.18)	230 (0.08)	14 (0.12)	201 (0.08)	19 (0.29)	79 (0.06)
1-5 y	81 (0.44)	1081 (0.29)	46 (0.38)	706 (0.29)	35 (0.54)	375 (0.29)
>5 y	89 (0.48)	1360 (0.37)	47 (0.39)	839 (0.35)	42 (0.65)	521 (0.40)
No child	8733 (46.92)	144 207 (38.74)	5522 (45.59)	89 330 (36.88)	3211 (49.40)	54 877 (42.21)

\*Data are given as number (percentage) of each group. Percentages may not total 100 because of rounding.

fied variable and sex was tested by comparing the likelihood value of the full model, including all variables and their sex interactions, with the likelihood value of the same model excluding only the sex interactions with the specified variable.

A test of trends, as if suicide risk increases or decreases with continuous changes of a study variable, was performed from the full model of the conditional logistic regression analysis. The value of each variable used for the trend test was defined as 0, 1, 2, . . . , according to the order of the categories grouped for each variable, with 0 referring to the reference category.

## RESULTS

In this study, 65.1% of the suicide cases were men; 46.4% of the suicide cases vs 70.5% of the controls were married or cohabiting; and 47.4% of the suicide cases vs 4.9% of the controls had a history of a psychiatric admission. **Table 1** displays the distribution of information about children in categories. Compared with the controls, individuals who committed suicide were less likely to have children or to have a young child, while they more often had a child with a psychiatric disorder or a child who had died.

The results of the conditional logistic regression analysis are shown in **Table 2**. The odds ratios (ORs) derived from the crude analysis decreased or increased gradually in the direction as expected. However, when including all these variables in one model and further adjusting for subjects' own socioeconomic, demographic, and psychiatric admission status, the protective effect of children for the total subjects was much reduced and was significant only for having 5 or more children and having a child younger than 3 years. However, this general effect of parenthood in reality reflected different effects in mothers and fathers (sex interaction test:  $P = .02$  for the number of children and  $P < .001$  for the age of the youngest child).

In the adjusted analysis, the protective effect of having children was not statistically significant for men, but it remained significant for women with 3 or more children. The tests of trend indicated that suicide risk decreased significantly with increasing number of children only for women (test of trend: OR, 0.94;  $P < .01$ ). At the same time, the influence of having a young child was much stronger in women than in men; it was statistically significant ( $P < .01$ ) for men only when having a child from

**Table 2. Results of the Conditional Logistic Regression Analysis\***

Variable	Total		Men		Women	
	Crude Analysis†	Adjusted Analysis‡	Crude Analysis†	Adjusted Analysis‡	Crude Analysis†	Adjusted Analysis‡
No. of children§						
0  ¶	1.00	1.00	1.00	1.00	1.00	1.00
1	0.73 (0.70-0.76)#	1.05 (0.99-1.12)	0.72 (0.68-0.76)#	1.06 (0.99-1.14)	0.74 (0.69-0.80)#	1.02 (0.92-1.13)
2	0.55 (0.52-0.57)#	1.01 (0.95-1.08)	0.56 (0.53-0.58)#	1.03 (0.95-1.11)	0.52 (0.48-0.56)#	0.97 (0.87-1.09)
3-4	0.52 (0.50-0.55)#	0.94 (0.87-1.01)	0.57 (0.53-0.60)#	0.98 (0.90-1.07)	0.44 (0.40-0.48)#	0.84 (0.73-0.96)#
≥5	0.49 (0.42-0.57)#	0.77 (0.64-0.93)#	0.60 (0.50-0.72)#	0.86 (0.69-1.05)#	0.29 (0.20-0.40)#	0.62 (0.42-0.90)#
Age of the youngest child, y**						
>18	1.00	1.00	1.00	1.00	1.00	1.00
7-18	0.86 (0.82-0.91)#	1.01 (0.95-1.08)	1.01 (0.94-1.08)	1.12 (1.04-1.21)#	0.62 (0.57-0.68)#	0.76 (0.68-0.85)#
4-6	0.74 (0.67-0.81)#	0.95 (0.86-1.05)	0.88 (0.80-0.98)#	1.05 (0.94-1.19)	0.48 (0.40-0.57)#	0.66 (0.53-0.83)#
2-3	0.65 (0.58-0.72)#	0.88 (0.78-0.99)††	0.86 (0.76-0.96)#	1.06 (0.93-1.21)	0.28 (0.22-0.35)#	0.42 (0.31-0.56)#
<2	0.51 (0.45-0.57)#	0.62 (0.55-0.70)#	0.61 (0.54-0.70)#	0.74 (0.65-0.85)#	0.30 (0.24-0.38)#	0.32 (0.24-0.42)#
No child	1.41 (1.34-1.47)#	NA	1.52 (1.44-1.61)#	NA	1.25 (1.16-1.35)#	NA
Children admitted to a psychiatric hospital						
0	1.00	1.00	1.00	1.00	1.00	1.00
1	2.13 (1.95-2.32)#	1.16 (1.05-1.29)#	1.91 (1.70-2.14)#	1.22 (1.06-1.39)#	2.50 (2.19-2.84)#	1.08 (0.91-1.28)
≥2	3.41 (2.57-4.51)#	1.51 (1.06-2.14)††	3.27 (2.27-4.71)#	1.54 (1.00-2.39)††	3.66 (2.35-5.69)#	1.40 (0.77-2.56)
No child	1.72 (1.66-1.79)#	NA	1.69 (1.60-1.74)#	NA	1.86 (1.74-2.00)#	NA
Death age and mode of a child						
No child dead	1.00	1.00	1.00	1.00	1.00	1.00
Death of a child	1.48 (1.08-2.03)#	1.45 (1.00-2.11)††	1.22 (0.80-1.85)	1.15 (0.72-1.85)	2.01 (1.26-3.22)#	2.64 (1.41-4.97)#
Aged <1 y						
Aged 1-6 y	3.29 (2.29-4.72)#	4.88 (3.23-7.39)#	3.50 (2.23-5.49)#	5.18 (3.19-8.41)#	2.97 (1.62-5.45)#	4.70 (2.12-10.43)#
Aged 7-17 y	2.38 (1.72-3.30)#	2.51 (1.70-3.71)#	2.04 (1.32-3.16)#	2.17 (1.33-3.54)#	2.99 (1.82-4.90)#	3.85 (2.01-7.38)#
Nonsuicidal death of a child aged ≥18 y	1.51 (1.19-1.90)#	1.40 (1.08-1.81)#	1.47 (1.10-1.95)#	1.40 (1.02-1.90)††	1.59 (1.07-2.35)††	1.35 (0.84-2.16)
Suicidal death of a child aged ≥18 y	4.99 (3.75-6.65)#	2.54 (1.78-3.64)#	3.98 (2.56-6.20)#	1.90 (1.12-3.23)††	6.09 (4.17-8.90)#	3.47 (2.09-5.75)#
No child	1.68 (1.62-1.74)#	NA	1.64 (1.57-1.71)#	NA	1.77 (1.65-1.89)#	NA

Abbreviation: NA, data not applicable.

\*Data are given as odds ratios (95% confidence intervals). The *P* values for the sex interaction test were .02, <.001, .92, and .15 for the 4 variables, respectively.

†Adjusted for age, sex, and calendar time through matching.

‡Further adjusted for all the variables in the table and marital status, labor market status, annual income, ethnicity, place of residence, sickness-related absence from a job, and psychiatric admission status.

§The analogous odds ratios (95% confidence intervals) for the trend test were 1.01 (0.99-1.04) (*P* = .30) and 0.94 (0.91-0.98) (*P* < .006) for men and women, respectively.

||This category was included only one time in the full model as the reference for the number of children.

¶Reference.

#*P* < .01.

\*\*The analogous odds ratios (95% confidence intervals) for the trend test were 0.97 (0.95-1.00) (*P* = .05) and 0.77 (0.72-1.81) (*P* < .001) for men and women, respectively.

††*P* < .05.

birth to the age of 1 year, while it was significant for women even with a child younger than 18 years. The test of trend was highly significant for women (OR, 0.77; *P* < .001) and marginally significant for men (OR, 0.97; *P* = .05), indicating that having a younger child is more protective, especially in women. In addition, the impacts of having children and having a young child did not differ according to marital status in women (marriage interaction test: *P* = .06 and *P* = .14, respectively), whereas they differed significantly by marital status in men (marriage interaction test: *P* < .001 and *P* < .01, respectively). For married or cohabiting men, the protective effect of having children was pronounced, and increased with the number of children. The adjusted ORs (95% confidence intervals [CIs]) were as follows: 1 child, 0.96 (0.87-1.05); 2 children, 0.88 (0.81-0.97); 3 to 4 children, 0.82 (0.73-0.91); and 5 or more children, 0.76 (0.60-0.97). However, an almost reversed pattern

was the case for single men. The adjusted ORs (95% CIs) were as follows: 1 child, 1.10 (0.98-1.23); 2 children, 1.14 (1.02-1.29); 3 to 4 children, 1.19 (1.03-1.37); and 5 or more children, 0.84 (0.43-1.76). Having a child younger than 2 years reduced the suicide risk significantly (OR, 0.73; 95% CI, 0.63-0.85; *P* < .01) only for married or cohabiting men.

Having 1 or more children admitted for a psychiatric disorder significantly increased the suicide risk, but its effect was much reduced when further adjusted for the subjects' own psychiatric admission status and other factors. Although it remained on a significant level for men, the effect was not statistically different between men and women (sex interaction test: *P* = .92). Moreover, the effect of mental illness in children differed significantly by the subject's own psychiatric status (interaction test: *P* < .03 for men and *P* < .01 for women). In the full analysis, having a child with



a psychiatric disorder increased suicide risk only for fathers and mothers who had never been admitted for a psychiatric diagnosis. For those without a psychiatric history, the adjusted ORs (95% CIs) of having 1 and 2 or more children admitted were 1.25 (1.06-1.48) and 2.46 (1.49-4.09) for fathers, respectively, and 1.62 (1.27-2.06) and 1.75 (0.64-4.82) for mothers, respectively. For those with a psychiatric history, the corresponding adjusted ORs (95% CIs) were 1.07 (0.88-1.30) and 0.96 (0.52-1.78) for fathers, respectively, and 0.95 (0.79-1.14) and 1.17 (0.62-2.18) for mothers, respectively.

The loss of a child markedly increased the suicide risk for men and women (sex interaction test:  $P = .15$ ). The effect was particularly marked when a child died during early childhood (eg, the OR was 5.18 for men and 4.70 for women if a child died at the age of 1-6 years). The relative risks decreased somehow when a child died at an older age, but the suicidal death of a child older than 18 years also showed a strong impact on parental, especially maternal, suicide. Moreover, for women, the influence of a child dying of a completed suicide after the age of 18 years was significantly higher than that of a same-age child dying of a nonsuicidal cause ( $\chi^2 = 7.30$ ,  $P < .01$ ).

Alternatively, when replacing the death mode and age of a child with the timing of the death of a child in the full model, losing a child within 1 month had an extremely strong impact on parental suicide. The adjusted ORs (95% CIs) associated with losing a child within 1 month, from 1 to 12 months, from 1 to 5 years, and more than 5 years before the suicide were 34.68 (19.31-62.29), 1.59 (0.88-2.89), 1.43 (1.02-1.98), and 1.11 (0.80-1.54) for men, respectively; the corresponding ORs (95% CIs) were 76.05 (26.64-217.08), 4.56 (2.16-9.61), 1.80 (1.16-2.80), and 1.86 (1.25-2.77) for women.

#### COMMENT

To our knowledge, this study is the first to estimate the impact and relative importance of variables related to children on parental suicide while controlling for a wide range of individual factors. Moreover, the method of retrieving data from Danish longitudinal population-based registers makes it possible to include a large sample in this study, yielding better statistical power in a study of a relatively uncommon risk factor, such as a suicidal death in children.

In Denmark, all death certificates are completed by physicians. If a cause is uncertain, whether it is a suicide, an unintentional injury, a homicide, or a natural cause of death, the police will require a forensic medical examination. Although some errors of omission or misclassification may exist, we believe this would not influence our results much because we included only definite suicides as the cases. Also, because of the availability of data, we were only able to include psychiatric data for people admitted to hospitals, which may represent a severe spectrum of psychiatric disorders; and we were unable to study other desirable variables, such as children's physical illness. In addition, our findings regarding young children may apply generally to relatively younger subjects, while the findings regarding psychiatric disorders and suicide in children may apply to relatively older parents.

#### PROTECTIVE EFFECTS ASSOCIATED WITH CHILDREN

This study shows that the presence of children has a protective impact on suicide in parents in terms of having children and, to a higher degree, having a young child; such effects exist even when adjusted for individual background, such as marital, socioeconomic, and psychiatric status; and their influences are much stronger in women than in men.

It is widely expected that childbearing is most often a positive life event that may prevent people from ending their life. The results from this study support the hypothesis by Durkheim<sup>1</sup> of parenthood reducing suicide risk and the attachment theory by Adam<sup>2</sup> as well. Our finding of a significantly decreased risk of suicide with increasing number of children for women is in line with the findings of the study by Hoyer and Lund,<sup>3</sup> and is also concordant with studies<sup>16,17</sup> investigating reasons for living, in which a negative correlation was found between child- and family-related concerns and suicidal behaviors. Our finding that people, especially women, with a younger child were less likely to commit suicide is consistent with the literature.<sup>4,5,18,19</sup> An exception from this pattern would, of course, be the increased suicide risk in women with puerperal mental disorders,<sup>20,21</sup> but this is probably too uncommon to have any substantial impact on the general protective effect of children.

Moreover, to our knowledge, this study is the first to demonstrate that suicide risk is reduced with the decreasing age of the youngest child; to our knowledge, it is also the first to indicate that having a young child is more important than a large family in relation to preventing parents from committing suicide. At the same time, our findings of significant sex differences for the protective effects of children and the interactions of these differences with the subject's marital status strongly suggest that being a parent of a child or a young child, in its own right, reduces suicide risk more often in women than in men, rather than other factors (eg, being married *per se*, which may be more protective against suicide for men than for women).<sup>5,22</sup> Also, the fact that fewer fathers than mothers have custody of their children when separated or divorced may contribute to the negative effect of having children on fathers living separately.

It is difficult to fully explain the protective impact of children on parental suicide. One important approach could be that the presence of children and/or young children may increase parents' feelings of self-worth, possibly based on their perception of being needed. Another explanation might be that children can provide emotional and material support to parents when they have difficulties or setbacks. Also, there might be a selection effect that people in better health, physically and mentally, or generally leading a happier life are more likely to have children. For instance, psychiatric illness may affect one's opportunities for marriage and childbearing.<sup>23</sup>

#### RISK FACTORS RELATED TO CHILDREN

In this study, we find that having a child with a psychiatric illness and, especially, losing a child are associated

with an elevated suicide risk, and their influences are similar in men and women. Also, a child dying at an earlier age during childhood has a stronger effect on suicide in parents, and the suicidal death of a child increases the risk of suicide more than the nonsuicidal death of a child. In addition, the suicide risk in parents is particularly high during the first month after losing a child.

Our results, that the effect of a psychiatric illness in children was markedly eliminated in the full analyses and that it significantly increased suicide risk only for those without a history of a psychiatric admission, suggest that a mental disorder in children is more likely to act as a risk factor for suicide through the association with a mental disorder in parents, even though we cannot determine to what extent it is due to genetic transmission of mental disorders or familial aggregation of other factors.

Loss of a child has a strong influence on parental suicide, and its impact was even increased when further adjusted for other risk factors. These results suggest that losing a child may contribute more than other factors to provoke parents to want to die, which is especially the case when losing a young child likely to be strongly attached to and dependent on the parents. Our results are concordant with, and may be explained by, the findings from previous studies that parents bereaved through the loss of a child showed a higher level of mental distress or psychiatric problems,<sup>6,7</sup> survivors of young decedents were more grief stricken and depressed and in greater shock than those of older decedents,<sup>24</sup> and grief recovery was more difficult for mothers of young deceased adults.<sup>25</sup>

Furthermore, our study also shows an excess risk of suicide in parents, especially mothers, who had an adult child who died of a completed suicide. It has been suggested that suicide bereavement is distinct in 3 significant ways: the thematic content of the grief, the social processes surrounding the survivor, and the impact suicide has on family systems.<sup>26</sup> Although no study has investigated specific grief reactions in parents to the suicidal death of a child, to our knowledge, it is understandable that if a child died of suicide, the parents may experience strong feelings of guilt, responsibility, shame, stigmatization, and rejection.

In addition, to our knowledge, this study is the first to demonstrate suicide risk in parents in relation to the timing since losing a child. The possible homicide-suicide may associate with the extremely high risk immediately after losing a child,<sup>27</sup> but such cases are rare and would unlikely contribute much to the risk. Nevertheless, our results strongly suggest that familial and social support is necessary and important for parents who lose a child, especially during the first month after the death of the child.

In conclusion, by using data from Danish longitudinal registers, this large case-control study found that the impact of children on parental suicide can be protective because of having children, while it can also be negative (eg, if losing a child). This cannot be explained by the differences in other risk factors, such as marital, socioeconomic, and psychiatric status. Parents with children, especially a young child, are at a reduced risk of suicide, while at the same time parents bereaved through losing a child are at an increased risk, particularly when a child dies in early childhood and during the first month after the loss.

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Corresponding author and reprints: Ping Qin, MD, PhD, National Center for Register-Based Research, Aarhus University, Taasingegade 1, DK-8000 Aarhus C, Denmark (e-mail: pq@ncrr.dk).

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