Who Is at Risk of Dying Young from Suicide and Sudden Violent Death? Common and Specific Risk Factors among Children, Adolescents, and Young Adults

ANNELIE WERBART TORNBLOM, MSc, KIMMO SORJONEN, PhD, BO RUNeson, MD, PhD and PER-ANDERS RYDELIUS, MD, PhD

Objective: Suicides and other sudden violent deaths are the most common causes of death among young people worldwide. This case-control study compared risk factors for suicide and other sudden violent death among young people.

Method: A total of 436 psychological autopsy interviews with next of kin were performed. The samples aged 10–25 years included 63 cases of suicide, 62 cases of other sudden violent death, and 104 matched living controls. Two stepwise multiple logistic regression analyses were performed.

Results: The number of recent stressful life events was the only common risk factor for suicide and other sudden violent death. Specific risk factors for suicide were any form of addiction and being an inpatient in adult psychiatric care. Specific risk factors for other sudden violent death were lower elementary school results, lower educational level, and abuse of psychoactive drugs.

Conclusions: The suicide group seems to have been more vulnerable and exposed to different kinds of stressors, whereas the sudden violent death group seems to have been more acting out and risk-taking. Both groups must be the subject of prevention and intervention programs.
Nearly one third of the approximately 800,000 people who die worldwide due to suicide every year consist of young people. Suicide is the second leading cause of death among 15–29-year-olds (WHO, 2018), only surpassed by unintentional injury, mostly traffic accidents (Cunningham, Walton, & Carter, 2018; Eurostat, 2019; National Center for Health Statistics, 2019). Sweden’s suicide rate (roughly at the same level as the EU average) has fallen by 20% over the past 15 years. However, the suicide rate among children and young adults has remained at the same level (in 2015, it was 10.9 per 100,000 young people between 13 and 24 years of age; Youth Wiki, 2017). These suicide figures are probably an underestimation, as suicide deaths might not be recognized, or may be misclassified as accidents or other causes of death (Bilsen, 2018; Stanistreet, Taylor, Jeffrey, & Gabbay, 2001).

The very low base rate of death by suicide makes it extremely difficult to accurately predict the risk for suicide (Lewinsohn, Rohde, & Seeley, 1994). The difficulties clinicians face in identifying suicidal patients are further exacerbated by the large proportion of depressed patients who do not die of suicide and the high proportion of suicidal ideation among youth (Zametkin, Alter, & Yemini, 2001). The predictive accuracy of instruments aimed at assessment of suicide risk is limited, and they cannot be of clinically practical use (Lindh, 2019). Moreover, “individuals may make a considerable contribution toward their own deaths under circumstances not ordinarily considered suicide” (Litman, Curphey, Shneidman, Farberow, & Tabachnick, 1963, p. 924).

The present study of consecutive cases of nonnatural death among children, adolescents, and young adults might contribute clinically relevant knowledge of risk factors for both suicide and other sudden violent death. We define suicide as “the act of deliberately killing oneself” (WHO, 2014, p. 12), and other forms of sudden violent death as unintentional injury-related death, still being open for underlying, hidden intention to die.

Systematic reviews indicate that the strongest risk factors for youth suicide are current mental disorders and a history of suicidal behavior and psychiatric care (Beautrais, 2000; Bilsen, 2018; Cavanagh, Carson, Sharpe, & Lawrie, 2003; Isometsä, 2001). Independent of mental disorders, negative psychosocial factors, broken homes (separation, divorce, or death of parents), family psychiatric disorder or suicidal behavior, disciplinary problems, antisocial behavior, alcohol or drug misuse, previous self-harm, and adverse life events, such as violence at home, bullying, and sexual abuse, are a common background (Beautrais, 2003; Bilsen, 2018; Cavanagh et al., 2003; Cavanagh, Owens, & Johnstone, 1999; Cheng, Chen, Chen, & Jenkins, 2000; Gould, Fisher, Parides, Flory, & Shaffer, 1996; Hawton & James, 2005; Heikkinen, Aro, & Lönnqvist, 1994; Marttunen, Aro, Henriksson, & Lönnqvist, 1994; Tidemalm et al., 2011). According to the life course model of suicidal behavior, an individual’s risk is determined by accumulative exposure to a wide range of risk factors, including social disadvantage, family problems, childhood adversity, personality factors, mental disorders, and exposure to recent stressful life events (Fergusson, Woodward, & Horwood, 2000). The association between stressful life events and death by suicide is well-established, even if there are substantial inconsistencies across studies in the specific nature of interpersonal stressors (Liu & Miller, 2014). Furthermore, research indicates that almost all suicides had experienced adverse life events within one year of death (Foster, 2011), such as loss of health, person, cherished idea, or possession (Cheng et al., 2000), adverse physical health-related events (Cavanagh et al., 2003), interpersonal conflict with parents and with boy/girlfriends, disruption of a romantic attachment, or legal or disciplinary problems (Brent et al., 1993). Additional factors include contagion–imitation and availability of means (Bilsen, 2018).

Looking the other way around, Swedish studies of Child and Adolescent
Psychiatry (CAP) outpatients and inpatients indicated a slightly increased risk of dying from suicide or sudden violent death compared to the average population (de Château, 1990; Nylander, 1979; Rydelius, 1984). A slightly increased suicide risk was also found in patients referred to CAP as emergency cases because of suicide attempts (Engqvist & Rydelius, 2006).

**Sudden Violent Death**

de la Grandmaison (2006) argued for the need to differentiate between sudden natural unexpected death and violent causes of unexpected death. Sudden violent deaths have traditionally been viewed as either “accidents,” “homicide,” or “suicide.” Major risk factors for sudden violent death among young people include male sex, antisocial personality disorder, criminality, alcohol and drug abuse, adverse family psychosocial characteristics, aggressive feelings and acts, and risk-taking behavior (af Klinteberg, Almqvist, Beijer, & Rydelius, 2011; Coffey et al., 2004; Kinner et al., 2015; Repo-Tiihonen, Virkkunen, & Tiihonen, 2001; Stenbacka & Jansson, 2014). Aggressive feelings and acts both against oneself and others, health-compromising behavior, and putting oneself at risk are recurring themes in studies of sudden violent death among youth (de Château, 1990; Mattila et al., 2008; Richardson, Brown, & Van Brakle, 2013; Teplin, McClelland, Abram, & Mileusnic, 2005), thus suggesting that sudden violent death might be regarded as hidden suicide.

**Hypothesis and Objectives**

The starting point for the present study was the following empirically anchored working hypothesis: A pattern of severe social maladjustment in the home environment, disturbances in identity and personality development, delinquency, mental illness, and specific life events precede both suicide and other sudden violent death among children, adolescents, and young adults, but less frequently occurs in living control cases from the general population. The assumption is that children growing up in insecure environments show symptoms of acting out as a reaction to their difficult life situation, and these symptoms are comparable to those of depression in other children. Our specific research questions were as follows: Which specific risk factors were common for individuals who died by suicide and violent death, in contrast to living individuals? Which risk factors were unique for the suicide group and for the other sudden violent death group, and were not present in the control group?

**METHOD**

**Setting**

Consecutive cases of nonnatural death among children, adolescents, and young adults (up to the age of 25 years) from the Stockholm Region in Sweden were identified at the Department of Forensic Medicine in Stockholm, responsible for all forensic autopsies in the Stockholm County. Information on causes of death was based on autopsy protocols and police reports. Of the 75 consecutive cases of suicide collected over a time period of four years and three months, 63 cases could be included. The collection of 76 consecutive cases of other sudden violent death (murder, accident, unclear accident) took two years, of which 62 cases could be included. To every deceased person, persons of the same age and sex were randomized from the population registry in Stockholm Region. In all, 229 families took part in the study (among the 104 control families the individual young person was included). In nine further cases of suicide and eight cases of sudden violent death, the relatives declined to participate and no further information was collected. In three further cases of suicide and six cases of sudden violent death, the relatives were unreachable by letter and telephone. Thus, in the suicide group the attrition was 12 cases (16%) and in the sudden violent death group, 14 cases (18%).
Sample

Of the 63 cases of suicide, 41 were men (65%) aged 12-25 years ($M = 21.4; SD = 2.5; Md = 22$) and 22 women (35%) aged 14-24 years ($M = 19.7; SD = 3.3; Md = 20.5$). Of the 62 cases of sudden violent death, 55 were men (89%) aged 10-25 years ($M = 20.7; SD = 3.7; Md = 21$) and seven women (11%) aged 17-22 years ($M = 20.0; SD = 1.9; Md = 20$). The 104 matched control cases included 76 men (73%) aged 10-25 years ($M = 20.7; SD = 3.4; Md = 21$) and 28 women (27%) aged 14-24 years ($M = 19.7; SD = 3.0; Md = 20$). For the sociodemographic characteristics of the three samples and descriptive statistics (psychosocial and psychiatric data), see Table 1. Previous suicide attempts, suicide methods, and cause of sudden violent death are presented in Table 2.

Interviews

Basic psychological autopsy procedures were used (Beskow, Runeson, & Asgård, 1991; Brent, Perper, Kolko, & Zelenak, 1988; Cavanagh et al., 2003; Hawton et al., 1998; Litman et al., 1963). The semi-structured interview protocol covered the following areas: the informant’s contacts with the deceased prior to suicide or other violent death, family relationships, the deceased’s stressful life events and coping strategies, psychiatric contacts and disorders, previous suicide attempts, and suicidal communication. Open-ended questions allowed the participants to develop their own story. In the control group, the interview protocol was adapted to fit living subjects and their relatives.

The first author conducted tape-recorded interviews, lasting three to four hours per informant, at their home. In the cases of suicide, the interviews were conducted three to 13 months postmortem ($M = 5.55; SD = 1.94; Md = 5$) and in the cases of other sudden violent death, three to 16 months ($M = 6.48; SD = 2.62; Md = 6$) postmortem. At least one interview per case was performed (range 1–4; a total of 436 interviews), preferably with parents of the dead person, and in the control group also with the young persons, but siblings and occasionally other relatives could replace a non-participating parent. Of the 105 interviews in the suicide group, 48 were with the mother, 38 with the father, 13 with a sibling, four with other relatives, and two with a partner. There was one interview in 27 cases, two interviews in 31 cases, three interviews in four cases, and four interviews in one case. In the sudden violent death group, 91 interviews included 49 with the mother, 32 with the father, eight with a sibling, one with another relative, and one with a partner. There was one interview in 35 cases, two interviews in 26 cases, and four interviews in one case. Of the 240 interviews in the control group, 104 were with the subjects, 92 with mothers, and 44 with fathers. There was one interview in one case (the young person only), two interviews (the subject and one parent) in 70 cases, and three interviews (the subject and both parents) in 33 cases.

Measures

The interviews comprised criteria for the following psychiatric diagnoses according to DSM–IV-TR: autistic disorder (AD), attention deficit hyperactivity disorder (ADHD), conduct disorder (CD), oppositional defiant disorder (ODD), depression spectrum disorder (mood disorder, major depressive disorder, or depressive episode), borderline personality disorder (BPD), and antisocial personality disorder (APD). As the criteria for two further DSM–IV autism diagnoses (Asperger syndrome and pervasive developmental disorder) were not included in the interview protocol and only one subject in the sudden violent death group and one in the control group met the AD criteria (in all six subjects), we also checked for broader autism spectrum disorder (ASD) according to DSM-5.

Based on family anamnesis items (severe somatic disease, psychiatric contacts, substance abuse, depression, and suicidality in
TABLE 1
Sociodemographic, psychosocial and psychiatric data for the three samples

|                           | Suicide | Sudden violent death | Control cases |
|---------------------------|---------|----------------------|---------------|
|                           | M (range) | SD | M (range) | SD | M (range) | SD |
| Age                       | 20.9 (12–25) | 3.0 | 20.6 (10–25) | 3.5 | 20.7 (10–25) | 3.4 |
| Mother’s age at the child’s birth | 29.7 (16–42) | 5.8 | 27.1 (17–39) | 5.5 | 28.9 (18–43) | 5.2 |
| Father’s age at the child’s birth | 33.0 (19–54) | 6.9 | 29.7 (19–40) | 6.0 | 31.7 (20–49) | 6.3 |

| Gender | N = 63 | % | N = 62 | % | N = 104 | % |
|--------|--------|---|--------|---|---------|---|
| Male   | 41     | 65.1 | 55     | 88.7 | 76      | 73.1 |
| Female | 22     | 34.9 | 7      | 11.3 | 28      | 26.9 |

| Parents’ latest marital status | Suicide | Sudden violent death | Control cases |
|--------------------------------|---------|----------------------|---------------|
| Separated or divorced         | 38      | 60.3                 | 37             | 59.7 | 46 | 44.2 |
| Married or cohabitant         | 13      | 20.6                 | 22             | 35.5 | 49 | 47.1 |
| Dead mother                   | 3       | 4.8                  | 1              | 1.6  | 2  | 1.9  |
| Dead father                   | 7       | 11.1                 | 2              | 3.2  | 7  | 6.7  |
| Dead both parents             | 2       | 3.2                  | 0              | 0.0  | 0  | 0.0  |

| Latest habitation | Suicide | Sudden violent death | Control cases |
|-------------------|---------|----------------------|---------------|
| With parent(s)    | 30      | 47.6                 | 31             | 50.0 | 47 | 45.2 |
| With partner      | 7       | 11.1                 | 8              | 12.9 | 22 | 21.2 |
| With friends      | 5       | 7.9                  | 4              | 6.5  | 3  | 2.9  |
| Alone             | 18      | 28.6                 | 15             | 24.2 | 31 | 29.8 |
| Psychiatric care  | 3       | 4.8                  | 2              | 3.2  | 1  | 1.0  |
| Homeless          | 0       | 0.0                  | 2              | 3.2  | 0  | 0.0  |

| Latest marital status | Suicide | Sudden violent death | Control cases |
|-----------------------|---------|----------------------|---------------|
| Single                | 58      | 92.1                 | 53             | 85.5 | 84 | 80.8 |
| Cohabitant           | 5       | 7.9                  | 9              | 14.5 | 19 | 18.3 |
| Married              | 0       | 0.0                  | 0              | 0.0  | 1  | 1.0  |
| Own children (yes)   | 2       | 3.2                  | 6              | 9.7  | 3  | 2.9  |
| Stepparents (yes)    | 20      | 31.7                 | 10             | 16.1 | 35 | 33.7 |
| Adopted (yes)        | 1       | 1.6                  | 2              | 3.2  | 4  | 3.8  |

| Birth order | Suicide | Sudden violent death | Control cases |
|-------------|---------|----------------------|---------------|
| Only child  | 7       | 11.1                 | 4              | 6.5  | 7  | 6.7  |
| First born  | 16      | 25.4                 | 20             | 32.3 | 48 | 46.2 |
| Middle child| 16      | 25.4                 | 18             | 29.0 | 20 | 19.2 |
| Youngest    | 24      | 38.1                 | 20             | 32.3 | 29 | 27.9 |

| Country of birth | Suicide | Sudden violent death | Control cases |
|------------------|---------|----------------------|---------------|
| Sweden           | 54      | 85.7                 | 51             | 82.3 | 98 | 94.2 |
| Other European country | 1 | 1.6 | 3 | 4.8 | 1 | 1.0 |
| Non-European country | 8 | 12.7 | 8 | 12.9 | 5 | 4.8 |
| Mother born in Sweden | 47 | 74.6 | 37 | 59.7 | 87 | 83.7 |
| Mother other European | 6 | 9.5 | 16 | 25.8 | 9 | 8.7 |
| Mother non-European | 10 | 15.9 | 9 | 14.5 | 8 | 7.7 |
| Father born in Sweden | 42 | 66.7 | 39 | 62.9 | 88 | 84.6 |
| Father other European | 9 | 14.3 | 12 | 19.4 | 9 | 8.7 |
| Father non-European | 12 | 19.0 | 11 | 17.7 | 7 | 6.7 |

(continued)
TABLE 1
(continued)

|                      | $N = 63$ |   | $N = 62$ |   | $N = 104$ |   |
|----------------------|---------|---|----------|---|-----------|---|
|                      | %       | % | %        |  %|           |   |
| Education            |         |   |          |   |           |   |
| Compulsory school or less | 33  | 52.4 | 38  | 61.3 | 27  | 26.0 |
| Upper secondary school  | 21  | 33.3 | 19  | 30.6 | 37  | 35.6 |
| Post-secondary or university | 6  | 9.5  | 5   | 8.1  | 35  | 33.7 |
| University degree    | 3       | 4.8  | 0   | 0.0  | 5   | 4.8  |
| Mother’s education   |         |   |          |   |           |   |
| Compulsory school or less | 11 | 17.5 | 12\(^a\) | 19.7 | 10 | 9.6 |
| Upper secondary school  | 18  | 28.6 | 27\(^a\) | 44.3 | 33 | 31.7 |
| Post-secondary or university | 8  | 12.7 | 10\(^a\) | 16.4 | 12 | 11.5 |
| University degree    | 26      | 41.3 | 12\(^a\) | 19.7 | 49 | 47.1 |
| Father’s education   |         |   |          |   |           |   |
| Compulsory school or less | 22 | 34.9 | 16\(^a\) | 26.2 | 19 | 18.3 |
| Upper secondary school  | 12  | 19.0 | 19\(^a\) | 31.1 | 28 | 26.9 |
| Post-secondary or university | 6  | 9.5  | 6\(^a\) | 9.8  | 18 | 17.3 |
| University degree    | 23      | 36.5 | 20\(^a\) | 32.8 | 39 | 37.5 |
| Occupation            |         |   |          |   |           |   |
| Work                 | 19      | 30.2 | 22 | 35.5 | 40 | 38.5 |
| Student              | 14      | 22.2 | 19 | 30.6 | 39 | 37.5 |
| Work and student     | 6       | 9.5  | 2  | 3.2  | 18 | 17.3 |
| Sick-listed          | 9       | 14.3 | 2  | 3.2  | 1  | 1.0  |
| Unemployed           | 15      | 23.8 | 17 | 27.4 | 6  | 5.8  |
| Mother’s occupation  |         |   |          |   |           |   |
| Work                 | 57      | 90.5 | 52 | 83.9 | 99 | 95.2 |
| Student              | 0       | 0.0  | 0  | 0.0  | 1  | 1.0  |
| Work and student     | 1       | 1.6  | 0  | 0.0  | 0  | 0.0  |
| Sick-listed          | 1       | 1.6  | 7  | 11.3 | 2  | 1.9  |
| Unemployed           | 2       | 3.2  | 0  | 0.0  | 1  | 1.0  |
| Retired              | 0       | 0.0  | 1  | 1.6  | 0  | 0.0  |
| Housewife            | 2       | 3.2  | 2  | 3.2  | 1  | 1.0  |
| Father’s occupation  |         |   |          |   |           |   |
| Work                 | 57\(^b\) | 91.9 | 56 | 90.3 | 103 | 99.0 |
| Sick-listed          | 3\(^b\) | 4.8  | 3  | 4.8  | 0  | 0.0  |
| Unemployed           | 1\(^b\) | 1.6  | 2  | 3.2  | 1  | 1.0  |
| Retired              | 1\(^b\) | 1.6  | 1  | 1.6  | 0  | 0.0  |
| Criminality          |         |   |          |   |           |   |
| None                 | 27      | 42.9 | 13 | 21.0 | 48 | 46.2 |
| Yes without sanction | 18      | 28.6 | 13 | 21.0 | 40 | 38.5 |
| Sentenced or investigated | 18 | 28.6 | 36 | 58.1 | 16 | 15.4 |
| Father’s criminality |         |   |          |   |           |   |
| None                 | 60      | 95.2 | 59 | 95.2 | 103 | 99.0 |
| Sentenced or investigated | 3 | 4.8  | 3  | 4.8  | 1  | 1.0  |
| Addiction            |         |   |          |   |           |   |
| None                 | 32      | 50.8 | 36 | 58.1 | 97 | 93.3 |
| Alcohol              | 11      | 17.5 | 8  | 12.9 | 3  | 2.9  |
| Substance            | 20      | 31.7 | 21 | 33.9 | 5  | 4.8  |
| Anabolic steroids    | 6       | 9.5  | 9  | 14.5 | 0  | 0.0  |
| Psychoactive drugs   | 6       | 9.5  | 20 | 32.3 | 1  | 1.0  |
| Addiction at the time of death | 37\(^a\) | 60.7 | 26\(^a\) | 42.6 | (continued)
The family), we created a *Family Dysfunction Index* (number of “yes” answers ranging from 0 to 8). Another included index was number of family problems during the subject’s childhood and adolescence (number of “yes” answers ranging from 0 to 10).

|                          | N = 63 | %   | N = 62 | %   | N = 104 | %   |
|--------------------------|--------|------|--------|------|----------|------|
| **Mother’s addiction**   |        |      |        |      |          |      |
| None                     | 60     | 95.2 | 57     | 91.9 | 100      | 96.2 |
| Alcohol                  | 2      | 3.2  | 3      | 4.8  | 4        | 3.8  |
| Substance                | 2      | 3.2  | 2      | 3.2  | 0        | 0.0  |
| Psychoactive drugs       | 0      | 0.0  | 2      | 3.2  | 0        | 0.0  |
| **Father’s addiction**   |        |      |        |      |          |      |
| None                     | 43     | 68.3 | 46     | 74.2 | 91       | 87.5 |
| Alcohol                  | 17     | 27.0 | 15     | 24.2 | 12       | 11.5 |
| Substance                | 4      | 6.3  | 5      | 8.1  | 4        | 3.8  |
| Psychoactive drugs       | 0      | 0.0  | 1      | 1.6  | 0        | 0.0  |
| **Psychiatric care**     |        |      |        |      |          |      |
| None                     | 18     | 28.6 | 26     | 41.9 | 55       | 52.9 |
| Inpatient <18 years      | 28     | 44.4 | 30     | 48.4 | 42       | 40.4 |
| Outpatient <18 years     | 6      | 9.5  | 8      | 12.9 | 1        | 1.0  |
| Inpatient >18 years      | 35     | 55.6 | 17     | 27.4 | 20       | 19.2 |
| Treatment unit youth     | 25     | 39.7 | 11     | 17.7 | 2        | 1.9  |
| Foster-home placement    | 9      | 14.3 | 12     | 19.4 | 2        | 1.9  |
| **Mother’s psychiatric care** |   |      |        |      |          |      |
| None                     | 51     | 81.0 | 49     | 79.0 | 76       | 73.1 |
| Inpatient >18 years      | 10     | 15.9 | 12     | 19.4 | 28       | 26.9 |
| Outpatient >18 years     | 2      | 3.2  | 1      | 1.6  | 2        | 1.9  |
| **Father’s psychiatric care** |   |      |        |      |          |      |
| None                     | 48     | 76.2 | 54     | 87.1 | 90       | 86.5 |
| Inpatient >18 years      | 13     | 20.6 | 7      | 11.3 | 12       | 11.5 |
| Outpatient >18 years     | 4      | 6.3  | 2      | 3.2  | 5        | 4.8  |
| Autism spectrum disorder (ASD) | 11   | 17.5 | 3      | 4.8  | 7        | 6.7  |
| Autistic disorder (AD)   | 4      | 6.3  | 1      | 1.6  | 1        | 1.0  |
| Attention def. hyperactivity dis. (ADHD) | 13 | 20.6 | 19 | 30.6 | 19\(^a\) | 18.4 |
| Conduct disorder (CD)    | 9      | 14.3 | 19     | 30.6 | 17\(^c\) | 16.5 |
| Oppositional defiant disorder (ODD) | 13 | 20.6 | 12 | 19.4 | 15\(^c\) | 14.6 |
| Borderline personality disorder (BPD) | 25\(^d\) | 43.9 | 21\(^e\) | 40.4 | 5\(^f\) | 5.8  |
| Depression spectrum disorder | 42 | 66.7 | 22 | 35.5 | 40\(^c\) | 38.8 |
| Antisocial personality disorder (APD) | 7\(^d\) | 12.3 | 19\(^e\) | 36.5 | 4\(^f\) | 4.7  |
| Being bullied             | 28     | 44.4 | 15     | 24.2 | 54       | 51.9 |
| Being sexually assaulted  | 13     | 20.6 | 1      | 1.6  | 4        | 3.8  |
| Suicide attempt among relatives | 20 | 31.7 | 18 | 29.0 | 38       | 36.5 |
| Death by suicide among relatives | 22 | 34.9 | 11 | 17.7 | 30       | 28.8 |

\(^a\)N = 61 owing to missing data.
\(^b\)N = 62 owing to missing data.
\(^c\)N = 103 due to missing data.
\(^d\)N = 57 age > 18 years.
\(^e\)N = 52 age > 18 years.
\(^f\)N = 86 age > 18 years.
Adverse Childhood Experiences (ACEs; Felitti et al., 1998) were measured following the 10-category classification applied in most recent ACE studies (ACEs Science 101, 2019; Dube et al., 2003): abuse variables (emotional and verbal abuse, physical abuse, sexual abuse), neglect variables (emotional neglect, physical neglect), and household dysfunction variables (battered mother [witnessing a mother being abused], household substance abuse, mental illness or depression in household, parental separation or divorce,
incarcerated [imprisoned] household member). For each case, all ACEs were coded as “no” or “yes,” based on the total available interview material. Such a procedure risks underestimating ACEs; however, this risk should have been the same in the three groups.

Stressful life events in the previous year were assessed using all relevant interview information and scored following a modified nonadult version of the Holmes and Rahe Social Readjustment Rating Scale (SRRS; Holmes & Rahe, 1967). The nonadult version is based on the Adolescent Life Change Event Scale (ALCES; Yeaworth, McNamee, & Pozehl, 1992) and is available online. To the original 39 SRRS items, we added the following age-relevant items: imprisonment, exposed to violence, moving away from home, increase in arguments with parents or partner, economic difficulties, and starting or interrupting work or studies. Each of the 45 items was ascribed a Life Change Unit (LCU; Rahe & Arthur, 1978) on a 100-point scale. The Social Readjustment Index (SRI) is the sum of all LCU scores. We also calculated the Life Event Index (LEI; Blasco-Fontecilla et al. (2012), which is simply the total number of stressful life events for each case.

Data Analysis

Following the procedure of psychological autopsy, we used multiple informants, when possible, for each case included in the analyses. For each quantitative interview item, the answers were weighed by the first author, striving to cover the maximal amount of relevant information. Thus, the analysis units were cases in the three groups, and not the informants. Statistical analyses are based on all collected quantitative data, and the 54 relevant variables are included in a predictor analysis. In all analyses, the dependent variable is nominal and tripartite: suicide, other sudden violent death, and control cases. To facilitate the identification of potential predictors for the final analysis, the univariate effects of the potential risk factors on the dependent variable were tested separately for cases of suicide–control cases and cases of sudden violent death–control cases, using logistic regression. To correct for the number of contrasts, the alpha level of each comparison was set at \( p < .025 \). As the three groups had analogous age distribution (Table 1) and there were no significant between-group age differences, age was not controlled for. As a last step, two stepwise multiple logistic regression analyses were performed to identify unique predictors of suicide and other sudden violent death. Variables showing significant between-group differences in the previous analyses were included as independent variables, and those contributing to an improved predictive capacity, as indicated by a decrease in the Akaike information criterion (AIC) and having a significant unique association with the outcome, were retained in the final model. Analyses were conducted with R 3.5.2 statistical software (R Core Team, 2018) employing the lmtest package (Zeileis & Hothorn, 2002).

Ethical Research Compliance

The project was approved by the Regional Ethical Review Board, Karolinska Institutet, Stockholm (reference number 96:204 and 2005/530-32), and all informants (parents and relatives of the deceased, as well as all participants in the control group and their parents) gave informed consent.

RESULTS

Univariate Effects

We found 18 significant differences between the suicide group and the control group and 22 significant differences between the sudden violent death group and the control group. Twelve of these potential risk factors were common for the suicide and sudden violent death groups, as compared to the control group, whereas six risk factors were unique for suicide and ten for sudden violent death (Table 3). In the case of dummy variables, significant results are reported below.
| Variable                                           | Suicide vs. control cases | Sudden violent death vs. control cases |
|---------------------------------------------------|---------------------------|--------------------------------------|
|                                                   | OR  | 95% CI  | p-value  | OR  | 95% CI  | p-value  |
| Gender (female)                                   | 1.456 | 0.741  | 2.861     | .275 | 0.345 | 0.141  | 0.848 | .020 |
| Mother’s age at the child’s birth                 | 1.024 | 0.967  | 1.085     | .414 | 0.936 | 0.880  | 0.995 | .035 |
| Elementary school resultsª                        |     |        |           | .081 |       |        |
| Results above average                             | 0.667 | 0.327  | 1.358     | .264 | 0.175 | 0.078  | 0.390 | .000 |
| Results below average                              | 0.667 | 0.198  | 2.244     | .513 | 1.174 | 0.445  | 3.097 | .746 |
| Missing grades from elementary school              | 6.667 | 0.724  | 61.405    | .094 | 5.419 | 0.614  | 47.801 | .128 |
| Upper secondary school, average or higher grades  | 0.209 | 0.097  | 0.450     | .000 | 0.182 | 0.084  | 0.394 | .000 |
| Education levelª                                   |     |        |           | .000 |       |        |
| Upper secondary school                            | 0.464 | 0.222  | 0.972     | .042 | 0.365 | 0.174  | 0.766 | .008 |
| Postsecondary or university                       | 0.140 | 0.051  | 0.383     | .000 | 0.102 | 0.035  | 0.293 | .000 |
| University degree                                 | 0.491 | 0.107  | 2.242     | .359 | 0.000 | 0.000  | NA    | .987 |
| Mother’s educational levelª                        |     |        |           | .507 |       |        |
| Upper secondary school                            | 0.496 | 0.177  | 1.391     | .182 | 0.682 | 0.256  | 1.819 | .444 |
| Postsecondary or university                       | 0.606 | 0.176  | 2.091     | .428 | 0.694 | 0.212  | 2.275 | .547 |
| University degree                                 | 0.482 | 0.181  | 1.285     | .145 | 0.204 | 0.071  | 0.583 | .003 |
| Father’s educational levelª                        |     |        |           | .069 |       |        |
| Upper secondary school                            | 0.370 | 0.148  | 0.923     | .033 | 0.806 | 0.333  | 1.951 | .632 |
| Postsecondary or university                       | 0.288 | 0.095  | 0.873     | .028 | 0.396 | 0.127  | 1.236 | .111 |
| University degree                                 | 0.509 | 0.229  | 1.135     | .099 | 0.609 | 0.259  | 1.433 | .256 |
| Occupation (studies or work; no–yes)              | 0.126 | 0.050  | 0.316     | .000 | 0.163 | 0.064  | 0.417 | .000 |
| Steady relationship at death or at interview      | 0.458 | 0.235  | 0.896     | .022 | 1.485 | 0.788  | 2.800 | .221 |
| Addiction (no–yes)                                | 13.424 | 5.391 | 33.428    | .000 | 10.008 | 3.996 | 25.065 | .000 |
| Alcohol abuse                                     | 7.122 | 1.903  | 26.653    | .004 | 4.988 | 1.271  | 19.578 | .021 |
| Substance abuse                                   | 9.209 | 3.244  | 26.142    | .000 | 10.141 | 3.581 | 28.722 | .000 |
| Abuse of anabolic steroids                         | NA | 0.000 | NA       | .986 | NA | 0.000 | NA | .983 |
| Abuse of psychoactive drugs                        | 10.842 | 1.274 | 92.302    | .029 | 49.048 | 6.377 | 377.227 | .000 |
| Alcohol or drugs at the time of death              | NA | 0.000 | NA       | .985 | NA | 0.000 | NA | .988 |
| Mother’s addiction (no–yes)                       | 1.250 | 0.270  | 5.777     | .775 | 2.193 | 0.566  | 8.497 | .256 |
| Father’s addiction (no–yes)                       | 3.256 | 1.482  | 7.151     | .003 | 2.435 | 1.080  | 5.491 | .032 |
| Father’s substance abuse                           | 1.695 | 0.409  | 7.032     | .467 | 2.193 | 0.566  | 8.497 | .256 |
| Investigated or sentenced for criminal acts        | 2.143 | 0.982  | 4.680     | .056 | 8.031 | 3.813  | 16.913 | .000 |
| Father’s criminality                               | 5.150 | 0.524  | 50.627    | .160 | 5.237 | 0.533  | 51.497 | .156 |
| Psychiatric care (no–yes)                          | 2.806 | 1.438  | 5.476     | .002 | 1.554 | 0.824  | 2.932 | .173 |
| Outpatient child and adolescent psychiatry         | 1.181 | 0.627  | 2.224     | .606 | 1.384 | 0.734  | 2.608 | .315 |
| Inpatient child and adolescent psychiatry          | 10.842 | 1.274 | 92.302    | .029 | 15.259 | 1.860 | 125.205 | .011 |

(continued)
| Variable                                           | Suicide vs. control cases | Sudden violent death vs. control cases |
|---------------------------------------------------|---------------------------|---------------------------------------|
|                                                   | OR 95% CI p-value         | OR 95% CI p-value                      |
| Outpatient adult psychiatric care                 | 5.250 2.617 10.533 .000   | 1.587 0.756 3.329 .222                |
| Inpatient adult psychiatric care                  | 33.553 7.579 148.533 .000 | 11.000 2.349 51.501 .002              |
| Admission to treatment unit for young people      | 8.417 1.756 40.352 .008   | 12.120 2.612 56.245 .001              |
| Mother’s psychiatric care (no–yes)                | 0.639 0.298 1.371 .250    | 0.720 0.340 1.524 .390                |
| Mother’s outpatient psychiatric care              | 0.512 0.229 1.143 .102    | 0.651 0.303 1.399 .272                |
| Mother’s inpatient psychiatric care               | 1.672 0.230 12.178 .612   | 0.836 0.074 9.415 .885                |
| Father’s psychiatric care (no–yes)                | 2.009 0.895 4.508 .091    | 0.952 0.375 2.418 .918                |
| Father’s outpatient psychiatric care              | 1.993 0.846 4.696 .115    | 0.976 0.362 2.627 .961                |
| Father’s inpatient psychiatric care               | 1.342 0.347 5.198 .670    | 0.660 0.124 3.509 .626                |
| Autism spectrum disorder (ASD)                    | 2.931 1.072 8.014 .036    | 0.717 0.178 2.881 .639                |
| Autistic disorder (AD)                            | 6.983 0.763 63.948 .085   | 1.717 0.105 27.951 .704               |
| Attention deficit hyperactivity disorder (ADHD)   | 1.149 0.523 2.527 .729    | 1.933 0.937 4.072 .074                |
| Conduct disorder (CD)                             | 0.843 0.351 2.026 .703    | 2.235 1.056 4.731 .035                |
| Oppositional defiant disorder (ODD)               | 1.525 0.672 3.463 .313    | 1.408 0.611 3.244 .422                |
| Borderline personality disorder (BPD)             | 12.656 4.457 35.943 .000  | 10.974 3.804 31.661 .000              |
| Depression spectrum disorder                      | 3.150 1.633 6.075 .001    | 0.866 0.450 1.666 .667                |
| Antisocial personality disorder (APD)             | 2.870 0.800 10.300 .106   | 11.803 3.732 37.331 .000              |
| Divorced or separated parents                     | 1.917 1.015 3.620 .045    | 1.866 0.986 3.532 .055                |
| Dead parent<sup>c</sup>                           |                           |                                       |
| Dead mother                                        | 1.863 0.619 5.605 .268    | 0.460 0.092 2.289 .343                |
| Dead father                                        | 2.794 0.452 17.267 .269   | 0.805 0.071 9.075 .861                |
| Dead both parents                                  | NA 0.000 NA .987         |                                       |
| Number of family problems                          | 0.979 0.827 1.160 .810    | 0.887 0.746 1.055 .175                |
| Adverse childhood experiences (ACE)               | 1.879 1.430 2.470 .000    | 1.569 1.198 2.054 .001                |
| Being bullied                                      | 0.741 0.395 1.389 .349    | 0.296 0.147 0.593 .001                |
| Being sexually assaulted                          | 6.500 2.015 20.963 .002   | 0.424 0.046 3.881 .447                |
| Family Dysfunction Index                          | 0.917 0.778 1.081 .302    | 0.750 0.629 0.893 .001                |
| Suicide attempt among relatives                   | 0.808 0.416 1.569 .529    | 0.727 0.368 1.435 .358                |

(continued)
only if there also are significant between-group differences on the single independent variable.

Both the suicide group and the sudden violent death group had significantly lower upper secondary school results than the general population controls, lower attained educational level, and were less likely to have had a meaningful occupation. Alcohol and substance abuse were associated with both causes of death, but abuse of psychoactive drugs was distinguishing for cases of sudden violent death. Among CAP inpatients, the odds of belonging to the sudden violent death group were twelve times higher than belonging to the control group, whereas the odds of belonging to the suicide group were five times higher among adult psychiatric outpatients. Both groups had higher odds than the controls of admission to inpatient adult psychiatric care and to a treatment unit for young people with substance abuse or criminality. Furthermore, higher odds of belonging to the suicide and the sudden violent death groups were associated with having been exposed to adverse childhood experiences and to recent stressful life events.

Borderline personality disorder was associated with both causes of death; depression spectrum disorder was associated with death by suicide, whereas antisocial personality disorder was associated with sudden violent death. Accordingly, being investigated or sentenced for criminal acts was more common among cases of sudden violent death than among the controls. Noticeably, being bullied was negatively associated with belonging to the sudden violent death group, whereas being sexually assaulted was positively associated with belonging to the suicide group in comparison with the controls. Paradoxically, Family Dysfunction Index was associated with lower odds of dying a sudden violent death rather than belonging to the controls.

In comparison with the control cases, distinguishing risk factors for suicide included father’s addiction, having contact with psychiatric care, being a psychiatric outpatient, having depression, and having been sexually
assaulted. Being in a steady relationship was negatively associated with belonging to the suicide group, thus constituting a potential protective factor against suicide. Distinguishing risk factors for sudden violent death included being a man, being investigated or sentenced, and having antisocial personality disorder. Furthermore, we found negative associations between belonging to the sudden violent death group and having elementary school results above average, having upper secondary school education, and the mother having a university degree.

**Multivariate Effects**

The multiple logistic regression analyses showed three significant differences between the suicide group and controls, and seven significant differences between sudden violent death group and the controls (Table 4). The multivariate models could explain a large proportion of the variance in the odds of belonging to the different groups ($R^2 = .528$ and .644, respectively).

Adjusting for the other predictors, we found significant positive associations between being in the suicide group, rather than the control group, and addiction (4.8 times higher odds), inpatient adult psychiatric care (11.2 times higher odds), and number of stressful life events in the previous year (2.1 times higher odds for each increase on the scale by one). Belonging to the sudden violent death group, rather than the control group, was positively associated with abuse of psychoactive drugs (47.8 times higher odds) and number of recent stressful life events (1.7 times higher odds for each increase on the scale by one). Furthermore, we found

**TABLE 4**

Multivariate effects of the potential risk factors on the dependent variable

| Variable                                      | Suicide vs. control cases ($R^2 = .528)$ | Sudden violent death vs. control cases ($R^2 = .644$) |
|-----------------------------------------------|----------------------------------------|-----------------------------------------------------|
|                                               | OR          | 95% CI       | $p$-value  | OR          | 95% CI       | $p$-value  |
| Addiction (no−yes)                            | 4.790       | 1.684        | 13.620     | .003  |                                             |
| Inpatient adult psychiatric care              | 11.164      | 2.329        | 53.513     | .003  |                                             |
| Number of stressful life events (LEI)         | 2.089       | 1.418        | 3.077      | .000  |                                             |
| Elementary school results$^b$                 | 0.150       | 0.048        | 0.465      | .001  |                                             |
| Results above average                         | 0.156       | 0.293        | 4.556      | .836  |                                             |
| Results below average                         | 0.997       | 0.077        | 12.944     | .998  |                                             |
| Missing grades from elementary school         | 47.751      | 4.135        | 549.034    | .002  |                                             |
| Education level$^c$                           | 0.077       | 0.018        | 0.323      | .000  |                                             |
| Upper secondary school                        | 0.252       | 0.082        | 0.770      | .166  |                                             |
| Postsecondary or university                   | 0.000       | 0.000        | NA         | .992  |                                             |
| University degree                             | 0.676       | 0.517        | 0.886      | .004  |                                             |
| Being bullied                                 | 0.135       | 0.043        | 0.421      | .001  |                                             |
| Number of stressful life events (LEI)         | 1.653       | 1.077        | 2.536      | .021  |                                             |

NA, not available due to too low frequency in at least one of the groups.

$^a$Nagelkerke R square.

$^b$Reference category “average results”.

$^c$Reference category “elementary school or less”.
negative associations with having elementary school results above average (85% lower odds) and the educational level (75% lower odds of upper secondary level; 92% lower odds of postsecondary level or university studies). Surprisingly, comparing to the controls, the sudden violent death group also had a lower Family Dysfunction Index (32% lower odds for each increase on the scale by one) and lower odds of being bullied (87%).

DISCUSSION

Looking at the sociodemographic data (Table 1), we found twice as many males as females in the suicide group and eight times as many males as females in the other sudden violent death group. In most Western countries, women have higher rates of suicide attempts, but lower rates of death by suicide than men (Payne, Svami, & Stanistreet, 2008). In our study, the gender difference was even more marked in the case of sudden violent death. According to Stillion and Noviello (2001), factors that contribute to the higher violent death rate for US males include an inherited tendency toward aggression, socialization practices that endorse violence, and an environment that models and supports violence for males.

About half of those who died by suicide had previously attempted suicide, and almost a quarter of those who died by suicide had previously made multiple suicide attempts (Table 2). On the other hand, almost half of the young persons had no previous suicide attempts. None of the females and only 11% of the males had attempted suicide in the sudden violent death group. A Swedish study of the risk of premature death among former CAP patients (Engqvist & Rydelius, 2006) indicated that problems in school, behavioral symptoms, and conduct symptoms were more important in the calculation of risk of early death or suicide than suicide attempts. Violent physical suicide methods were more common than poisoning among both sexes. Accordingly, no significant gender difference in suicide method was found in a Danish sample (Nordentoft & Branner, 2008). Hanging was the most common suicide method among both sexes in our study and is also the most prevalent method in Europe (Värnik et al., 2008), in contrast to United States, where the use of firearms is the most common method of suicide for both men and women (Callanan & Davis, 2012). Traffic accidents were the most common cause of sudden violent death for both sexes (the first leading cause of death among young people in both the United States and Europe; Cunningham et al., 2018; Eurostat, 2019; National Center for Health Statistics, 2019), followed by abuse of psychoactive drugs and overdose among men.

Comparing the risk factors for suicide and other sudden violent death, identified in the univariate analysis, we found both similarities and differences (Table 3). Common risk factors, in comparison with the controls, covered such areas as education and occupation, addiction, psychiatric care, and early and late adversities in life. Differences between suicide and sudden violent death included gender, partner relationship, abuse of psychoactive drugs, father’s addiction, problems with justice, and somewhat different patterns of school outcomes, victimization, psychiatric care, and mental disorders (commented below). Living in a steady relationship seemed to be a protective factor against suicide, whereas being a man was a risk factor for sudden violent death.

Analysis of multivariate effects of the potential risk factors (Table 4) indicated that the number of stressful life events in the previous year was the only common risk factor for both suicide and other sudden violent death. Risk factors for suicide included addiction and being an inpatient in adult psychiatric care. Risk factors for sudden violent death included having lower elementary school results, lower education level, and abuse of psychoactive drugs. The negative association between being bullied and sudden violent death might be interpreted as a consequence of the subjects showing acting out and aggressive tendencies rather than being victims. On the other hand, the lower Family
Dysfunction Index in this group is hard to interpret.

Our results suggest that substance abuse has a different meaning in cases of suicide and other sudden violent death. We found addiction to be more common in cases of suicide than in the controls, whereas abuse of psychoactive drugs was a distinguishing factor for other sudden violent death. Being in adult inpatient psychiatric care increased the odds of belonging to the suicide group, thus indicating more severe or acute mental problems, but also the need of including risk assessment and preventive measures into routine clinical care, not just in emergency units (Schaffer et al., 2016). Accordingly, a Finnish survey (Pirkola, Sund, Sailas, & Wahlbeck, 2009) concluded that well-developed community mental health services are more strongly associated with lower suicide rates than are services oriented toward inpatient treatment provision.

Looking at the multivariate effects, none of the psychiatric diagnoses were associated with higher odds of belonging to the suicide or the sudden violent death group rather than the control group. This confirms that the complex interplay between psychosocial risk factors has a decisive influence on both causes of death, beyond diagnostic categories (cf., Foster, 2011; Gould et al., 1996). On the other hand, systematic reviews found current mental disorder and previous psychiatric care to be the strongest risk factors for youth suicide (Beautrais, 2000; Cavanagh et al., 2003; Isometsä, 2001). On the univariate level, borderline personality disorder was associated with both causes of death; depression was associated with death by suicide, whereas antisocial personality disorder was associated with sudden violent death. Studies show that up to 10% of patients with BPD die by suicide (Skodol et al., 2002). The association between BPD (emotionally unstable personality disorder according to ICD-10) and suicide was previously found, for example, in Canada (Lesage et al., 1994) and Taiwan (Cheng et al., 2000). In a Swedish study, persons with BPD constituted one third of the total sample of suicides in adolescents and young adults (Runeson & Beskow, 1991). Previously, high ratios of both borderline and antisocial personality disorders were found among young Swedish people who died by suicide and other forms of sudden violent death (Rydelius, 1984, 1988). Antisocial personality disorder has been shown to covary with BPD (Moran, 1999). In our study, both these personality disorders were common in the sudden violent death group. The association between antisocial personality disorder and sudden violent death is consistent with previous research (Coffey et al., 2004; Repo-Tiihonen et al., 2001). Similar to previous research (Bourdet-Loubère, & Raynaud, 2013; Brent, Perper, Goldstein, et al., 1988; Cheng et al., 2000; Eapen & Crnec, 2012; Runeson, 1989; Williams, O'Connor, Eder, & Whitlock, 2009), we found an association between depression and suicide. Depression spectrum disorder was the largest diagnostic category in the suicide group (67% of cases), thus indicating that depression covaries with many other risk factors for suicide (Berman, Jobes, & Silverman, 2006; Lewinsohn et al., 1994).

Besides mental disorders, some of the other well-documented risk factors emerged in the present study only on the univariate level, such as adverse childhood experiences (both suicide and sudden violent death), being sexually assaulted (suicides), and severity of stressful life events in the previous year (both groups). Previous research indicated that independently of other psychosocial and psychiatric factors, early and late life adversities, and particularly accumulated adversities, are a risk factor for suicidal behavior (Björkenstam, Kosidou, & Björkenstam, 2017; Ferguson et al., 2000; Foster, 2011; Joiner et al., 2007; Liu & Miller, 2014; Read, Agar, Barker-Collo, Davies, & Moskowitz, 2001; Séguin, Renaud, Lesage, Robert, & Turecki, 2011). However, a new finding is the importance of adverse life events as a risk factor for sudden violent death.

Strikingly, some potential psychosocial and psychiatric risk factors were not associated with death by suicide or sudden violent death, even on the univariate level (e.g., having a younger mother, foster-home
placement, having divorced or separated parents, death of a parent, recent death among relatives or friends, mother's addiction, father's lower education level, father's criminality, suicide or suicide attempts among relatives, parents' psychiatric care, having ADHD, conduct disorder, or oppositional defiant disorder).

To sum up, the suicide group seems to have been more vulnerable and exposed to different kinds of stressors, whereas the sudden violent death group seems to have been more acting out and risk-taking. Two different ways of coping with adversities and strains in life are conceptually linked to internalizing disorders (depression, anxiety disorder, phobic, panic, and obsessive–compulsive) and externalizing disorders (antisocial personality, substance dependence), both playing a part in suicide attempts. At least two subtypes of individuals with suicidal behavior have been found in previous studies (Apter et al., 1991, 1995): depressed/withdrawn, and irritable/aggressive. Suicidal behavior among individuals with externalizing symptoms is not necessarily a result of comorbid depressive or other internalizing disorder; instead, it might be associated with impulsive and anger-related behaviors (Verona, Sachs-Ericsson, & Joiner, 2004). Impulsive–aggressive traits play a greater role in completed suicide among younger individuals than among older ones (McGirr et al., 2008). In our study, we found associations between internalizing psychopathology and suicide (depression spectrum disorders), and between externalizing psychopathology and sudden violent death (antisocial personality disorder). However, addiction (externalizing) and BPD (mixed internalizing and externalizing psychopathology; Verona et al., 2004) were associated with both causes of death. Thus, we can speculate that mixed psychopathology represents what is common for suicide and sudden violent death, whereas a predominance of internalizing psychopathology represents what is specific for cases of suicide, and a predominance of externalizing psychopathology represents what is specific for cases of sudden violent death. It is possible that these differences are connected with differences in coping strategies between the two groups (further explored in a coming study).

As stated by Portes, Sandhu, and Longwell-Grice (2002, p. 805), “Some adolescents internalize rejection and respond with suicide; other troubled adolescents engage in homicide before ending their own lives.” We could add to this that still others externalize rejection and die a sudden violent death.

**Strengths and Limitations**

The main assets of the present study are the prospective design and the inclusion of both cases of death by suicide and sudden violent death, as well as matched living control cases from the general population. To our knowledge, no other case–control study that compares risk factors for the two causes of death among young people has been published to date. Furthermore, the study is based on a prospective collection of consecutive cases in the two groups of death with relatively high response rates (82%–84%), contributing to the high representativity of our results. This has to be compared with the usual response rate of 50%–60% for psychological autopsy studies (Hawton et al., 1998). The use of multiple informants minimalized the risk of over- or under-reporting bias. On the other side, the procedure of weighing the informants’ answers inevitably involves a risk of subjective judgments. Another potential source of error is the relatively high proportion of single informants. Relatively high rates of psychopathology in the control group were observed, however, reflecting what is known about the Swedish population of young people, especially in the metropolitan area of Stockholm. The proportion of Swedish 13- and 15-year-old youths reporting psychological and somatic ill health has doubled the last three decades, and nowadays, more than 62% of the 15-year-old girls and 35% of the boys reported multiple psychosomatic health complaints. In a national public health survey, every third woman and every fifth man in the age group 16–29 years report reduced mental well-being in 2018.
Additionally, an increased occurrence of ADHD diagnoses has been noticed, may be partly due to the diagnosis being a precondition for supportive measures in Swedish schools (Polyzoi, Ahnemark, Medin, & Ginsberg, 2018; Rydell, Lundström, Gillberg, Lichtenstein, & Larsson, 2018).

**Conclusions and Implications**

Most of the psychological models of suicide focus either on vulnerability factors and coping deficits or on the situational perceived stress (Barzilay & Apter, 2014). Our study suggests a dynamic interplay between adverse childhood experiences, connected with vulnerability factors, current strains in life, help-seeking behavior (including contacts with psychiatric ward), and coping strategies. This interplay seems to have some common features, but also important differences when comparing cases of suicide and cases of sudden violent death. A synthesis of findings from psychological autopsy studies (Foster, 2011) confirmed that inadequate problem-solving skills increase suicide risk. However, we still lack studies comparing internalizing and externalizing coping in cases of suicide and of sudden violent death among men and women separately.

In conclusion, the pattern of psychosocial factors, developmental disturbances, and strains in life was partly similar, partly different in cases of suicide and of sudden violent death, but for both groups was significantly different from the control cases. This can pose a serious challenge to professionals and providers of health and social services. What was not included in the variables explored here but clearly surfaced from the interviews were risk factors linked to the contacts with school counselors, social authorities, CAP and adult psychiatry and other professionals (Werbart Törnblom, Werbart, & Rydelius, 2015). In the suicide group, parents typically did not see health professionals as an asset during a crisis, perceiving them as too impersonal and preoccupied, understanding neither the emergency nor the underlying problems. In the sudden violent death group, barriers to seeking help were even larger and the professionals seemed not to understand the psychic pain behind antisocial behavior, addiction, or delinquency. Consequently, there is an urgent need for in-depth research into the mechanisms of destructive and self-destructive behavior, bridging the gap between empirical studies and clinical and social practice. Cunningham et al. (2018) made a case for a shift in public perception of injury deaths in children and adolescents from being viewed as “accidents” to being regarded as social ecologic phenomena and as preventable. Not only suicide, but also other sudden violent death in youths must be the subject of prevention and intervention programs. Focusing on adverse childhood experiences (Dube et al., 2001), as well as targeting thwarted belongingness and perceived burdensomeness (Ribeiro, Bodell, Hames, Hagan, & Joiner, 2013), can constitute a common ground. The greatest challenge for the society is to take adequate action to assist those who never dare to seek professional help before dying by suicide or sudden violent death (29% and 42%, respectively, in our study).

**REFERENCES**

ACEs Science 101. (2019). Retrieved April 17, 2019, from https://acestoohigh.com/aces-101.

Af Klinteberg, B., Almquist, Y., Beijer, U., & Rydelius, P.-A. (2011). Family psychosocial characteristics influencing criminal behaviour and mortality—possible mediating factors: A longitudinal study of male and female subjects in the Stockholm Birth Cohort. *BMC Public Health, 11*, 756–770. https://doi.org/10.1186/1471-2458-11-756.

Apter, A., Gothelf, D., Orbach, I., Weizman, R., Ratzoni, G., Har-Even, D., et al. (1995). Correlation of suicidal and violent behavior in different diagnostic categories in hospitalized
adolescent patients. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, 912–918.

AFTER, A., KOTLER, M., SEVY, S., PLUTCHIK, R., BROWN, S. L., FOSTER, H., ET AL. (1991). Correlates of risk of suicide in violent and nonviolent psychiatric patients. *American Journal of Psychiatry*, 148, 883–887.

BARZILAY, S., & AFTER, A. (2014). Psychological models of suicide. *Archives of Suicide Research*, 18(4), 295–312. https://doi.org/10.1080/13811118.2013.824825.

BEAUTRAIS, A. L. (2000). Risk factors for suicide and attempted suicide among young people. *Australian and New Zealand Journal of Psychiatry*, 34, 420–436. https://doi.org/10.1080/1440-1614.2000.00691.x.

BEAUTRAIS, A. L. (2003). Suicide and serious suicide attempts in youth: A multiple-group comparison study. *American Journal of Psychiatry*, 160, 1093–1099. https://doi.org/10.1176/appi.ajp.160.6.1093.

Berman, A. L., Jobes, D. A., & Silverman, M. M. (2006). The empirical context. In A. L. Berman, D. A. Jobes, & M. M. Silverman (Eds.), *Adolescent suicide: Assessment and intervention* (2nd ed., Chap. 3, pp. 77–117). Washington, DC: American Psychological Association. https://doi.org/10.1037/11285-001.

Beskow, J., Runeson, B., & Åsgard, U. (1991). Ethical aspects of psychological autopsy. *Acta Psychiatrica Scandinavica*, 84, 482–487.

Bilsen, J. (2018). Suicide and youth: Risk factors. *Frontiers in Psychiatry*, 9, 540. https://doi.org/10.3389/fpsyt.2018.00540.

Björkenstam, C., Kosidou, K., & Björkenstam, E. (2017). Childhood adversity and risk of suicide: cohort study of 548 721 adolescents and young adults in Sweden. *BMJ*, 357, j1334. https://doi.org/10.1136/bmj.j1334.

Blasco-Fontecilla, H., Delgado-Gomez, D., Legido-Gil, T., De Leon, J., Perez-Rodriguez, M. M., & Baca-Garcia, E. (2012). Can the Holmes-Rahe Social Readjustment Rating Scale (SRRS) be used as a suicide risk scale? An exploratory study. *Archives of Suicide Research*, 16(1), 13–28. https://doi.org/10.1080/13811118.2012.640616.

Bourdet-Loubere, S., & Raynaud, J. P. (2013). Suicidal ideation and attempts during middle childhood: Associations with subjective quality of life and depression. *Open Journal of Medical Psychology*, 2, 93–100. https://doi.org/10.4236/ojmp.2013.23015.

Brent, D. A., Perper, J. A., Goldstein, C. E., Kolko, D. J., Allan, M. J., Allman, C. J., ET AL. (1988). Risk factors for adolescent suicide: A comparison of adolescent suicide victims with suicidal inpatients. *Archives of General Psychiatry*, 45, 581–588. https://doi.org/10.1001/archpsyc.1988.01800300079011.

Brent, D. A., Perper, J. A., Kolko, D. J., & Zelegak, J. P. (1988). The psychological autopsy: Methodological considerations for the study of adolescent suicide. *Journal of the American Academy of Child and Adolescent Psychiatry*, 27, 362–366. https://doi.org/10.1097/00004583-198805000-00016.

Brent, D. A., Perper, J. A., Moritz, G., Baughner, M., Roth, C., Balach, L., ET AL. (1993). Stressful life events, psychopathology, and adolescent suicide: A case control study. *Suicide and Life-Threatening Behavior*, 23(3), 179–187. https://doi.org/10.1111/j.1943-278X.1993.tb00178.x.

Callanan, V. J., & Davis, M. S. (2012). Gender differences in suicide methods. *Social Psychiatry and Psychiatric Epidemiology*, 47(6), 857–869. https://doi.org/10.1007/s00127-011-0393-5.

Cavanagh, J. T. O., Carson, A. J., Sharpe, M., & Lawrie, S. M. (2003). Psychological autopsy studies of suicide: A systematic review. *Psychological Medicine*, 33, 395–405. https://doi.org/10.1017/S0033291702009694.

Cavanagh, J. T. O., Owens, D. G. C., & Johnstone, E. C. (1999). Life events in suicide and undetermined death in south-east Scotland: A case control study using the method of psychological autopsy. *Social Psychiatry Psychiatric Epidemiology*, 34, 645–650. https://doi.org/10.1007/s001270050187.

Cheng, A. T., Chen, T. H., Chen, C. C., & Jenkins, R. (2000). Psychosocial and psychiatric risk factors for suicide: Case-control psychological autopsy study. *British Journal of Psychiatry*, 177, 360–365. https://doi.org/10.1192/bjp.177.4.360.

Coffey, C., Vett, F., Cini, E., Patton, G. C., Wolfe, R., & Moran, P. (2004). Mortality in young offenders: Retrospective cohort study. *British Medical Journal*, 326, 1064–1066. https://doi.org/10.1136/bmj.326.7398.1064.

Cunningham, R. M., Walton, M. A., & Carter, P. M. (2018). The major causes of death in children and adolescents in the United States. *New England Journal of Medicine*, 379, 2468–2475. https://doi.org/10.1056/NEJMsr1804754.

De Château, P. (1990). Mortality and aggressiveness in a 30 year follow up study in child guidance clinics in Stockholm. *Acta Psychiatrca Scandinavica*, 81, 472–476. https://doi.org/10.1111/j.1600-0447.1990.tb05484.x.

De la Grandmaison, G. L. (2006). Is there progress in the autopsy diagnosis of sudden unexpected death in adults? *Forensic Science International*, 156, 138–144. https://doi.org/10.1016/j.forsciint.2004.12.024.

Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P., Williamson, D. F., & Giles, W. H. (2001). Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood

---

774 RISK OF SUICIDE AND SUDDEN VIOLENT DEATH IN YOUTH
Experiences Study. JAMA, 286(24), 3089–3096. https://doi.org/10.1001/jama.286.24.3089.

Dube, S. R., Felitti, V. J., Dong, M., Chapman, D. P., Giles, W. H., & Anda, R. F. (2003). Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: the adverse childhood experiences study. Pediatrics, 111, 564–572. https://doi.org/10.1542/peds.111.3.564.

Eapen, V., & Crnic, R. (2012). Strategies and challenges in the management of adolescent depression. Current Opinion in Psychiatry, 25, 7–13. https://doi.org/10.1097/YCO.0b013e32834de3bd.

Engqvist, U., & Rydelius, P. A. (2006). Death and suicide among former child and adolescent psychiatric patients. BMC Psychiatry, 6, 51. https://doi.org/10.1186/1471-244X-6-51.

Eurostat. (2019). Being young in Europe today: Health. Luxembourg: United Union. Retrieved June 24, 2019, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Being_young_in_Europe_today:_health#Causes_of_death.

Eapen, V., & Crnic, R. (2012). Strategies and challenges in the management of adolescent depression. Current Opinion in Psychiatry, 25, 7–13. https://doi.org/10.1097/YCO.0b013e32834de3bd.

Engqvist, U., & Rydelius, P. A. (2006). Death and suicide among former child and adolescent psychiatric patients. BMC Psychiatry, 6, 51. https://doi.org/10.1186/1471-244X-6-51.

Eurostat. (2019). Being young in Europe today: Health. Luxembourg: United Union. Retrieved June 24, 2019, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Being_young_in_Europe_today:_health#Causes_of_death.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. American Journal of Preventive Medicine, 14, 245–258. https://doi.org/10.1016/S0749-3797(98)00017-8.

Fergusson, D. M., Woodward, L. J., & Horwood, L. J. (2000). Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. Psychological Medicine, 30, 23–39. https://doi.org/10.1017/S003329179900135X.

Folkhälsomyndigheten [The Public Health Agency of Sweden]. (2019). Psykisk hälso och suicid-prevention: Lägersrapport 2018 [Mental health and suicide prevention: Progress report 2018]. Solna: Folkhälsomyndigheten. Retrieved October 7, 2019, from https://www.folkhalsomyndigheten.se/contentassets/49e2c585bdde480798d89683650ca67d/psykisk-halsa-suicid-prevention-lagersrapport-2018-19006.pdf.

Foster, T. (2011). Adverse life events proximal to adult suicide: A synthesis of findings from psychological autopsy studies. Archives of Suicide Research, 15(1), 1–15. https://doi.org/10.1080/13811118.2011.540213.

Gould, M. S., Fisher, P., Pardes, M., Flory, M., & Shaffer, D. (1996). Psychosocial risk factors of child and adolescent completed suicide. Archives of General Psychiatry, 53, 1155–1162. https://doi.org/10.1001/archpsyc.1996.01830120095016.

Hawton, K., Appleby, L., Platt, S., Foster, T., Cooper, J., Malmbeg, A., et al. (1998). The psychological autopsy approach to studying suicide: A review of methodological issues. Journal of Affective Disorders, 50, 269–276. https://doi.org/10.1016/S0165-0327(98)00033-0.

Hawton, K., & James, A. (2005). Suicide and deliberate self harm in young people. British Medical Journal, 330, 891–894. https://doi.org/10.1136/bmj.330.7496.891.

Heikkinen, M., Aro, H., & Lonnoqvist, J. (1994). Recent life events, social support and suicide. Acta Psychiatrica Scandinavica, 89(377), 65–74. https://doi.org/10.1111/j.1600-0447.1994.tb05805.x.

Holmes, T. H., & Rahe, R. H. (1967). The Social Readjustment Rating Scale. Journal of Psychosomatic Research, 11, 213–218. https://doi.org/10.1016/0022-3996(67)90010-4.

Isometsa, E. T. (2001). Psychological autopsy studies: A review. European Psychiatry, 16, 379–385. https://doi.org/10.1016/S0924-9338(01)00594-6.

Joiner, T. E., Jr., Sachs-Ericsson, N. J., Wingate, L. R., Brown, J. S., Anestis, M. D., & Selby, E. A. (2007). Childhood physical and sexual abuse and lifetime number of suicide attempts: A persistent and theoretically important relationship. Behaviour Research and Therapy, 45, 539–547. https://doi.org/10.1016/j.brat.2006.04.007.

Kinner, S. A., Degenhardt, L., Coffey, C., Hearps, S., Spittal, M., Sawyer, S. M., et al. (2015). Substance use and risk of death in young offenders: A prospective data linkage study. Drug and Alcohol Review, 34(1), 46–50. https://doi.org/10.1111/dar.12179.

Lesage, A. D., Boyer, R., Grunberg, F., Vanier, C., Morissette, R., & Lover, M. (1994). Suicide and mental disorders: A case-control study of young men. American Journal of Psychiatry, 151, 1063–1068. https://doi.org/10.1176/ajp.151.7.1063.

Levinsohn, P. M., Rohde, P., & Seeley, J. R. (1994). Psychosocial risk factors for future adolescent suicide attempts. Journal of Consulting and Clinical Psychology, 62(2), 297–305. https://doi.org/10.1037/0022-006X.62.2.297.

Lind, A. (2019). Predicting suicide attempt and suicide: The role of standardised instruments in a psychiatric cohort. Thesis for doctoral degree, Karolinska Institutet, Stockholm.

Litman, R. E., Curphey, T., Shneiderman, E. S., Farberow, N. L., & Tabachnick, N. (1963). Investigations of equivocal suicides. JAMA, 184 (12), 924–929. https://doi.org/10.1001/jama.1963.037002500600008.

Liu, R. T., & Miller, I. (2014). Life events and suicidal ideation and behavior: A systematic review. Clinical Psychology Review, 34(3), 181–192. https://doi.org/10.1016/j.cpr.2014.01.006.
more targeted suicide prevention strategies. *World Psychiatry, 15*, 135–145. https://doi.org/10.1002/wps.20321.

Seguin, M., Renaud, J., Lesage, A., Robert, M., & Turecki, G. (2011). Youth and young adult suicide: A study of life trajectory. *Journal of Psychiatric Research, 45*, 863–870. https://doi.org/10.1016/j.jpsychires.2011.05.005.

Skodol, A. E., Gunderson, J. G., Pfohl, B., Widger, T. A., Livesley, W. J., & Siever, L. J. (2002). The borderline diagnosis I: Psychopathology, comorbidity, and personality structure. *Biological Psychiatry, 51*, 936–950. https://doi.org/10.1016/S0006-3223(02)01324-0.

Stanistreet, D., Taylor, S., Jeffrey, V., & Gabbay, M. (2001). Accident or suicide? Predictors of coroners’ decisions in suicide and accident verdicts. *Medicine, Science and the Law, 41*(2), 111–115. https://doi.org/10.1177/002580240104100205.

Stenbacka, M., & Jansson, B. (2014). Unintentional injury mortality—The role of criminal offending: A Swedish longitudinal population based study. *International Journal of Injury Control and Safety Promotion, 21*(2), 127–135. https://doi.org/10.1080/17457300.2013.792281.

Stillion, J. M., & Noviello, S. B. (2001). Living and dying in different worlds: Gender differences in violent death and grief. *Illness, Crisis & Loss, 9*, 247–259. https://doi.org/10.1177/105413730100900302.

Teplin, L. A., McClelland, G. M., Abram, K. M., & Mileusnic, D. (2005). Early violent death among delinquent youth: A prospective longitudinal study. *Pediatrics, 115*(6), 1586–1593. https://doi.org/10.1542/peds.2004-1439.

Tideal, D., Runeson, B., Waern, M., Frisell, T., Carlstrom, E., Lightenstein, P., et al. (2011). Familial clustering of suicide risk: A total population study of 11.4 million individuals. *Psychological Medicine, 41*, 2527–2534. https://doi.org/10.1017/S0033291711000833.

Varnik, A., Koltes, K., van der Feltz-Cornelis, C. M., Marusic, A., Oskarsson, H., Palmer, A., et al. (2008). Suicide methods in Europe: a gender-specific analysis of countries participating in the “European Alliance Against Depression”. *Journal of Epidemiological Community Health, 62*, 545–551. https://doi.org/10.1136/jech.2007.063591.

Verona, E., Sachs-Ericsson, N., & Joiner, T. E. (2004). Suicide attempts associated with externalizing psychopathology in an epidemiological sample. *American Journal of Psychiatry, 161*, 444–451. https://doi.org/10.1176/appi.ajp.161.3.444.

Werbart Tornblom, A., Werbart, A., & Rydelius, P.-A. (2015). Shame and gender differences in paths to youth suicide: Parents’ perspective. *Qualitative Health Research, 25*(8), 1099–1116. https://doi.org/10.1177/1049732315578402.

WHO. (2014). Preventing suicide: A global imperative. Geneva: World Health Organization. Retrieved July 22, 2019, from http://www.who.int/mental_health/suicide-prevention/world_report_2014/en/.

WHO. (2018). *National suicide prevention strategies: Progress, examples and indicators*. Geneva: World Health Organization. Retrieved July 21, 2019, from https://www.who.int/mental_health/suicide-prevention/national_strategies_2019/en/.

Williams, S. B., O’Connor, E., Eder, M., & Whitleck, E. (2009). Screening for child and adolescent depression in primary care settings: A systematic evidence review for the US Preventive Services Task Force. *Pediatrics, 123*, e716–e735. https://doi.org/10.1542/peds.2008-2415.

Yeaworth, R. C., McNamara, M. J., & Pozehl, B. (1992). The Adolescent Life Change Event Scale: Its development and use. *Adolescence, 27*(108), 783–802.

Youth Wiki (2017). *Youth policies in Sweden*. Brussels: European Commission. Retrieved June 23, 2019, from https://eacea.ec.europa.eu/national-policies/sites/youthwiki/files/gdlsweden.pdf.

Zamelkin, A. J., Alter, M. R., & Yemini, T. (2001). Suicide in teenagers: Assessment, management, and prevention. *JAMA, 286*(24), 3120–3125. https://doi.org/10.1001/jama.286.24.3120.

Zeileis, A., & Hothorn, T. (2002). Diagnostic checking in regression relationships. *R News, 2*(3), 7–10. Retrieved April 17, 2019, from https://CRAN.R-project.org/doc/Rnews/