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## Child maltreatment and sleep problems among adolescents in Ontario: A cross sectional study

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## ABSTRACT

**Introduction:** Child maltreatment has a negative impact on health and well-being. Healthy sleep patterns are an important indicator of health and are particularly important for adolescent growth and development. Few studies examine the relationship between child maltreatment and sleep problems using a general population, adolescent sample. The objective of the current study was to examine the relationship between five different types of child maltreatment and four sleep outcomes among adolescents.

**Methods:** Data were from a subset of the Ontario Child Health Study 2014, a representative sample of 14 to 17-year-olds in Ontario, Canada (n=2,910). Sexual abuse, physical abuse and exposure to intimate partner violence (EIPV) were measured using the Childhood Experiences of Violence Questionnaire (CEVQ). Emotional maltreatment and physical neglect were measured using items derived from survey questions designed for the National Longitudinal Study of Adolescent to Adult Health. Sleep outcomes included time it takes to fall asleep, waking during the night, and hours of sleep on weekdays and weekends. Models were adjusted for socio-demographic variables.

**Results:** Findings indicate that all types of child maltreatment were associated with increased odds of taking more than 10 min to fall asleep (adjusted odds ratio [AOR]: 1.21–1.58), waking more often during the night (AOR: 1.62–5.73) and fewer hours slept on weekdays (adjusted beta [AB]: –0.39 to –0.15). Child sexual abuse, emotional maltreatment, and EIPV were associated with decreased hours of sleep on weekends (AB: –0.63 to –0.28).

**Conclusion:** Preventing child maltreatment may improve sleep outcomes among adolescents, thereby improving overall health and well-being.

**Abbreviations:** OCHS, Ontario Child Health Study; EIPV, exposure to intimate partner violence; CEVQ, Childhood Experience of Violence Questionnaire; AOR, adjusted odds ratio; ABR, adjusted beta range

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## 1. Introduction

In Canada, 32 % of the adult general population has reported experiencing child maltreatment (Afifi et al., 2014). Research has shown that child maltreatment is associated with negative health outcomes including mental and physical health problems (Afifi, MacMillan et al., 2016; Afifi et al., 2014; Gal, Levav, & Gross, 2011) and suicidal behaviours (Afifi, Taillieu et al., 2016). Child maltreatment is also related to poor sleep outcomes (Chapman et al., 2011, 2013, Chapman et al., 2013; Greenfield, Lee, Friedman, & Springer, 2011; Kajeepeta, Gelaye, Jackson, & Williams, 2015; Lind et al., 2015; Steine et al., 2012), which is an important indicator of overall health. Sleep problems are common among Canadian adolescents, with 28 % of 14–17 year olds sleeping less than the recommended duration of 8–10 h per night (Chaput & Janssen, 2016), and 15.3 % reporting symptoms of insomnia (i.e. having trouble falling asleep most of the time or all of the time) (Chaput, Yau, Rao, & Morin, 2018). Studying the relationship between child maltreatment and adolescent sleep problems is important, not only to determine the independent association between child maltreatment and sleep, but also because poor sleep patterns are often a precursor to further negative health outcomes (Medic, Wille, & Hemels, 2017).

Sleep problems can include a variety of indicators of dysregulation such as heightened susceptibility to nightmares, nocturnal waking, difficulty initiating sleep, difficulty maintaining sleep, and daytime dysfunction due to poor sleep (Abajobir, Kisely, Williams, Strathearn, & Najman, 2017; Gal et al., 2011; Turnbull, Reid, & Morton, 2013; Wamser-Nanney & Chesher, 2018). Adolescence is a critical time for engaging in healthy sleep patterns due to significant neurological and functional processes that are developing at this time (Telzer, Goldenberg, Fuligni, Lieberman, & Gálvan, 2015). Implications of sleep problems in adolescence include increased risk for poor mental and physical health (Fredriksen, Rhodes, Reddy, & Way, 2004; Roberts, Roberts, & Chen, 2002; Roberts, Roberts, & Duong, 2008), poor academic functioning (Fredriksen et al., 2004; Roberts, Roberts, & Duong, 2009; Smaldone, Honig, & Byrne, 2007), interpersonal difficulties (Roberts et al., 2008, 2009), behaviour problems (Stein, Mendelsohn, Obermeyer, Amromin, & Benca, 2001), and poor cognitive development (Ruiz, Quackenboss, & Tulve, 2016). Chronic sleep problems can result in negative outcomes that can continue into adulthood (Medic et al., 2017; Reidy et al., 2016).

Much of the current research has used adult samples to examine the relationship between retrospective reports of child maltreatment and adult sleep problems. These studies provide evidence that child maltreatment is related to sleep problems in later life (Chapman et al., 2011, 2013; Duval, McDuff, & Zadra, 2013; Greenfield et al., 2011; Kajeepeta et al., 2015; Lind et al., 2015; Steine et al., 2012). Less is known about the associations between child maltreatment and sleep problems occurring in adolescence and most of the available data have come from clinical samples. The current literature has produced unclear results, with one study showing an increased prevalence of sleep problems among maltreated adolescents compared to controls (Okada et al., 2018), while two others showed limited or no associations between child maltreatment and sleep problems (Schneiderman, Ji, Susman, & Negriff, 2018; Wamser-Nanney & Chesher, 2018). Okada et al. (2018) studied the prevalence of sleep problems among maltreated children aged 6–12 years in Japan compared to a non-maltreated sample. The authors found a higher prevalence of sleep problems in the maltreated sample, but did not measure if the results were significantly different from the non-maltreated sample (Okada et al., 2018). Another clinical sample of adolescents between the ages of 6–18 years found that domestic violence was the only maltreatment type related to sleep problems (Wamser-Nanney & Chesher, 2018) and a third sample of adolescents found no associations between child maltreatment and sleep disturbances compared to controls (Schneiderman et al., 2018).

In the current literature, no studies have examined the relationship between different types of child maltreatment and sleep problems in adolescence using a representative, adolescent sample. This is a major limitation because clinical samples are not generalizable to the general population and have limited utility for developing policy and prevention strategies on a population level. A clearer picture of the relationship between child maltreatment and sleep in adolescence using representative data can help to build evidence for child maltreatment prevention programs and health promotion priorities. The current study will use a large, representative sample to examine the relationship between child maltreatment and sleep problems in adolescence. It will provide a more in-depth understanding of the relationships between different maltreatment types and sleep problems as well as determine if a dose-response relationship exists (i.e., greater number of maltreatment types related to poorer sleep outcomes). The aims for the current study were to determine if child maltreatment was associated with: 1) increased odds of taking longer to fall asleep; 2) increased odds of waking up in the night; 3) sleeping fewer hours on weekdays and; 4) sleeping fewer hours on weekends in a sample of adolescents aged 14–17 years old in Ontario, Canada.

## 2. Method

### 2.1. Data and sample

Data were from the 2014 Ontario Child Health Study (OCHS 2014), a provincial cross-sectional study with a three-stage stratified cluster sampling design, collected by Statistics Canada. A representative sample of children and youth aged 4–17 years old were selected from Ontario households listed on the 2013 Canadian Child Tax Benefits File ( $N = 10,802$ , response rate 48.9 %) (Boyle, Georgiades, Duncan, Comeau, & Wang, 2019; Statistics Canada, 2017). Up to four children in the same household could be selected to participate with one child being randomly chosen to be the selected child. Only children in the family between the ages of 14 and 17 years old were asked about experiences of child maltreatment; therefore, only these respondents were included in the current study. The current analyses included data from both the selected child and siblings between the ages of 14–17 years old ( $n = 2,910$ ). Complex weighting methods developed by Statistics Canada were employed to ensure that the assumption of independence was accounted for when using data on children from the same family (Statistics Canada, 2017). Further, sampling and bootstrap weights

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