

# Maternal schizophrenia and out-of-home placements of offspring: A national follow-up study among Finnish women born 1965–1980 and their children

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## Abstract

Schizophrenia may affect a mother's ability to parent. We investigated out-of-home placements among children with a biological mother having schizophrenia, and their relation to maternal characteristics and adverse perinatal health outcomes of the offspring. For each Finnish woman born between 1 JAN 1965 – 31 DEC 1980 and diagnosed with schizophrenia before 31 DEC 2013 ( $n = 5214$ ), five matched controls were randomly selected from the Finnish Central Population Register. Children born to these women were identified and followed till 31 DEC 2013. The Child Welfare Register, the Medical Birth Register and the Register of Congenital Malformations were used to gather information. Altogether 35.1% of children with an affected mother and 3.2% of control children were placed out of home during the follow-up. The incidence rate ratio (IRR) of out-of-home placement among children with an affected mother was 12.6 (95% confidence interval (CI) 10.80–13.46) when children with a non-affected mother served as a reference. Single motherhood (IRR 2.2, 95% CI 1.88–2.60) and maternal smoking (IRR 1.9, 95% CI 1.68–2.16), but not an adverse perinatal outcome of the offspring, increased the risk of out-of-home placement. To conclude, maternal schizophrenia is a strong risk factor for placement of children in out-of-home care.

*Keywords: Child welfare services, Out-of-home placement, Schizoaffective disorder, Schizophrenia, Women*

## 1. Introduction

Parenting is the process of raising and educating a child from birth until adulthood that involves endeavoring to realize the physical, emotional, psychological, and developmental needs of a child. Moreover, it is a long-term commitment requiring physical and practical tasks and psychological responsibilities such as providing affection, stimulation and effective discipline (David et al., 2011). There has been an increase in pregnancies among women with schizophrenia spectrum disorders (Matevosyan, 2011; Solari et al., 2009). For example, in Ontario, Canada, the general fertility rate among women with schizophrenia was 16% higher in 2007–2009 than in 1996–1998 (the incidence rate ratio (IRR) 1.16, 95% confidence interval (CI) 1.04–1.31) (Vigod et al., 2012). Maternal schizophrenia potentially disrupts the mother-infant relationship and adaptation to motherhood (Malhotra et al., 2015), as well as impacts a mother's parenting skills and abilities (Maybery and Reupert, 2009). While positive symptoms of schizophrenia can lead to unwanted behaviors, negative symptoms tend to exert their influence through the absence of desirable behaviors. Besides

the positive and negative symptoms of psychosis, women suffering from schizophrenia can experience problems of interpersonal, mood, cognitive, and behavior abnormalities that interfere with optimal parenting. On the other hand, women with severe mental health disorders have reported experiencing stigma regarding parenting issues (Jeffery et al., 2013). They often feel that they are perceived as bad parents and concern about custody loss is common (Diaz-Caneja and Johnson, 2004; Nicholson et al., 1998a; Nicholson et al., 1998b; Savvidou et al., 2003). Fear of losing custody or access to children can dominate interactions with mental health and social services, making many women reluctant to disclose difficulties in parenting to professionals (Diaz-Caneja and Johnson, 2004). Among mothers with schizophrenia, those with supportive marital and other relationships, those whose partners are well, and those from higher social class show the best parenting outcomes (Abel et al., 2005).

Since the 1960s, evidence has accumulated for an association between maternal schizophrenia and various adverse perinatal health outcomes of the child

including prematurity, low birthweight and congenital malformations (Matevosyan, 2011). Children with a mother suffering from schizophrenia tend to obtain lower Apgar-scores (Bennedsen et al., 2001; Jablensky et al., 2005; Simoila et al., 2018) and they more often need neonatal monitoring than children with a non-affected mother (Simoila et al., 2018). The causes of these unwanted perinatal health outcomes and the potential to prevent them have remained unclear. Possible causative factors include abnormal fetal development due to a genetic predisposition, the effects of maternal illness and stress, concurrent problems such as sociodemographic disadvantage, poor nutrition and associated life style factors, poor attendance at antenatal care, or the effects of prescribed drugs (Judd et al., 2014). Infants with perinatal problems can be challenging to mothers, especially to those with severe mental health problems.

In most developed countries, it is the legal responsibility of health care and social services to intervene if the well-being of a child is jeopardized due to unacceptable childrearing conditions, though the criteria for placing children vary across local authorities, child protection teams, individual professionals, and capacity constraints (Bhatti-Sinclair and Sutcliffe, 2013). The Finnish child welfare system consists of child protection aspects as well as family service aspects. Family service is the primary way to help families, but if this is not enough, the under-aged offspring can be placed out of home, either voluntarily or involuntarily. At the age from 18 to 21, a youngster can be placed out-of-home only if he/she accepts the plan him/herself (so-called after-care). Mothers with schizophrenia are more likely to remain under social service supervision after discharge from mother-and-baby units than mothers in the general population (Kumar et al., 1995; Salmon et al., 2003) and they are at high risk of losing, either temporarily or permanently, custody of their children (Seeman, 2012). However, as far as the authors know, there is only one national register-based cohort study focusing on out-of-home placements of children with a mother suffering from schizophrenia; the study from Denmark, with almost 800,000 first-born singletons, reported that 40% of children with an affected mother were placed outside the home at some point of their childhood (Ranning et al., 2015). Among these children, IRR of placement in care was 24 when children of mothers from the general population served as a reference. The risk of out-of-home placement was especially high during the child's first year of life (IRR 80). This might be explained, at least partly, by the fact that among mothers with mental disorders, the first month after childbirth is associated

with an increased risk of psychiatric readmission (Munk-Olsen et al., 2009).

The aim of this Finnish register-based population study was to (1) investigate the prevalence and length of out-of-home placements among children with a biological mother suffering from schizophrenia, as well as (2) to study associations between maternal background variables, adverse perinatal health outcomes of the offspring and out-of-home-placements.

## 2. Methods

### 2.1. Women

The study sample comprised a Finnish national population of women who were born between 1 JAN 1965– 31 DEC 1980 and diagnosed with schizophrenia or schizoaffective disorder in specialized health care at some point during the follow-up time ending 31 DEC 2013 (n = 5214). For each case, five control women were randomly selected from the Finnish Central Population Register, matched for age and place of birth, who had not been diagnosed with schizophrenia, schizoaffective disorder or any other psychotic disorder by the end of the follow-up time. Other mental disorders, such as mood or anxiety disorders, were allowed. The total final number of controls was 25,999 because sometimes controls could not be found due to strict matching criteria. Diagnoses of the women were obtained from the Care Register for Health Care from the National Institute of Health and Welfare. The onset of schizophrenia or schizoaffective disorder was defined as the day when the disorder was diagnosed and coded in specialized health care. In Finland, psychiatric classification according to the International Classification of Diseases–Eighth Revision (ICD-8) (World Health Organization, 1965) served in clinical practice between 1969 and 1986 (schizophrenia: 295.0–6, 295.8–9; schizoaffective psychosis: 295.7). This classification was later replaced by the Diagnostic and Statistical Manual of Mental Disorders – Third Revised Edition (DSM-III-R) (American Psychiatric Association, 1987), used in clinical practice between 1987 and 1995. However, the diagnoses were converted to ICD-9 (World Health Organization, 1977) diagnoses, when, for example, reporting them to the Care Register for Health Care (schizophrenia: 295.0–6, 295.8–9; schizoaffective psychosis: 295.7). Since 1996, ICD-10 (World Health Organization, 1992) has been used in Finland (schizophrenia: F20; schizoaffective psychosis: F25). We then conjoined the diagnoses of schizophrenia and schizoaffective disorder (hereafter, schizophrenia).

## 2.2. Offspring

The Medical Birth Register has been maintained by the National Institute of Health and Welfare since 1987. It covers all delivery hospitals in Finland and includes data on live births and stillbirths of fetuses with a birth-weight of at least 500 g or a gestational age of at least 22 weeks, as well as data on the mothers. Using this register, we identified all singletons born to women suffering from schizophrenia and their controls. However, in this study, only children born after 31 DEC 1990 were used in further analyses since the Child Welfare Register (see 2.4.) was established in 1991. Children were followed from birth until they turned 21 (the aftercare of the Finnish child welfare services finished), moved abroad, died or the follow-up time ended (31 DEC 2013). The mean follow-up time of children with a mother suffering from schizophrenia was 11.0 (standard deviation (SD) 6.86) years and 12.4 (SD 5.83) years for children with a non-affected mother ( $p < 0.001$ ).

## 2.3. The child welfare register

According to the Finnish Child Welfare Act, the Social Welfare Board is obliged to take responsibility of the care and upbringing of a child who meets each of the following three criteria: (1) the child's health or development is seriously endangered by the lack of care or other conditions at home, or the child seriously endangers his health or development by the abuse of intoxicants, by committing an illegal act other than a minor offence, or by any other comparable behavior; (2) support interventions in community care are not appropriate or possible or have proved to be inadequate; and (3) substitute care is considered to be in the best interests of the child. There are no uniform criteria for out-of-home placements, but each decision is based on the Child Welfare Act. Since 1991, information on children placed out of home by municipal Child Welfare Services has been registered to the Child Welfare Register, maintained by the National Institute of Health and Welfare. The register includes the following information: the date of out-of-home placement and the length of out-of-home placement.

## 2.4. Information on pregnancy-related and perinatal health outcomes

The following variables were collected from the Medical Birth Register: maternal age and marital status at birth, the number of deliveries (parity),

premature birth (< 37 weeks' gestation), low birth-weight of the child (< 2500 g), and child's low Apgar-score at 1 min (0–6).

The Finnish Register of Congenital Malformations has been maintained by the National Institute of Health and Welfare since 1963. The register contains data on congenital chromosomal and structural anomalies detected in stillborn and live born infants and fetuses, as well as terminations of pregnancy due to congenital anomaly. We included only major congenital anomalies and multiple anomalies and syndromes, excluding minor anomalies according to the European Surveillance of Congenital Anomalies (EUROCAT) criteria (EUROCAT Central Registry, 2017).

## 2.5. Statistical analyses

Chi square ( $\chi^2$ ) test (being single at the end of pregnancy, maternal smoking in the beginning of pregnancy, perinatal health problems of the child, number of mothers facing out-of-home placement of at least one child, number of children placed out of home, number of children placed out of home during the first year of his/her life), Student's t-test (maternal age, parity, total length of out-of-home placement), Mann–Whitney U test (number of out-of-home placements) were used. Findings were considered significant when the two-tailed  $p < 0.05$ .

Logistic regression analysis was performed to analyze the risk of out-of-home placement among children with a mother suffering from schizophrenia when children with a non-affected mother served as a reference. Analyses were done both unadjusted and adjusted. In adjusted models, child's birth year (= Model 1), child's birth year and a perinatal health problem (yes/no) (= Model 2), child's birth year and maternal age, parity, marital status at birth (single vs. married/cohabiting) and maternal smoking status in the beginning of pregnancy (yes/no) (= Model 3), and child's birth year, a perinatal health problem (yes/no), maternal age, parity, marital status at birth (single vs. married/cohabiting) and maternal smoking status in the beginning of pregnancy (yes/no) (= Model 4) were used as covariates. IRRs with 95% CIs are reported. Findings were considered significant when the p-value for the regression model was  $< 0.05$ .

Analyses were performed using SPSS 22.0 for Windows and SAS 9.3.

## 2.6. Ethical considerations

The Ethics Committee of Helsinki and Uusimaa Hospital District evaluated and approved the study

plan. Permission to use the confidential register data in the study was granted by the National Institute for Health and Welfare and the Population Register Center. The declaration of Helsinki was followed.

### 3. Results

Between 1991 and 2013, altogether 2904 children were born to 1675 women with schizophrenia and, respectively, 14 496 children to 6767 control women.

#### 3.1. Characteristics of mothers

The distribution of background variables of women with schizophrenia and control women is presented in Table 1. Women with schizophrenia were significantly older and significantly more often single at the end of pregnancy than control women. They also smoked at the beginning of pregnancy significantly more often than control women. The number of pregnancies was significantly lower among women with schizophrenia than among control women.

#### 3.2. Adverse perinatal health outcomes of the offspring

The distribution of various perinatal health outcomes of the offspring is presented in Table 2. The prevalence of all studied adverse perinatal health outcomes (premature birth, low birth-weight, low 1-minute Apgar-score, major congenital anomaly) was significantly higher among children with a mother suffering from schizophrenia than among children with a non-affected mother.

#### 3.3. Out-of-home placements

Altogether, 684 (40.8%) mothers with schizophrenia and 322 (4.8%) non-affected mothers faced out-of-home placement of at least one child during the follow-up period ( $\chi^2 = 1576.45$ ,  $p < 0.001$ ).

Focusing on the offspring, 1019 (35.1%) children with a mother suffering from schizophrenia and 469 (3.2%) children with a non-affected mother were placed out of home during the follow-up ( $\chi^2 = 3219.00$ ,  $p < 0.001$ ) (Fig. 1).

Of all out-of-home placed children, 256 (25.1%) with a mother suffering from schizophrenia and 37 (7.9%) with a non-affected mother were already placed during the first year of their lives ( $\chi^2 = 60.88$ ,  $p < 0.001$ ).

The median number of out-of-home placements was 4 (interquartile range (IQR) 2–5, range 1–54) among children with a mother suffering from

schizophrenia and 3 (IQR 1–4, range 1–34) among children with a non-affected mother ( $U = 33,622$ ,  $p = 0.001$ ).

The mean total length of an out-of-home placement was 5.1 years (SD 5.48) in children with a mother suffering from schizophrenia and 2.4 years (SD 3.66) in children with a non-affected mother ( $t = 9.660$ ,  $p < 0.001$ ).

#### 3.4. Predictors

IRR of out-of-home placement among children with a mother suffering from schizophrenia was 12.6 (95% CI 10.80–13.46) when children with a non-affected mother served as a reference (Table 3). When all studied maternal (age, marital status, parity, smoking status) and child's (any adverse perinatal health outcome: premature birth, low birth-weight, low 1-minute Apgar-score, major congenital anomaly) background variables were used as covariates, IRR of out-of-home placement was 9.7 (95% CI 8.65–10.85).

Focusing on children with a mother suffering from schizophrenia (Table 4), both being a single mother at the end of pregnancy (IRR 2.2, 95% CI 1.88–2.63) and maternal smoking in the beginning of pregnancy (IRR 1.9, 95% CI 1.68–2.16) increased the risk of out-of-home placement significantly.

Among children with a non-affected mother, maternal smoking at the beginning of pregnancy (IRR 4.0, 95% CI 3.31–4.84), being a single mother at the end of pregnancy (IRR 2.1, 95% CI 1.67–2.59) and mother's previous deliveries (IRR 1.3, 95% CI 1.17–1.32) significantly increased the risk of out-of-home placement. Advanced maternal age significantly decreased the risk of out-of-home-placement (IRR 0.9, 95% CI 0.88–0.93).

#### 3.5. Time trends related to risk of out-of-home placements

As a post-hoc analysis, we analyzed children born between 1991–1999 and 2000–2013 separately. The proportion of children placed outside the home before the age of 5 significantly increased among children with a mother suffering from schizophrenia (12.9% to 23.3%,  $p < 0.001$ ), while the increase was statistically insignificant among controls (0.7% to 0.8%,  $p = 0.440$ ). The same was true when using the cut-offpoint of 10 years old: the proportion of children placed outside the home increased significantly from 20.8% to 32.6% among children with a mother suffering from schizophrenia ( $p < 0.001$ ) and insignificantly from 1.4% to 1.8% among controls ( $p = 0.068$ ).

**Table 1**

The distribution of background variables among women with schizophrenia (SZH) and non-affected women.

Variable	Women with SZH (n = 1675)	Control women (n = 6767)	<i>p</i>
Age at birth; mean (SD)	27.2 (5.14)	29.5 (4.82)	<b>&lt; 0.001</b>
Single at the end of pregnancy; n (%)	625 (37.3)	1404 (20.7)	<b>&lt; 0.001</b>
Smoking in the beginning of pregnancy; n (%)	944 (31.5)	1994 (13.3)	<b>&lt; 0.001</b>
Number of deliveries (= parity); mean (SD)	1.8 (1.03)	2.2 (1.14)	<b>&lt; 0.001</b>

SD = standard deviation

The Chi-square ( $\chi^2$ ) test and independent samples t-test were used to compare the groups.

The bolded *p*-values represent statistical significance.

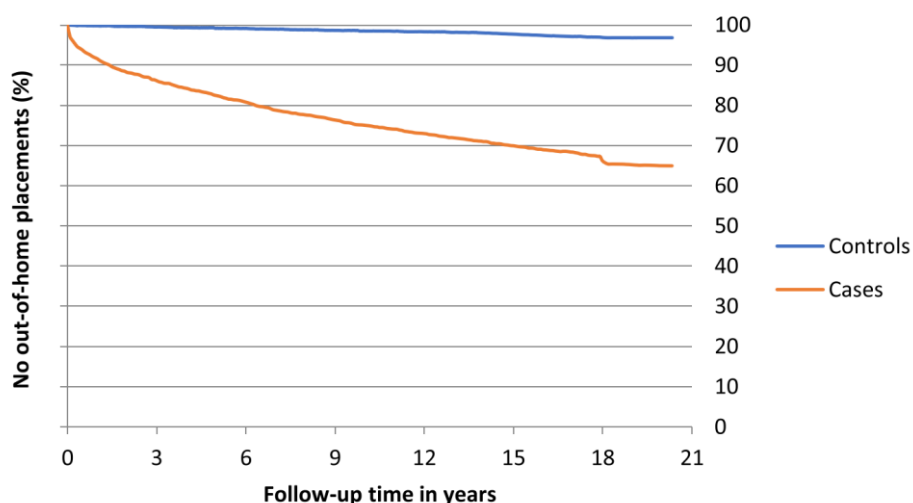
**Table 2**

The distribution of various perinatal problems among children with a mother suffering from schizophrenia (SZH) and children with a non-affected mother.

Variable	Children with a mother with SZH (n = 2904)	Children with a non-affected mother (n = 14496)	<i>p</i>
Premature birth; n (%)	172 (5.9)	564 (3.9)	<b>&lt; 0.001</b>
Low birth weight; n (%)	111 (3.8)	387 (2.7)	<b>&lt; 0.001</b>
Low 1-minute Apgar-score; n (%)	164 (5.6)	628 (4.3)	<b>0.002</b>
Major congenital anomaly; n (%)	123 (4.2)	440 (3.4)	<b>&lt; 0.001</b>
At least one of the above-mentioned perinatal health problems; n (%)	335 (11.5)	1212 (8.4)	<b>&lt; 0.001</b>

The Chi-square ( $\chi^2$ ) test was used to compare the groups.

The bolded *p*-values represent statistical significance.



**Fig. 1.** The Kaplan–Meier survival curves for being placed out of home among children with a mother suffering from schizophrenia (= cases) and among children with a non-affected mother (= controls) ( $p < 0.001$ ).

**Table 3**

The risk of out-of-home placement among children with a mother suffering from schizophrenia when children with a non-affected mother served as a reference

Model	IRR	95% CI
1	12.6	10.8–13.46
2	11.9	10.70–13.32
3	9.8	8.71–10.92
4	9.7	8.65–10.85

IRR = incidence rate ratio; CI = confidence interval

Model 1: Adjusted for child's birth year.

Model 2: Model 1 + a perinatal health problem of the child (yes/no).

Model 3: Model 1 + maternal age, parity, marital status at the end of pregnancy (single vs. married/co-habiting) and smoking status in the beginning of pregnancy (yes/no).

Model 4: Model 1 + all maternal and child's background variables.

All differences are statistically significant.

**Table 4**

Risk factors for out-of-home placement among children with a mother suffering from schizophrenia and among children with a non-affected mother.

Variable	IRR	(95% CI)
<i>Mothers with schizophrenia</i>		
Maternal smoking in the beginning of pregnancy	<b>1.9</b>	<b>1.68–2.16</b>
Being single at the end of pregnancy	<b>2.2</b>	1.88–2.63
Number of deliveries	1.1	0.99–1.11
Maternal age	1.0	0.97–1.00
Perinatal health problem of the offspring	1.2	0.98–1.33
<i>Non-affected mothers</i>		
Maternal smoking in the beginning of pregnancy	<b>4.0</b>	<b>3.31–4.84</b>
Being single at the end of pregnancy	<b>2.1</b>	<b>1.67–2.59</b>
Number of deliveries	<b>1.3</b>	<b>1.17–1.32</b>
Maternal age	<b>0.9</b>	<b>0.88–0.93</b>
Perinatal health problem of the offspring	1.3	0.94–1.71

IRR = incidence rate ratio; CI = confidence interval.

The bolded *p*-values represent statistical significance.

#### 4. Discussion

The present national, register-based population study investigated out-of-home placements among children with a biological mother suffering from schizophrenia, as well as associations between maternal characteristics, adverse perinatal health outcomes of the offspring and out-home-placements. We found that over 40% of mothers with schizophrenia had faced an out-of-home placement of at least one child. Both being a single mother and maternal smoking turned out to be significant risk factors for out-of-home placement of the offspring. Focusing on children, approximately every third child with a mother suffering from schizophrenia was placed outside the home. Their risk of facing an out-of-home placement was almost 13-fold higher compared to that of children with a non-affected mother. Of out-of-home placed children, every fourth child was already placed during his or her first year of life.

Our finding is in line with the review of Seeman (2012) reporting that, depending on the jurisdiction, time period studied and specifics of the population, approximately 50% of mothers who suffer from schizophrenia lose custody of their children. Our findings are also in agreement with the national population study from Denmark which found that 40% of children with a mother suffering from schizophrenia were placed outside the home at some point of their childhood and that a substantial proportion of children were already placed during their first year of life (Ranning et al., 2015).

Among women with schizophrenia, both smoking in the beginning of pregnancy and being single at the end of pregnancy served as risk factors for later out-of-home placements of offspring. However, these same variables also turned out to be risk factors for out-of-home placement among non-affected women. Maternal tobacco smoking and being single are not, themselves, grounds for out-of-home placement of a child, but these variables reflect a variety of problems which a mother can face. For example, prenatal exposure to nicotine has been associated with a variety of cognitive and behavioral/developmental problems among offspring, such as hyperactivity and conduct problems, leading to special needs of the child (Kotimaa et al., 2003; Weissman et al., 1999). Further, maternal smoking is linked to both lower socioeconomic status and education level (Laaksonen et al., 2002), and the heaviest smokers tend to be the most disadvantaged (Maughan et al., 2001). Smoking is also associated with problematic alcohol use, as well as illegal drug use (Swarbrick et al., 2017). In many countries, single mothers are considered a vulnerable group in society

(Burström et al., 1999). They experience poorer physical and mental health than their married counterparts and single motherhood tends to place women in an adverse social position that is associated with prolonged stress mainly due to unemployment, economic hardship and social exclusion (Rousou et al., 2013). However, even though a child with a perinatal health problem can be demanding and difficult to look after, in this study, a perinatal health problem did not increase the risk of a child's out-of-home placement in either group.

The number of out-of-home placements was significantly higher in children with a mother suffering from schizophrenia than in children with a non-affected mother. We also noticed that the range of out-of-home placements was high, reaching up to 54 among children with a mother suffering from schizophrenia and 34 in children with a non-affected mother. This surely reflects the complexity of the topic, but also raises the question of what kind of impact this has for the child from the perspective of attachment and mental health. We also found that the proportion of children placed outside the home had substantially increased from the 1990s to 2000s in families with a mother suffering from schizophrenia, but this was not the case in families with a non-affected mother. Out-of-home placements often occur when the mother is referred to psychiatric treatment. Support networks around mothers with schizophrenia may have attenuated over time, which could, at least partly, explain our finding. Moreover, the Finnish child welfare law was renewed in 2010; an anticipatory child welfare notification can be made already during pregnancy, if there is a reason to assume that the offspring is going to need actions of child welfare. Alcohol use disorders are reported to be common among individuals with psychotic disorders (Regier et al., 1990; Kendler et al., 1996). In Finland, women's share of the overall alcohol consumption has increased. In 1968, it was just over 10%, but nowadays women account for more than 25% of the total alcohol consumption. It might be that problematic alcohol use has increased more among women with schizophrenia than among population women. Unfortunately, so far, we have no time trend analysis of alcohol consumption among Finnish population of patients with schizophrenia.

Our finding that over 40% of mothers with schizophrenia face an out-of-home placement of their child support the general instructions given by Seeman (2012), which highlight that intensive treatment services and counseling should be offered to families with a mother suffering from schizophrenia including psychoeducation of the early signs of relapse, crisis planning, mapping of social contacts and resources in

the network, and training in parenting skills and practical household issues. Intensive collaboration between staff from child psychiatry, adult psychiatry and child welfare services is also needed.

Among professionals, actions against stigma might be needed (Jeffery et al., 2013). From the child's point of view, it is important that he/she has at least one healthy adult in his/her everyday life so that the child does not need to take on the parenting role in the family. In addition, in cases where an out-of-home placement is evident, both the mother and the child need support and a possibility to mourn their loss.

#### 4.1. Strengths and limitations

The strengths of this study include our ability to investigate the Finnish national female population of patients with schizophrenia or schizoaffective disorder, the relatively long follow-up time, and the good quality of information from Finnish health care registers (Aro et al., 1990; Gissler et al., 1995). In addition, in Finland, the diagnoses of psychotic disorders are reliable (Isohanni et al., 1997; Pihlajamaa et al., 2008). However, some limitations need to be considered. First, we used an age- and place-of-birth-matched control group for comparison, but confounding factors such as socioeconomic status, education and employment status were not taken into account, which might have affected our results (Ranning et al., 2015). In Finland, most patients with schizophrenia are on disability pension (Perälä et al., 2008). The municipal health-care services and social services, including child welfare services, are funded by tax revenues and available to all citizens regardless of their financial situation or employment. Second, we had no information about the non-psychotic psychopathology of the mothers, their somatic disorders or the nature or amount of their substance use. Finally, we did not have any information related fathers or information related to the psychopathology of the offspring.

#### 4.2. Implications

Maternal schizophrenia is a strong risk factor for placement of children in out-of-home care. Intensive treatment services and counseling should be offered to families with a mother suffering from schizophrenia. Collaboration between psychiatric services, social services and child welfare services is important. It seems that the proportion of children placed outside the home had substantially increased from the 1990s to 2000s in families with a mother suffering from schizophrenia. This phenomenon should be investigated more specifically in the future.

Further, studies related to possible psychopathology of these out-of-home placed children should be carried out.

#### Conflict of interest

The authors declare that they have no conflicts of interest.

#### Funding

This study has been funded by the Helsinki and Uusimaa Hospital District. The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

#### Acknowledgments

The authors are most grateful to M. Grainger for her contribution to data management and computational issues.

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