



## Research paper

# Intergenerational involvement in out-of-home care and death by suicide in Sweden: A population-based cohort study



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## ABSTRACT

**Background:** Individuals involved in out-of-home care are at higher risk of death by suicide. We aimed to determine whether parents with two generations of involvement in out-of-home care (themselves as children, and their own children) are at increased risk of death by suicide than parents with no involvement or parents with one generation of involvement in out-of-home care.

**Method:** This population-based cohort study included all individuals born in Sweden between 1973 and 1980 who had at least one child between 1990 and 2012 ( $n = 487,948$ ). Women ( $n = 259,275$ ) and men ( $n = 228,673$ ) were examined separately.

**Results:** When compared with mothers with no involvement in out-of-home care, mothers with two generations of involvement were at more than five times greater risk of death by suicide (aHR = 5.52; 95% CI 2.91–10.46); mothers with one generation of involvement were also at significantly higher risk of death by suicide (mothers were in care as children: aHR = 2.35; 95% CI 1.27–4.35; child was placed in care: aHR = 3.23; 95% CI 1.79–5.83). Involvement in out-of-home care (in either generation) did not affect risk of death by suicide for fathers.

**Limitations:** Reason for placement in out-of-home care is not known; these reasons could also be associated with risk of death by suicide

**Conclusion:** Mothers with involvement in out-of-home care, either as children or when their child was placed in care, are at significantly higher risk of death by suicide. Mental health services should be provided to individuals involved in out-of-home care.

## 1. Introduction

Death by suicide is complex issue, with causes that are not well understood (Lee et al., 2017). Mental illness and adverse childhood experiences – such as child abuse – have been identified as risk factors for suicide attempts and completions (Hiroeh et al., 2001; Martin et al., 2016). Children with adverse experiences are often placed in out-of-home care (OHC), such as foster or institutional care, and those involved in OHC often experience a range of mental health challenges

(Heneghan et al., 2015). Previous studies have identified that children with a history of OHC are between two and four times more likely to attempt suicide, and between two and three times more likely to complete suicide (Vinnerljung et al., 2006; Katz et al., 2011; Pilowsky and Wu, 2006; Hjern et al., 2004; Evans et al., 2017). Those who were in care as children are also more likely to have their own children placed in care, and mothers whose children are placed in care are also at higher risk of suicide attempts and completions (Wall-Wieler et al., 2018a; Mertz and Andersen, 2017; Wall-Wieler et al., 2018b).

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Why is involvement in OHC such a strong risk factor for death by suicide? First, children involved with OHC – a proxy for child abuse and neglect – are significantly more likely to develop mental illness (Pilowsky and Wu, 2006). This has been attributed to both nature and nurture; children placed in care often have a family history of mental illness, have experienced parental rejection and trauma, and often experience continued instability when they are placed in care (Connell et al., 2006; Kohl et al., 2012). Additionally, disadvantage often accumulates over time for children in OHC; these children have lower levels of educational attainment, resulting in lower rates of employment and income in adulthood, higher rates of incarceration, and having their own child(ren) placed in OHC (Vinnerljung and Hjern, 2011; Hook and Courtney, 2010; Fowler et al., 2009; Putnam-Hornstein and Needell, 2011). Having a child placed in OHC can also increase risk of death by suicide; the experience of having a child placed in care is experienced by most mothers as traumatic, characterized by ambiguous loss and disenfranchised grief (Zeman, 2004; McKegey, 2003). Filial deprivation – the parental experience of being separated from their child – results in a deterioration of mental health and social stability (Jenkins and Norman, 1972; Wall-Wieler et al., 2017; Hiilamo and Saarikallio-Torp, 2011). Individual with accumulated disadvantage – such as those who themselves have a history of OHC – are at an increased risk of having their child placed in care and have fewer resources to manage this stressful event (Mertz and Andersen, 2017; McLeod and Kessler, 1990). Therefore, losing custody of a child may result in greater risk of death by suicide for children who themselves had a history of OHC.

Previous research has identified placement in OHC as a child as a risk factor for death by suicide, and losing custody of a child to child protection services as a risk factor for death by suicide among mothers (Vinnerljung et al., 2006; Wall-Wieler et al., 2018b). What is not known is whether fathers whose children are placed in care are also at higher risk of suicide attempts and completions, and whether two generations of involvement in OHC (as a child and as a parent) increases this risk. This study discusses these gaps in knowledge. Addressing these aims will address the important question of whether or not accumulation of adversity from childhood to adulthood increases the risk of suicide. Swedish population-based registry data are used to address this question.

## 2. Methods

### 2.1. Setting and data

Sweden – a northern European country – has approximately 10 million residents, with all residents having access to universal health-care coverage (Sweden Institute 2018; Statistics Sweden 2017). Study data were provided by national registers held by the Swedish National Board of Health and Welfare (the Medical Birth Register, the Cause of Death Register, the Hospital Discharge Register, the National Child Welfare Register), the National Council for Crime Prevention (the National Register of Criminal Convictions), and Statistics Sweden (the Multi-Generation Register, the Register for the Total Population, and the Longitudinal Integrated Database for Health Insurance and Labor Market Studies (LISA by Swedish acronym), and the Swedish Parent Register). These de-identified registries were linked at the individual level using a unique personal identification number. For children born in Sweden, linkages with mothers are provided in all cases through the Medical Birth Registry. Linkages with fathers are available in the Multi-Generation Registry and are available for more than 99% of children.

The Regional Ethics Committee in Stockholm approved this study (dnr: 2010/5:1); all data were anonymized and therefore did not require informed consent.

### 2.2. Cohort formation

Individuals included in this study were drawn from the whole

population of Sweden born between January 1, 1973 and December 31, 1980. The start date (January 1, 1973) was selected as the beginning of data on out-of-home care in Sweden. Two separate cohorts were created: one for females and one for males.

Of the 352,348 females born between 1973 and 1980, 261,496 did not move out of Sweden and had at least one child before January 1, 2013. Mothers were divided into four groups. Group 1 included mothers who themselves had spent time in care and had at least one child placed in care ( $n = 1234$ ). Group 2 included mothers who spent time in care, but whose child(ren) were not placed in care before 2013 ( $n = 6331$ ). Mothers not placed in care were also divided into two groups – those having a child placed in care (Group 3;  $n = 3318$ ), and those not having a child placed (Group 4;  $n = 250,506$ ) (Fig. S1a in Appendix A). Mothers dying before their child was placed in care were excluded from the cohort.

Of the 381,087 males born between 1973 and 1980, 231,451 did not move out of Sweden and had at least one child before January 1, 2013. Fathers were divided into four groups. Group 1 included fathers who themselves had spent time in care and had at least one child placed in care ( $n = 691$ ). Group 2 included fathers who spent time in care, but whose child(ren) were not placed in care before 2013 ( $n = 5475$ ). Fathers not placed in care were also divided into two groups – those having a child placed in care (Group 3;  $n = 2449$ ), and those who did not have a child placed (Group 4;  $n = 222,758$ ) (Fig. S1b in Appendix A). Fathers who died before their child was placed in care were excluded from the cohort. The index date for each individual in the study was the day they became a parent (birth of their first child).

### 2.3. Measures

Cause of death was obtained from the National Cause of Death Register; deaths before 1997 were defined in accordance with the ninth revision of the WHO international classification of diseases (ICD-9), and deaths in 1997 according to the tenth revision (ICD-10). Death by suicide was defined by an underlying cause of death of E950–E959, E980–E989 (ICD-9) or X60–X84, Y10–Y34 (ICD-10), indicating both certain and uncertain suicides. All suicide diagnoses are based on forensic autopsies. (Von Borczyskowski A et al., 2011).

Involvement in out-of-home care and death by suicide have both been linked to sociodemographic variables, psychiatric disorders, addictions, and involvement with the criminal justice system; these were therefore included as covariates in the analysis (Christoffersen et al., 2003; Turecki and Brent, 2016). Sociodemographic variables in the index year were obtained from LISA; these variables included parental level of education (<10 years, 10–11 years, 12–13 years, >13 years), location of residence (metropolitan area, smaller city, rural), employment status, and whether they received social welfare benefits. Parent's age at the index date was derived from the Multigenerational Registry. The Hospital Discharge Registry and the Register of Court Convictions were used to examine whether the parents had a suicide attempt, any psychiatric disorder, addictions, or violent criminal convictions at any time before the index date; all definitions are based on previous research using the same data (Hjern et al., 2004). Suicide attempts are defined as a hospitalization with a suicide attempt as a main or contributory diagnosis (ICD-9 codes E950–E959, E980–E989; ICD-10 codes X60–X84; ICD-10 codes Y10–Y34). Having a psychiatric disorder was defined as having at least one hospitalization with a psychiatric disorder as a main or contributory diagnosis (ICD-9 codes 291–319; ICD-10 codes F00–F99). Alcohol misuse is defined as at least one hospitalization with alcohol misuse as a main or contributory diagnosis (ICD-9 codes 291, 303, 305.0, 357.5, 425.5, 535.3, 571.0–571.3, E86.0, E98.0; ICD-10 codes F10, G62.1, I42.6, K70.0, K70.1, K70.9, K29.20, K29.21, K70.30), or at least one conviction of an alcohol-related crime. Drug misuse is defined as at least one hospitalization with drug misuse as a main or contributory diagnosis (ICD-9 codes 292, 304, 965.0, 968.5, 969.6, 969.7; ICD-10 codes F11–F19, T40.0–T40.4, T40.6–T40.9, T41.3,

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