International Journal of Child and Adolescent Resilience
Revue internationale de la résilience des enfants et des adolescents

Childhood maltreatment and risk of harm to self and others: The role of sex and polyvictimization

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Abstract

Objectives: Research has shown that children who experience abuse and neglect are at much higher risk of experiencing negative outcomes such as physical and mental health problems, social skill deficits, and poor quality of life. The goal of this paper was to examine the relationship between polyvictimization and risk of harm to self and others, taking into account both age and sex differences.

Methods: A total of 8980 participants (4156 with maltreatment history) were recruited from over 50 mental health facilities in Ontario, Canada. Group comparisons were completed to examine types of trauma experienced, and risk of harm to self and others.

Results: Among our sample, we found that 29% of children and youth had experienced multiple types of interpersonal trauma. We also found that while female children and youth who had experienced trauma were at greater risk of harm to themselves, males were at greater risk of harming others. Further, our results highlight that children and youth who had experienced multiple types of maltreatment, regardless of age or sex, were at the greatest risk of harm to self and others.

Implications: Findings from this research highlight that interpersonal trauma is multifaceted and add to existing evidence that there is a cumulative relationship between experiencing multiple types of maltreatment and risk in relation to harming oneself or others. Our findings underscore the importance of a background assessment that takes into account all forms of maltreatment in order to properly understand risk of harm and inform intervention.

Keywords: Childhood maltreatment; children's mental health; polyvictimization; risk of harm; interRAI.

Volume 7, Number/Numéro # 1, 2020, pp. 108-122
https://doi.org/10.7202/1072592ar

Introduction

Child maltreatment has been defined as child abuse and includes physical, sexual, and psychological abuse, neglect, and exposure to domestic violence (World Health Organization, 2016). While there is extensive research into the negative effects of various forms of child maltreatment, very few studies report the prevalence rates of specific types of abuse, such as neglect, despite it being the most reported form of child maltreatment by child protective service agencies (Stoltenborgh et al., 2013). Children who have experienced maltreatment are at much higher risk of experiencing mental health problems, substance use (Baiden et al., 2014), social skill deficits, and other life stressors compared to non-maltreated children (El-Sheikh et al., 2008; Raviv et al., 2010; Robinson et al., 2009; Smith et al., 2014; Taussig & Culhane 2010). Further, as part of a systematic review of the literature examining the risk of future maltreatment, Hindley et al. (2006) found that, compared to those children and youth (hereafter referred to as children) who had not previously experienced maltreatment, children who had experienced abuse were six times more likely to experience recurrent maltreatment.

Childhood maltreatment and polyvictimization: Short- and long-term negative consequences

There is a well-established relationship between child maltreatment and psychopathology (e.g., Alvarez-Lister et al., 2014; Ford et al., 2011; Guerra et al., 2019; Heleniak et al., 2015; Mills et al., 2013; Stewart, Baiden, Theall-Honey, 2014), as well as high risk behaviours including nonsuicidal self-injury (NSSI; Baiden et al., 2017b; Klassen et al., 2018; Stewart, Baiden & Theall-Honey, 2014; Stewart, Baiden, Theall-Honey & den Dunnen, 2014), and suicidal behaviour (Ford et al., 2013). Specifically, abused children often engage in NSSI as a means to regulate their affect (Nock & Prinstein, 2005), attempt to control anger or pain associated with past traumatic experiences (Suyemoto, 1998), or use it as a distraction to prevent intrusive thoughts (Brown et al., 2002). Further, NSSI predicts future suicidal thoughts and behaviour (Hamza et al., 2012; Wilkinson et al., 2011).

A direct relationship has also been found between child abuse and harm to others (Al Odhayani et al., 2013; Fagan, 2005; Lansford et al., 2007) including the commission of aggression and violent crimes (e.g., Allen, 2011; Sansone et al., 2012). For example, physical and sexual abuse in childhood has been found to be related to intimate partner violence (Berzenski & Yates, 2010; Wolff & Shi, 2012) as well as abuse to offspring (Taillieu & Brownridge, 2015) suggesting that risk of injury toward others in childhood may be an identifiable precursor of family violence and child abuse (Temcheff et al., 2008). Moreover, childhood emotional and behavioural difficulties are also associated with other detrimental consequences including increased risk for academic underachievement, school dropout, and future underemployment (Fergusson & Woodward, 2002; McLeod & Kaiser, 2004).

Most children who experience one type of maltreatment, experience at least one additional type (Barboza, 2018; Ney et al., 1994; Pears et al., 2008). In line with cumulative risk theory (Appleyard et al., 2005), children who are exposed to multiple types of maltreatment, or polyvictimization, tend to experience more trauma symptoms than children who experience repeated episodes of the same kind of maltreatment (Finkelhor et al., 2007). Further, polyvictimization is associated with more severe abuse, and the interaction between number of maltreatment types and maltreatment severity predict greater levels of trauma symptomatology (Clemmons et al., 2007). Similarly, individuals who experience multiple childhood adversities, especially those who experience high levels of maltreatment, have increased odds of developing psychopathology (McLafferty et al., 2018).

Researchers have investigated the relationship between polyvictimization and mental health among children presenting in different service sectors. For example, parent reports from a community sample of children revealed that polyvictimization was the best predictor, in comparison to individual victimization categories, of depression, anxiety, and anger/aggression (Cyr et al., 2014). Among a sample of outpatient children, Ford and his colleagues (2011) found that clinically severe externalizing behaviour (e.g., conflict with others, violating social norms), as rated by parents, was associated with polyvictimization. Alvarez-Lister and colleagues (2014) found higher rates of internalizing (i.e., anxiety, depression, withdrawal) and externalizing (i.e., aggressive and delinquent behaviour) difficulties among outpatient adolescents who had experienced polyvictimization. Recently, Suarez-Soto and colleagues (2019) found that among a sample of adolescents recruited from inpatient and youth-justice settings, suicidality was twice as likely among those who had experienced polyvictimization.

Longitudinal research has also demonstrated that higher rates of psychopathology later in life are predicted by a greater number of maltreatment allegations during childhood (Lauterbach & Armour, 2016) and that earlier onset of maltreatment is predictive of greater symptoms of anxiety and depression in adulthood (Kaplow & Widom, 2007).

Seminal research utilizing retrospective data found that adults who had experienced trauma during their childhood were at increased risk for a wide variety of negative consequences including substance abuse, depression, suicide attempts, poor relationships, heart, lung, and liver diseases, as well as cancer (Felitti et al., 1998). Further, the likelihood of developing these mental health, social, and physical health difficulties increased for adults who had experienced greater numbers of childhood trauma incidents. Extant literature suggests that polyvictimization is highly associated with anger, suicidal behaviour (Charak et al., 2016), poor quality of life, and multiple health conditions (e.g., Dong, 2004; Dube, 2003; Edwards et al., 2003; Jelley et al., 2020; Mersky et al., 2013) among diverse populations. Moreover, such childhood victimization has also been associated with the increased likelihood of revictimization into adulthood (Pereda & Gallardo-Pujol, 2014).

Sex differences in childhood maltreatment, polyvictimization, and psychopathology

Around the world, rates of both emotional and sexual abuse tend to be higher for girls than boys, while rates of physical abuse are similar for both (Moody et al., 2018). Among various populations, females consistently present with higher rates of internalizing problems (e.g., anxiety, depression), while males tend to experience higher rates of externalizing difficulties (e.g., defiance, hyperactivity; Kramer et al., 2008) including aggression towards others (e.g., Baillargeon et al., 2007; Card et al., 2008). Among outpatient children (Ford et al., 2011), community adolescents (Ford et al., 2010), and youth in conflict with the law (Ford et al., 2013), it has been found that females, compared to males, are significantly more likely to have experienced polyvictimization. Further, while suicidality is higher among both community males and females who have experienced polyvictimization as compared to non-polyvictimized youth, females are at greatest risk for suicidality (e.g., Soler et al., 2013). Taken together, these research findings underscore the importance of taking sex differences into consideration when examining the relationship between childhood maltreatment and risk of harm to self and others.

Present study

Researchers have only recently begun to examine the relationship between *cumulative* maltreatment, behaviour problems (Annerback et al., 2012) and suicidality (Soler et al., 2013; Suarez-Soto et al., 2019). While researchers have explored the risks and outcomes associated with exposure to multiple forms of trauma, much of the research examining polyvictimization relies on retrospective data (e.g., Felitti et al., 1998; Charak et al., 2016). Furthermore, while there has been some research on polyvictimization among children, to our knowledge, none have examined sex differences in relation to polyvictimization and risk of harm to both self and others. Given the negative sequelae associated with childhood maltreatment, coupled with research findings suggesting that those children experiencing maltreatment are often victims of multiple types of maltreatment, understanding the relationship between polyvictimization and risk of harm is of the utmost importance.

The present study utilizes a large sample of high-risk inpatient and outpatient children seeking mental health services. It was hypothesized that those children who had experienced polyvictimization would be at greatest risk of harm to self and others. Additionally, it was expected that females would be at greater risk for harm to self while males would pose a greater risk of injury to others. This research also evaluated whether the association between polyvictimization and risk of harm is moderated by sex. The ultimate aim was to gain a better understanding of the association among polyvictimization and risk of harm (to self and others) to inform future intervention and prevention efforts in clinically-referred children.

Method

Participants

The present study utilized archival data from 8980 children between the ages of 4 and 18 years ($M = 12.02$, $SD = 3.58$) from over 50 mental health care facilities in Ontario, Canada as part of standard of care. More than half of the children were males 58.3% ($n = 5235$).

Procedure

Data was collected from November 2012 to January 2018 by trained assessors (e.g., nurses, social worker, psychologists, child and youth workers) at the time of intake into clinical services. Referrals were made by their parents, family physicians, teachers, or other allied professionals. Administration involved a semi-structured interview involving the child, guardians, family members as well as collateral contacts (e.g., teachers, therapists). Additionally, information

from medical records, report cards, academic assessments, and relevant clinical documents were also reviewed. Data were entered by assessors into a de-identified web-based software system that securely stores the data at interRAI Canada and provides a unique, randomly generated study-specific participant number. All personal identifiers were removed prior to data being available for analysis. Western University ethics approval was granted for the secondary analysis of data collected in various agencies throughout the Province of Ontario (#106415).

Measures

interRAI Child and Youth Mental Health Assessment (ChYMH). The ChYMH (Stewart, Hirdes et al., 2015) is a clinician-rated needs-based assessment comprised of over 400 clinical items covering a wide variety of domains in the area of child and youth mental health (e.g., social, psychiatric, environmental, medical). This instrument takes approximately 45-90 minutes to administer depending on case complexity. Information from this assessment system can be utilized by multiple stakeholders for several purposes including individualized client assessments, outcome measurement, quality indicators and resource allocation. Several scales and algorithms that measure symptom frequency and severity are embedded within the ChYMH to indicate level of risk and support goal-setting for intervention. Additionally, care planning protocols, called Collaborative Action Plans (Stewart, Theall et al., 2015), highlight areas of imminent risk and provide goal-directed intervention planning based on the strengths, needs, and preferences of the child and/or family (Stewart et al., 2017; Stewart, Currie et al., 2015; Stewart & Hamza, 2017; Stewart, Hirdes et al., 2015; Stewart, Poss et al., 2019). Several instruments within the interRAI Child and Youth suite have been developed to provide an integrated health information assessment system with multiple applications (Stewart et al., 2017; Stewart, Hirdes et al., 2015; Stewart, Theall et al., 2015). These applications have also been designed for children, youth, and adults with mental health and developmental disabilities (Billawala et al., 2018; Fries et al., 2019; Lapshina & Stewart, 2019; Stewart et al., 2016; Stewart, LaRose et al., 2015; Stewart, Morris et al., 2019). ChYMH scales and algorithms have demonstrated strong reliability and validity in children across multiple contexts (Hirdes et al., 2020; Lau et al., 2018, 2019; under review; Stewart & Babcock, 2020; Stewart et al., 2020; Stewart & Hamza, 2017; Stewart & Hirdes, 2015; Stewart, Hirdes et al., 2015; Stewart, Morris et al., 2019; Stewart, Poss et al., 2019; Stewart, Thornley et al., 2019).

Items, scales, and algorithms. A variety of clinical elements, scales, and algorithms within the interRAI ChYMH assessed polyvictimization as well as harm to self and others.

Traumatic Life Events and Polyvictimization. Traumatic life events were assessed utilizing six items that address interpersonal traumatic life events experienced by a child. Sexual abuse was determined as any form of exposure of genitals, sexual assault, sexual touching or coercion. Physical abuse referred to any incident resulting in non-accidental injury, physical confinement, or excessive physical discipline experienced by the child. Emotional abuse included pervasive hostility toward the child whereby the self-esteem, identity, emotional wants and needs of the child/youth were invalidated. Witnessing domestic violence pertained to the child having awareness, or knowledge of, or witnessing verbal threats or physical actions toward another family member. Physical neglect referred to the failure to meet the physical needs of the child. Finally, emotional neglect was defined as the failure to provide nurturance, warmth, love, or affection to the child. Item response options were 0 (never), 1 (more than 1 year ago,) 2 (31 days-1 year ago), 3 (8-30 days ago), 4- (4-7 days ago), and 5 (present within the last 3 days). Given the low prevalence of recent traumatic life events, the responses were dichotomized into 0 (never) and 1 (occurred ever). The responses were further summed resulting in an ordinal polyvictimization variable, with values of 0 (no trauma), 1 (one type of trauma), 2 (two types of trauma), and 3 (three or more types of trauma). It should be noted that while polyvictimization could be determined, the specific severity (e.g., penetration) and chronicity (e.g., multiple times daily) of the abuse could not.

Risk of Suicide and Self-harm in Kids (RiSsK). RiSsK is an algorithm which reflects risk of suicide and self-harm among clinically referred children (Stewart et al., 2020). It is based on six individual items (i.e., attempts to kill self, self-harm attempts without intent to kill, considered self-injury, others concerned about self-injury, family overwhelmed and any self-injurious behaviours) as well as the Depression Severity Index (a 9-item scale which measures the frequency and severity of depressive symptoms).

Risk of Injury to Others (RIO). RIO is an algorithm utilized to identify the child's risk of injury to others (Stewart et al., under review). This algorithm is based on a decision tree composed of nine items (i.e. violent ideation, threatened violence, violence to others, verbal abuse, socially inappropriate or disruptive behaviour, destructive behaviour, family overwhelmed, impulsivity and physical abuse).

Analytic strategy

The results were analyzed using IBM SPSS Statistics package, version 25. Preliminary analyses examined sex differences in traumatic life events, polyvictimization, and risk of self-harm and injury to others. Pearson chi-square tests examined sex differences in the prevalence of traumatic life events and polyvictimization. To examine sex differences in risk of self-harm and injury to others, generalized linear models (GLM) with Tweedie distribution with log link and robust standard error estimation were chosen to fit the data and address the violation of normality assumption.

Next, we probed for an interaction between polyvictimization and sex. The GLMs with Tweedie distribution and robust estimation models included two main effects (polyvictimization: none, one, two, or three or more types of trauma; and sex: male, female), a polyvictimization × sex interaction, and age as a covariate. Age was used as a covariate in these models to control for the increased likelihood of children having experienced trauma as they get older. In the models, male and no polyvictimization served as reference categories for sex and polyvictimization respectively. All statistical tests were two-tailed. The significance level was set at alpha .01, which corresponded to 99% confidence intervals in GLM analyses. Bonferroni corrections were utilized to account for multiple comparisons, by dividing the unadjusted *p*-value by the number of comparisons and then comparing with alpha (.01).

Results

Preliminary analyses

In the sample, males ($M = 11.33$, $SE = 3.49$) were younger than females ($M = 12.99$, $SD = 3.47$), $t(8979) = -22.27$, $p < .001$, 99% CI: -1.85, -1.45. For sample characteristics see Table 1.

Table 1. Sample characteristics by sex

	Males		Females	
	n	%	n	%
History of foster family placement				
None	4424	84.5	3190	85.2
One foster family	438	8.4	310	8.3
Multiple foster families	357	6.8	241	6.4
Legal guardianship[2]				
Both parents	2917	55.7	2133	57.0
Mother only	1563	29.9	1045	27.9
Father only	209	4.0	162	4.3
Other relatives or non-relatives	293	5.6	183	4.9
Child protection agency	236	4.5	181	4.8
Youth responsible for self	14	.3	38	1.0
Marital status of parents[3]				
Never married	1130	21.6	749	20.0
Married	2067	39.5	1499	40.0
Partner/significant other	186	3.6	80	2.1
Widowed	104	2.0	73	1.9
Separated	686	13.1	493	13.2
Divorced	734	14.0	657	17.5
Unknown	319	6.1	191	5.1

Note. [1]n = 8960. [2]n = 8974. [3]n = 8968

Prevalence of traumatic events and polyvictimization and sex differences

Prevalence of each type of traumatic life event, as well as prevalence of polyvictimization among our sample, and each individual type of traumatic life event is presented in Table 2. Witnessing domestic violence was the most prevalent trauma experienced among our sample. Polyvictimization was most prevalent among those who had experienced physical and emotional neglect.

Table 2. Prevalence of traumatic life events and polyvictimization

			Prevalence of Polyvictimization	
	n	%	n	%
Sexual abuse	919	10.2	731	79.5
Physical abuse	1660	18.5	1507	90.8
Emotional abuse	2483	27.7	2120	85.4
Witness of domestic violence	2593	28.9	1836	70.8
Emotional neglect[1]	1060	11.8	986	93.0
Physical neglect[2]	764	8.5	752	98.4
Polyvictimization				
No trauma	4824	53.7		
One type of trauma	1547	17.2		
Two types of trauma	1082	12.0		
Three or more types of trauma	1527	17.0		

Note. [1]n = 8605. [2]n = 8747.

Table 3 presents the prevalence of traumatic life events and polyvictimization as a function of sex. More females than males experienced sexual, physical, and emotional abuse. The greatest difference was found in the prevalence of sexual abuse wherein 17.6% of females experienced sexual abuse compared to 4.9% of males. No sex differences were revealed in witnessing domestic violence, nor emotional or physical neglect.

The prevalence of polyvictimization significantly varied by sex. Specifically, more females than males had experienced trauma (50.4% vs. 43.4%). Further, more females had two or three or more types of trauma (14.2% and 19.4% of females vs. 10.5% and 15.3% of males). The prevalence of experiencing one type of trauma did not differ between sexes (males: 17.6%, females: 16.7%).

Table 3. Prevalence of traumatic life events and polyvictimization by sex (n = 8980)

	Males		Females				
	%	(n)	%	(n)	χ^2	*p*	*Phi/Cramer's v*
Sexual abuse	4.9	(259)	17.6	(660)	381.86	< .001	.206
Physical abuse	17.2	(902)	20.2	(758)	13.13	< .001	.038
Emotional abuse	24.5	(1283)	32.0	(1200)	61.96	< .001	.083
Witness of domestic violence	28.5	(1494)	29.3	(1099)	0.692	.405	.009
Emotional neglect[1]	12.4	(623)	12.2	(437)	0.031	.860	.002
Physical neglect[2]	8.7	(446)	8.7	(318)	0.001	.980	.000
Polyvictimization					68.18	< .001	.087
No trauma	**56.6**	**(2966)**	**49.6**	**(1859)**			
One type of trauma	17.6	(921)	16.7	(626)			
Two types of trauma	**10.5**	**(550)**	**14.2**	**(532)**			
Three or more types of trauma	**15.3**	**(799)**	**19.4**	**(728)**			

Note. [1]n = 8605. [2]n = 8747. For polyvictimization, percentages in bold indicate statistically significant sex difference at α = .01.

Sex differences in risk of self-harm and injury to others

To examine sex differences in risk of self-harm as well as risk of injury to others, the outcome variables were regressed onto sex (male, female) using GLM with Tweedie distribution. For RiSsK, the overall model was significant, full model Likelihood Ratio χ^2 (1) = 213.22, $p < .001$. The main effect of sex was significant, wherein females ($M = 1.89$, $SE = .03$) scored higher than males ($M = 1.18$, $SE = .02$) on risk of suicide and self-harm, $B = .468$, $SE = .023$, 99% CI: .409, .527, Wald χ^2 (1) = 419.92, $p < .001$.

For RIO, the overall model with sex as a predictor was significant; full model Likelihood Ratio χ^2 (1) = 290.11, $p < .001$. The main effect of sex was significant, wherein females ($M = 1.28$, $SE = .03$) scored lower than males ($M = 2.21$, $SE = .03$) on risk of injury to others, $B = -.544$, $SE = .025$, 99% CI: -.608, -.481, Wald χ^2 (1) = 485.91, $p < .001$.

Risk of harm to self and others as a function of sex and polyvictimization

To examine the possible moderating effect of sex, analyses probed for an interaction between polyvictimization and sex. The models included two main effects (polyvictimization: none, one type, two types, three or more types; and sex: male, female), a polyvictimization × sex interaction, and age as a covariate. The polyvictimization × sex interaction was not significant in the model with the risk of suicide and self-harm as the outcome variable, Wald χ^2 (3) = 3.71, $p = .295$, as well as in the model with risk of injury to others as the outcome variable, Wald χ^2 (3) = 7.37, $p = .061$.

Risk of Suicide and Self-harm in Kids (RiSsK). The overall model with main effects of sex, trauma, and age was significant with the full model Likelihood Ratio of χ^2 (5) = 1876.32, $p < .001$. There was a significant main effect of sex, wherein females ($M = 1.73$, $SE = .03$) scored higher than males ($M = 1.33$, $SE = .02$) with respect to risk of suicide and self-harm, $B = .261$, $SE = .023$, 99% CI: .201, .322, Wald χ^2 (1) = 124.19 $p < .001$. In addition, age significantly positively predicted risk of suicide and self-harm, $B = .090$, $SE = .004$, 99% CI: .081, .099, Wald χ^2 (1) = 601.69, $p < .001$.

After adjusting for age and sex, the differences in risk of suicide and self-harm varied significantly as a function of polyvictimization. Pairwise comparisons with Bonferroni correction revealed that children with no trauma background scored lower on risk of self-harm than children in all other groups (all p's $< .001$). Further, children who had experienced one type of trauma scored lower on risk of self-harm than children who had experienced two or three or more types of trauma (p's $< .01$). Those children who had experienced two types of trauma did not differ from those who had experienced three or more types of trauma ($p = 1.00$).

Risk of Injury to Others (RIO). The overall model with main effects of sex, polyvictimization, and age was significant; full model Likelihood Ratio χ^2 (5) = 1945.97, $p < .001$. The main effect of sex was significant, wherein females ($M = 1.43$, $SE = .03$) scored lower than males ($M = 2.31$, $SE = .03$) on risk of injury to others, $B = -.480$, $SE = .025$, 99% CI: -.544, -.416, Wald χ^2 (1) = 372.68, $p < .001$. Age negatively predicted risk of injury to others, $B = -.080$, $SE = .003$, 99% CI: -.088, -.072, Wald χ^2 (1) = 668.39, $p < .001$.

Controlling for age and sex, polyvictimization significantly predicted the risk of injury to others. Pairwise comparisons with Bonferroni correction revealed that children with no trauma scored lower on risk of injury to others than children in all other groups (all p's $< .001$). In addition, children who had experienced one type of trauma scored lower than children who had experienced two or more types of trauma (p's $< .001$) in terms of their risk of injury to others. Those who had experienced two types of trauma did not differ from those who had experienced three or more types of trauma ($p = .082$). Table 4 provides information on descriptive statistics for risk of self-harm and injury to others as a function of polyvictimization.

Table 4. Generalized linear models for Risk of Suicide and Self-harm in Kids (RiSsK) and Risk of Injury to Others (RIO) as a function of polyvictimization, adjusting for sex and age

Dependant variable	Polyvictimization					
	No trauma	One trauma	Two traumas	Three or more traumas		
	M (SE)	*M (SE)*	*M (SE)*	*M (SE)*	Wald χ^2	*p*
RiSsk	1.17 (.02)$_a$	1.51 (.04)$_b$	1.70 (.05)$_c$	1.76 (.04)$_c$	249.30	< .001
RIO	1.29 (.02)$_a$	1.75 (.04)$_b$	2.12 (.06)$_c$	2.30 (.05)$_c$	537.85	< .001

Note. M = Mean, SE = Standard Error. RiSsK, range: 0-6. RIO, range: 0-6. Different subscripts indicate significant pairwise differences using Bonferroni adjustment ($p < .01$).

Discussion

Polyvictimization and risk of harm to self and others

This study investigated polyvictimization and risk of harm to self or others as well as potential moderating effects of sex with a large sample of clinically-referred children. After controlling for sex and age, polyvictimization was associated with risk of suicide and self-harm as well as risk of injury to others. More specifically, results from this study indicated that children who had experienced two or more types of maltreatment scored higher with respect to expressions of harm-related indices than those with no maltreatment history as well as those children who had experienced one form of maltreatment. However, no differences were found between those children who had experienced two types of maltreatment and those who had experienced three or more with respect to risk of harm to self or risk of injury to others. These results are consistent with previous literature indicating that maltreated children are at increased risk for non-suicidal self-injury (NSSI; Armiento et al., 2016; Baiden et al., 2017a, 2017b) and research demonstrating that children who experience a greater number of maltreatment types are at heightened risk for suicidality (e.g., Ford et al., 2013; Suarez-Soto et al., 2019).

With respect to risk of injury to others, the findings presented herein are supported by the literature highlighting that children who experience multiple forms of abuse are more likely to exhibit aggressive/antisocial behaviour (e.g., Alvarez-Lister et al., 2014; Cyr et al., 2014; Ford et al., 2011). Moreover, aggression during childhood predicts juvenile delinquency and violent behaviour into adulthood (Farrington, 1994; Herrenkohl et al., 2000; Miller, 2001). Though some studies have used a greater number of maltreatment types to determine high level polyvictims (e.g., eight or more in Suarez-Soto et al., 2019; 13 or more in Alvarez-Lister et al., 2014), our findings indicate that there is a significant difference in risk of harm to self or others once children have experienced two forms of maltreatment. Despite this heightened risk, it is important to note that not all children who experience polyvictimization exhibit these harm-related behaviours. As such, further investigation to identify protective factors that reduce the likelihood of engaging in such behaviours is needed.

With respect to sex differences, as expected, findings from this study indicated that females were at greater risk of suicide and self-harm while males were at greater risk of injury to others. Higher rates of internalizing psychopathology in females and higher rates of externalizing psychopathology in males have been found in the literature (e.g., Eaton et al., 2012; Kramer et al., 2008). In children who have been victimized, these behaviours may be confounded by the type of abuse experienced. Specifically, sexual abuse, a traumatic event that tends to be experienced more by girls than boys, has consistently been identified as a risk factor for NSSI (Ford & Gomez, 2015). Consistent with our hypothesis and in line with previous research, it was found that girls engaged in more self-harm, ideation and suicidal behaviours than boys (Baiden et al., 2017a).

We found no interaction effect of polyvictimization and sex for risk of harm to self or risk of injury to others. Contrary to findings among samples of community adolescents (Itani et al., 2017; Soler et al., 2013), there was no significant interaction between polyvictimization and sex with respect to risk of harm to self. Similarly, while Ford and colleagues (2010) found that being male and having experienced polyvictimization both predicted delinquency (e.g., theft, use of force to obtain money, possessions, or sexual relations, perpetrating physical attacks), there was no significant interaction between polyvictimization and sex with respect to risk of harm to others. These discrepancies could be the result of the different populations (e.g., clinically referred compared to community youth), differences in age ranges of samples, or the specific types of maltreatment experienced, and warrant further investigation. Findings presented herein indicate that despite there being sex differences with respect to risk of harm to self as well as risk of injury to others, those children who experience multiple forms of maltreatment are at increased risk of harm to self and others regardless of their sex.

Our results revealed that older children were at greater risk of suicide and self-harm, whereas younger children were at greater risk of injury to others. These findings are also supported by previous longitudinal data demonstrating that externalizing behaviour decreased over time for both sexes (Leve et al., 2005). Consistent with other research, older children are more likely to engage in self-harm and are at higher risk for suicide than their younger counterparts (Whitlock et al., 2006). This is consistent with the positive relationship between age and risk of suicide and self-harm observed for both males and females in this study.

Taken together, these results highlight the complex and multi-faceted relationship between childhood maltreatment and the risk children pose to themselves and others. Findings presented herein underscore that while

there are sex and age differences with respect to risk of harm to self and others, those children who experience polyvictimization are at greater risk of harm to self and harm to others regardless of their sex or age. These findings add to the body of literature demonstrating the compounding negative effects of experiencing multiple forms of maltreatment.

Prevalence of polyvictimization

Consistent with previous research, our findings indicated that experiencing one type of abuse was associated with increased risk of experiencing multiple types of maltreatment, or polyvictimization. Our findings indicated that the prevalence rate of polyvictimization was 29%. Previous research among clinical outpatient samples of youth has reported lower prevalence rates of polyvictimization (8-12%; Alvarez-Lister et al., 2014; Ford et al., 2013). Conversely, Suarez-Soto and colleagues (2019) reported a much higher incidence rate, 61.7%, of polyvictimization among their sample of inpatient and youth-justice involved adolescents. It is likely that these differences are due to a number of factors including dissimilar populations (i.e., inpatient, outpatient, youth-justice), differences in age ranges of participants, different sample sizes, and variations in conceptualizing polyvictimization (i.e., number of maltreatment types).

Sex differences and childhood maltreatment

With respect to sex differences, our findings indicated that rates of both emotional and sexual abuse tend to be higher for girls than boys which is in line with findings from Moody and colleagues' (2018) research review. While Moody and colleagues (2018) found no sex differences for rates of physical abuse, females in our sample experienced physical abuse more often than males. It should be noted that Moody and colleagues (2018) reviewed literature that relied on self-reported lifetime maltreatment before the age of 18, whereas our data included reports by the child as well as information gathered from other sources (i.e., parent/guardian, file review, case worker, etc.). Research findings indicated that being a victim of sexual or emotional abuse and being female were associated with higher rates of disclosure and help-seeking behaviour (Meinck et al., 2017); however, disclosure was much less likely to occur before an investigation of physical versus sexual abuse cases (Rush et al., 2014). Given that reports of various forms of child maltreatment examined in this paper do not rely solely on self-report, the data utilized in this study is less likely to be affected by a reluctance to report physical abuse. These methodological differences could account for discrepancies in incidence rates of physical abuse among males and females. In line with findings from research using community (Ford et al., 2010) and youth justice-involved adolescents (Ford et al., 2013), our data revealed that females who were referred for mental health services were more likely to experience polyvictimization than their male counterparts. This sex difference is important for clinicians when developing intervention and care plans, but also when identifying future risks when the first maltreatment experience is reported.

Limitations and future directions

The findings of this study are not without limitations. Given that the data used in this study was cross-sectional, no causal statements or longitudinal predictions can be made. Moreover, in the present study, traumatic events were limited to six types experienced by children in the sample. Therefore, associations among other traumatic events and risk of self-harm and injury to others were not considered. As a result, children in the "no trauma" category might have experienced other traumatic life events which were not considered in the study, such as living in a violent neighbourhood, bullying, or death of a family member. Further, the polyvictimization variable was created by collapsing the data across all six types of traumatic events examined in this study. Although this approach results in a loss of information on specific trauma type combinations, it allowed for a more parsimonious and less complicated approach to assist with interpretation. Finally, as the sample used in this study consists of children referred for mental health services who received inpatient or outpatient treatment, the results may not be generalizable to other populations, such as children with developmental disabilities or children with physical health conditions. Future research should continue to work towards understanding the negative impacts of various types of maltreatment and polyvictimization, as well as the potentially differential needs of children in diverse settings (i.e., community, inpatient, outpatient, youth-justice) in an effort to better inform intervention programs.

Research implications

Researchers have highlighted that a thorough assessment of abuse history, including documentation regarding multiple forms of trauma, is necessary when working with youngsters in mental health settings (Adams et al., 2016). This is especially true given that children who present with more complicated victimization histories tend to

experience more severe emotional and behavioural problems. Consequently, a standardized assessment system that provides an integrated health information system across service sectors utilizing high quality data is critically important (Stewart & Hirdes, 2015; Hirdes et al., 2020).

The interRAI assessment system is utilized worldwide to improve outcomes for vulnerable populations. This is the first study to use the RiSsK and RIO algorithms to examine their relationship to polyvictimization. These algorithms rely on a comprehensive assessment of a child's needs and risks as part of the interRAI ChYMH assessment. These decision-support algorithms can be utilized to gain a more in-depth understanding of specific levels of risk of harm and can assist with improved triaging and prioritization (Marshall et al., 2020; Stewart & Babcock, 2020). Moreover, specific care planning protocols or collaborative action plans (Stewart et al., 2015) can be triggered to support evidence-informed interventions based on need (Arbeau et al., 2015; Stewart, Kam et al., 2015).

Given that in Canada suicide is the second leading cause of death among adolescents (Navaneelan, 2012), understanding the risk factors associated with suicide is paramount. Similarly, understanding that experiencing multiple forms of child maltreatment is related to major risk indices that require immediate intervention underscores the importance of assessing mental health issues through a trauma-focused lens to assist with care planning. While children exposed to polyvictimization are at heighten risk for harm-related behaviours, fostering resilience (e.g., trusting, secure attachment relationships, strategies to improve emotion regulation) can reduce the likelihood of continued anguish for these young victims. Given that these children have been exposed to such traumatic situations, early intervention is needed to develop more adaptive approaches to manage stress to enhance their quality of life. Furthermore, prevention programs (e.g., parenting classes; psychoeducation) are essential in order to reduce the suffering of our most vulnerable children. Those children who are exposed to multiple forms of maltreatment are often at imminent risk and require urgent intervention to prevent potential suicide attempts and harm toward others. Further, these results highlight the importance of understanding sex differences and the cumulative nature of polyvictimization on child outcomes.

Funding

This work was supported by the Public Health Agency of Canada under grant #1617-HQ-000050.

Conflict of interest

None of the authors has any financial or personal relationships with other people or organizations that could inappropriately influence their work.

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