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# Gender-based differences in injecting drug use by young adults who experienced maltreatment in childhood: Findings from an Australian birth cohort study



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## ABSTRACT

*Background:* Childhood maltreatment has been associated with a range of adverse mental and psychosocial outcomes, but its association with subsequent injecting drug use (IDU) is less clear. This study investigates the associations between specific and multiple forms of substantiated childhood maltreatment and IDU reported at 21 years.

*Method:* The Mater-University of Queensland Study of Pregnancy is a prospective birth cohort study. It recruited pregnant women at their first antenatal clinic visit and collected data on their children at 21 years. Data from 3750 participants (1769 males and 1981 females) were analysed using agency substantiated childhood maltreatment from birth to 14 years of age and self-reports of ever IDU at 21 years. We used multivariable logistic regression analyses to control for possible confounders.

*Results:* The sample's mean age was 20.6 years. Some 4.1% (n = 72) of males and 4.6% (n = 91) of females had experienced substantiated childhood maltreatment. The prevalence of IDU was 6.6% (n = 118) and 4.6% (n = 91) for males and females, respectively. In adjusted models, all forms of substantiated childhood maltreatment, with the exception of sexual abuse, were associated with IDU in females (adjusted odds ratios (AORs) = 2.69–3.02) but only emotional abuse (AOR = 2.51) was associated with IDU in males. Multiply occurring forms of childhood maltreatment were also associated with IDU in females (AORs = 2.36–3.41) but not in males.

*Conclusions*: Injecting drug use appears to be an adverse outcome of childhood maltreatment particularly in females. Additional research is needed to better understand why females appear to be more affected than males.

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# 1. Introduction

Childhood maltreatment has an association with a range of adverse mental and psychosocial outcomes over a person's life course. Sexual, physical, emotional abuse and neglect, or multiple types of maltreatment (Nguyen et al., 2010) have been linked to low self-esteem (Nguyen et al., 2010), depression, anxiety (Afifi

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http://dx.doi.org/10.1016/j.drugalcdep.2016.12.027 0376-8716/© 2017 Elsevier B.V. All rights reserved. et al., 2014; Chapman et al., 2004; Edwards et al., 2003; MacMillan et al., 2001; Mills et al., 2013; Nguyen et al., 2010; Spataro et al., 2004; Springer et al., 2007), suicidal ideations and/or attempts (Afifi et al., 2014; Hadland et al., 2015; Marshall et al., 2013). Similarly, childhood maltreatment may lead to delinquent behaviour (Cudmore et al., 2015; Gao et al., 2016) or externalizing problems (Mills et al., 2013; Spataro et al., 2004) often involving problematic substance use (Markowitz et al., 2011; Ompad et al., 2005). Exposure to childhood maltreatment has also been associated with impaired cognitive development (Mills et al., 2011), a range of physical health disorders (Wegman and Stetler, 2009) as well as poor adherence to medications (Markowitz et al., 2011). However, there has been little explicit research on the association between childhood maltreatment and injecting drug use (Edlin and Carden, 2006).

There is some evidence that childhood maltreatment may lead to injecting drug use. This body of evidence, largely from crosssectional studies, suggests that sexual abuse, physical abuse and neglect may be associated with injecting drug use (DeBeck et al., 2013; Kerr et al., 2009; Markowitz et al., 2011; Ompad et al., 2005; Wu et al., 2010). For instance, children exposed to sexual and physical abuse have been found to be earlier and persistent injecting drug users (DeBeck et al., 2013; Ompad et al., 2005). However, these studies tend to rely on the self-reported recall of childhood maltreatment. By contrast, sexual and emotional abuse, and neglect have not been associated with injecting drug use in high risk youth (Kerr et al., 2009). In addition, the vast majority of these crosssectional studies have focused on the effects of either sexual or physical abuse rather than emotional abuse and neglect.

Two longitudinal studies found that sexual abuse predicted the initiation of injecting drug use, with nearly one in ten abused youth injecting drugs at a 2.71 times greater rate than the non-maltreated group (Hadland et al., 2012; Roy et al., 2003). However, these studies did not consider the effects of other possible concurrent types of childhood maltreatment.

The association between childhood maltreatment and injecting drug use may also vary by gender. For example, longitudinal studies have shown that females are more likely to experience sexual abuse (Ompad et al., 2005; Wang et al., 2010), with many females experiencing multiple forms of maltreatment (Messina et al., 2008; Wang et al., 2010), whereas males experience physical abuse (Wang et al., 2010). In cross-sectional studies, there is also evidence of gender differences in the experience of specific (Kang et al., 2002; Lake et al., 2015; Markowitz et al., 2011; Shand et al., 2011) and multiple (Wu et al., 2010) forms of childhood maltreatment in injecting drug users. That means females are at a greater risk of injecting drug use (DeBeck et al., 2013). However, such a gender effect may be modified by other confounders or covariates (DeBeck et al., 2013), with a number of studies reporting no gender differences in the association between childhood maltreatment and injecting drug use (Hadland et al., 2012; Kerr et al., 2009; Ompad et al., 2005). These include younger age (Ompad et al., 2005; Roy et al., 2003), poverty, including homelessness (Roy et al., 2003), parental substance use and accompanying poor mental health (Hammersley et al., 2016; Kerr et al., 2009).

The current evidence is inconclusive and largely based on retrospective data that may be prone to report, selection, helpseeking, and rumination bias (DeBeck et al., 2013; Kerr et al., 2009; Markowitz et al., 2011; Ompad et al., 2005; Wu et al., 2010). Studies have also not examined the association between different types of substantiated childhood maltreatment (i.e., sexual, physical, emotional abuse and neglect (both physical and emotional)) and the extent to which they are associated with the injecting drug use in young adulthood while adjusting for potential confounders. Substantiation of childhood maltreatment refers to the independent confirmation by child protection services that a child has been exposed to maltreatment by a caregiver before the age of 18 (Strathearn et al., 2009).

This study therefore uses a prospective longitudinal study design to determine the association between substantiated childhood maltreatment and injecting drug use. We specifically addressed two questions: (1) to what extent are different and cooccurring forms of substantiated childhood maltreatment (0–14 years) associated with injecting drug use in young adulthood (at 21 years), and (2) are there gender differences in these associations?

### 2. Method

#### 2.1. Study participants

The Mater-University of Queensland Study of Pregnancy (MUSP) is a prospective pre-birth cohort study of a sample of all women presenting at the Mater Misericordiae Hospital for their first obstetric visit in Brisbane, Australia from 1981 to 1983. A total of 8556 mothers were initially approached and 8458 accepted the invitation to participate. Of these women 7223 gave birth to a live, singleton baby at the study hospital (Najman et al., 2015; Najman et al., 2005). The current study consists of offspring with and without records of agency-substantiated cases of childhood maltreatment (ages 0-14 years) who reported on whether they had ever engaged in the injection of illicit drugs by the age of 21 years. The sample was restricted to 1769 and 1981 young males and females, respectively, for whom there were complete data (Supplementary Fig. S1). The protocol was approved by the Human Ethics Review Committee of the University of Queensland and the Mater Hospital. Family members provided consent up to the 14-year follow-up. Participants provided informed consent at the 21-year follow-up.

#### 2.2. Substantiated childhood maltreatment

Notified cases of childhood maltreatment (including physical, sexual, and emotional abuse and neglect) 0–14 years of age were identified from state-wide child protection records. Notifications of childhood maltreatment come from mandatory reports by medical practitioners and referrals from the general public that were screened and investigated by Families, Youth and Community Care Queensland (FYCCQ). Substantiated cases of childhood maltreatment were those that were confirmed by FYCCQ because of "reasonable cause to believe that the child had been, was being, or was likely to be abused or neglected." The definition of sexual abuse included "exposing a child to or involving a child in inappropriate sexual activities." Physical abuse was defined as "any non-accidental physical injury inflicted by a person who had care of the child". Emotional abuse included "any act resulting in a child's suffering any kind of emotional deprivation or trauma". Finally, childhood neglect was defined as a "failure to provide conditions that were essential for the healthy physical and emotional development of a child." Childhood experiences of "neglect" were intended to incorporate both physical and emotional neglect by those who were taking care of a child (Steering Committee for the Review of Commonwealth/State Service Provision (SCRCSSP), 2000). Data were anonymously linked to the MUSP longitudinal database in September 2000. Details are presented elsewhere (Strathearn et al., 2009). Children in the current study cohort often experienced multiple forms of maltreatment (Abajobir et al., 2017). As a result, the present study used hierarchical categories of substantiated childhood maltreatment (i.e., sexual, physical, emotional abuse, and neglect) (Lau et al., 2005). We used a "multi-type" childhood maltreatment model (Arata et al., 2007; Lau et al., 2005) to examine the associations between co-occurring multiple types of childhood maltreatment and the outcome. In this model, we created six distinct categories of the childhood maltreatment to examine their possible association with injecting drug use. This classification of childhood maltreatment is closer to the reality of the experiences of children who have been maltreated in multiple ways and helps assess the cumulative effects and severity of overlapping types of childhood maltreatment. Those children who had substantiated records of childhood maltreatment are grouped as cases and "not any maltreatment" was used as the reference group.

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