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# Psychotic disorders in sexually abused youth: A prospective matched-cohort study

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#### A R T I C L E I N F O

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#### ABSTRACT

Child sexual abuse has been identified as a potential risk factor for developing a psychotic disorder. However, little is known about the prevalence of psychotic disorders in youth who were sexually abused during adolescence and young adulthood. Gender differences also remain unclear. This study used administrative databases from a Child Protection Agency and a public health care system. It aimed to investigate the prevalence of psychotic disorders in sexually abused youth between the first substantiated report of sexual abuse and the beginning of adulthood. A second objective was to assess gender differences. Administrative health data for 882 sexually abused youth were compared with 882 matched controls from the general population over a 13-year period using conditional generalized linear mixed models. Stratified analyses by gender (group comparison) and group (gender comparison) were also performed. Sexually abused youth were 10 times more at risk of receiving a diagnosis of psychotic disorder than youth from the general population. There was no gender difference in the prevalence of psychotic disorders among sexually abused youth. These results highlight the importance of targeted prevention of psychotic disorders among sexually abused youth. Future studies should investigate risk factors and developmental trajectories of psychotic disorders in this population.

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#### 1. Introduction

A recent meta-analysis indicated that individuals with psychotic disorders are 2.38 times more likely to have been sexually abused in childhood than the general population (Varese et al., 2012). Up to 40% of individuals with a psychotic disorder report childhood sexual abuse (CSA) (Bebbington et al., 2004; Bendall et al., 2008; Bonoldi et al., 2013; Braehler et al., 2013; Kilcommons and Morrison, 2005; Li et al., 2015), which is more than twice the prevalence (12.7%) observed in the general population (Stoltenborgh et al., 2015). The few studies that considered gender differences in the association between CSA and psychosis indicated that more women (up to 47.7%) than men (up to 28.3%) with a psychotic disorder report CSA (Álvarez et al., 2011; Ramsay et al., 2011; Read et al., 2005). However, these studies had no control groups. Therefore, we do not know if the higher rates of CSA in women with psychotic disorders parallel those found in the general population, as women in general are 2-3 times more likely to have been sexually abused in childhood than men (Afifi et al., 2014; Stoltenborgh et al., 2015). One study suggested CSA had a differential gender effect, with women being 1.88 times more likely to report CSA

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https://doi.org/10.1016/j.schres.2018.03.020 0920-9964/© 2018 Elsevier B.V. All rights reserved. if they had a psychotic disorder compared with those who did not; this elevated risk was not apparent in men (Fisher et al., 2009).

Similar results have been observed in studies that investigated association between CSA and other disorders with psychotic features. In a study involving methamphetamine users from a drug rehabilitation center, participants who reported CSA were three times more likely to have had methamphetamine-related psychosis before entering rehabilitation than those who did not report CSA (Ding et al., 2014). Furthermore, 28% of individuals with bipolar disorder including psychotic features reported sexual or physical violence during their childhood (Neria et al., 2005). A significant relationship between CSA and auditory hallucinations has been reported in this population (Hammersley et al., 2003). Some authors stressed that the CSA-psychosis association can be found in other disorders with psychotic features, such as substance-induced psychosis and affective disorders, although few studies have considered these disorders (Hammersley et al., 2008; Schäfer and Fisher, 2011).

Most previous studies on the CSA-psychotic disorder association used cross-sectional designs, in which CSA was retrospectively reported by youth or adults with psychotic disorders. Although providing important information, these studies assumed that sexual abuse preceded psychotic disorders, but were unable to determine the actual order of events (Bendall et al., 2008). Prospective designs may prevent this bias, but are seldom used. One of the two existing prospective studies revealed that participants with police or child protection services

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reports of CSA were twice as likely to have received medical services for a psychotic disorder than those from the general population (Cutajar et al., 2010b). However, the second study did not find a significant effect between CSA and schizophrenia over a 9-year study period (Spataro et al., 2004). Unfortunately, neither of those studies controlled for potential confounders that were included in previous cross-sectional studies, such as intellectual disability, substance use or abuse, and organic disorders (Bendall et al., 2012; Choi et al., 2015; Hammersley et al., 2003; Hassan et al., 2016; Janssen et al., 2004; Murphy et al., 2014). Moreover, both studies focused on the rates of contact with medical services for a psychotic disorder in the target population. To our knowledge, no prospective study has investigated the prevalence of psychotic disorders in sexually abused youth and young adults.

The present study used a prospective matched-cohort design to investigate the association between CSA and psychotic disorders, including substance-induced psychosis and affective disorders with psychotic features, while controlling for potential confounders for sexual abuse and psychotic disorders. This study aimed to determine if children with substantiated reports of sexual abuse were at higher risk than children from the general population of at least one psychotic disorder diagnosis between the substantiated report of abuse and the beginning of adulthood. Based on previous literature, we expected a higher prevalence of psychotic disorders in sexually abused youth compared with the general population. The association between CSA and prevalence of psychotic disorders was further investigated by gender. We expected that both sexually abused boys and girls would have a greater prevalence of psychotic disorders than boys and girls from the general population. As the literature is unclear regarding gender differences, we had no specific hypothesis regarding how sexually abused boys would differ from sexually abused girls.

#### 2. Methods

This prospective matched-cohort study was part of a larger study in which administrative databases from a Child Protection Agency (CPA) and public health care system in a large Canadian city were linked. The ethics committees of the CPA, the Information Access Committee, the public health insurance agency, and the Université de Montréal granted an ethical certificate of conformity or authorization to obtain confidential information from administrative databases. Procedures have been described in detail elsewhere (Daigneault et al., 2017a; Daigneault et al., 2017b). Requirement for consent was waved as the data were taken from existing databases.

#### 2.1. Participants

The final sample comprised 882 youth with a substantiated report (see Section 2.2.1) of sexual abuse between January 1, 2001 and December 1, 2010 at the participating CPA, and 882 matched youth from the general population. The matched general population group was selected from the public health insurance agency's administrative databank, which covers all the Canadian citizens residing in the province and foreign nationals authorized to stay within the province for more than six months, their accompanying spouses and children. Groups were matched by: a) birth year and month, b) gender, and c) geographical area. Each group comprised 661 girls (75%) and 221 boys (25%). At the time of the substantiated report of sexual abuse (study entry), participants' average age was 11.11 years (standard deviation [SD] = 4.18 years, range 1–21 years). As described elsewhere (Daigneault et al., 2017b), boys were significantly younger than girls at the time of the first substantiated report, by almost 1.5 years. At the end of the study period, participants' average age was 18.95 years (SD = 4.71 years, range 7-29 years).

#### 2.2. Measures

#### 2.2.1. Independent variable

The independent variable had two levels: 1) the sexually abused group and 2) the general population group. Sexual abuse was defined as any gesture of a sexual nature, with or without physical contact, committed without consent or through emotional manipulation or blackmail (Ministère de la santé et des services sociaux, 2001). In Canada, when sexual abuse is reported to the Director of Youth Protection, a CPA worker conducts a summary analysis of the situation, and decides if the report should be retained for evaluation. If the report is retained for evaluation, a social worker evaluates the child's situation and living conditions, and makes a clinical judgment regarding the level of corroboration of the sexual abuse (Ministère de la santé et des services sociaux, 2016). Participants included in the present study were those whose sexual abuse report was substantiated, meaning there was sufficient evidence that sexual abuse had occurred. Children in the general population group were not included in the sexually abused group, and did not have substantiated reports of sexual abuse between 2001 and 2010 at the participating CPA, but resided in the same geographical area.

#### 2.2.2. Dependent variables

All documented diagnoses of psychotic disorders (including affective disorders with psychotic features and substance-related psychosis) made during medical consultations or hospitalizations were obtained from the public health insurance agency (outpatient services) and Ministry of Health (inpatient services) databases between January 1, 1996 and March 31, 2013. Included diagnostic categories from the International Classification of Diseases Tenth Revision (ICD-10) (World Health Organization, 2011) were: 1) schizophrenia, schizotypal, and delusional disorders (F20–F29); 2) mood (affective) disorders (F30–F39) with the psychotic symptoms specifier (0.2, 0.3, or 0.5); and 3) mental and behavioural disorders due to psychoactive substance use (F10–F19) with the psychotic disorder specifier (0.5) (see Table 1 for a complete list of included diagnoses).

#### 2.2.3. Confounding factors

Material and social deprivation at the time of the first substantiated report of sexual abuse were estimated via postal codes, which suggested the socioeconomic level of the geographical area (Pampalon et al., 2009); these factors were controlled for in all analyses. Medical services (consultations/hospitalizations) received for psychotic disorders before the first substantiated report of abuse were also controlled. Furthermore, intellectual disability, substance use or abuse, and organic mental disorders before the first substantiated report of abuse were used as control variables, because of their potential link with sexual abuse or psychotic disorders (Bendall et al., 2012; Choi et al., 2015; Euser et al., 2015; Hammersley et al., 2003; Hassan et al., 2016; Janssen et al., 2004; Murphy et al., 2014). ICD-10 diagnostic categories for controlled variables are presented in Table 1.

#### 2.3. Analyses

Conditional generalized linear mixed models were used to compare the prevalence of psychotic disorders in sexually abused youth with the general population. This procedure considers the dependency between participants (matching). The group effect was tested for the prevalence of psychotic disorders, which is a dichotomous outcome regarding the presence of at least one psychotic disorder diagnosis between the substantiated report of sexual abuse and the end of the study period. This model specified a logistic and binomial density link function. Stratified analyses were performed using the same procedure; we conducted the analysis separately for boys and girls to test the group effect (sexual abuse or general population) on the prevalence of psychotic disorders (gender stratified analysis). Then, we conducted the analysis separately for the sexual abuse and general population groups to test the gender

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