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RESEARCH ARTICLE

Mental health in Norwegian children and adolescents exposed to childhood maltreatment: a comparison to a general population sample

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Abstract

The current study aimed to compare mental health outcomes of children and adolescents with maltreatment experiences to a general population sample. A secondary aim was to examine sex differences in mental health outcomes, and the association between polyvictimization and mental health. The two samples were age- and sex-matched, and data was collected from caregiver-reports and self-reports. 1378 participants aged 5 to 18 years were included in the study. Children and adolescents exposed to maltreatment had more mental health problems than the general population sample. Large effect sizes ($d \geq 0.8$) were found for emotional problems ($d = 1.19$), hyperactivity problems ($d = 0.88$), peer problems ($d = 0.86$), and the impact score ($d = 0.93$). A moderate to large effect size was found on the conduct problems subscale ($d = 0.68$), and a small effect size was found on the prosocial subscale ($d = -0.22$). There was a dose-response relationship between cumulative maltreatment exposure and the severity of mental health problems. Childhood maltreatment was associated with considerably more emotional problems, hyperactivity problems, and peer problems, which in turn can impact the daily life of the exposed children and adolescents. Effective support measures for maltreated young people must be a priority.

Keywords: Mental health, childhood maltreatment, polyvictimization, strengths and difficulties questionnaire

Introduction

Childhood maltreatment (CM) is a global issue with immediate and long-term associations with health (Edwards et al., 2003; Gilbert et al., 2009; Negriff, 2020; Stoltenborgh et al.,

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2015). CM includes all types of physical and/or emotional ill-treatment, sexual abuse, and neglect that occur in the context of a relationship of responsibility, trust, or power (The World Health Organization, 2020; Schønning et al., 2021). Prevalence rates vary depending on measurement criteria, but according to a global status report by the World Health Organization from 2014, 36% of children under the age of 18 have been psychologically abused, 23% have been physically abused, 13% have been sexually abused (18% of girls and 8% of boys) and 16% of children have been neglected (World Health Organization, 2014). Self-reported data from a representative sample of Norwegian adolescents aged 12–16 show some differences compared to global estimates, in particular what concerns psychological abuse (18 vs. 36% globally) and sexual abuse (6 vs. 8–18% globally) (Hafstad et al., 2020). The figures for physical abuse and neglect were more comparable with a Norwegian prevalence of 18 and 14%, respectively (Hafstad et al., 2020). The Norwegian estimates of CM are similar to the prevalence of CM found in Sweden (Jernbro & Janson, 2017).

The research on the long-term associations between CM and adult mental health is well-established, with high-quality systematic reviews and meta-analyses (Carr et al., 2020a, 2020b, 2020c). However, far fewer studies have focused on CM and mental health in childhood and adolescence. Studying mental health outcomes during childhood and adolescence is crucial because this developmental period is marked by significant psychological and neurobiological changes, characterized by, among other things, a heightened brain plasticity (Fuhrmann et al., 2015; Selemon, 2013). Adolescence, in particular, is a key stage for identity formation and represents an important window for change. During this time, adolescents may be more responsive to interventions aimed at mitigating the immediate impacts of CM than in adulthood (Fandakova & Hartley, 2020). Additionally, children and adolescents may have fewer and less adaptive coping strategies available compared to adults, and the use of maladaptive coping strategies such as self-harm can worsen mental health issues and lead to distinct long-term trajectories (Eschenbeck et al., 2018; Steinhoff et al., 2021). Increased knowledge of CM and its association with child and adolescent mental health is essential for health services and clinicians to be able to intervene early in the developmental phase of exposed children and adolescents and thus maximize the prospects of recovery (Cicchetti & Toth, 2016).

CM is associated with mental health problems in childhood and adolescence (Danielson et al., 2005; Fang et al., 2015; Humphreys et al., 2020; Lansford et al., 2002; Peltonen et al., 2010). The general findings from most of these studies are that CM is associated with higher levels of mental health problems. Still, the strength of the associations differs across domains of mental health. A meta-analysis of CM and depression in children and adolescents found a moderate effect size ($Z = 0.45$), of exposure to CM on depressive symptoms (Humphreys et al., 2020). A recent study by Negriff and colleagues that compared adolescents exposed to adverse childhood experiences to non-exposed found a small to moderate effect size for anxiety symptoms and a moderate effect size for depressive symptoms (Negriff, 2020). The formerly mentioned study by Negriff et al. found no significant differences in externalizing behavior between adolescents with adverse childhood experiences and their non-exposed peers (Negriff, 2020). However, a large Australian cohort study found significantly higher rates of externalizing behavior in adolescents exposed to CM than their non-exposed peers (Mills et al., 2013). These studies point to the increased risk of

internalizing problems such as symptoms of anxiety and depression associated with experiencing CM, but also that the strength of the association is inconclusive (Humphreys et al., 2020; Negriff, 2020). Currently, there seem to be some conflicting findings regarding the association between CM and externalizing behavior that need to be elaborated upon (Mills et al., 2013; Negriff, 2020). The importance of replicating and expanding on these findings, particularly in populations with externally validated CM experiences, has been highlighted as a research gap for future studies (Cecil et al., 2017).

Sex differences in the association between CM and mental health problems are an important and debated topic within the field. A systematic review from 2008 found that nearly half of the included studies reported no sex differences (Gershon et al., 2008). However, conflicting findings have been reported, and there seems to be a tendency that among youth, CM is associated with more mental health problems among males in adolescence (Garnefski & Diekstra, 1997; Gershon et al., 2008). Other studies have found no significant sex by CM interactions on mental health problems, including several meta-analyses (Lewis et al., 2016; Maikovich-Fong & Jaffee, 2010; White & Kaffman, 2019). Thus, the issues of sex-specific associations between experiencing CM and mental health remains elusive, and there is a clear need to explore further the specific outcomes of CM in males and females (White & Kaffman, 2019).

Children and adolescents exposed to maltreatment are often subjected to several types of abuse, a concept called polyvictimization (Finkelhor et al., 2009). Polyvictimization is a concept and measure used to capture the cumulative burden of violence and identify children and adolescents who suffer from especially high levels of maltreatment and abuse (Finkelhor et al., 2009; Hamby et al., 2018). There is some debate regarding the usefulness of the polyvictimization approach, with some researchers arguing that there is a strong association between any number of abuse experiences and mental health problems, supporting a cut-off of single maltreatment victimization (Negriff, 2020). Others have found an incremental increase in mental health problems related to a number of maltreatment victimizations (Finkelhor et al., 2009), which support a cumulative risk understanding of CM (Evans et al., 2013), and argue that a polyvictimization approach to assessment is needed for an accurate appraisal of the impact of CM on mental health (Turner et al., 2010).

There is a spectrum of environmental risk factors associated with CM. These encompass family dysfunction, such as parental substance abuse, mental illness, or a parental history of CM (Stith et al., 2009). Additionally, low socio-economic status and neighborhood characteristics have been identified as contributing risk factors for CM (Thornberry et al., 2014). Recent research has also explored the potential genetic predisposition to experiencing CM. Conditions and vulnerabilities with a higher genetic component, such as physical illnesses or mental health disorders like ADHD, may adversely affect parent-child interactions and increase the risk of CM (Austin et al., 2020; Sidebotham et al., 2001). These pathways underscore the complexity of the association between CM and subsequent mental health problems. Children may possess genetic predispositions toward both poorer mental health outcomes and exposure to CM, highlighting the intricate interplay between genetic and environmental influences (Pezzoli et al., 2020).

The main aim of the current study was to compare the mental health of Norwegian children and adolescents with maltreatment experiences to an age- and sex-matched general population sample across domains of mental health. A second aim was to examine sex

differences in mental health outcomes of CM in Norwegian children and adolescents. A third aim was to examine the distribution of maltreatment types experienced in the Triple-S cohort and explore how polyvictimization is associated with mental health problems.

Methods

Procedure and sample

The sample with maltreatment experiences in the current study comes from the Norwegian Triple-S Cohort study (Triple-S), which has been described in detail elsewhere (Schønning et al., 2021). The participants in the Triple-S study were recruited from the Stine Sofie Centre (SSC), and all children and adolescents who attended the SSC for a weeklong stay during the recruitment period were invited to participate. To be included in the current study, participants had to be between 5 and 18 years old, have been exposed to one or more types of CM, and have this substantiated by health personnel, child protective services, crisis centers or other official sources, and be able to complete the questionnaire in Norwegian. Data on children aged 5–11 years was caregiver-reported, and data on adolescents aged 12–18 was self-reported.

The data collection was conducted during their weeklong stay at the SSC using electronic questionnaires on a secure web-based platform between January 2021 and February 2022. To further increase the sample size, former participants at the SSC from 2016 until 2021 were also invited to participate in the study. Former participants were recruited via the SSC's website and social media platforms and directly by e-mails and telephone calls. Those who agreed to participate were sent a unique link to the web-based questionnaire and completed the survey at a time they chose. The recruitment phase yielded 312 participants in the Triple-S sample.

The general population sample

The general population sample consisted of children and adolescents participating in the Bergen Child Study (BCS)/youth@hordaland Study (y@h). The BCS is a longitudinal cohort study of children who attended grades 2 to 4 in all public, private, or special schools in the municipality of Bergen, Norway. The study started in 2002 and consisted of four waves of data collection, covering age groups 7–9, 11–13, 14–16, and 17–19. The study changed its name to y@h for the fourth and last data collection wave. The fourth wave included all adolescents in the former county of Hordaland, in which the city of Bergen is the most populated metropolitan area. The data collected in wave 1 (7–9 years) was caregiver-reported, and the data from waves 2–4 (11–13, 14–16, and 17–19) was self-reported and caregiver-reported. The first wave was conducted in 2002/2003 and had a target population of 9439 children aged 7–9 years, and included 7007 (74.3% participation rate) participants (Sivertsen et al., 2017). The second wave was conducted in 2006 and included 5683 participants aged 11–13 years (70.8% participation rate) (Sivertsen et al., 2017). The third wave included 1085 participants (18.3% participation rate) in 2009. The fourth wave included 10,257 participants of 19,439 eligible adolescents (53% participation rate) and was conducted in 2012 (Sandtorv et al., 2018). For more details on the general population sample, please see the following papers (Bøe et al., 2016; Heiervang et al., 2007).

For each of the 312 participating children from the Triple-S sample, 4 children were randomly selected from the BCS/y@h sample as a comparison group. The children from the BCS/y@h sample were matched on age, sex, and type of report (self-reported vs. caregiver-reported). A ratio of 4/1 between comparators and study sample has been deemed sufficient, and expanding the number of comparators beyond this provides little power improvements (Grimes & Schulz, 2005). In order to achieve a study sample size with an approximately 1:4 ratio between cases and comparators, the eligible age range of matches was set to ± 1.5 years. The current study sample from BCS included 1068 participants.

Measures

Information about age and sex was retrieved from the participants' Norwegian 11-digit personal identity number. The first 6 numbers are the date of birth, and the 9th digit identifies sex at birth based on whether it is an odd or an even number.

Maltreatment measures

All participants from the Triple-S sample had experienced some type of CM, and CM assessments were only conducted in the Triple-S sample. Five categories of CM were assessed: neglect, psychological abuse, physical abuse, sexual abuse and witnessing intimate partner violence (IPV). The questionnaire used to assess CM history was previously used in the UEVO study, a large survey of CM experiences in Norwegian adolescents (Hafstad et al., 2020). It was developed based on validated scales such as the Juvenile Victimization Questionnaire (Finkelhor et al., 2005) and the Conflict Tactics Scale (Straus, 1995), and previous studies on CM in Norway (Mossige & Stefansen, 2007) and Sweden (Jernbro & Janson, 2017), and was specifically adapted to the target group of the UEVO study In the current study, CM was assessed using a multi-informant approach, with data being self-reported by adolescents, reported by caregivers for children, and corroborated by health personnel, child protective services or other official sources. A multi-informant approach has been recommended as the "gold standard" within the CM field (Hardt & Rutter, 2004), and was recently recommended in a systematic review (Langevin et al., 2022). The polyvictimization variable was generated by aggregating the count of different types of CM experienced by each participant.

Physical abuse was assessed with questions formerly used by Jernbro & Janson (Jernbro & Janson, 2017), based on the Conflict Tactics Scale (Straus, 1995) and questions from the ACE-study (Anda et al., 2010). For adolescents aged 12—18 years, the questions covered various degrees of physical violence perpetrated by a caregiver at home. Physical abuse was dichotomized into categories of *moderate* and *severe.* Moderate physical abuse included having been struck with an open hand, pushed violently, or pinched. Severe physical abuse included being kicked, punched or beaten up. For participants aged 5—11 years, physical abuse was assessed by two questions of physical violence. Participants were considered as cases if they confirmed experiencing at least one incident of physical abuse.

Sexual abuse was assessed by six questions about different forms of sexual abuse from peers and six identical questions regarding adult perpetrators for adolescents aged 12–18 years. Sexual abuse was dichotomized into contact abuse, assessed by three questions,

and non-contact abuse, assessed by three questions. Response categories were presented on a four-point Likert scale and ranged from "never" to "many times". For participants aged 5–11 years, sexual abuse was dichotomized into rape, and sexual assaults other than rape, perpetrated by either an adult or someone under 18 years of age. If at least one sexual abuse experience was confirmed, participants were scored as a case.

Psychological abuse was assessed by 8 questions from a module in the Juvenile Victimization Questionnaire (Finkelhor et al., 2005) for both children and adolescents. The questions covered experiences from caregivers that could be abusive, such as being mocked, harshly yelled at, threatened with violence, told they were not wanted, or locked in confined spaces. Response categories were presented on a four-point Likert scale (1–4) from "never" to "very often". If the respondent reported "sometimes" ($\geq$2) or more on any of these experiences, they were scored as a case.

Neglect was assessed by 6 questions from a module in the Juvenile Victimization Questionnaire (Finkelhor et al., 2005) for children and adolescents. These items covered experiences such as being inadequately fed, not having access to clean clothes, feeling unloved, or having caregivers incapacitated by the use of intoxicants. Response categories ranged from "never" to "very often/always" on a five-point scale. If the respondent reported "sometimes" ($\geq$2) or more on any of the 6 questions, the participant was scored as having experienced neglect.

IPV was assessed by six questions about psychological- and physical abuse towards their mother or father, respectively, for children and adolescents. Witness to psychological abuse was assessed by two questions about seeing their parent ridiculed or scolded. Witness to physical abuse was assessed by four questions ranging from seeing their parent being shaken or pushed, to being beaten up. Response categories were scored from "never" to "often" on a four-point scale. If the respondent replied, "a couple of times" or "often", they were scored as a case.

Mental health was assessed using the Strengths and Difficulties Questionnaire (SDQ). The SDQ is a 25-item questionnaire for assessing emotional and behavioral problems in children and adolescents (Goodman, 2001). The SDQ consists of five subscales; conduct problems, emotional symptoms, peer problems and hyperactivity-inattention, and one subscale that assesses prosocial behavior (Goodman, 2001). Each subscale contains five items measured on a three-point Likert scale ("not true", "somewhat true" or "certainly true"). A total difficulties score was calculated by combining the scores of the four difficulties subscales. SDQ also has an impact supplement, measuring the extent to which reported difficulties impact everyday life. SDQ is acknowledged as a reliable questionnaire for assessing mental health problems in adolescent populations (Goodman, 2001). Additionally, a study evaluating the psychometric properties of the SDQ in foster children supports the utilization of the SDQ total difficulties score for measuring mental health problems in high-risk populations (Lehmann et al., 2014). In the present study, SDQ were caregiver-reported for participants aged 5–11 years and self-reported for participants aged 12–19 years.

Statistical analyses

IBM SPSS version 28 for Windows was used for all analyses (Corp, 2021). Descriptive analyses, with means, standard deviations, and frequencies were used to describe the samples.

Independent samples *t*-tests were used to compare mean scores on symptom subscales, total difficulties score, and total impact scores between the two samples. Welch's *t*-test was used as unequal variances between the samples were assumed (Delacre et al., 2017). Cohen's d was used as a standardized effect size to report the differences between the groups, and the standard interpretation was used (0.20 = small, 0.50 = moderate, and ≥0.80 = large) (Cohen, 2013). Regression analysis was conducted to examine the potential interaction effects of sex and CM on mental health, and the estimated marginal means are presented. To explore the association between polyvictimization and mental health, participants were divided into groups based on number of victimization types they had experienced, and a univariate analysis of variance was conducted. The results are presented in estimated marginal means.

Ethics

The Norwegian Triple-S Cohort was approved by the Regional Committee for Ethics in Medical and Health Research in the south-eastern region of Norway (#95445) (Schønning et al., 2021). All participants from 12 to 18 years old provided an electronic consent to participate in the study. In Norway, a regulation was passed in 2018 that allows adolescents aged 12–16 to consent independently to participate in studies focusing on certain issues where parents might be interested in denying their child participation, such as studies about CM. For children from five to 11 years, at least one of their legal guardians (parent or other) provided electronic consent for participation. The participants were informed of the possibility to withdraw from the study without explanation in writing and orally, with no consequences for their future contact with or assistance from the SSC.

  The BCS study obtained informed consent from parents of the participating children and adolescents in the first three waves. In the fourth wave, y@h, the adolescents provided electronic consent for participation. They were informed that they could withdraw their consent at any time without explanation. The BCS and y@h have been approved by the Regional Committee for Medical Research Ethics in Western Norway (#2011/811) and the National Data Inspectorate.

Results

Characteristics of the sample

The mean age of the Triple-S sample was 12.5 years, and the BCS sample was 12.7 years. The Triple-S sample consisted of 42.6% boys and the BCS sample had 42.5% boys.

Exposure to maltreatment in the Triple-S sample

All 312 children and adolescents in the Triple-S sample had been exposed to at least one type of maltreatment. Table 1 shows the distribution of the various types of maltreatment among children aged 5–11 years in our sample. Among both boys and girls, the most common types of maltreatment were *psychological abuse* (girls: 67.6%, boys: 80.0%), *witnessing psychological abuse towards their mother* (girls: 64.9%, boys: 70.2%) and *physical abuse* (girls: 51.5%, boys: 63.6%).

Table 1. Maltreatment exposure in the triple-S sample aged 5–11 years.

Type of maltreatment	5–11 Years		
	Girls (*N* = 75)	Boys (*N* = 68)	Total (*N* = 143)
Physical abuse, *n* (%)	34 (51.5%)	35 (63.6%)	69 (57.0%)
Sexual abuse (excluding rape), *n* (%)	19 (30.6%)	5 (11.4%)	24 (22.6%)
Rape, *n* (%)	19 (28.8%)	10 (19.2%)	29 (24.6%)
Psychological abuse, *n* (%)	50 (67.6%)	52 (80%)	102 (73.4%)
Witness to psychological abuse (mother), *n* (%)	48 (64.9%)	46 (76.7%)	94 (70.2%)
Witness to physical abuse (mother), *n* (%)	35 (48.6%)	40 (62.5%)	75 (55.2%)
Witness to psychological abuse (father), *n* (%)	15 (22.1%)	10 (17.9%)	25 (20.2%)
Witness to physical abuse (father), *n* (%)	5 (7.9%)	5 (8.9%)	10 (8.4%)
Neglect, *n* (%)	35 (47.9%)	26 (40%)	61 (44.2%)

Note. Maltreatment exposure in Table 1 is caregiver-reported. *N*: number of participants.

Table 2 shows the distribution of maltreatment in the sample of older adolescents (12—18 years). The most common types of maltreatment in girls were *neglect* (68%), *psychological abuse* (64.3%), and *contact sexual abuse by an adult* (52.1%). In boys, the most prevalent types of abuse were *psychological abuse* (76.1%), *neglect* (61.8%), and *moderate physical abuse* (60.3%).

The distribution of polyvictimization in the Triple-S sample was high: 11.2% had been exposed to 1 type of maltreatment, 20.1% to two types, 32.7% to three types, 20.1% to four types and 15.8% to 5 types of CM.

Mental health in children with maltreatment experiences compared with the general population sample

Means on SDQ subscale scores, total impact scores, and total difficulties score for the Triple-S sample compared with the BCS sample are displayed in Table 3. Children with CM experiences displayed higher levels of mental health problems than the general population sample. Large effect sizes ($d \geq 0.8$) were found for emotional problems ($d = 1.19$), hyperactivity problems ($d = 0.88$), peer problems ($d = 0.86$), and the impact score ($d = 0.93$). A moderate to large effect was found on the conduct problems subscale ($d = 0.68$) and a small effect were found on the prosocial subscale ($d = -0.22$). The largest effect size between the maltreated sample and the general population sample was found on the total difficulties score ($d = 1.28$).

A potential sex interaction effect in the total SDQ score was examined through a linear regression model. Figure 1 shows the findings, and there was no significant effect of sex ($p = .444$) or sex interaction effect on SDQ total difficulties score between the two groups ($p = .655$).

Table 2. Maltreatment exposure in the triple-S sample aged 12–18 years.

Type of maltreatment	12–18 Years		
	Girls ($n = 101$)	Boys ($n = 68$)	Total ($n = 169$)
Moderate physical abuse, n (%)	44 (44.9%)	41 (60.3%)	85 (51.2%)
Severe physical abuse, n (%)	20 (20.2%)	21 (31.3%)	41 (24.7%)
Non-contact sexual abuse by an adult, n (%)	42 (43.8%)	21 (31.8%)	63 (38.9%)
Contact sexual abuse by an adult, n (%)	50 (52.1%)	24 (36.4%)	74 (45.7%)
Non-contact sexual abuse by peers, n (%)	36 (36.7%)	24 (36.4%)	60 (36.6%)
Contact sexual abuse by peers, n (%)	29 (29.3%)	17 (26.2%)	46 (28.1%)
Psychological abuse, n (%)	63 (64.3%)	51 (76.1%)	114 (69.1%)
Witness to psychological abuse (mother), n (%)	30 (30.6%)	39 (59.1%)	69 (42.1%)
Witness to physical abuse (mother), n (%)	21 (21.6%)	27 (40.9%)	48 (29.5%)
Witness to psychological abuse (father), n (%)	7 (7.3%)	6 (9.7%)	13 (8.2%)
Witness to physical abuse (father), n (%)	4 (4.2%)	1 (1.6%)	5 (3.2%)
Neglect, n (%)	68 (68.0%)	42 (61.8%)	110 (65.5%)

Note. Maltreatment exposure in Table 2 is self-reported. n = number of participants.

The association between polyvictimization and mental health problems was investigated by analyzing the SDQ total difficulties score across number of maltreatment types experienced. The results are presented in Figure 2 and show a significant difference in SDQ total difficulties score between the samples, and an overall dose-response relationship regarding number of maltreatment types experienced. The increase was significant from having experienced 1 type of CM, to 3 ($p = .009$), 4 ($p = <.001$) and 5 ($p = <.001$) types of CM. The increase in SDQ total difficulties score was also significant from having experienced 2 types of CM to 4 ($p = <.001$) and 5 ($p = <.001$) types.

Discussion

In the present study, children and adolescents aged 5–18 years with experiences of maltreatment displayed more mental health problems than the general population sample. Emotional problems, hyperactivity problems, and peer problems were particularly high in the sample exposed to CM. The difference in prosocial behavior between the two samples was small. No significant sex interaction effect of maltreatment was found in children and adolescents in the current study. A dose-response relationship between polyvictimization and mental health problems was found in the current study.

In the Triple-S sample, 89% of the participants had experienced two or more types of CM. Other studies have similar findings, with the majority of CM victims having experienced polyvictimization (Turner et al., 2010). A 2010 study on polyvictimization in US children and adolescents found that 80% of the sample had experienced at least one type of

Table 3. Mental health problems measured by the strengths and difficulties questionnaire by group (triple-S and BCS).

	Triple S (n = 312)	BCS (n = 1068)	MD (95 % CI)	p	Cohen's d[a] (95% CI)
SDQ emotion, M (SD)	5.2 (2.8)	2.3 (2.3)	−2.9 (−3.2 to −2.6)	<.001	1.19 (1.06 to 1.33)
SDQ conduct, M (SD)	2.2 (1.8)	1.3 (1.3)	−1.0 (−1.2 to −0.8)	<.001	0.68 (0.55 to 0.81)
SDQ hyperactivity, M (SD)	5.3 (2.6)	3.3 (2.3)	−2.1 (−2.4 to −1.7)	<.001	0.88 (0.75 to 1.01)
SDQ peer problems, M (SD)	3 (2.2)	1.4 (1.7)	−1.6 (−1.9 to −1.3)	<.001	0.86 (0.73 to 0.99)
SDQ prosocial, M (SD)	7.9 (2)	8.3 (1.6)	0.4 (0.1 to 0.6)	.003	−0.22 (−0.35 to −0.10)
SDQ total, M (SD)	15.7 (6.6)	8.2 (5.6)	−7.5 (−8.3 to −6.7)	<.001	1.28 (1.15 to 1.42)
SDQ Impact, M (SD)	2.6 (2.7)	0.7 (1.6)	−1.8 (−2.1 to −1.5)	<.001	0.93 (0.79 to 1.06)

Note. n: number of participants; M: mean; SD: standard deviation; MDP: mean difference; CI: confidence interval.
[a]Cohen's d: 0.20 = small, 0.50 = moderate, 0.80 = large.

victimization, and 66% had been exposed to more than one type of maltreatment (Turner et al., 2010). The high prevalence of different CM types in the Triple-S sample was not surprising as it is a high-risk sample, with confirmed experiences of CM as a prerequisite to attending the SSC and being included in the current study. Except for having witnessed IPV towards their father, all five maltreatment types had been experienced by at least 20% of the Triple-S sample. Overall, the distribution of types of maltreatment is similar in the two age groups presented. In comparison, there were some differences in the prevalence of sexual abuse between the two age groups. The different assessment procedures may explain this difference, as the questions that assessed sexual abuse in the older age group were more detailed and covered a broader range of coercive sexual acts, such as being kissed against their will, which could be assumed to be more prevalent. Another possible explanation for the contrasting prevalence of sexual abuse in older adolescents is that sexual abuse was reported by the caregiver in the youngest group, and self-reported by the adolescents, so the sexual abuse could not have been disclosed by the child or uncovered yet by the caregivers.

The Triple-S sample had on average more mental health problems than the general population sample and this was evident in all SDQ subscales, indicating a general increased risk across symptom domains. The largest differences were found for emotional problems, followed by hyperactivity and peer problems, all with large effect sizes. This is in line with findings from a large birth cohort in Australia, which found a similar strong association between multiple types of maltreatment and internalizing mental health problems (Mills et al., 2013), and several other studies (Danielson et al., 2005; Humphreys et al., 2020; Lansford et al., 2002; Peltonen et al., 2010). The results in the current study showed a large effect size for hyperactivity in children and adolescents exposed to maltreatment compared to the comparison group. The increased risk of hyperactivity and ADHD symptoms in maltreated children and adolescents is in line with findings from other studies. However, the effect sizes in the current study are stronger (Briscoe-Smith & Hinshaw, 2006; Lam, 2005;
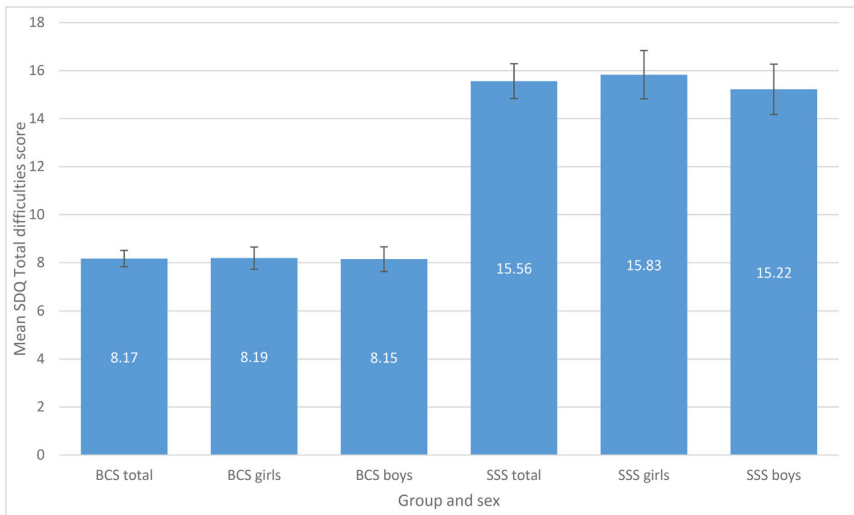
Figure 1. SDQ total difficulties score by group (Triple-S and BCS) and sex. Error bars represent 95% confidence intervals.
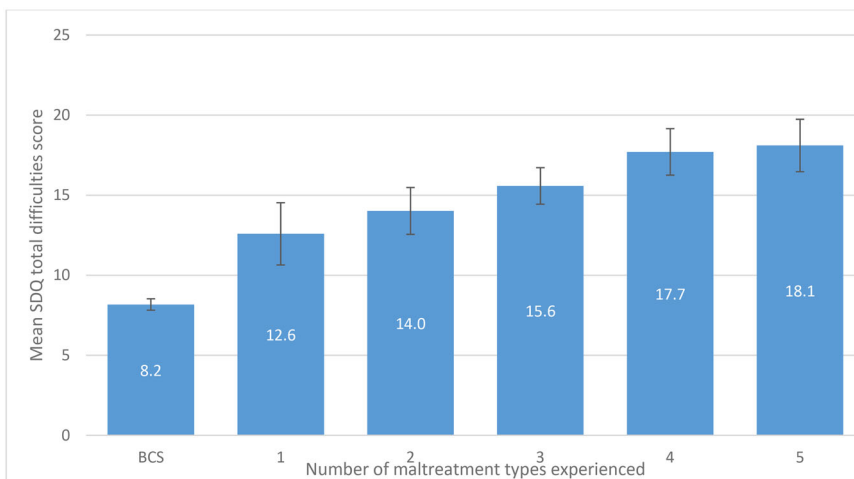

Figure 2. SDQ total difficulties scores by number of maltreatment types. Error bars represent 95% confidence intervals.

Spencer et al., 2005). CM has also been identified as a risk factor for conduct problems and criminality in adolescents. Still, the association between CM and conduct problems was one of the weaker associated SDQ subscales in the current study, suggesting that this is not the symptom domain that is mostly affected and in line with previous studies (De Sanctis et al., 2012). The results of the current study showed that the maltreated sample also scored higher on peer problems, as evidenced by the large effect size, which could indicate that they have increased trouble cooperating with peers and making friends. Peer problems in maltreated populations were also found in a systematic review from 2014, supporting the

validity of the findings (Pacheco et al., 2014). However, the difference in prosocial behavior was small, suggesting that social competence is not necessarily reduced in victims of CM. The formerly mentioned systematic review concluded that CM impairs social competence but highlights the importance of further investigating this association as few studies exist and the findings are inconclusive (Pacheco et al., 2014). The current study adds to the literature and suggests a weak association between exposure to CM and reduced prosocial behavior in children and adolescents.

The results of the current study are mostly consistent with the literature on CM, where CM is associated with higher levels of mental health problems (Jonkman et al., 2013; Mills et al., 2013; Salum et al., 2016; Shan et al., 2019), supporting the validity of these findings for a Norwegian population. However, some of the findings conflict with existing literature, such as the weak association of exposure to CM and reduced prosocial behavior. The findings of the current study also show a moderately increased risk of conduct problems in victims of CM, conflicting with the more-than threefold increase in risk found in other studies (De Sanctis et al., 2012). These problems can have a considerable impact on daily functioning for the afflicted child or adolescent, as made evident by the large mean difference in the impact subscale. Impact is a measure of the distress, burden, and social impairment experienced by the child or adolescent in their daily life and an important measure of how strongly the problems interfere with their everyday life (Vugteveen et al., 2021).

With the exception of the subscale on prosocial behavior, the mental health measures exhibited largely similar effect sizes, suggesting that CM acts as a general risk factor for various mental health problems. This finding aligns with a recent meta-analysis of quasi-experimental studies indicating that CM may impact broad underlying factors associated with multiple mental health problems, such as altered brain structure and function, information-processing biases, or emotional dysregulation, rather than disorder-specific risk factors (Baldwin et al., 2023). Theoretically, difficulties in emotion regulation have been proposed as a transdiagnostic mechanism linking CM to psychopathology (Weissman et al., 2019). Specifically, heightened emotional reactivity and frequent rumination have been identified as mediators in the longitudinal relationship between CM and general mental health problems (Weissman et al., 2019). Difficulties in emotional dysregulation could potentially serve as an underlying mechanism explaining the association found between CM and increased mental health problems in our study, as emotional dysregulation represents a core characteristic and a transdiagnostic feature across all included mental health subscales (Beauchaine & Cicchetti, 2019). Moreover, aspects of emotion dysregulation, such as negative emotionality and the use of certain dysfunctional emotion regulation strategies (e.g., suppression), have a genetic basis, potentially serving as pathways that increase both the risk of experiencing CM and subsequent poorer mental health outcomes (McRae et al., 2017).

No significant interaction effect of sex on the total difficulties score was found in the current study. The literature on the sex interaction effect of CM on mental health is somewhat inconclusive, but former studies have found that CM, and physical abuse in particular, is associated with an externalizing liability in males, and only internalizing liability in females (Keyes et al., 2012). However, the findings of the current study are supported by a few other studies, suggesting that there may not be a strong empirical basis for assuming that one sex has stronger associations with poorer mental health when exposed to CM, and that

explaining why some victims of CM experience more negative consequences is more complex than sex (Lewis et al., 2016; Maikovich-Fong & Jaffee, 2010).

A dose-response relationship was found between the number of maltreatment types experienced and mental health problems. A similar dose-response relationship between cumulative maltreatment exposure and severity of mental health problems has been found in other large-scale studies (Turner et al., 2010), and is typically found in both child and adult clinical samples (Cloitre et al., 2009; Steine et al., 2017), which suggests that this finding is robust regardless of age.

Strengths and limitations

There are several limitations to consider in the current study. First, despite the matching of age and sex, several other important differences between the two samples could have influenced the findings, such as socioeconomic status, ethnicity, geographical differences, or religiosity. Second, CM was not assessed in the general population sample in the current study. However, the prevalence of CM in the general population sample is expected to be similar to the prevalence found in the UEVO study, which is a population-based survey of representative Norwegian adolescents aged 12–16 years (Hafstad et al., 2020). In the UEVO study, 11% of the sample reported three or more types of CM, compared to 69% in the Triple-S sample, illustrating the possible difference in CM exposure between the samples in the current study. Third, there is a difference in time between the data collection in the two samples. The BCS and y@h data collections were conducted from 2002 to 2012, while the Triple-S data collection was conducted in 2021 and 2022. An increase in mental health problems over the last twenty years has been widely reported (Bor et al., 2014; Twenge et al., 2019), particularly during the COVID-19 pandemic (Lee et al., 2020), and this general increase in mental health problems among children and adolescents should be considered when interpreting the findings of the present study as the differences in mental health problems between the samples may be smaller. Fourth, the cross-sectional nature of the current study does not allow for interpretations about cause and effect and cannot inform development over time (Olsen & St George, 2004). Fifth, the possibility of confounding variables and direction of effects should be taken into consideration, as some studies have found that children with physical or psychological difficulties have an increased risk of being victimized (Cater et al., 2014; Sentenac et al., 2012; Turner et al., 2010). Another possible confounder could be that underprivileged children and adolescents are more likely to both be exposed to CM (Imran et al., 2019) and have worse mental health (Reiss, 2013). Lastly, as caregivers served as informants for children aged 5–11, they may be hesitant to identify their own role in the maltreatment and as such provide less valid reports.

Strengths of the current study include the matched design, which allows for age and sex to be equally distributed between cases and comparators thus removing the potential confounding effect of these factors (Pearce, 2016). Another strength is using a detailed multi-informant approach to assess CM. A third strength is the relatively high number of children and adolescents with CM exposure included in the current study. These participants are typically challenging to identify and recruit in epidemiological studies, and the Triple-S sample provides unique data on this population in a Norwegian context. As the only inclusion

criteria for the Triple-S sample are exposure to CM, the findings may, as such, be regarded as representative for other children and adolescents with CM history.

Conclusion

In the current study, children and adolescents with maltreatment experiences were found to have more mental health problems, in a dose-dependent way, than the general population sample. These mental health problems included emotional problems, hyperactivity problems, peer problems, conduct problems, and reduced daily life functioning. There was little difference in prosocial behavior between the samples. Mental health problems can have severe consequences for these exposed children and adolescents, and addressing mental health problems in children exposed to childhood maltreatment requires a comprehensive and individualized approach. Clinicians should take care in assessing mental health problems in children exposed to childhood maltreatment and provide treatment when warranted.

Author contributions

VS, BS, MH, and AD conceived and designed the study. VS drafted the manuscript. SAN conducted the matching of participants. VS and BS conducted the analyses, with BS providing statistical guidance. All authors reviewed the manuscript and have made substantial contributions to the final manuscript. All authors approved the final version of the manuscript.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The data collected in this study are not publicly available because of privacy regulations from the Norwegian Regional Committees for Medical and Health Research Ethics (REC). Requests to access the datasets should be directed to the NIPH (Datatilgang@fhi.no). Guidelines for access to NIPH data are found at https://www.fhi.no/en/more/access-to-data. Approval from REC (https://helseforskning.etikkom.no) is a pre-requirement.

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