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The relationship between child maltreatment and Axis I mental disorders: A summary of the published literature from 2006 to 2010

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ABSTRACT

Research has indicated that child maltreatment is associated with an increased likelihood of mental disorders and suicidal ideation and attempts that continues into adulthood. The purpose of this paper is to provide a synopsis of the recent published research from 2006 to 2010 on the association between child maltreatment and Axis I mental disorders and suicidal ideation and attempts. The databases MEDLINE and PsycINFO were searched for relevant and high quality citations up to October 2010. The results indicated that all types of child maltreatment examined are linked to reduced mental health. A general noted trend in the literature is that earlier age of onset of child maltreatment is associated with poorer mental health outcomes. Sex differences do exist with some disorders being more likely among males (e.g., antisocial behaviour) and other more likely among females (e.g., depression, PTSD, substance use disorders) following child maltreatment.

Keywords: Child Maltreatment; Child Abuse; Physical Abuse; Sexual Abuse; Emotional Abuse; Neglect; Exposure to Intimate Partner Violence; Mental Disorders; Mental Health; Depression; Anxiety Disorders; Conduct Disorder; Eating Disorders; Substance Use Disorders; Suicidal Ideation; Suicide Attempts

1. CHILD MALTREATMENT AND AXIS I MENTAL DISORDERS: A SYNOPSIS OF THE RECENT PUBLISHED LITERATURE FROM 2006 TO 2010

Child maltreatment is a major public health problem that is related with significant impairment and burden of suffering in childhood, adolescence, and adulthood. Child maltreatment includes physical abuse, sexual abuse, emotional abuse, neglect, and exposure to intimate partner violence (IPV). A relationship between child maltreatment and mental disorders has been well established in the literature [1-5]. A number of possible mechanisms may explain the relationship between child maltreatment and mental disorders. First, a direct relationship may exist indicating that child maltreatment may lead to mental disorders in childhood, adolescence, and adulthood. Another possible pathway may be an indirect relationship between child maltreatment and mental disorders; the experience of child maltreatment may alter a child's personality or coping mechanisms, which may in turn have an impact on psychopathology. In addition, genetics may play an important role in the relationship between child maltreatment and mental disorders. Genetic make-up may predispose an individual to mental disorders, which could be unmasked by adverse environmental factors such as child maltreatment. Conversely, a certain genotype may be protective against poor mental health outcomes that may provide some insight into why some children appear to function better than others following child maltreatment.

The objective of the current review is to provide an up-to-date summary of the best scientific evidence published in the last five years (2006-2010) describing the relationship between child maltreatment and depression, anxiety disorders, eating disorders, conduct disorders, substances use disorders, and suicidal ideation and attempts. The current review significantly contributes to the existing literature by including all types of child maltreatment, several Axis I mental disorders, suicidal ideation and attempts, and a focus on the most contemporary literature.

2. METHODS

Although a formal systematic review was not conducted, search strategies were designed to identify original research that evaluated the recent high quality literature on child maltreatment and mental disorders from 2006 to 2010. The databases MEDLINE and PsycINFO were searched for relevant citations up to October, 2010. In-

clusion criteria included: 1) articles published between 2006 and 2010 and 2) articles examining physical abuse, sexual abuse, emotional abuse, neglect, and/or IPV in combination with Axis I mental disorders (depression, anxiety disorders, eating disorders, conduct disorder, and substance use disorders) and/or suicidal ideation and attempts. Mental disorders occurring in childhood, adolescence, and adulthood with a novel contribution to the field were considered for the review. Due to the scope of this task, the review provides only a synopsis of this literature.

3. CHILD MALTREATMENT AND MENTAL DISORDERS

Major Depressive Disorder. Major depressive disorder is characterized in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) as two weeks or more of depressed mood or loss of interest accompanied with other depressive symptoms such as changes in appetite, changes in sleep, decreased energy, difficulty concentrating, among others [6]. Research findings from studies using a variety of samples from several countries have indicated that a history of child maltreatment is associated with an increased likelihood of depressive symptoms, past 12-month depression, or lifetime depression in adolescence and adulthood [1,7-18]. Several different types of child maltreatment have been examined and have all shown to be significantly associated with depression. Regular and frequent occurrence of child maltreatment has been found to significantly increase the likelihood of chronicity of depression (defined as being depressed for 24 months or more in the previous 48 months) [19]. In addition exposure to IPV has been found to be significantly associated with depression in various samples [20,21]. Research findings from the Netherlands indicated that emotional neglect, emotional abuse, physical abuse, and sexual abuse increased the likelihood of current adulthood depression, anxiety disorders, and comorbid anxiety and depression [22,23]; the strongest relationship indicated that regular to frequent emotional neglect increased the likelihood of having depression (without anxiety) by 4.5 times and comorbid depression and anxiety by 9 times [22]. The relationship between comorbidity of depression with other mental disorders based on DSM-III-R criteria was also noted in a United States sample that indicated that comorbidity of major depressive disorder with other mental disorders was more common among adults with substantiated experiences of child abuse and neglect compared to adults without a history of child maltreatment [17].

Further insight into child maltreatment and depression can be noted when studying multiple types of child maltreatment that commonly co-occur. A study of adolescents from an Alabama urban school sample determined a general trend of increasing depressive symptoms corresponding with combinations of two or three types of child maltreatment compared to experiencing no maltreatment or only one type of maltreatment in isolation [24]. These findings highlight the need to investigate multiple forms of co-occurring types of child maltreatment and to be aware of how increased exposure of abuse and neglect can have more prominent impact on mental health.

Investigating demographic variables such as age of onset of child maltreatment and sex is important since they may have significant impacts on the relationship between child maltreatment and depression and implications for intervention. Research findings from a prospective cohort design study from the Midwest United States found that the earlier age of onset of court reported physical abuse, sexual abuse and neglect corresponded with greater increases in depressive symptoms in adulthood [25]. A notable strength of this study is the prospective cohort design; however, severity and chronicity of abuse was not measured, which may confound the relationship between age of child maltreatment onset and depression symptoms. Similarly, findings from a study retrospectively examining age of self-reported sexual abuse in a sample of adults from Sao Paulo, Brazil indicated that likelihood of depression was significantly higher among individuals reporting sexual abuse before the age of 12 compared to those reporting sexual abuse after the age of 13 [26]. Sex differences have also been noted when examining the relationship between child maltreatment and depression in a variety of samples. In a nationally representative sample of adolescents, physical abuse increased the likelihood of depression for males and females; however, statistically higher effects were noted for females compared to males [27]. In a convenience sample of male and female university students, sex differences were noted in the relationship between child maltreatment and depressive symptoms; paternal emotional abuse and exposure to IPV was associated with greater depressive symptoms among females only [28]. Collectively these studies indicate that age and sex may be important factors for understanding the relationship between child maltreatment and severity of depressive symptoms.

Anxiety Disorders. Anxiety disorders are a category of mental disorders indentified in the DSM-IV, which includes panic disorder (and panic attacks), agoraphobia, specific phobia, social phobia, obsessive compulsive disorder (OCD), posttraumatic stress disorder (PTSD), and generalized anxiety disorder (GAD) [6]. Anxiety behaveiours were found to be common among a sample of children from Montreal who disclosed sexual abuse [29]. With regard to psychiatric diagnoses, child maltreatment has been found to be associated with an increased likelihood of having anxiety disorders [10,15,22,23]. More specifically, research findings from various samples and

countries have indicated that a history of child maltreatment is associated with an increased likelihood of panic disorder or panic attacks [13,23,30], agoraphobia [7,23], specific phobia [7,15,30], social phobia [7,15,23,30,31], OCD [13,15,32], PTSD [7,13,15,30,33,34], and GAD [7,13,15,23,30] in adolescence and adulthood.

Many studies have looked at the relationship between specific types of child maltreatment with both individual anxiety disorders and anxiety disorders broadly defined. For example, in an eight year longitudinal cohort study from the Netherlands, emotional neglect, emotional abuse, physical abuse, and sexual abuse were associated with any lifetime DSM-IV anxiety disorder and several individual lifetime anxiety disorders in adulthood independent of depression [23]. Using a representative adult sample from the United States, it was determined that a history of sexual abuse and exposure to IPV among females and physical abuse and exposure to IPV among males was linked to lifetime DSM-IV anxiety disorders [35]. Population attributable fractions were also calculated in these data to determine the proportion of mental disorder that would be reduced in the general population if the child maltreatment (physical abuse, sexual abuse, and exposure to IPV) did not occur. These findings indicated that anxiety disorders would be reduced by approximately 10% among females if sexual abuse did not occur, 13% among females if exposure to IPV did not occur, 7% among males if physical abuse did not occur, and 9% among males if exposure to IPV did not occur [35]. An important limitation of this study is that neglect and emotional maltreatment were not assessed in the survey.

Another study using the same data found that both physical and sexual abuse had a unique relationship with several anxiety disorders independent of the effects of sociodemographic variables and depression, and that results varied according to sex [30]. More specifically, among females, physical abuse was associated with increased odds of PTSD and specific phobia, while sexual abuse was associated with an increased likelihood of social phobia, panic disorder, and PTSD. Among males, physical abuse increased the likelihood of having social phobia, and PTSD and sexual abuse was associated with an increased likelihood of social phobia. These findings indicate that the increased risk of specific anxiety disorders may vary according to the type of maltreatment and the sex of the individual experiencing maltreatment.

In addition to sex, age of onset of child maltreatment is also important in relation to anxiety disorders. Data from a prospective cohort from the United States indicated that younger age of onset (measured dichotomously as before and after age five and developmentally across developmental stages) of child maltreatment including substantiated cases of physical abuse, sexual abuse, and neglect corresponded with greater severity of anxiety symptoms in adulthood [25]. The authors note an important study limitation in that severity and chronicity of abuse were not included in the models and may confound the relationship between age of onset and anxiety symptoms. These findings were similar to age on onset data for child maltreatment and depression severity.

Child maltreatment and social phobia has been examined in a predominately male treatment-seeking sample from the United States; increasing severity of child maltreatment (sexual abuse, physical abuse, physical neglect, emotional neglect, and emotional abuse) was associated with increasing severity of social phobia, reduced quality of life, reduced resilience, and increased disability [31]. The types of child maltreatment with the greatest impact on social phobia symptoms and severity in this study were emotional neglect and emotional abuse.

Less research has been conducted on child maltreatment and OCD. However, studies using clinical and convenience samples from the United States have found support for this association [32,36] with emotional maltreatment demonstrating a small, but robust impact on OCD [36]. When specifically examining child sexual abuse in a representative sample from England, sexual abuse was associated with increased odds of several anxiety disorders including OCD, GAD, panic, and phobias [13].

Conversely, a large body of research has been conducted on child maltreatment and PTSD. PTSD may develop after a traumatic exposure and is described in the DSM-IV as re-experiencing a traumatic event along with avoidance of reminders of the trauma, emotional numbing, and increased arousal [6]. Child maltreatment is a frequently occurring traumatic event that precipitates PTSD. The relationship between various types of child maltreatment and PTSD diagnosis has been noted in a variety of samples. Data from a clinical Canadian sample of 7 to 12 year old girls from Montreal, Quebec indicated that girls who were sexually abused had greater PTSD symptoms compared to girls who were not sexually abused; social support was protective and reduced PTSD symptoms, while a child's use of avoidance coping strategies increased PTSD symptoms [37]. Results from a clinical sample of inpatient adolescents from the United States indicated that sexual abuse, physical abuse, emotional abuse, and physical neglect were all correlated with severity of PTSD symptoms, with emotional abuse demonstrating the strongest relationship [38]. In a treatment seeking sample of children aged 8 to 17 from New York, exposure to IPV, physical abuse, and sexual abuse were associated with an increased likelihood of PTSD after adjusting for age, sex, and ethnicity [39]. Although these findings were highly significant, it should be noted that the assessment of exposure to IPV, physical abuse, and sexual abuse were limited due to the non-specific nature of the questions included in the study.

Child maltreatment remains robustly associated with PTSD after adjusting for several important covariates. In a nationally representative sample from the United States a history of child maltreatment (including physical abuse, sexual abuse, exposure to IPV, and neglect) increased the likelihood of lifetime PTSD in adulthood by 6.4 times after adjusting for sociodemographic variables and parental psychopathology [7]. When the child maltreatment was also coupled with parental divorce the odds of experiencing PTSD increased to 7.8 after adjusting for the same covariates. Experiencing multiple types of child maltreatment was predictive of PTSD in a convenience sample of females from the United States; this relationship was partially mediated through social support, which highlights the potential role of social support to more adaptive adjustment following child maltreatment [40].

Sex, age, and ethnicity have all been investigated in the relationship between child maltreatment and PTSD. Sex differences have been noted in PTSD diagnosis with females compared to males being twice as likely to be diagnosed with PTSD [41]. This relationship was also found in a United States sample when examining sex differences in PTSD among adults who were abused or neglected as children [42]. Specifically, females who were maltreated compared to males had significantly increased odds of having PTSD. With regard to age of maltreatment, unlike depression and anxiety disorders, research has indicated that the risk of PTSD may be greater when age of onset for maltreatment occurs later in childhood. Research findings from Sao Paulo, Brazil, indicated that PTSD risk was 10 times higher in patients reporting sexual abuse after the age of 12 compared to those before the age of 12 [26]. Further research investigating the relationship between age of onset for child maltreatment and PTSD before firm conclusion can be made. This is especially the case since data from this research was limited to 60 outpatients (75% females) from Brazil.

Eating Disorders. Eating disorders are described in the DSM-IV as severe disturbances in eating behaviour and include Anorexia Nervosa (refusal to maintain minimal body weight) and Bulimia Nervosa (episodes of binge eating followed by inappropriate to compensate for binge eating) [6]. Although the relationship between eating disorders and child maltreatment may not be studied as frequently compared to other mental disorders, an association between all subtypes of child maltreatment and severe eating behaviour disturbances has been noted [2, 13,43-45]. However, a significant proportion of this research is limited because it has been conducted mainly among females and among undergraduate students.

In a Canadian study of male and female undergraduate university students from British Columbia, the association between several types of child maltreatment and disordered eating behaviours was examined [46]. The findings from this study indicated that sexual abuse, neglect, and emotional abuse were correlated with increased eating disturbances including drive for thinness, bulimia, and body dissatisfaction; neglect had the most consistent relationship with disordered eating symptoms. Anxiety and self-esteem mediated the relationship between neglect and eating pathology in this study. In a study of women with bulimia, emotional abuse was the only type of child maltreatment associated with increased severity of bulimia symptoms after adjusting for age, education, and other types of child maltreatment (sexual abuse, physical abuse, and physical neglect), while sexual abuse was associated with purging behaviours after adjusting for the same covariates [47]. The possible meditational role of dissociation and depression in the relationship between child maltreatment (emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect) and bulimic symptoms is described in a sample of female undergraduate university students from the United States [48]. Findings from the study determined that only emotional abuse and sexual abuse were correlated with bulimic symptoms and that depressive symptoms fully mediated the relationship between emotional abuse and bulimic symptoms. This mediation relationship suggests that treating depression among individuals with a history of childhood emotional abuse may decrease the likelihood of developing bulimic symptoms. The generalizability of the findings are limited due to the unrepresentative sample of female undergraduate students.

A longitudinal population-based study of females conducted in Australia found that the incidence of bulimia in adolescents was 2.5 times greater among those reporting one exposure to sexual abuse and 4.9 times higher among those reporting two or more exposures to sexual abuse compared to those who had not been sexually abused [49]. These relationships remained significant for individuals experiencing more than two sexual abuse exposures after adjusting for prior anxiety, depression, and severe dieting. The current body of research demonstrates a link between child maltreatment and eating disorders. However, further research with representative samples of both males and females is needed to fill in current gaps of knowledge.

Conduct Disorders. The DSM-IV describes conduct disorders as repetitive and persistent patterns of behaveiour that violates the rights of others or societal rules and laws [6]. A recent review of longitudinal conduct disorder studies indicated that among the most significant predictors for conduct disorder were child physical abuse, punitive or erratic parental discipline, poor parental supervision, and parental conflict [50].

Child maltreatment is consistently linked to conduct disorders in a variety of samples. In a large longitudinal study from New Zealand, both physical abuse and sexual

abuse were associated with conduct/antisocial personality disorder in early adulthood [10]. In a nationally representative study from the United States, child maltreatment, including physical abuse, sexual abuse, neglect, and exposure to IPV, increased the likelihood of conduct disorder by 2.6 times after adjusting for sociodemographic variables [7]. This relationship increased to 4.0 times when the child also experienced parental divorce. In a small sample of high school seniors followed for two years, sexual abuse, physical abuse, and neglect in childhood were associated with increased likelihood of past 12 month antisocial behaviour; sex differences were found with childhood sexual abuse being associated with higher levels of current antisocial behaviour among male adolescents compared to female adolescents [51].

To attempt to understand the relationship between child maltreatment and antisocial development independent of inherited liability,[1] a large epidemiological sample of twins from Missouri and a clinical sample of singleton children were examined [52]. The findings indicated that genetic and environmental factors (*i.e.*, child maltreatment) both have independent influence on antisocial behaviour in children indicating that preventing child maltreatment and creating supportive environments is of utmost importance for those families with an inherited liability for antisocial development. Future well designed prospective, longitudinal studies that include family and genetic level variables are necessary to provide further insight into the relationship between child maltreatment and conduct disorder.

Substance Use Disorders. A substance use disorder is the abuse of or dependence on a substance including drugs, alcohol, or toxins [6]. Many studies have found a relationship between child maltreatment and substance use disorders [7,20,53-57]. Child maltreatment has been linked to early age of onset for alcohol and drugs using a variety of samples. For example, physical and sexual abuse both increased the likelihood of younger (14 years or less) age of onset for drinking (not including small tastes or sips) [58]. In a cocaine dependent sample, emotional abuse among males and emotional abuse, sexual abuse, and overall maltreatment among females were associated with young age of first time alcohol consumption [59]. In addition, exposure to IPV, physical abuse, and sexual abuse before the age of 10 has been linked to preteen alcohol use initiation (drinking alcohol other than a few sips) [60]. A similar pattern has also been noted for drug use. For example, sexual abuse has been associated with significantly earlier age of onset for drug use (any use of cannabis, opiates, sedatives, stimulants, and cocaine) in an adult twin sample from Australia [61].

In addition to earlier age of onset for substance use, child maltreatment has also been linked to alcohol and drug use problems. In a national sample of adolescents from the United States, all types of child maltreatment examined (neglect, physical abuse, and sexual abuse) increased the likelihood of adolescent binge drinking (5 or more drinks in a row at least 2 to 3 times per month) after adjusting for age, sex, race, and parental alcoholism [62]. Similarly, supervision neglect, physical neglect, physical assault, and sexual abuse remained robustly associated with increased odds of regular and binge drinking (5 or more drinks in a row at least once in the past year) among adolescents after adjusting for sex, age, ethnicity, parent's education, family income, immigrant generation, and United States region [12]. In another adolescent school sample, sexual abuse was also linked to 1.7 times increased odds of heavy episodic drinking (5 or more drinks in a row in the past year) [60].

With an increased likelihood of earlier and excessive use of alcohol and drugs, it may not be surprising that child maltreatment has also been related to illicit drug use and substance use disorders. In a representative sample from Ontario, physical abuse and sexual abuse increased the likelihood of past year alcohol abuse or dependence by 1.9 times and 2.4 times, respectively [53]. In a more recent Ontario sample, severe physical abuse and exposure to IPV increased the risk of any lifetime alcohol consumption and lifetime, past year, and frequent (6 or more times in the past year) cannabis use among adolescents [56]. In a national sample of adolescents from the United States, supervision neglect, physical neglect, physical assault, and sexual abuse increased the likelihood of marijuana use (1 or more times in the past 30 days) and any lifetime inhalant use (glue or solvents; with the only exception that physical neglect was not significantly related to inhalant use) [12]. In a Canadian study of street involved youth from Vancouver, physical abuse was the only type of child maltreatment that was associated with a 1.9 times increased likelihood of injection drug use after age, parental drug use, and sexual abuse were adjusted [63]. In a population based sample from New Zealand, child sexual abuse was associated with substance dependence in young adulthood after adjusting for several social, family, and individual factors [10]. Finally, in a national longitudinal sample of adolescents from the United States, child physical abuse, but not sexual abuse, was associated with past year alcohol abuse, marijuana abuse, and other drug abuse in young adulthood [64]. Collectively these studies demonstrate a relationship between child maltreatment and substance use disorders. However, further research is necessary to uncover the specific relationships between specific types of child mal-

[1]In this study, inherited liability is a lifetime construct that was measured using two family history methods including presence or absence of clinical level externalizing behaviour problems in the co-twin using the Child Behaviour Checklist and in the singleton sample determining the closest adult relative with antisocial personality disorder, alcohol dependence, or drug dependence.

treatment and individual substances and how these relationships may vary according to sex. More detailed examinations of these relationships are necessary.

Some studies have investigated the relationship between child maltreatment and substance use specifically among females. Results from a longitudinal study of adult females from the United States indicated that child physical abuse, sexual abuse, and/or neglect was associated with substance use problems (negative consequences related to drinking and drug use) and any past year use of illicit drugs (marijuana, psychedelics, cocaine, and heroin) in middle adulthood [65]. These relationships were partially mediated by PTSD symptoms, stressful life events, and delinquent and criminal behaviour, which provides insight into the possible underlying mechanisms in the relationship between child maltreatment and substance use. In another sample of females aged 18 to 59, several significant relationships were noted between child maltreatment and numerous substances [66]. More specifically sexual abuse was associated with adult use of nicotine, marijuana, antidepressants, and antipsychotic drugs. Physical abuse increased the likelihood of adult use of nicotine, marijuana, cocaine, antidepressants, and anxiolytic drugs. Emotional abuse was linked to adult use of nicotine, marijuana, cocaine, antidepressants, anxiolytic, and sleeping pills.

Sex differences have been noted in studies that examined the relationship between child maltreatment and substance use stratified according to sex. For example, in a clinical treatment-seeking sample for cocaine dependence, greater severity of childhood emotional abuse increased the likelihood of cocaine relapse for females, but not for males [67]. In another study from the United States, physical abuse, sexual abuse, and neglect had a long term impact on alcohol use for females with child maltreatment leading to alcohol abuse or dependence in early adulthood, which was predictive of excessive drinking in later adulthood [68]. The same relationship was not found for males. Exposure to IPV during adolescence has also demonstrated increased odds of alcohol use problems in early adulthood by 5.6 times for females only; a significant relationship was not found for males [69]. Collectively, research in this area indicates that the relationship between child maltreatment and substance use may be especially strong for females [70]. One possible explanation could be that females may be more likely to use substances as a way of coping with being maltreated as a child. Emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, and exposure to IPV have been found to increase the odds of using drinking as a coping mechanism [58]. Further investigation of the relationship between specific types of child maltreatment and individual substance abuse/dependence and the use of substances as a coping mechanism is necessary using representative samples of males and females.

Suicidal Ideation and Attempts. Suicidal ideation is the thought of killing oneself, while a suicide attempt is the act of trying to kill oneself. Many studies using a variety of samples have found a positive link between child maltreatment and suicidal ideation and attempts [2,7,10,71-74]. One of the most comprehensive investigations of child maltreatment and suicide attempts was recently published using data from the World Mental Health surveys conducted in 21 countries with a total sample size of n = 109, 377 [75]. These data indicated that physical and sexual abuse had the strongest impact on suicide attempts compared to other childhood adversities within the familial context such as neglect, exposure to IPV, parental death, parental divorce, physical illness, and financial hardship. Importantly, physical and sexual abuse were associated with suicide attempts across the lifespan, but notably the odds were higher for earlier onset of suicide attempts occurring in childhood (ages 4 to 12) and adolescence (13 to 19).

Representative Canadian data from military personnel indicated that child physical abuse was significantly associated with suicide attempts among males (4.4 times increased odds) and females (2.3 times increased odds) after adjusting for sociodemographic variables, military rank, and type of military service [76]. Child physical abuse and sexual abuse also increased the likelihood of suicide attempts in outpatients with bipolar disorder in a sample from Toronto [77].

In an analysis of nationally representative United States data, it was found that although all types of physical and sexual abuse were linked to suicide attempts, the impact of child maltreatment varied according to child maltreatment type and severity [78]. More specifically, both rape before the age of 15 and physical abuse increased the odds of suicide attempts by approximately 5 to 6 times, while molestation before the age of 15 increased the odds of suicide attempts by approximately 3 times. A significant relationship was not noted between verbal abuse and suicide attempts in this study. However, in a clinical sample of adult inpatients from Italy, compared to nonmaltreated patients, individuals who were verbally abused by a family member, physically abused leaving bruises or marks, and punished with belt or other hard object had increase odds of suicide attempts by 6, 9, and 20 times, respectively [79]. Further research is necessary to clarify the relationship between verbal abuse and suicide attempts.

The number of types of maltreatment and particular combination of maltreatment was also found to increase the odds of suicidal ideation and attempts in a representtative United States sample of female adolescents [80]. This study found an upward trend with more types of maltreatment corresponding with increasing odds of sui-

cidal ideation and attempts, and sexual abuse in combination with other types of maltreatment demonstrating higher odds of suicidality compared to single types of maltreatment and combinations of maltreatment not involving sexual abuse. It is important to replicate this study using a representative sample of males to see if similar trends are noted for males.

Sex differences have been noted in research from a large school sample from Minnesota [81]. An increase in suicidal ideation and attempts were found for individuals with a history of physical abuse, sexual abuse, and exposure to IPV. However, the risk of suicidal ideation and attempts were greater for abused boys (odds ratios ranging from 5 to 15) compared to girls (odds ratios ranging from 4 to 5). Similarly, sex differences have also been noted with regard to mediators of child sexual abuse in an adult clinical sample of suicide attempters from the United States [82]. Among females with a recent suicide attempt, those with a history of child sexual abuse compared to those without had higher levels of suicidal ideation. Among men with a recent suicide attempt, those with a history of child sexual abuse compared to those without had greater hopelessness, suicidal ideation, were more likely to have attempted suicide multiple times, and meet criteria for PTSD. The authors concluded that even though females were more likely to have a history of child sexual abuse compared to males, males who were sexually abused as boys may experience poorer outcomes. In a sample of Australian males with child sexual abuse histories, it was found that self-blame for abuse, feeling isolated and alone, and physical injury from child sexual abuse were important factors for understanding risk for suicidal ideation [83].

Research examining potential moderators in the relationship between child maltreatment and suicide attempts to provide insight into why some children who are maltreated attempt suicide while others do not. Results from a French-Canadian school based cohort indicated an interaction effect between sexual abuse frequency and abuser identity; the relationship between sexual abuse frequency and suicide attempts depended on who abused the child, with sexual abuse by an immediate family member posing the greatest risk [84]. In another study using the same data it was found that child sexual abuse was one of the strongest correlates that distinguished between suicide ideators and those who also attempt suicide [85]. Finally, utilizing a school sample from Minnesota, researchers examined if protective factors could reduce the risk of suicidal ideation and attempts among adolescents who were sexually abused. The results indicated that family connectedness served as the strongest protective factor for reducing the association between sexual abuse and suicidal behaviour [86]. More studies examining protective factors are necessary because they have important implications with regard to intervention strategies.

4. CONCLUSIONS

Children who are maltreated are at an increased risk of developing depression, anxiety disorders, eating disorders, conduct disorders, substance use disorders, and suicidal ideation and attempts that continues throughout the lifespan. Many studies have included age and sex as important factors for understanding the increased probability of specific mental disorders following child maltreatment. With regard to age, the general trend noted in the literature is that earlier age of onset of child maltreatment is associated with poorer mental health outcomes. The relationship between child maltreatment and mental health had been amply documented among males and females; however, sex differences do exist with some disorders being more likely among males (e.g., antisocial behaviour) and other more likely among females (e.g., depression, PTSD, and substance use disorders) following specific types of child maltreatment. In addition to sex differences, it is necessary for future studies to further investigate the role of sex in the relationship between child maltreatment and Axis I disorders.

Several important limitations of this literature can be noted upon a critical appraisal of the most recent research examining the link between child maltreatment and Axis I mental disorders. First, the challenges of defining and measuring child maltreatment are great and have been documented in the literature [87-89]. This is related to both the lack of standardized definitions for child maltreatment and the sensitive nature of the topic that makes assessment difficult. These challenges lead to inconsistent definitions and measurement of child maltreatment across studies, which limit capacity to make comparisons across studies. These inconsistencies are present in the current literature. Assessment of child maltreatment ranged from the use of multiple items from validated tools to one non-specific question asking, for example, if a respondent had ever been physically abused as a child. Advancements in defining and measuring child maltreatment in research and consistent application in research studies are a priority.

Second, many different types of child maltreatment exist and have been included when investigating child maltreatment and Axis I disorders. However, often due to lack of statistical power, it is necessary to combine several types of child maltreatment into one group. The experiences of different types of abuse are not the same making it important to study specific types of child maltreatment individually whenever possible. In addition, physical abuse and sexual abuse are commonly included in investigations of child maltreatment and mental health. It is important to encourage the investigation of other subtypes

of child maltreatment that are less frequently studied including physical neglect, emotional neglect, and exposure to IPV.

Third, the experience of child maltreatment may not be the same for males and females. Research has indicated that sex differences exist in the relationship between child maltreatment and mental health outcomes. It is important to study males and females separately whenever possible.

Finally, a variety of samples and study designs have been applied to study child maltreatment and Axis I mental disorders. Clinical and convenience samples are important for advancing knowledge, but are limited in the ability to generalize findings beyond the populations from which the sample was drawn. Investment in future data collection from representative general population samples that employs a prospective and longitudinal study design for studying child maltreatment and mental health outcomes would be ideal.

The more explicit research in terms of the studying the specific type of child maltreatment, individual Axis I mental disorders, stratifying the sample according to sex, and examining these relationships in representative population-based samples will generate the most detailed findings and will have greatest implications for policy, intervention, and treatment. Addressing these limitations in future research is necessary for advancing the field and improving our ability to reduce the likelihood of poor mental health outcomes associated with child maltreatment and to facilitate healthy development and well-being among these individuals.

Limitations of the current review should also be noted. Due to the large number of publications in this field, it is only possible to provide a synopsis of the most relevant and high quality studies published over the last five years (2006 to 2010). As a means of reducing the scope of this task, only Axis I mental disorders were included in the review. However, it should be noted that Axis II personality disorders are also related to child maltreatment [90].

In summary, child maltreatment is associated with an increased likelihood of poor mental health outcomes that continues into adulthood. Many high quality studies have demonstrated this relationship. Future research that can address some of these limitations in the current literature is necessary to advance knowledge in the field, inform intervention strategies, and improve health and well-being of children who experience maltreatment.

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