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Original article

Obstetric and perinatal health outcomes related to schizophrenia: A national register-based follow-up study among Finnish women born between 1965 and 1980 and their offspring

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ABSTRACT

Background: This national register-based study assesses obstetric and perinatal health outcomes in women with schizophrenia and their offspring.
Methods: Using the Care Register for Health Care, we identified Finnish women who were born in 1965-1980 and diagnosed with schizophrenia. For each case, five age- and place-of-birth- matched controls were obtained from the Central Population Register of Finland. They were followed from the day when the disorder was diagnosed in specialized health-care (the index day) until 31.12.2013. Information related to births was obtained from the Medical Birth Register and the Register of Congenital Malformations. We focused on singleton pregnancies that led to a delivery after the index day. We restricted the analysis of deliveries in controls to those that occurred after the index day of the case. Maternal age, marital status, smoking status, sex of the newborn, and parity were used as covariates in adjusted models.
Results: We identified 1162 singleton births among women with schizophrenia and 4683 among controls. Schizophrenic women had a 1.4-fold increased risk of induction of labor, delivery by cesarean section, and delivery by elective cesarean section. Regarding offspring, the risk of premature birth and the risk of low Apgar score at 1 min (<7) were 1.6-fold, of resuscitation 2.5-fold, and of neonatal monitoring 2.1-fold higher.
Conclusions: Schizophrenia associates with some specific delivery methods, but delivery complications are rare and their prevalence does not differ from that observed among community women. Maternal schizophrenia associates with some negative perinatal health outcomes of the offspring.

1. Introduction

De-institutionalization has enabled women with schizophrenia to be more sexually active [1] and the general fertility rate among them appears to have increased [2]. Since the 1960s, evidence has accumulated for an association between schizophrenia and various obstetric and postpartum complications [3,4]. The first meta-analysis [5] reported that births to women with schizophrenia incur an increased risk of pregnancy and birth complications, as well as low birthweight and poor neonatal conditions of the offspring.

In a Danish population-based study [6–8], women with schizophrenia were at increased risk of delivery interventions such as surgical delivery, vaginal assisted delivery, amniotomy, and pharmacological stimulation of labor. Their offspring were at increased risk of preterm delivery, being small for gestational age,

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low birth-weight, low Apgar scores, post-neonatal death, and congenital malformations as compared with newborns of unexposed mothers. A Swedish national population-based study [9] reported increased risks of preterm delivery, low birth-weight, being small for gestational age, stillbirth and infant death among newborns of women with schizophrenia. However, risk estimates were markedly reduced by controlling for maternal factors including: smoking during pregnancy, age, education, country of birth, pregnancy-induced hypertensive diseases, and parity. In an Australian population-based study [10], women with schizophrenia showed an increased risk of placental abnormality, abruptio placentae, prolonged labor, precipitate delivery, cephalopelvic disproportion, antepartum hemorrhages and fetal distress. Risks of gestational age <37 weeks, birth-weight <2500 g, 5-min Apgar score <7, time to spontaneous respiration >2 min, intubation, drug side effects, and receiving narcotic antagonists were all elevated among babies of women with schizophrenia. However, after adjustment for maternal age, marital status, Aboriginal descent, parity, plurality, and sex of the offspring, the only complications that remained significant were abruptio placentae and naloxone administration. The incidence of birth defects including congenital malformations and chromosomal anomalies was only marginally elevated, but there was a significant increase in the incidence of defects of the cardiovascular system and minor physical anomalies. In a population-based study from Israel [11], the need for induction of labor, augmentation of delivery, as well as low birth-weight (<2500 g) and congenital malformations of the offspring, were significantly increased among women with schizophrenia. No significant differences were observed in labor complications. According to a recent meta-study [12], neonates to women with schizophrenia are profiled with intrauterine growth retardation, prematurity, low Apgar scores, and congenital defects. Additionally, the postpartum period typically involves psychotic relapse and parenting difficulties. However, after adjusting for maternal age, unhealthy behaviors, length of antipsychotic treatment, maternal-fetal attachment, as well as parity, maternal schizophrenia remains predictive of only prematurity and postpartum psychosis. In a Canadian population-based study [13], infants born to women with schizophrenia were at higher risk of prematurity, as well as of being either small or large for gestational age. These findings remained significant after adjustment with maternal pre-pregnancy medical comorbidity, age, socio-economic status and parity. Further, compared with age- and parity-matched controls, women with schizophrenia required significantly more intensive hospital resources, including operative delivery and admission to the intensive care unit.

Overall, population-based studies of deliveries of women with schizophrenia are still relatively scarce. Moreover, delivery is influenced by cultural and socio-economic conditions, as well as the provision and funding of health care services. Therefore, research findings may be context-specific, and the generalizability of findings between settings, countries, and time periods is thus uncertain. The aim of this Finnish register-based population study was to investigate obstetric and perinatal health outcomes in women with schizophrenia and their newborns. As post-hoc analyses, we explored associations between maternal smoking and unwanted perinatal health outcomes of the offspring, as well as time trends related to these outcomes.

2. Materials and methods

2.1. Participants

The study sample comprised a Finnish national population of women who were born between 1.1.1965–31.12.1980 and diagnosed with schizophrenia or schizoaffective disorder (=broadly-defined schizophrenia; here, schizophrenia) in specialized healthcare at some point during the follow-up time ending 31.12.2013 (n = 5214). For each case, five controls were randomly selected from the Finnish Central Population Register, matched for age and place of birth, and who had not been diagnosed with schizophrenia, schizoaffective disorder or any other psychotic disorder by the end of the follow-up time. Other mental health disorders, such as depression or mood disorders, were allowed. The total final number of controls was 25,999 because for a few cases no control could be found due to the strict matching criteria.

2.2. Diagnoses of schizophrenia and schizoaffective disorder

The diagnoses were obtained from the Care Register for Health Care of the National Institute of Health and Welfare. In Finland, psychiatric classification according to the International Classification of Diseases – Eighth Revision (ICD-8) [14] 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 Version (DSM-III-R) [15], used in clinical practice between 1987 and 1995. However, the diagnoses were converted to ICD-9 [16] 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 [17] has been used in Finland (schizophrenia: F20; schizoaffective psychosis: F25). The onset of schizophrenia was defined as the day when the disorder was diagnosed and coded in specialized health care.

2.3. Follow-up

Women were followed from the onset of the disorder until the individual moved abroad, died, or follow-up ended on 31.12.2013. The information on death or emigration was gathered from the Finnish Central Population Register. The follow-up time of schizophrenic women was 14.0 (standard deviation [SD] 6.9) years, and, respectively, of controls 14.3 (SD 6.9) years (p = .001).

2.4. Information on obstetric and perinatal health outcomes

2.4.1. The Medical Birth Register

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. Individual data collection starts from the beginning of pregnancy and ends after one week from the delivery. Data quality studies indicate that most of the register content corresponds well or satisfactorily with hospital records [18]. In this study, all pregnancies leading to singleton births during the follow-up period were included, whereas multiple pregnancies were excluded. The following variables were collected: maternal age at birth, marital status at the end of pregnancy, smoking in the beginning of pregnancy, sex of the newborn, the number of deliveries, breech presentation (recorded since 1991), induction of labor (since 1991), epidural anesthesia (since 1991), use of forceps/vacuum, asphyxia (since 1991), delivery by cesarean section, delivery by elective cesarean section (since 1991), a perinatal death, gestational birth age (by fetal ultrasound examination at the first maternity care visit), premature birth (<37 weeks' gestation), very premature birth (<28 weeks' gestation), birth-weight, low birth-weight (<2500 g), very low birth-weight (<1500 g), low Apgar score at 1 min (<7), very low Apgar score at 1 min (<4), assisted ventilation (since 1991), resuscitation (since 1991), and neonatal monitoring (since