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Assessing Childhood Maltreatment Exposure in Patients Without and With a Diagnosis of Substance Use Disorder

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Objectives: Childhood maltreatment (CM), widely held as a risk factor for substance use disorders (SUDs), is commonly assessed using the Childhood Trauma Questionnaire (CTQ). Retrospective self-reports are, however, potentially subject to bias. We used a unique patient sample with prospectively documented CM to examine the performance of the CTQ and how this is affected by the presence of SUD.

Methods: Analysis was based on a total of 104 individuals. Subjects with prospectively recorded CM were identified from a specialized childhood trauma unit in Linköping, Sweden (n = 55; 31 with SUD, 61% females; 24 without SUD, 71% females). Clinical controls had SUD but no CM (n = 25, 48% females). Healthy controls had neither SUD nor CM (n = 24, 54% females). We analyzed the agreement between retrospective CTQ scores and prospectively documented CM by κ analysis and assessed the performance of the CTQ to identify CM exposure using receiver operating characteristic (ROC) analysis.

Results: Agreement between prospectively and retrospectively recorded CM exposure was poor for sexual abuse (36.6%, Cohen κ = 0.32, P = 0.008) and physical abuse (67.3%, κ = 0.35, P = 0.007). Overall CTQ performance was fair (ROC: area under the ROC curve = 0.78, optimal cutoff = 36.5, sensitivity = 0.65, specificity = 0.75). However, performance was excellent in the absence of SUD (area under the ROC curve = 0.93, cutoff = 32.0, sensitivity = 0.88, specificity = 0.88), but poor in participants with lifetime SUD (area under the ROC curve = 0.62, cutoff = 42.0, sensitivity = 0.60, specificity = 0.36).

Conclusions: These data support the CTQ as a tool to assess CM exposure but suggest that it may be less useful in patients with SUD.

Key Words: childhood maltreatment, substance use disorder, Childhood Trauma Questionnaire, sensitivity, specificity

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Childhood maltreatment (CM) is associated with negative social, physical, and mental health outcomes later in life.^{1–4} Clinical populations⁵ and in particular populations with substance use disorders (SUDs)⁶ report more CM compared with the general population. The association between CM and subsequent SUD development is statistically robust.^{7–11} We recently reported that a large proportion of this risk remains after controlling for familial confounds, including genetic vulnerability, consistent with a causal role of CM.¹²

However, research findings and clinical identification of CM typically rely on structured retrospective self-reports, using instruments such as the Childhood Trauma Questionnaire, developed in the 90s^{13,14} and currently most widely used as the 28-item short form (CTQ)¹⁵ validated in several countries.^{5,16–19} Retrospective self-reports are potentially subject to multiple sources of bias, including recall and selection bias (eg, self-selection into samples),^{20,21} intentional false reporting,²² but also minimization or denial of past maltreatment.²³ Studies based on prospectively documented CM, that is, with maltreatment documented during childhood, are however rare. One such study using a large subsample (N = 1037) of the Dunedin cohort found poor agreement between CTQ scores retrospectively reported in young adults and prospective reports of childhood adverse events, collected during childhood, including physical and sexual abuse (κ = 0.31).²⁴

A recent meta-analysis described similarly poor agreement between retrospective and prospective reports of CM based on 16 studies and 25,471 CM exposed individuals, assessed using various clinical instruments (κ = 0.19).²⁵ Moreover, retrospectively and prospectively recorded CM seems to be associated with different outcomes. In the Dunedin cohort, retrospectively reported

CM showed a weaker association with objectively assessed life outcomes than did prospective CM measures but had a higher correlation with self-reports of current mental suffering and neuroticism.²⁴ Retrospective recall can also be influenced by the very outcomes, which are studied in association with it. A study of nearly 8000 adults found inconsistent reports of CM in 39% of the participants between 2 separate assessments 12 years apart, and the retrospective reports were moderated by current levels of negative mental health outcomes, such as chronic stress and psychological distress.²¹ Accounting for these potential sources of error is critically important, because it might prompt different interpretations when assessing retrospectively reported CM in clinical populations.

The CTQ is validated in the Swedish population,⁵ but to our knowledge, no study has previously investigated the agreement between prospectively and retrospectively recorded CM in a Swedish, or indeed in any clinical sample. Here, we therefore examined the agreement between prospectively and retrospectively recorded severe CM in a unique clinical sample, identified from a specialized childhood trauma unit. We capitalized on the availability of objectively documented and prospectively recorded CM as recently described¹² and were able to bring back a subsample of these individuals for an in-person assessment. Using this group, we determined quantitative performance measures of the CTQ, that is, the relationship between its sensitivity versus specificity, to differentiate individuals with prospectively recorded CM from 2 sex- and age-matched control groups: healthy controls and SUD patients with no recorded CM experience. Finally, we examined whether the performance of the CTQ is influenced by the presence of a lifetime SUD diagnosis.

METHODS

Participants

This study is part of a larger follow-up of adult outcomes in former patients from a specialized child and adolescent trauma unit in Linköping.¹² The study was approved by the Regional Ethics Review Board, Linköping, Sweden (Dnr 2015/256-31). All participants provided a written informed consent before assessment. Recruitment took place from March 2017 to July 2020. We used the regional healthcare register for Östergötland County, Sweden, containing practically all healthcare visits in the region since 1999²⁶ to identify all former trauma unit patients who had reached adulthood (n = 470).

An initial screening, based on the medical records of the former trauma unit patients, was performed by one of the authors (P.A.G.). Prospectively documented CM exposure was verified in medical records, as was the presence or absence of an SUD diagnosis or contact with an SUD clinic. Individuals with no CM, those who had emigrated, were deceased, lacked contact details, and had any current or life-time diagnosis of schizophrenia, bipolar or psychotic disorder, organic brain disorder, current suicidality, or cognitive impairment were excluded. We identified all individuals with both CM exposure and documented contact with SUD services (CM+/SUD+, n = 65). Initial eligibility assessment found that 2 were deceased, and 8 met exclusion criteria (documented severe psychiatric illness). The remaining 55 were invited to participate. For each CM+/SUD+ participant, we identified up to 3 sex- and age-matched among those exposed to CM, but with no SUD

treatment contact (SUD-), using the same local register. After an initial screening, 140 CM+/SUD- subjects were invited to participate. For each CM+/SUD+ participant, we also recruited sex- and age-matched clinical controls with lifetime SUD but with no recorded CM exposure (CM-/SUD+), and no other current psychiatric disorder. These clinical controls were recruited both using the medical records as above and through advertisements from addiction clinics in the region. We thus identified 106 individuals with CM-/SUD+ eligible for assessment, who were invited to participate. Healthy controls with no psychiatric disorder or CM (CM-/SUD-) sex and age matched to the CM+/SUD+ group were recruited by advertising among students at Linköping University, on Facebook, and inviting participants from previous studies on healthy controls. A total of 34 were invited to participate.

Participants meeting eligibility criteria after initial screening were contacted by phone and invited to participate. In person, face-to-face assessment was performed by a psychiatrically trained research nurse or study physician. The assessment included clinical evaluation for psychiatric disorders and a structured Mini International Neuropsychiatric interview (MINI-7.0.2)²⁷ for *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*,²⁸ Swedish version.²⁹ Participants also filled out the CTQ and other self-report questionnaires. Healthy and clinical controls were excluded if CM was identified in either the patient records, during the clinical assessment or with the posttraumatic stress disorder (PTSD) module in MINI-7.

The final study population comprised 104 individual in the following 4 groups: one with both prospectively documented CM and lifetime SUD (CM+/SUD+, n = 31, 61% female; mean age, 29.2 years; SD, 3.5 years); one with CM only (CM+/SUD-, n = 24, 71% female; mean age, 29.3 years; SD, 3.9 years); one healthy control group with neither maltreatment, nor SUD (CM-/SUD-, n = 24, female 65.5%; mean age, 28.3 years; SD, 5.2 years); and a clinical control group with lifetime SUD but no documented CM (CM-/SUD+, n = 25, female 25%; mean age, 27.5 years; SD, 3.3 years).

Variables

Prospectively Documented CM

Childhood maltreatment was defined as former contact with the trauma unit, documented in medical records. Referrals to the trauma unit came from child protective services for cases involving severe CM and were therefore based on thorough objective investigations. We identified the type of CM using medical records. Data extraction from the medical records was done by 2 researchers rating approximately 50% records each, a senior child and adolescent psychiatrist, and a research assistant. A template for data extraction was created based on items of the CTQ.¹⁵ Medical records contained information on sexual/physical abuse and physical neglect but did not contain structured documentation on other CTQ items, such as emotional abuse or neglect. Participants were categorized according to the experienced CM type (ie, "sexual abuse," "physical abuse," "neglect"). Exposure to multiple forms of CM was common. When multiple types of CM were documented, participants were categorized to each type of maltreatment, and we also recorded the number of different types of maltreatment. Categorization of CM types was done blinded for the CTQ ratings and other data. The first 10 medical records were used

for training. After individual rating, the scores were compared, and a consensus categorization was decided upon. Interrater reliability, investigated in another 18 individual ratings in a yes/no format, was for sexual abuse, $\phi = 0.67$, $P = 0.015$ (χ^2 double-sided), for physical abuse, $\phi = 0.67$, $P = 0.007$ (χ^2 double-sided), indicating satisfactory reliability.

Retrospectively Assessed CM

We used the CTQ–Short Form, a 28-item self-report questionnaire for maltreatment in childhood and adolescence. Twenty-five clinical items are equally distributed across 5 subscales covering emotional abuse, emotional neglect, sexual abuse, physical neglect, and physical abuse.^{13,15} Items are rated 1 (never true) to 5 (very often true), generating a total CTQ score between 25 and 125, and subscale scores ranging between 5 and 25. Three additional items assess minimization/denial, to detect possible underreporting of traumatic experiences. The CTQ has previously been validated in Sweden with construct validity and internal consistency similar to the original version.⁵

Personality

The NEO Five-Factor Inventory assesses personality traits according to the 5-factor model as described by Costa and McCrae³⁰: neuroticism, extraversion, openness, agreeableness, and conscientiousness. The form consists of 60 items, 12 for each personality trait. Trait scores were converted into sex-specific standardized *t* scores with a mean of 50 and a standard deviation of 10 before analysis, based on Swedish normative data.³¹

Substance Use Disorder

Lifetime substance use disorder (SUD) was identified via medical records and contact with addiction treatment services. Current SUD was assessed using the MINI and self-reported current problems and toxicological screens. To ensure that participants were not under the influence of alcohol or drugs during the assessment visit, they were tested with a breathalyzer and with urine drug screening before the visit. Fourteen participants in the CM+/SUD+ group, and 10 in the CM-/SUD+ group had a diagnosis of current (last 12 months) AUD or SUD as identified by the MINI interview. In addition, 1 participant in the CM+/SUD+ group and 4 in the CM-/SUD+ group had positive urine tests for amphetamine, tetrahydrocannabinol, opioids, or benzodiazepines, indicating ongoing substance use.

Statistical Analysis

Participant characteristics were compared between groups using analysis of variance (ANOVA), followed by Tukey post hoc test for multiple comparisons. Pearson correlation coefficient was used as measure of bivariate correlations. Agreement between prospectively documented childhood physical and sexual abuse and CTQ subscales was assessed using Cohen κ statistics.

We assessed the performance of the CTQ to differentiate between those with prospectively recorded trauma and controls using a receiver operating characteristic (ROC) analysis. The ROC curve plots the sensitivity (ie, true positive rate) against 1-specificity (ie, false-negative rate) across the range of CTQ ratings. The area under the ROC curve (AUC) was estimated and categorized, with 0.5 to 0.7 considered to have low accuracy (ie, ability to

classify a participant with and without CM based on CTQ score), 0.7 to 0.8 moderate, 0.8 to 0.9 excellent, and greater than 0.9 outstanding.³² The optimal cutoff was determined by Index of Union (IU), calculated as the point where the sensitivity and specificity values are simultaneously closest to the AUC value.³³ Positive predictive values and negative predictive values were also calculated.

We also conducted a logistic regression analysis to control for sex, age, and education as covariates, to assess which characteristics other than the CTQ score that may help discriminate between CM exposed and nonexposed individuals, as defined by a significant contribution to the model. An ROC analysis using the logistic regression predictor was created. The population was then split into subgroups by SUD or sex. An ROC analysis was applied to each subgroup to determine whether the characteristics had an impact on the performance of the CTQ. The effect of multiple trauma exposure on the total CTQ score was assessed by linear regression and Pearson correlation. An analysis of covariance was also conducted with sex and age as covariates.

The α level for determining statistical significance was set at 0.05. Data management and statistical analyses were performed in SPSS (Version 26.0; IBM Corp, Armonk, NY).

RESULTS

Participant characteristics are presented in Table 1. We identified a statistically significant difference in total CTQ scores across the 4 groups, as determined by 1-way ANOVA ($F(3,100) = 11.25$, $P < 0.001$; Table 1, Fig. 1). Tukey post hoc test revealed a significant difference between CM+ groups and healthy controls ($P < 0.001$), as well as between healthy and clinical controls, that is, patients with current SUD ($P = 0.026$). No significant difference in total CTQ scores was found between the 2 CM+ groups ($P = 0.87$) nor between the CM+ groups and the clinical controls ($P = 0.27$ for CM+/SUD+ and $P = 0.077$ for CM+/SUD-, respectively).

Effect of Multiple Types of Maltreatment on Total CTQ Score

A linear regression found a significant relationship between the number of prospectively documented CM types and total CTQ score ($r = 0.51$, $P < 0.001$; Fig. 2). For each additional type of maltreatment, the total CTQ score increased on average 11.3 points. An analysis of covariance showed no significant contribution of age ($P = 0.38$) or sex ($P = 0.9$) as covariates.

Agreement Between Prospectively Recorded CM and Retrospective Self-report

The agreement between prospective and retrospective CM measures was poor for both sexual abuse (36.6%, Cohen $\kappa = 0.32$, $P = 0.008$; Fig. 3A) and physical abuse (67.3%, $\kappa = 0.35$, $P = 0.007$; Fig. 3B), with cutoffs set according to the CTQ manual¹⁵ at greater than 6 points for sexual abuse and greater than 8 points for physical abuse. Emotional abuse and neglect were insufficiently documented to allow an analysis.

Sensitivity and Specificity of the CTQ

The crude ROC analysis comparing prospective CM with total CTQ score is shown in Figure 4A. The ROC revealed a moderate ability for the total CTQ score to discriminate prospectively

TABLE 1. Demographic, Clinical, and Psychological Characteristics of the Population

	CM With SUD (CM+/SUD+)	CM Without SUD (CM+/SUD-)	Clinical Controls With SUD (CM-/SUD+)	Healthy Controls (CM-/SUD-)	ANOVA <i>P</i>
n (% of total)	31 (30)	24 (23)	25 (24)	24 (23)	
Demographics, mean (SD)					
Sex, F, n (%)	19 (61)	17 (71)	12 (48)	13 (54)	0.33
Age	29.2 (3.5)	29.3 (3.9)	27.5 (3.3)	28.3 (5.2)	0.41
Education*	2.7 (1)	2.4 (1)	2.8 (1)	1.2 (0.5)	<0.001
NEO <i>t</i> score, mean (SD)					
Neuroticism	58.3 (12.5)	51 (10.8)	57 (12)	44.7 (9.5)	<0.001
Extraversion	44.5 (11.6)	50.8 (8.6)	45 (9.1)	54.3 (10.2)	0.001
Openness	51.3 (11)	48.7 (8.2)	51.3 (10.8)	51 (8)	0.75
Agreeableness	47.6 (14.1)	50.5 (9.6)	46.5 (11.5)	55.3 (10)	0.047
Conscientiousness	43.4 (13.1)	50.9 (11.4)	43 (14.8)	53.1 (10.9)	0.008
CTQ, mean (SD)					
Total	51.1 (19.7)	54.7 (22.8)	42.6 (16.1)	28.3 (3.9)	<0.001
CTQ subscales					
Physical abuse	9.1 (4.7)	9.2 (4.5)	6.6 (2.9)	5.1 (0.3)	<0.001
Sexual abuse	9.2 (6.3)	10.6 (7.2)	5.2 (0.7)	5 (0)	<0.001
Emotional abuse	12 (5.5)	12.3 (6)	10.7 (5.4)	5.7 (1)	<0.001
Physical neglect	8.4 (3)	9.6 (5)	8.4 (4.6)	5.3 (0.7)	0.001
Emotional neglect	12.4 (5.6)	13 (5.2)	11.6 (5.5)	7.2 (2.9)	<0.001
Denial score	0.2 (0.5)	0.3 (0.6)	0.3 (0.8)	1.2 (1.2)	<0.001

Childhood maltreatment = Contact with the trauma treatment unit at the child and adolescent psychiatry (CAP-TU).

Substance use disorder (SUD) = SUD diagnosis.

Clinical controls = Patient population with SUD and contact with addiction clinic with no exposure to CM.

*Education is coded in reverse order, 1 = university/collage, 2 = high school, 3 = elementary school.

recorded cases of CM, with an AUC of 0.78 ($n = 104$). The optimal IU cutoff score was identified at 36.5 points and resulted in a sensitivity of 0.65, a specificity of 0.74, and a positive predictive value of 0.71. A sensitivity analysis using logistic regression, including sex and age as predictors, was statistically significant ($\chi^2(3) = 25.22, P < 0.001$), explaining 29% of the variance and correctly predicting 68.3% of cases. Total CTQ score contributed significantly to the model ($P < 0.001$), while sex ($P = 0.36$) and age ($P = 0.29$) did not. A ROC curve based on a logistic regression model, including sex and age as covariates, showed an acceptable discriminative ability with an AUC of 0.79, that is, very similar to that of the crude analysis based on total CTQ scores only.

Separate ROC analyses were then carried out for participants with and without SUD. For participants without SUD, the fit was excellent (AUC = 0.93, $n = 48$) and significantly better than for participants with SUD, where it was poor (AUC = 0.62, $n = 56$, AUC difference = 0.30, 95% confidence interval = 0.14 to 0.47, $P < 0.001$; Fig. 4B). The optimal IU cutoff point for participants without SUD was identified at 32.0 points, resulting in a sensitivity of 0.88 and specificity of 0.88. For participants with SUD, the IU optimal cutoff was 42.0, with a sensitivity of 0.60 and specificity of 0.36. Finally, ROC curves for each sex were compared and were not significantly different (AUC = 0.79 for females and 0.73 for males, AUC difference = 0.06, 95% confidence interval = -0.13

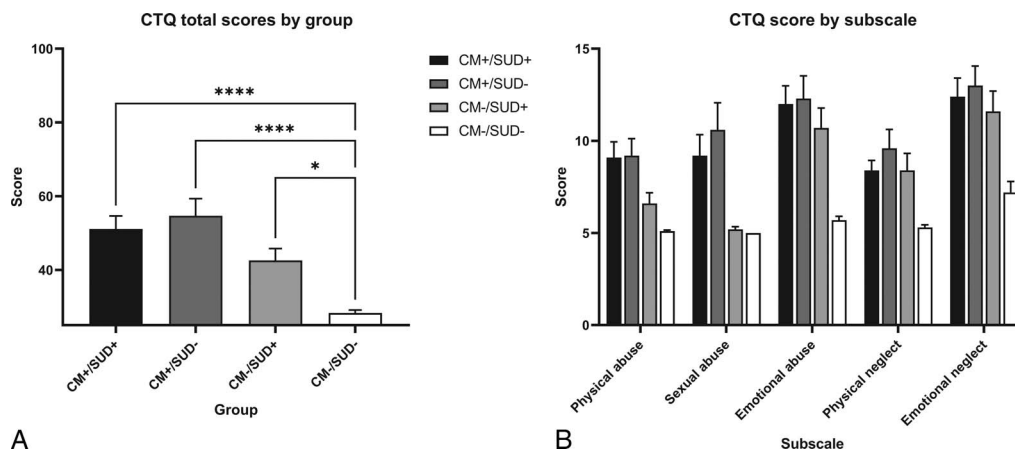


FIGURE 1. CTQ scores by group. A, CTQ total score. B, Scores for each CTQ subscale by group. Bars represent mean; error bars represent SEM. CTQ total score range 25–125, baseline at 25. CTQ subscales range 5–25, baseline at 5. Denial score control questions 0–3. * $P < 0.05$, *** $P < 0.001$. + exposed, – unexposed.

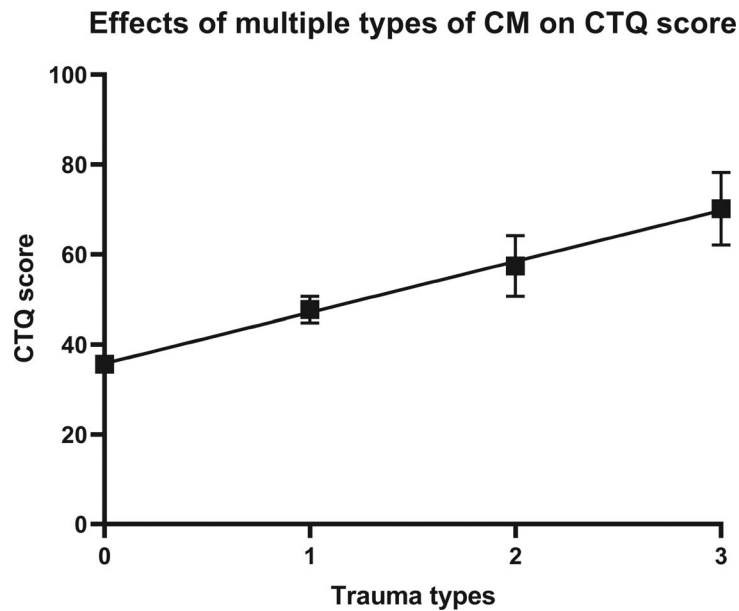


FIGURE 2. CTQ total score as a function of number of prospectively documented types of CM. Dots represent mean values, and error bars are SEM. Solid line is linear regression model, $y = 35.79 + 11.33x$. CTQ score range 25–100, baseline at 25.

to 0.25, $P = 0.52$) (Fig. 4C). Optimal IU cutoff for females was at 36.5 points, resulting in sensitivity of 0.68 and specificity of 0.78. For males, IU optimum was also at 36.5, resulting in a sensitivity of 0.63 and specificity of 0.68.

determined and prospectively recorded CM extracted from medical records, and the CTQ in adulthood as a retrospective self-report measure, in a sample of former patients from a specialized child and adolescent psychiatry trauma unit. We also evaluated the ability of the CTQ to differentiate individuals with known severe CM from a sample of healthy controls and clinical controls with lifetime SUD but without prospectively recorded CM.

DISCUSSION

In the present study, we examined the agreement between prospectively and retrospectively recorded CM, as well as the impact of multiple types of CM on total CTQ score. We used objectively

Overall, we found poor agreement between prospective and retrospective reports for both sexual ($\kappa = 0.32$) and physical abuse ($\kappa = 0.35$), closely replicating findings from previous studies,

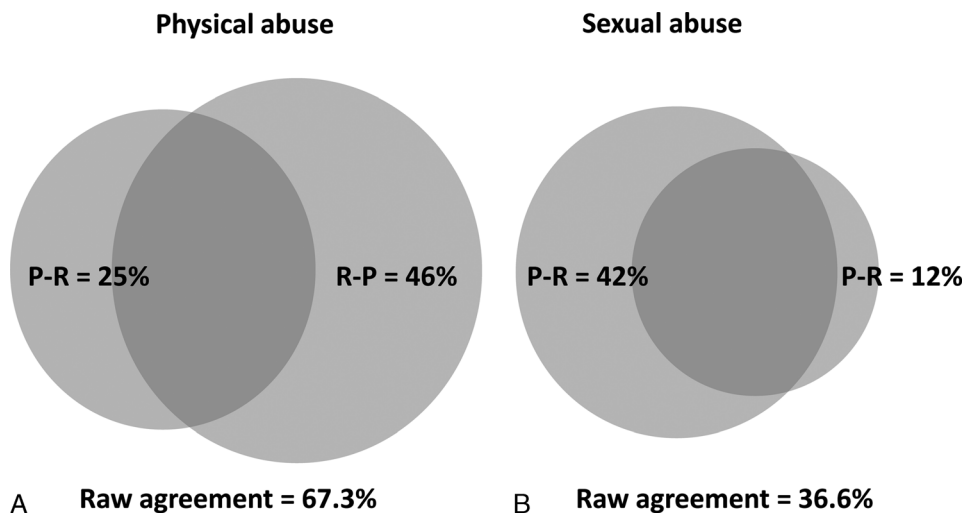


FIGURE 3. Venn diagrams showing the overlap between individuals by prospective and retrospective records of A, physical and B, sexual abuse. Light circles indicate retrospective report (R), dark circles indicate prospectively documented CM (P). The light nonoverlapping section (R–P) shows the proportion of individuals with retrospective reports of physical or sexual abuse, assessed by each CTQ subscale respectively, but without prospective documentation of that type of maltreatment. The dark nonoverlapping section (P–R) shows the proportion of individuals with prospective records of each type of CM who did not report that same CM in retrospect. The overlap between the 2 circles shows the proportion of individuals with both prospective and retrospective reports of CM.

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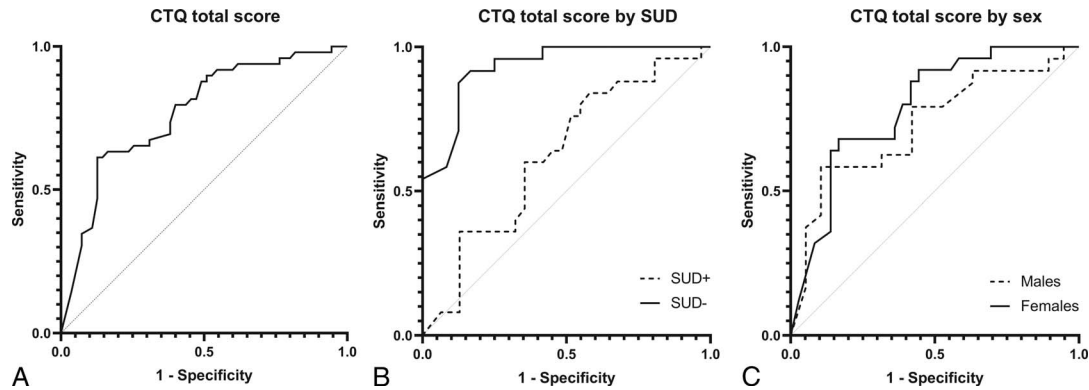


FIGURE 4. ROC curves. A, The solid line represents all participants in all groups (AUC = 0.78). B, The solid line represents participants without SUD (AUC = 0.93) and dashed line those with SUD (AUC = 0.62). C, The solid line represents males (AUC = 0.73) and dashed females (AUC = 0.79). Thin dotted line is the diagonal line that represents performance at random.

which suggest that retrospective and prospective records of CM may in fact be associated with different aspects of psychopathology.^{24,25} The crude ROC analysis showed a moderate overall ability for the CTQ to discriminate those with severe CM from healthy or clinical controls with no recorded CM (AUC = 0.78). However, this overall number in fact reflects a marked heterogeneity. Thus, in individuals with no SUD, the ability of the CTQ to discriminate individuals with CM from those with no CM was excellent (AUC = 0.93), while in those with SUD, it was only marginally better than chance (AUC = 0.62). Performance characteristics of the CTQ did not differ between males and females, and logistic regression showed no influence of sex or age. These results indicate that the total CTQ score has a clinically useful ability to identify severe CM in the absence of SUD. Conversely, in the presence of SUD, the total CTQ scores may need to be interpreted with caution.

Subjects with lifetime SUD showed high total CTQ scores, similar to those with prospectively documented severe CM exposure and significantly higher than scores in healthy controls. While this is in agreement with prior research indicating high CTQ scores in adults with SUD problems^{5,6,9,34} and high prevalence of both PTSD and trauma exposure in subjects with SUD,³⁵ results were nonetheless unexpected in an SUD population recruited as controls without any recorded CM. We believe that 2 main factors may have contributed to the higher total CTQ scores in the SUD population. First, individuals with SUD may in fact be more exposed to CM, although subthreshold for being identified by the social services as severe CM resulting in referral to the type of specialized unit from which the CM exposed group was recruited. This is also reflected by CTQ scores in the CM-/SUD+ group, mostly composed of emotional maltreatment and neglect.⁶ As discussed previously,¹² CM defined by contact with a treatment unit and social services reflects a selection of patients with severe CM in our sample. Second, individuals with SUD may be more prone to report experiences of CM, as negative life outcomes and psychosocial stress have been shown to correlate with increased CTQ scores²⁴ and with the propensity to report previously unreported maltreatment.²¹ The difference between ROC curves for participants with and without SUD was also mainly driven by SUD patients with no recorded CM reporting, who reported more physical and emotional neglect and emotional abuse, possibly more open to interpretation.

Both as an internal control of our observations, and of interest in its own right, we replicated prior findings of an association between SUD and neuroticism.^{36–38} Childhood maltreatment has been shown to increase the risk and severity of SUD even when familial confounding is considered,¹² and this effect may be in part mediated by neuroticism.⁹ This is supported by the finding that participants with SUD scored higher on neuroticism regardless of CM exposure.

Our findings have implications both for research and clinical practice. Childhood maltreatment is an important risk factor for SUD and is associated with greater severity of addiction, increased risk for psychological comorbidity, and poorer treatment outcomes.^{9,39–43} There is therefore a need to develop, systematically study, and offer in clinical practice specialized interventions for SUD patients with a history of CM. Identification of CM exposure is thus of high importance both for research and clinical practice. A consistent finding, perhaps best illustrated by identification of hazardous alcohol use, is that sensitivity of problem identification is improved when screening with a structured instrument is systematically used before obtaining a history, rather than relying on history taking alone.⁴⁴ However, to offer this type of benefit, a structured assessment instrument needs to be not only sensitive, but also specific. For patients without a diagnosis of SUD, the CTQ seems to meet this dual requirement. It fails to do so in patients with such a diagnosis, rendering it less useful for either research or clinical use in this specific population.

Our study has both strengths and limitations. A strength is the use of objectively determined and prospectively recorded CM data extracted from medical records and a detailed psychiatric assessment. Limitations are primarily a limited sample size and the selection of participants. The CM exposed sample was selected from a population with traumatization severe enough to engage social services. Because of this, our study population represents the more severe end of the CM spectrum and cannot be assumed to generalize to the general population, in which adverse events occur on a spectrum. A slight imbalance in sex distribution between the groups might be a limitation but was statistically controlled for in the analysis. Another potential weakness is the difficulty to exclude CM exposure in participants classified as unexposed. We addressed this to the best of our ability, by prescreening controls using available medical records, thoroughly

evaluating them using both clinical evaluation and a structured psychiatric interview, and excluding control subjects in whom CM exposure was found. However, we cannot exclude that some CM exposure nevertheless remained undetected among participants classified as unexposed. Finally, state variables in mood and life outcomes have been shown to moderate CTQ scores.^{21,24,45} We took this into account by evaluating the presence of psychiatric morbidity during the screening process and excluding anyone in whom this evaluation yielded a psychiatric diagnosis other than SUD. This is both a strength and a weakness. While minimizing the risk for a confound of, for example, low mood, this selection potentially renders the sample less representative of CM exposed individuals in general.

In summary, our data support the notion that CTQ is a reliable instrument to identify individuals exposed to severe CM, but primarily when SUD is not present. In SUD populations, CTQ scores alone are insufficient to identify individuals with severe CM. This is of relevance for treatment providers who appropriately strive to include assessment of CM exposure in their evaluation and treatment planning. It also prompts caution when interpreting studies based on retrospective reports of CM in patients with SUD. Overall, more research is needed to understand how adult clinical conditions such as PTSD, depression, or SUD impact retrospective CM reports.

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