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Impact of Multiple Types of Childhood Trauma Exposure on Risk of Psychiatric Comorbidity among Alcoholic Inpatients

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Abstract

Background—This study examined the prevalence of single- and multiple-type childhood trauma exposure (CTE) among alcoholic patients undergoing in-patient detoxification and treatment. The relationships between various types of CTE and lifetime psychiatric comorbidities and suicide attempts were also explored.

Methods—A total of 196 alcoholic inpatients were assessed by Structured Clinical Interview for DSM-IV Axis I Disorders (SCID) and Childhood Trauma Questionnaire (CTQ) for CTE history.

Results—The overall prevalence of CTE of the entire sample was high (55.1%). Specifically, the prevalence of emotional abuse was 21.4%, physical abuse 31.1%, sexual abuse 24.0%, emotional neglect 20.4%, and physical neglect 19.9%. Regarding multiple types of CTE, 31.7% and 18.9% reported at least two and at least three CTE types respectively. Strikingly, among those with at least one positive CTQ category, more than half reported two or more CTE types. A history of emotional abuse increased the risk of mood disorder, in particular major depressive disorder, as well as PTSD. Physical abuse contributed to the prediction of suicide attempts, while sexual abuse was associated with a diagnosis of anxiety disorder, PTSD, and multiple comorbidities (e.g., anxiety and mood disorder). The number of reported CTE types or the total scores of the CTQ predicted an increased risk of having single or multiple psychiatric comorbidities as well as suicide attempts.

Conclusions—We observed high rates of a broad range of CTE types and a trend for CTE-specific enhancement of risk for various psychiatric outcomes among alcoholic inpatients. Of notion, a dose-response relationship between number of CTE types and risk of psychiatric comorbidities as well as suicide attempts was found. We suggest a wide range of CTE should be included when exploring the effects of CTE or developing prevention and treatment strategies among alcoholic subjects.

Keywords

Childhood Trauma; Alcohol Dependence; Psychiatric Comorbidity; Suicide

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INTRODUCTION

Prior studies have consistently shown that alcohol dependence (AD) is associated with Axis I psychiatric comorbidities (Grant and Harford, 1995; Kessler et al., 1997a; Schuckit et al., 1997; Hasin et al., 2007). This association might arise from shared genetic or environmental susceptibility factors, as well as interactions between them. Accumulating evidence points to childhood trauma exposure (CTE) as an environmental susceptibility factor for a variety of psychiatric disorders in both clinical and community samples (Kendler et al., 2000; MacMillan et al., 2001; Nelson et al., 2002). The susceptibility might be derived from the effects of these early life stressors on hypothalamic-pituitary-adrenal (HPA) axis (Nemeroff, 2004) and may be accentuated among subjects at genetic risk for AD, who also show heritable abnormalities of HPA axis activity (De Bellis, 2002; Clarke et al., 2008). Consistent with this notion, alcohol dependent patients reporting CTE have higher rates of coexisting psychiatric comorbidities (Windle et al., 1995; Langeland et al., 2004) or increased scores on anxiety and depression rating scales (Kroll et al., 1985; Schaefer et al., 1988; Goodale and Stoner, 1994), compared to their non-exposed counterparts.

Multiple types of CTE often co-occur within individuals, including sexual, physical and emotional abuse, as well as physical or emotional neglect. The latter three categories are characterized by patterns of harmful interactions in the carer-child relationship, and like other types of CTE are associated with adverse outcomes (Glaser, 2002; Wright et al., 2009). They can occur independently of other abuse types (Claussen and Crittenden, 1991). However, little is known about the prevalence of these three types of CTE in alcoholic patients. A systemic review of prospective studies indicates that not only severe abuse but also neglect is inextricably linked with common psychiatric disorders in later life (Weich et al., 2009). Moreover, individuals frequently report more than one type of CTE and the majority of maltreated children experience polyvictimization, making it necessary to assess these simultaneously (Kessler et al., 1997b; Finkelhor et al., 2007). Of particular importance, the seriousness of health and psychological consequences increases with the number of CTE categories experienced (Felitti et al., 1998; Walker et al., 1999; Edwards et al., 2003). The additive effect of different CTE categories underscores the importance of exploring the graded relationship between CTE and psychiatric comorbidities, particularly among the more vulnerable alcoholics.

Earlier studies have typically focused on the bivariate associations between a single type of CTE (e.g., physical abuse or sexual abuse) and psychological symptom scores in alcoholic adults (Kroll et al., 1985; Schaefer et al., 1988; Goodale and Stoner, 1994). Subsequent research assessed the impact of dual abuse (physical and sexual abuse) on various psychiatric comorbidities using multivariate statistical analyses and found that those with dual abuse had higher rates of coexisting mental disorders (Windle et al., 1995; Langeland et al., 2004). More recent studies have further examined a broader range of CTE in relation to psychological symptom severity (Roy, 1999; Mirsal et al., 2004; Evren et al., 2006; Dom et al., 2007) or one specific disorder such as posttraumatic stress disorder (PTSD) (Dom et al., 2007). Only limited work to date has addressed the associations between childhood emotional abuse and neglect as well as physical neglect on one hand, and psychiatric comorbidities on the other in alcoholic patients. One study assessing a mixed sample of substance dependent individuals, including 66 alcoholic subjects, suggested that the risk for psychiatric comorbidities or suicide attempt is higher in those with a history of childhood abuse or neglect (Evren et al., 2006). However, the potentially combined effect of CTE categories other than physical and sexual abuse on the clinical pattern (Langeland et al., 2004) has not been described. In addition, CTE measurements employed by studies in search for an association with psychiatric comorbidities could only yield dichotomous result (i.e., events that either did or did not occur) without offering information concerning continuous

dimensions such as severity. As such, there is still a paucity of data providing evidence that the number of CTE types is closely linked to the psychiatric comorbidities in alcoholic patients.

We examined the prevalence of single- and multiple-type CTE in alcoholic patients undergoing inpatient detoxification and treatment. Given the prevalence of alcohol use disorders in the population and a very small proportion of them that seek inpatient treatment (the NSDUH report, 2009, available at <http://www.oas.samhsa.gov/2k9/AlcTX/AlcTX.pdf>), this study provides a unique opportunity to characterize the relationship between CTE and psychiatric outcomes in alcoholic inpatients which are thought to possess distinct clinical features (Ray et al., 2011). We also added evidence in literature regarding the psychopathological impact of emotional maltreatment, including emotional abuse and neglect as well as physical neglect, on these subjects. In addition, by evaluating a broad spectrum of CTE, we sought to understand if more severe CTE, either individually or jointly, conferred a higher risk of co-morbid Axis I disorders, including mood and/or anxiety disorders, and suicide attempts. Since psychiatric comorbidity and suicide attempts are common in alcohol dependent patients, our findings have potential implications for developing prevention and treatment strategies for alcoholic subjects with CTE.

Methods

Participants

Participants who met the *Diagnostic and Statistical Manual for Mental disorders, 4th Edition, Text-revised (DSM-IV-TR*; American Psychiatric Association, 2000) criteria for alcohol dependence were consecutively recruited from 2009 January to 2010 July at the National Institute on Alcohol Abuse and Alcoholism Inpatient Unit in the NIH Clinical Center where they were voluntarily admitted to a 28-day inpatient treatment protocol. Subjects were literate in English and were not suffering from active psychotic symptoms or cognitive impairment. They were each routinely queried during one or more interviews regarding all clinical data, including sociodemographic variables, psychiatric diagnoses, family history of alcohol use, and drinking parameters as well as history of childhood trauma exposure. To avoid the possibility that depression and anxiety symptoms, commonly seen during active alcohol withdrawal stage but generally subsiding after one week of abstinence, may distort responses on CTQ, patients were administered the CTQ after at least one week of withdrawal treatment. Informed consent was obtained in accordance with the Declaration of Helsinki and the NIH Combined NeuroScience Institutional review board.

Clinical Assessments

The *Structured Clinical Interview for DSM-IV Axis I Disorders (SCID)* (First et al., 1997) was used for the diagnostic assessment of alcohol dependence as well as other psychiatric diagnoses, including depression and anxiety disorders. Severity of alcohol dependence was assessed using the Alcohol Dependence Scale (ADS) (Skinner and Horn, 1984), and alcohol consumption during the preceding 3 months was assessed using the Timeline Follow-Back (TLFB) (Sobell and Sobell, 1992). Quantitative family history of alcohol problems was evaluated using Family Tree Questionnaire (FTQ) (Mann et al., 1985). A history of attempted suicide was ascertained from the Addiction Severity Index (ASI). Every participant received routine monitoring of blood and liver biochemical values.

Assessment for Childhood Trauma Exposure (CTE)

We assessed CTE for each participant after one week of admission using the Short Form of the Childhood Trauma Questionnaire (CTQ) (Bernstein et al., 2003). The CTQ is a reliable and valid 28-item self-report questionnaire that measures and yields scores for five

categories of CTE, including emotional, physical, and sexual abuse as well as emotional and physical neglect, and a weighted total CTQ score. Each subscale is measured in 5 items rated on a 5-point Likert scale from 1 (never true) through 5 (very often true). The overall total score has a range of 25–125 and reflects the severity of overall trauma exposure. Such Likert-type items create dimensional scales providing quantitative scores, thereby enhancing reliability and maximizing statistical power. In addition, cutoff scores for none to low, low to moderate, moderate to severe, and severe to extreme exposure are provided for each scale. Incidence of childhood trauma exposure was determined by using cut-offs for each CTQ subscale score that indicated a moderate to severe level of exposure. Subjects with scores exceeding the cutoff for moderate exposure on a subscale were classified as positive for a history of CTE in that category. The cut-offs for each subscale were as follows: 1) emotional abuse 13; 2) physical abuse 10; 3) sexual abuse 8; 4) emotional neglect 15; 5) physical neglect 10. The CTQ has good internal consistency, measurement invariance, and criterion-related validity in clinical and community samples. Convergence reliability with therapist assessments of abuse histories is high. Good specificity and sensitivity of cutoff scores to classify maltreated subjects have been reported as well (Bernstein et al., 2003). Furthermore, the reliability and validity of the CTQ has been demonstrated in patients with substance use disorders (Thombs et al., 2007).

Statistical Analysis

Demographic and clinical data are presented as means $\pm$ SD. We used chi-square analyses to examine background characteristics, psychiatric comorbidities, and the prevalence of CTE. The associations between CTE and risk for developing co-morbid disorders were examined by multiple logistic regression analyses to compute odds ratio and a 95% confidence interval. In addition to gender and the predictor variables from the CTQ, the following variables were included as covariates in the regression models: age, number of years of education, race, and FTQ family history density scores. In addition to analyzing individual CTQ categories, we explored graded associations between CTE and psychiatric comorbidity risk by also computing logistic regression models that included the number of CTQ categories experienced (i.e. the total number of moderate to severe CTQ categories), and the CTQ total score (i.e. the sum score of 5 CTQ categories), as predictor variables. The adjusted odds ratios indicate the relative risk of a given comorbid disorder for the variables identified after adjustment for other variables in the equation. All statistical analyses were conducted in SAS version 9.2 (SAS Institute, Cary, NC). The level of statistical significance was set at $P < 0.05$ for all tests.

RESULTS

A total of 196 alcohol-dependent subjects were recruited (mean age: 40.5 ± 0.7 years), including 134 males and 62 females. The descriptive characteristics and drinking variables are displayed in Table 1. 41.3% (81 of 196) of the subjects met criteria for at least one of the included comorbid diagnoses. Nearly one-fourth (26.0%) of the entire sample were diagnosed to have more than one comorbidity (2 types of disorder). Comorbid disorders were more prevalent in females compared with males. Specifically, female subjects had a higher prevalence of major depressive disorder (MDD), any anxiety disorder, and post-traumatic stress disorder (PTSD). About one-eighth of subjects (12.8%) had a history of attempted suicide, with females having a higher rate than males.

When applying cutoff scores that identify the presence of moderate or severe trauma exposures, we found the overall prevalence of CTE of the entire sample was 55.1% ($n = 108$) (Table 2). Approximately 47.0 % of men and 72.6 % of women had been exposed to childhood trauma. In terms of multiple types of CTE, 31.7% of the entire sample reported at

least two types of CTE while 18.9% ($n = 37$) reported at least three CTE types. The prevalence of multiple types of CTE was higher among women than among men: 41.9% of women vs 26.8% of men reported at least two CTE types while 25.8% of women vs 15.7% of men reported at least three CTE types. Notably, among those with at least one positive CTQ category ($n=108$), while 42.6% of them reported only one CTE type, more than half reported two or more CTE types (57.4%) and nearly one third (34.3%) reported three or more CTE types. Specifically, the prevalence of individual CTE type was 21.4% for emotional abuse, 31.1% for physical abuse, 24.0% for sexual abuse, 20.4% for emotional neglect, and 19.9% for physical neglect. Regarding the prevalence for the five dichotomous maltreatment classifications by gender, a significant gender difference was found only for childhood sexual abuse, whereas other types of CTE did not differ substantially between genders. The total scores of CTQ were also comparable between genders.

Table 3 shows the likelihood of lifetime prevalence of the specified psychiatric comorbidities and suicide attempts as predicted by the 5 individual CTQ categories. Statistical analyses were not done for dysthymic disorder, generalized anxiety disorder, panic disorder, agoraphobia and social phobia because the case number for those with these co-occurring disorders was relatively small. Emotional abuse was a significant predictor of any mood disorders, major depressive disorders, and PTSD while physical abuse predicted suicide attempts. Sexual abuse was a significant predictor of any anxiety disorders, PTSD, and 2 disorders. Physical neglect also increased the risk for 2 disorders. Except for gender, sociodemographic data did not predict psychiatric comorbidities or suicide attempts. We found that female gender carried a heightened risk for any anxiety disorder, and for suicide attempts.

In addition to the evaluation of the influence of each type of CTE, we further analyzed the graded relationship between the CTE level and the risk of psychiatric problems (Table 4). We found that the number of CTQ categories that had been experienced predicted an increased risk for all types of psychiatric comorbidities that we assessed as well as suicide attempts. Specifically, the higher the number of reported CTQ categories, the higher the odds of comorbid disorders. Likewise, we also examined the effects of overall CTE intensity on the comorbidity risk (Table 5). We found that the total CTQ scores showed a robust relationship with the risk of co-occurring comorbidities and suicide attempts.

DISCUSSION

The present study, which assessed a broad range of CTE including both abuse and neglect, resulted in three main findings with respect to alcohol dependent inpatients: 1) childhood exposure of each type of CTE or multiple types of CTE is rather common; 2) certain types of CTE may be linked to different types of comorbid outcomes; for instance, sexual abuse and emotional abuse is linked to anxiety disorders and mood disorders respectively, whereas physical abuse is associated with suicide attempts; 3) a history of multiple types of CTE or a high level of overall trauma exposure is associated with an increased risk of lifetime psychiatric comorbidities or suicide attempts. These observations are in agreement with previous studies that describe putative long-term effects of CTE on adult psychiatric comorbidities in treatment seeking alcoholic subjects (Kroll et al., 1985; Schaefer et al., 1988; Goodale and Stoner, 1994; Windle et al., 1995; Langeland et al., 2004).

We found that alcohol dependent inpatients generally had higher rates of physical and sexual abuse compared to other community-based studies that used the same CTE measurement tool (men: physical abuse 3.3% to 22.1%, sexual abuse 2.2% to 3.3%; women: physical abuse 5.1% to 14.2%, sexual abuse 7.5% to 11.4%)(Scher et al., 2004; Sachs-Ericsson et al., 2005). While a direct comparison with prior studies of alcohol dependent patients that used

similar designs is limited because of differences in the definitions of physical and sexual abuse, diagnostic criteria (Windle et al., 1995; Langeland et al., 2004), and in subject recruitment setting (Langeland et al., 2004), our findings were similar to previous research (Windle et al., 1995). Male alcoholics have been consistently found to report childhood sexual abuse less frequently than females. This gender difference is likely due to the fact that among individuals with a history of documented sexual abuse in childhood, far fewer men than women considered their CTE as sexual abuse (Widom, 1997). One way in which our findings expand on previous work is in the investigation of other types of CTE that have been largely unexamined including emotional abuse, emotional and physical neglect. Interestingly, rates for these types of CTE were nearly as high in our patients as those for the well-studied physical or sexual abuse, and were generally greater than those found in a community sample (men: emotional abuse 9.6%, emotional neglect 4.9%; physical neglect 22.1%; women: emotional abuse 14.3%, emotional neglect 5.3%; physical neglect 14.2%) (Scher et al., 2004). The paucity of studies focusing on the prevalence of these CTE types in alcohol dependent patients prohibits meaningful comparison. A prior report showed 58.8% and 35.3% of alcoholic patients experiencing maternal and paternal dysfunction respectively (Langeland et al., 2004). These measures are likely related to some extent to the neglect subscales in CTQ, and the estimates for these two measures appear comparable between studies.

We found the prevalence of multiple (at least two) types of CTE was rather high in alcohol dependent patients (31.7%), much greater than in a community sample (13%) (Scher et al., 2004). Strikingly, in the entire sample, more than half of those reporting CTE had two or more types of CTE. The high degree of overlap indicates that various CTE types tend to cluster, and thus experiencing multiple forms of CTE could be “the norm” (Finkelhor et al., 2007). The rates of multi-types of CTE actually vary widely from study to study, from 13% to 90% (McGee et al., 1995; Higgins and McCabe, 2000; Scher et al., 2004; Sesar et al., 2010). This disparity may arise due to the different criteria or operational definition used to classify maltreated or non-maltreated subjects (Sesar et al., 2010). One advantage of the CTQ is that it assesses the frequency of each childhood maltreatment event and produces a severity score for each specific CTE type. The continuous scores provide researchers with an overall assessment for that CTE type and the ability to identify the presence of CTE by a cut-off score. Collectively, these findings highlight the need for simultaneous and consistent assessment of a full range of CTE in alcoholic patients due to a high prevalence of co-occurring CTE types.

Demographic characteristics such as age, education, and family history of alcohol use disorders did not predict psychiatric comorbidity in our study. The lack of association with family history implies that CTE in our subjects did not merely serve as a proxy marker for susceptibility factors that are shared between alcohol use and other psychiatric disorders. We did find, however, that female compared to male alcoholics had higher odds of developing anxiety disorders, PTSD, and multiple disorders, as well as suicide attempts. These findings are generally consistent with previous reports, including that from the National Comorbidity Survey which found that, among a subsample of subjects with at least one CTE type, women had much higher odds of developing PTSD (Kessler et al., 1995) and a population-based study which demonstrated that female gender was a significant predictor of suicide attempts (Brezo et al., 2007). Likewise, in a similar study of alcohol dependent inpatients, women showed an increased risk for anxiety disorders (Windle et al., 1995). These findings suggest that female gender carries a higher risk for psychiatric sequelae and should be considered as a substantive factor in the treatment evaluation and suicide prevention for patients with AD.

Our observation affirming the association between sexual abuse and anxiety disorders, in particular PTSD, or multiple comorbidities supports an earlier report on alcohol dependent

patients (Langeland et al., 2004) and a recent meta-analysis (Chen et al., 2010). Also consistent with previous studies is the increased risk of suicide attempts among alcoholics with a history of physical abuse (Kroll et al., 1985; Windle et al., 1995). The latter finding is particularly important in the clinical management of alcoholic patients with physical abuse history because alcohol consumption may lower inhibitions and further heighten the risk of the impulsive, self-destructive behaviors like suicide. Notably, we found emotional abuse to be a significant predictor of comorbid mood disorders, in particular major depression, as well as PTSD, while physical neglect was a predictor of multiple comorbidities. Much research has described the psychological sequelae, such as anxiety and depression symptoms, of emotional maltreatment (Spertus et al., 2003; Weich et al., 2009; Wright et al., 2009). Using structured interviews to examine psychiatric comorbidities, we further indicate that emotional abuse may be as important as sexual and physical abuse and have independent adverse effects on mental health. By a broad definition, emotional maltreatment encompasses both acts of commission (e.g. verbal abuse, spurning, terrorizing, isolating) and acts of omission (e.g., ignoring, being unresponsive or unavailable) and may be the most prevalent form of CTE (Wright et al., 2009). In our sample, emotional abuse, emotional neglect, and physical neglect in combination (i.e., emotional maltreatment) was fairly prevalent (34.2% of subjects), and was a significant predictor of mood disorders, anxiety disorders, PTSD, and multiple comorbidities (data not shown). This suggests that emotional neglect, a common co-occurring CTE with other CTE types, does not increase the risk for psychiatric comorbidity by itself, but may do so in combination with other types of emotional maltreatment.

It has been shown in alcohol dependent patients dual abuse (physical and sexual abuse) is a significant predictor of major depression, dysthymic disorder, generalized anxiety disorder, and suicide attempts (Windle et al., 1995). The current study, assessing a more comprehensive range of CTE, extends these findings by demonstrating that the number of reported CTE types was a significant predictor for either single or multiple comorbid psychiatric disorders, as well as suicide attempts, among alcohol dependent inpatients. Similar results were obtained when the CTQ total score was analyzed. These findings are analogous to those of a large-scale study examining the relationship between multiple forms of CTE (sexual abuse, physical abuse, and witnessing of maternal battering) and adult mental health, in which the authors showed a dose-response relationship between the number of types of reported CTE and mental health scores (Edwards et al., 2003). Similarly, our study shows that as the number of CTE type increases, the likelihood of one or more psychiatric comorbidities also increases in alcohol dependent individuals. This association is particularly significant since alcohol dependence with comorbidity is common and has generally poorer outcomes (Baigent, 2005). Given the high coexistence of multiple types of CTE, the results again suggest a need for preventive interventions in public health to consider a complete assessment of CTE.

The pathway from CTE to psychopathology in adult alcoholics is undoubtedly complex. One important factor in this pathway may be long-term HPA axis dysregulation that develops as a consequence of CTE, which results in enhanced stress vulnerability during adulthood, in turn increasing the risk for mood and anxiety disorders as well as AD (Heim et al., 2001; Koob and Kreek, 2007). Interestingly, recent evidence has demonstrated that different types of CTE might have differential consequences on HPA axis responsivity in adulthood. For instance, in a non-clinical sample, childhood sexual abuse is associated with an enhanced cortisol response (Carpenter et al., 2009) whereas emotional abuse associated with a blunted cortisol response (Carpenter et al., 2007). Furthermore, in alcoholic patients during alcohol withdrawal, sexual abuse was the only CTE type reported to be related to higher levels of cortisol, while emotional abuse was negatively correlated with levels of adrenocorticotropin-releasing hormone (Schafer et al., 2010). These observations might explain in part our

findings that different types of CTE may increase risk for specific types of psychiatric disorders in alcoholics.

Some methodological limitations should be considered before generalization of the results. First, the research design is cross-sectional and the results therefore do not allow us to establish a causal role of CTE in the development of psychiatric disorders. Second, recall bias, potentially influenced by current psychiatric conditions (e.g., major depression) and mood states, may affect the reporting of abuse incidents. Third, social or familial factors associated with both CTE and greater risk for psychiatric disorders may contribute to the associations observed (Langeland and Hartgers, 1998). Furthermore, the interplay between CTE and specific genetic predispositions for AD may underlie the increased risk for other psychopathology. The potential shared genetic risk is difficult to tease apart. Studies that do not take account of these confounders may overestimate the strength of any associations. On the other hand, it can be argued that the over-adjustment of some factors which are likely to mediate the later-life psychopathology, such as childhood behavior problems or parental mental illness, will underestimate risk (Weich et al., 2009). Future works using siblings without exposure to CTE as control subjects, or twin-studies using co-twin control methodology could address these issues.

In conclusion, we assessed a broad spectrum of CTE in a well-characterized sample of alcohol dependent men and women, and demonstrated relatively high rates not only of physical and sexual abuse but also of emotional abuse, emotional neglect and physical neglect are frequent among them. Notably, a substantial proportion of subjects with CTE experience multiple types of CTE and there is a dose-dependent relationship between number of CTE categories and risk of psychiatric comorbidities and suicide attempts. Emotional and sexual abuse appear to be relatively more important than other types of CTE in the association with more forms of psychiatric comorbidity. These findings emphasize the need for greater care in assessing and classifying subjects with respect to a range of CTE categories when evaluating alcohol dependent patients. Together with other anamnestic information, this information can contribute to a better understanding of the complex clinical picture that maltreated subjects often present. In addition, an early focus on parenting skills that attempts to minimize children's exposure to different forms of trauma can be expected to help reduce psychiatric sequelae in adulthood.

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REFERENCE

- Baigent MF. Understanding alcohol misuse and comorbid psychiatric disorders. *Curr Opin Psychiatry*. 2005; 18:223–228. [PubMed: 16639144]
- Bernstein DP, Stein JA, Newcomb MD, Walker E, Pogge D, Ahluvalia T, Stokes J, Handelsman L, Medrano M, Desmond D, Zule W. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse Negl*. 2003; 27:169–190. [PubMed: 12615092]
- Brezo J, Paris J, Tremblay R, Vitaro F, Hebert M, Turecki G. Identifying correlates of suicide attempts in suicidal ideators: a population-based study. *Psychol Med*. 2007; 37:1551–1562. [PubMed: 17537281]
- Carpenter LL, Carvalho JP, Tyrka AR, Wier LM, Mello AF, Mello MF, Anderson GM, Wilkinson CW, Price LH. Decreased adrenocorticotropic hormone and cortisol responses to stress in healthy adults reporting significant childhood maltreatment. *Biol Psychiatry*. 2007; 62:1080–1087. [PubMed: 17662255]

- Carpenter LL, Tyrka AR, Ross NS, Khoury L, Anderson GM, Price LH. Effect of childhood emotional abuse and age on cortisol responsivity in adulthood. *Biol Psychiatry*. 2009; 66:69–75. [PubMed: 19375070]
- Chen LP, Murad MH, Paras ML, Colbenson KM, Sattler AL, Goranson EN, Elamin MB, Seime RJ, Shinozaki G, Prokop LJ, Zirakzadeh A. Sexual abuse and lifetime diagnosis of psychiatric disorders: systematic review and meta-analysis. *Mayo Clin Proc*. 2010; 85:618–629. [PubMed: 20458101]
- Clarke TK, Treutlein J, Zimmermann US, Kiefer F, Skowronek MH, Rietschel M, Mann K, Schumann G. HPA-axis activity in alcoholism: examples for a gene-environment interaction. *Addict Biol*. 2008; 13:1–14. [PubMed: 17910738]
- Claussen AH, Crittenden PM. Physical and psychological maltreatment: relations among types of maltreatment. *Child Abuse Negl*. 1991; 15:5–18. [PubMed: 2029672]
- De Bellis MD. Developmental traumatology: a contributory mechanism for alcohol and substance use disorders. *Psychoneuroendocrinology*. 2002; 27:155–170. [PubMed: 11750776]
- Dom G, De Wilde B, Hulstijn W, Sabbe B. Traumatic experiences and posttraumatic stress disorders: differences between treatment-seeking early- and late-onset alcoholic patients. *Compr Psychiatry*. 2007; 48:178–185. [PubMed: 17292709]
- Edwards VJ, Holden GW, Felitti VJ, Anda RF. Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: results from the adverse childhood experiences study. *Am J Psychiatry*. 2003; 160:1453–1460. [PubMed: 12900308]
- Evren C, Kural S, Cakmak D. Clinical correlates of childhood abuse and neglect in substance dependents. *Addict Behav*. 2006; 31:475–485. [PubMed: 15964150]
- Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, Koss MP, Marks JS. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med*. 1998; 14:245–258. [PubMed: 9635069]
- Finkelhor D, Ormrod RK, Turner HA. Polyvictimization and trauma in a national longitudinal cohort. *Dev Psychopathol*. 2007; 19:149–166. [PubMed: 17241488]
- First MB, Spitzer RL, Gibbon M, Williams JBW. Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), Clinician Version. 1997
- Glaser D. Emotional abuse and neglect (psychological maltreatment): a conceptual framework. *Child Abuse Negl*. 2002; 26:697–714. [PubMed: 12201163]
- Goodale TS, Stoner SB. Sexual abuse as a correlate of women's alcohol abuse. *Psychol Rep*. 1994; 75:1496–1498. [PubMed: 7886169]
- Grant BF, Harford TC. Comorbidity between DSM-IV alcohol use disorders and major depression: results of a national survey. *Drug Alcohol Depend*. 1995; 39:197–206. [PubMed: 8556968]
- Hasin DS, Stinson FS, Ogburn E, Grant BF. Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2007; 64:830–842. [PubMed: 17606817]
- Heim C, Newport DJ, Bonsall R, Miller AH, Nemeroff CB. Altered pituitary-adrenal axis responses to provocative challenge tests in adult survivors of childhood abuse. *Am J Psychiatry*. 2001; 158:575–581. [PubMed: 11282691]
- Higgins DJ, McCabe MP. Relationships between different types of maltreatment during childhood and adjustment in adulthood. *Child Maltreat*. 2000; 5:261–272. [PubMed: 11232272]
- Kendler KS, Bulik CM, Silberg J, Hettema JM, Myers J, Prescott CA. Childhood sexual abuse and adult psychiatric and substance use disorders in women: an epidemiological and cotwin control analysis. *Arch Gen Psychiatry*. 2000; 57:953–959. [PubMed: 11015813]
- Kessler RC, Crum RM, Warner LA, Nelson CB, Schulenberg J, Anthony JC. Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the National Comorbidity Survey. *Arch Gen Psychiatry*. 1997a; 54:313–321. [PubMed: 9107147]
- Kessler RC, Davis CG, Kendler KS. Childhood adversity and adult psychiatric disorder in the US National Comorbidity Survey. *Psychol Med*. 1997b; 27:1101–1119. [PubMed: 9300515]

- Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the National Comorbidity Survey. *Arch Gen Psychiatry*. 1995; 52:1048–1060. [PubMed: 7492257]
- Koob G, Kreek MJ. Stress, dysregulation of drug reward pathways, and the transition to drug dependence. *Am J Psychiatry*. 2007; 164:1149–1159. [PubMed: 17671276]
- Kroll PD, Stock DF, James ME. The behavior of adult alcoholic men abused as children. *J Nerv Ment Dis*. 1985; 173:689–693. [PubMed: 4056784]
- Langeland W, Draijer N, van den Brink W. Psychiatric comorbidity in treatment-seeking alcoholics: the role of childhood trauma and perceived parental dysfunction. *Alcohol Clin Exp Res*. 2004; 28:441–447. [PubMed: 15084902]
- Langeland W, Hartgers C. Child sexual and physical abuse and alcoholism: a review. *J Stud Alcohol*. 1998; 59:336–348. [PubMed: 9598715]
- MacMillan HL, Fleming JE, Streiner DL, Lin E, Boyle MH, Jamieson E, Duku EK, Walsh CA, Wong MY, Beardslee WR. Childhood abuse and lifetime psychopathology in a community sample. *Am J Psychiatry*. 2001; 158:1878–1883. [PubMed: 11691695]
- Mann RE, Sobell LC, Sobell MB, Pavan D. Reliability of a family tree questionnaire for assessing family history of alcohol problems. *Drug Alcohol Depend*. 1985; 15:61–67. [PubMed: 4017879]
- McGee RA, Wolfe DA, Yuen SA, Wilson SK, Carnochan J. The measurement of maltreatment: a comparison of approaches. *Child Abuse Negl*. 1995; 19:233–249. [PubMed: 7780784]
- Mirsal H, Kalyoncu A, Pektas O, Tan D, Beyazurek M. Childhood trauma in alcoholics. *Alcohol Alcohol*. 2004; 39:126–129. [PubMed: 14998829]
- Nelson EC, Heath AC, Madden PA, Cooper ML, Dinwiddie SH, Bucholz KK, Glowinski A, McLaughlin T, Dunne MP, Statham DJ, Martin NG. Association between self-reported childhood sexual abuse and adverse psychosocial outcomes: results from a twin study. *Arch Gen Psychiatry*. 2002; 59:139–145. [PubMed: 11825135]
- Nemeroff CB. Neurobiological consequences of childhood trauma. *J Clin Psychiatry*. 2004; 65(1):18–28. [PubMed: 14728093]
- Ray LA, Hart E, Chelminski I, Young D, Zimmerman M. Clinical correlates of desire for treatment for current alcohol dependence among patients with a primary psychiatric disorder. *Am J Drug Alcohol Abuse*. 2011; 37:105–110. [PubMed: 21219256]
- Roy A. Childhood trauma and depression in alcoholics: relationship to hostility. *J Affect Disord*. 1999; 56:215–218. [PubMed: 10701480]
- Sachs-Ericsson N, Blazer D, Plant EA, Arnow B. Childhood sexual and physical abuse and the 1-year prevalence of medical problems in the National Comorbidity Survey. *Health Psychol*. 2005; 24:32–40. [PubMed: 15631560]
- Schaefer MR, Sobieraj K, Hollyfield RL. Prevalence of childhood physical abuse in adult male veteran alcoholics. *Child Abuse Negl*. 1988; 12:141–149. [PubMed: 3260808]
- Schafer I, Teske L, Schulze-Thusing J, Homann K, Reimer J, Haasen C, Hissbach J, Wiedemann K. Impact of childhood trauma on hypothalamus-pituitary-adrenal axis activity in alcohol-dependent patients. *Eur Addict Res*. 2010; 16:108–114. [PubMed: 20224278]
- Scher CD, Forde DR, McQuaid JR, Stein MB. Prevalence and demographic correlates of childhood maltreatment in an adult community sample. *Child Abuse Negl*. 2004; 28:167–180. [PubMed: 15003400]
- Schuckit MA, Tipp JE, Bucholz KK, Nurnberger JI Jr, Hesselbrock VM, Crowe RR, Kramer J. The life-time rates of three major mood disorders and four major anxiety disorders in alcoholics and controls. *Addiction*. 1997; 92:1289–1304. [PubMed: 9489046]
- Sesar K, Simic N, Barisic M. Multi-type childhood abuse, strategies of coping, and psychological adaptations in young adults. *Croat Med J*. 2010; 51:406–416. [PubMed: 20960590]
- Skinner H, Horn J. Alcohol Dependence Scale: User's Guide. 1984
- Sobell, LC.; Sobell, MB. Timeline follow-back: a technique for assessing self-reported alcohol consumption. In: Litten, RZ.; Allen, JP., editors. *Measuring Alcohol Consumption: Psychosocial and Biochemical Methods*. 1992. p. 41-72.
- Spertus IL, Yehuda R, Wong CM, Halligan S, Seremetis SV. Childhood emotional abuse and neglect as predictors of psychological and physical symptoms in women presenting to a primary care practice. *Child Abuse Negl*. 2003; 27:1247–1258. [PubMed: 14637300]

- Thombs BD, Lewis C, Bernstein DP, Medrano MA, Hatch JP. An evaluation of the measurement equivalence of the Childhood Trauma Questionnaire--Short Form across gender and race in a sample of drug-abusing adults. *J Psychosom Res.* 2007; 63:391–398. [PubMed: 17905047]
- Walker EA, Gelfand A, Katon WJ, Koss MP, Von Korff M, Bernstein D, Russo J. Adult health status of women with histories of childhood abuse and neglect. *Am J Med.* 1999; 107:332–339. [PubMed: 10527034]
- Weich S, Patterson J, Shaw R, Stewart-Brown S. Family relationships in childhood and common psychiatric disorders in later life: systematic review of prospective studies. *Br J Psychiatry.* 2009; 194:392–398. [PubMed: 19407266]
- Windle M, Windle RC, Scheidt DM, Miller GB. Physical and sexual abuse and associated mental disorders among alcoholic inpatients. *Am J Psychiatry.* 1995; 152:1322–1328. [PubMed: 7653688]
- Wright MO, Crawford E, Del Castillo D. Childhood emotional maltreatment and later psychological distress among college students: The mediating role of maladaptive schemas. *Child Abuse & Neglect.* 2009; 33:59–68. [PubMed: 19167067]

Table 1**Demographic and Clinical Characteristics in Alcohol-Dependent Patients**

	Total	Men	Women
Gender, n (%)	196	134 (68.4)	62 (31.6)
Age (years) (mean $\pm$ SD)	40.5 $\pm$ 10.0	40.6 $\pm$ 9.8	40.2 $\pm$ 10.5
Race, n (%)			
Caucasian	121 (61.7)	77 (57.5)	44 (71.0)
African American	57 (29.1)	44 (32.8)	13 (21.0)
Others ¹	18 (9.2)	13 (9.7)	5 (8.0)
Education years (mean $\pm$ SD)	13.8 $\pm$ 2.6	13.7 $\pm$ 2.8	14.0 $\pm$ 2.1
Lifetime Alcohol Use (mean $\pm$ SD)			
Lifetime - any alcohol use (yrs)	21.1 $\pm$ 9.7	22.1 $\pm$ 9.6	19.0 $\pm$ 9.6
Lifetime - alcohol intoxication (yrs)	14.8 $\pm$ 9.7	16.1 $\pm$ 9.6	11.9 $\pm$ 9.3
Age at first alcohol use	19.4 $\pm$ 6.4	18.6 $\pm$ 5.5	21.1 $\pm$ 7.7
Age at first alcohol intoxication	25.7 $\pm$ 10.3	24.6 $\pm$ 9.7	28.2 $\pm$ 11.0
ADS Score (mean $\pm$ SD)	21.5 $\pm$ 7.8	20.7 $\pm$ 8.0	23.4 $\pm$ 7.1
Family History Density (mean $\pm$ SD)	0.2 $\pm$ 0.2	0.2 $\pm$ 0.2	0.2 $\pm$ 0.2
Timeline Follow Back (90 Days) (mean $\pm$ SD)			
Total Drinks	1089.5 $\pm$ 752.0	1195.7 $\pm$ 771.5	861.7 $\pm$ 658.2
Number of Drinking Days	70.2 $\pm$ 22.7	71.6 $\pm$ 22.6	67.2 $\pm$ 22.8
Average Drinks per Day	14.9 $\pm$ 8.3	16.2 $\pm$ 8.6	12.0 $\pm$ 6.8
Number of Heavy Drinking Days	64.8 $\pm$ 26.7	66.6 $\pm$ 26.6	60.9 $\pm$ 26.7
Breath Alcohol Level at Admission (mean $\pm$ SD)	0.1 $\pm$ 0.1	0.1 $\pm$ 0.1	0.1 $\pm$ 0.1
Laboratory Values at Admission (mean $\pm$ SD)			
Serum GGT (U/L)	195.4 $\pm$ 293.0	216.1 $\pm$ 300.2	150.6 $\pm$ 273.6
Albumin (g/dL)	4.1 $\pm$ 0.4	4.1 $\pm$ 0.4	4.0 $\pm$ 0.3
ALT (U/L)	64.0 $\pm$ 51.5	67.8 $\pm$ 54.8	55.8 $\pm$ 42.9
AST (U/L)	66.2 $\pm$ 79.5	68.2 $\pm$ 83.4	62.0 $\pm$ 70.6
CDT (%)	0.1 $\pm$ 0.1	0.1 $\pm$ 0.1	0.1 $\pm$ 0.05
Lifetime Comorbid Diagnoses, n (%)			
Any Mood Disorder	33 (16.8)	17 (12.7)	16 (25.8)
Major Depressive Disorder	27 (13.8)	13 (9.7)	14 (22.6)
Dysthymic Disorder	6 (3.1)	5 (3.7)	1 (1.6)
Any Anxiety Disorder	72 (36.7)	39 (29.1)	33 (53.2)
Generalized Anxiety Disorder	8 (4.1)	5 (3.7)	3 (4.8)
Panic Disorder	9 (4.6)	5 (3.7)	4 (6.5)
Agoraphobia	7 (3.6)	5 (3.7)	2 (3.2)
Social Phobia	20 (10.2)	14 (10.4)	6 (9.7)
Post-Traumatic Stress Disorder	43 (21.9)	21 (15.7)	22 (35.5)
More Than One Disorders ²	51 (26.0)	25 (18.7)	26 (41.9)
Attempted Suicide, n (%)	25 (12.8)	8 (6.0)	17 (27.4)

Abbreviations: SD = standard deviation; ADS = Alcohol Dependence Severity; GGT = gamma glutamyltransferase; ALT = alanine aminotransaminase; AST = aspartate aminotransferase; CDT = carbohydrate deficient transferring

¹including 1 Hispanics (0.5%), 3 Asians (1.5%), 1 Native Americans (0.5%), 4 multi-racials (2%), and 9 unknown (4.6%).

²includes two or more of any mood disorder, any anxiety disorder, and/or PTSD

Table 2

Prevalence and Distribution of Number of Five Types of CTQ^{1,2} (Data are expressed as n (%))

CTQ Subscale	Total (n = 196)		Men (n = 134)		Women (n = 62)		Chi-Square	p
	No	Yes	No	Yes	No	Yes		
Emotional Abuse	154 (78.6)	42 (21.4)	108 (80.6)	26 (19.4)	46 (74.2)	16 (25.8)	1.03	0.31
Physical Abuse	135 (68.9)	61 (31.1)	95 (70.9)	39 (29.1)	40 (64.5)	22 (35.5)	0.81	0.37
Sexual Abuse	149 (76.0)	47 (24.0)	120 (89.6)	14 (10.4)	29 (46.8)	33 (53.2)	42.60	<0.001
Emotional Neglect	156 (79.6)	40 (20.4)	109 (81.3)	25 (18.7)	47 (75.8)	15 (24.2)	0.80	0.37
Physical Neglect	157 (80.1)	39 (19.9)	107 (79.9)	27 (20.1)	50 (80.7)	12 (19.3)	0.02	0.90
CTQ Total Scores (mean ± SD) 43.3 ± 16.5 40.6 ± 14.7 49.3 ± 18.5								
Number of CTQ Categories Experienced for Each Subject								
0	88 (44.9)		71 (53.0)		17 (27.4)		16.30 0.006	
1	46 (23.5)		27 (20.2)		19 (30.7)			
2	25 (12.8)		15 (11.1)		10 (16.1)			
3	20 (10.2)		11 (8.2)		9 (14.5)			
4	12 (6.1)		9 (6.7)		3 (4.8)			
5	5 (2.6)		1 (0.8)		4 (6.45)			

¹ Cutoff scores for moderate or severe levels of each CTQ subscale were used to classify individuals: Emotional abuse: 13; Physical Abuse: 10; Sexual Abuse: 8; Emotional Neglect: 15; Physical Neglect: 10.

² Co-occurring maltreatment categories are not mutually exclusive.

Logistic Regression Analysis Predicting Comorbid Psychiatric Disorders and Suicide Attempts by Demographic Characteristics, Family History of Alcoholism, and Five Types of CTQ ^a

Table 3

Predictor	Any Mood Disorder	Major Depressive Disorder	Any Anxiety Disorder	PTSD	2 Disorders ^b	Suicide Attempts
Age	1.04 (1.00–1.09)	1.06* (1.00–1.11)	1.01 (0.97–1.05)	1.01 (0.96–1.06)	1.01 (0.97–1.06)	0.97 (0.92–1.02)
Gender ²	1.68 (0.66–4.30)	1.94 (0.69–5.45)	2.80** (1.23–6.38)	2.18 (0.83–5.76)	2.37 (0.95–5.89)	4.49** (1.41–14.25)
Education (years)	1.05 (0.89–1.24)	0.96 (0.80–1.16)	0.92 (0.79–1.07)	1.00 (0.85–1.18)	1.00 (0.85–1.16)	0.99 (0.81–1.21)
Race ¹	0.91 (0.32–2.56)	1.29 (0.42–3.90)	1.27 (0.55–2.91)	2.18 (0.80–5.93)	1.81 (0.71–4.64)	0.27 (0.06–1.19)
Family History Density	1.59 (0.15–17.35)	2.71 (0.22–33.75)	4.62 (0.59–36.40)	0.51 (0.04–6.07)	0.57 (0.06–5.68)	1.04 (0.07–15.65)
Emotional Abuse	4.96** (1.53–16.11)	6.34** (1.80–22.31)	1.92 (0.70–5.26)	3.22* (1.07–9.73)	2.67 (0.97–7.39)	0.48 (0.13–1.88)
Physical Abuse	1.01 (0.36–2.85)	1.28 (0.43–3.81)	2.05 (0.88–4.78)	1.64 (0.64–4.17)	1.99 (0.82–4.83)	11.8*** (3.14–44.33)
Sexual Abuse	2.40 (0.91–6.32)	2.41 (0.84–6.94)	2.43* (1.00–5.92)	5.97*** (2.15–16.62)	5.55*** (2.11–14.59)	1.53 (0.46–5.10)
Emotional Neglect	0.64 (0.18–2.27)	0.51 (0.13–1.96)	1.2 (0.40–3.64)	1.92 (0.58–6.40)	1.53 (0.48–4.85)	0.65 (0.14–3.11)
Physical Neglect	1.31 (0.43–4.00)	1.08 (0.33–3.62)	2.22 (0.85–5.84)	2.69 (0.91–7.96)	3.46* (1.22–9.81)	0.76 (0.19–3.10)

^a All values are given as odds ratio (95% confidence interval)

^b Includes two or more of Any Mood Disorder, Any Anxiety Disorder, and/or PTSD.

¹ African American = 1, otherwise = 0;

² Female = 1, male = 0

* < 0.05;

** P < 0.01;

*** P < 0.001

Logistic Regression Analysis Predicting Comorbid Psychiatric Disorders and Suicide Attempts by Demographic Characteristics, Family History of Alcoholism, and Number of CTQ Categories Experienced ^a

Table 4

Predictor	Any Mood Disorder	Major Depressive Disorder	Any Anxiety Disorder	PTSD	2 Disorders ^b	Suicide Attempts
Age	1.03 (0.99–1.08)	1.04 (1.00–1.09)	1.01 (0.97–1.05)	1.01 (0.97–1.05)	1.01 (0.97–1.06)	0.98 (0.94–1.02)
Gender ²	1.91 (0.83–4.41)	2.18 (0.88–5.37)	3.12*** (1.48–6.58)	3.05** (1.29–7.20)	3.18** (1.41–7.18)	4.89*** (1.88–12.74)
Education years	1.08 (0.93–1.26)	1.01 (0.86–1.19)	0.93 (0.80–1.07)	1.01 (0.87–1.19)	1.01 (0.87–1.17)	1.02 (0.84–1.24)
Race ¹	0.88 (0.34–2.29)	1.35 (0.49–3.67)	1.36 (0.62–2.95)	2.00 (0.79–5.11)	1.76 (0.73–4.21)	0.55 (0.16–1.87)
Family History Density	1.51 (0.15–14.85)	2.14 (0.19–24.15)	5.13 (0.69–38.24)	0.74 (0.07–7.82)	0.87 (0.10–7.95)	0.60 (0.05–7.47)
Number of CTQ Categories	1.52** (1.15–2.02)	1.58** (1.16–2.14)	1.85*** (1.41–2.43)	2.40*** (1.73–3.31)	2.39*** (1.75–3.26)	1.42* (1.04–1.95)

^a All values are given as odds ratio (95% confidence interval)

^b includes two or more of Any Mood Disorder, Any Anxiety Disorder, and/or PTSD.

¹ African American = 1, otherwise = 0;

² Female = 1, male = 0

* < 0.05;

** P < 0.01;

*** P < 0.001

Logistic Regression Analysis Predicting Comorbid Psychiatric Disorders and Suicide Attempts by Demographic Characteristics, Family History of Alcoholism, and CTQ Total Scores^a

Table 5

Predictor	Any Mood Disorder	Major Depressive Disorder	Any Anxiety Disorder	PTSD	2 Disorders ^b	Suicide Attempt
Age	1.03 (0.99–1.08)	1.04 (1.00–1.09)	1.00 (0.96–1.04)	1.01 (0.97–1.05)	1.01 (0.97–1.05)	0.98 (0.93–1.02)
Education years	1.10 (0.94–1.28)	1.03 (0.88–1.21)	1.03 (0.88–1.21)	1.01 (0.87–1.19)	1.03 (0.88–1.19)	1.02 (0.84–1.24)
Race ¹	0.82 (0.31–2.15)	1.25 (0.45–3.47)	1.59 (0.64–3.97)	2.00 (0.79–5.11)	1.45 (0.61–3.45)	0.50 (0.15–1.73)
Family History Density	1.15 (0.11–12.24)	1.56 (0.12–19.55)	0.85 (0.08–8.66)	0.74 (0.07–7.82)	0.92 (0.10–8.44)	0.54 (0.04–6.92)
Gender ²	1.61 (0.68–3.84)	1.76 (0.69–4.52)	2.40 ^{**} (1.02–5.63)	3.05 [*] (1.29–7.20)	2.59 [*] (1.14–5.86)	4.49 ^{**} (1.71–11.85)
CTQ total scores	1.05 ^{***} (1.03–1.08)	1.06 ^{***} (1.03–1.09)	1.05 ^{***} (1.03–1.07)	1.08 ^{***} (1.05–1.11)	1.08 ^{***} (1.05–1.11)	1.04 ^{**} (1.01–1.06)

^a All values are given as odds ratio (95% confidence interval)

^b includes two or more of Any Mood Disorder, Any Anxiety Disorder, and/or Post-Traumatic Stress Disorder.

¹ African American = 1, otherwise = 0;

² Female = 1, male = 0

* < 0.05;

** P < 0.01;

*** P < 0.001