Childhood Exposure to Psychological Trauma and the Risk of Suicide Attempts: The Modulating Effect of Psychiatric Disorders

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Objective We examined whether childhood exposure to psychological trauma is associated with greater suicidality and whether specific psychiatric disorders modulate this association in a representative sample of Korean adults.

Methods The Korean version of the Composite International Diagnostic Interview 2.1 was administered to 6,027 subjects aged 18−74 years. Subjects who experienced a traumatic event before the age of 18 years, the childhood-trauma-exposure group, were compared with controls without childhood trauma exposure.

Results Childhood exposure to psychological trauma was associated with lifetime suicidal ideation (OR=3.19, 95% CI=2.42−4.20), suicide plans (OR=4.15, 95% CI=2.68−6.43), and suicide attempts (OR=4.52, 95% CI=2.97−6.88). These associations weakened after further adjustment for any psychiatric disorders, but they were not eliminated. The risk of suicide attempts related to childhood trauma increased with the presence of a concurrent alcohol use, depressive, or eating disorder.

Conclusion In terms of clinical implications, patients with these disorders who have a history of childhood trauma should be carefully assessed for their suicide risk and aggressively treated for psychiatric disorders. **Psychiatry Investig 2015;12(2):171-176**

Key Words Trauma, Psychiatric disorders, Suicide.

INTRODUCTION

In 2011, South Korea had the highest suicide rate of all countries that belong to the Organization for Economic Cooperation and Development (OECD) (33.3 suicides per 100,000 population).[1] Significant associations between retrospectively reported childhood exposure to psychological trauma and increased lifetime suicide risk have been documented by numerous studies.[2-4] Because of the well-known association between childhood trauma and adult psychiatric disorders, including important risk factors for suicide attempts[5,6] such as affective disorders and alcohol abuse,[7-10] it is necessary to examine the

effect of psychiatric disorders on the association between childhood trauma and subsequent suicidal behavior.

In a retrospective cohort study of 17337 adults in San Diego County who completed a survey about adverse childhood experiences, suicide attempts, and multiple other health-related issues, Shanta et al.[2] found that adverse childhood experiences in any category increased the risk of attempted suicide 2- to 5-fold. The ACE score had a strong, graded relationship to attempted suicide during childhood/adolescence and adulthood. Adjustment for illicit drug use, depressed affect, and self-reported alcoholism reduced the strength of the relationship between the ACE score and suicide attempts. Data from the Childhood Trauma Survey conducted via telephone in Australia (n=2,559), Bedi et al.[11] found that among those sexually abused as children, odds of suicide attempts were 3.4 times higher among women and 2.8 times higher among men, compared with those not abused. Odds ratios (OR) were reduced (2.6 for women and 2.3 for men), but remained statistically significant after adjusting for the presence of major depressive disorder. In the National Comorbidity Survey of the US using the Composite International Diagnostic Interview (CIDI)

(n=5,877), Molnar et al.[4] also found that controlling for lifetime psychiatric illnesses weakened the association between childhood abuse and suicide attempts, but it did not eliminate this association. All of these studies suggest partial mediation of the childhood traumatic experience-suicide attempt relationship by the psychopathology such as depression.[2,4,11] However, it is not clear whether the impact of childhood trauma on subsequent suicide attempts is modulated by the occurrence of psychiatric disorders (Figure 1A) as well as mediated by the certain psychopathology (Figure 1B). In other words, it remains unknown whether the degree of the association between childhood trauma and suicide attempts differ or not between groups with and without specific psychiatric disorders.

In this investigation, we attempted to further clarify the complex relationships between childhood trauma, psychopathology, and suicidal behavior using a nationally representative sample of South Koreans. We tested the following hypotheses: 1) childhood trauma is independently associated with suicidal behavior, including suicidal ideation, plans, and attempts, even after controlling for psychiatric disorders and 2) specific psychiatric disorders not only mediate the association between childhood trauma and suicide attempts, but also modulate the association.

METHODS

Sample

The Korean Epidemiologic Catchment Area (KECA) study was conducted in 2001[12] and 2006[13] to determine the lifetime and 12-month prevalence, socioeconomic correlates, and comorbidities of the major mental disorders included in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) among Korean adults. In 2011, a follow-up to the KECA study was conducted. Subjects were selected using a stratified, multi-stage, clustered sampling design based on the population census conducted by community registry offices in 2010. The individual with the earliest birthday (i.e., the earliest date within the birth month) was chosen from each randomly selected household. Of the 8,196 subjects (aged 18–74 years) who were initially selected, a total of 6,027 participated in face-to-face interviews (73.5% response rate).

In all, 78 interviewers were recruited from each catchment area. These interviewers were psychiatric nurses, social workers, and medical students, all of whom were familiar with psychiatric epidemiologic surveys. The three psychiatrists who served as trainers were certified by the CIDI training center at the University of Michigan. All interviewers participated in a five-day training session that included didactic sessions to review general interview skills and the interview instrument, mock interviews, and role-playing exercises. Trainers monitored interviews on closed-circuit television and provided feedback to the interviewers.

The study protocol was approved by the institutional review board of the Seoul National University College of Medicine. Each subject was fully informed of the study objectives and methods before the interview. Written informed consent was obtained from all subjects prior to their participation in the study.

Measurement

Trained lay interviewers administered the Korean version of the Composite International Diagnostic Interview (K-CIDI).[14] The CIDI[15] is a fully structured diagnostic tool designed to determine psychiatric diagnoses based on the definitions and criteria in the DSM-IV.[16] The K-CIDI[14] was developed according to World Health Organization (WHO) guidelines.[17] The inter-rater reliability, test/retest reliability, and validity of the K-CIDI are characterized by kappa values of 0.86–1.00, 0.42–0.89, and 0.50–1.00, respectively. For purposes of the present study, the DSM-IV diagnoses were collapsed into eight diagnostic groups: alcohol use disorders, depressive disorders, bipolar disorders, psychotic disorders, anxiety disorders, somatoform disorders, and eating disorders.

Based on the PTSD section of the K-CIDI,[14] exposure to the following potentially traumatic experiences (at any time during an individual's life) was initially assessed: military combat, sudden injury/accident to the subjects, natural disaster, seeing someone hurt or killed, rape, sexual assault, physical assault, threat/kidnapping, torture, or another kind of traumatic event. Each subject's age at the time of each event was also recorded.
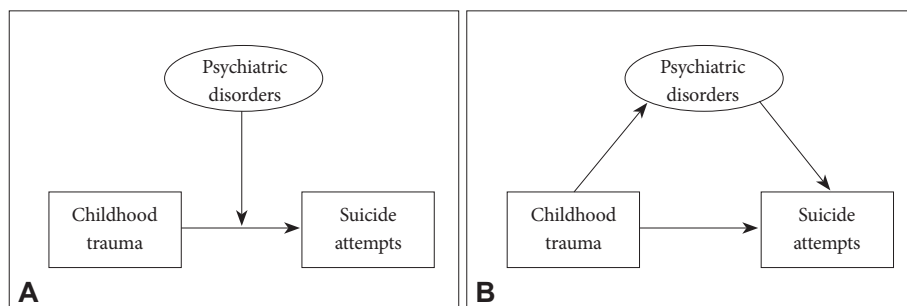

Figure 1. Modulation (A) and mediation (B) of the relationship between childhood trauma and suicide attempts by psychiatric disorders.

Subjects who experienced a traumatic event before the age of 18 years were placed in the childhood-trauma-exposure (CTE) group and subjects who did not experience such an event were placed in the control (non-CTE) group.

We used the K-CIDI module addressing suicide to assess lifetime suicidality. Suicidal ideation was assessed with the following question: "Have you ever seriously thought of committing suicide?" Existence of a suicide plan was assessed with the following question: "Have you ever concretely planned suicide?" Suicide attempts were assessed with the following question: "Have you ever attempted suicide?" Data about age at the time of the first suicide attempt and the number of suicide attempts were also collected.

Statistical analyses

We calculated weighted values for each respondent to approximate the national population with respect to the age and sex distribution in each catchment area based on the 2010 Korean National Statistical Office census. All statistical analyses were performed using these data.

To identify possible confounders that mediated the association between childhood trauma and suicidal behaviors, we compared the socio-demographic characteristics and lifetime prevalence of psychiatric disorders between CTE and non-CTE groups. Group differences were computed using t-tests for continuous variables and chi-square tests for categorical variables. Using an alpha level <0.1, we found significant group differences in sex (p=0.093), age (p<0.001), marital status (p<0.001), and the prevalence of alcohol use, major depressive, psychotic, anxiety, and eating disorders (p<0.001, each) (Table 1).

Logistic regression analysis was used to calculate ORs and 95% confidence intervals (CIs) using lifetime suicidal behavior as the main outcome variables and childhood trauma as the principal predictor. Two models were used to explore the effect of childhood trauma on lifetime suicidal behavior: model 1 included sex, age, and marital status as covariates; model 2 included the presence of an alcohol use, depressive, psychotic, anxiety, and eating disorder as well as sex, age, and marital status as covariates.

We then explored the modulation of the relationship between childhood trauma and suicide attempts by the presence of each psychiatric disorder using Baron and Kenny's method. Multiple linear regression models were constructed with suicide attempts as the dependent variable and each psychiatric disorder, childhood trauma, sex, age, and marital status as independent variables. Subsequently, the modulation of each

Table 1. Socio-demographic and clinical characteristics of subjects with and without childhood trauma exposure (CTE)

	No CTE (N=5,782)	CTE (N=240)	χ^2	p
Sex, female (%)	49.9	55.4	2.83	0.093
Age (years), mean±SD	43.2±14.6	37.7±15.8	5.68	<0.001
Marital status (%)			22.71	<0.001
Married	61.8	46.4		
Unmarried	46.4	53.6		
Education (%)			1.10	0.576
Middle school education or lower	21.4	18.8		
High school education	35.2	37.7		
College degree or higher	43.4	43.5		
Income (%)			4.51	0.105
Low	38.4	43.6		
Middle	27.0	20.2		
High	34.6	36.2		
Psychiatric diagnosis (%)				
Alcohol use disorders	13.0	25.0	28.19	<0.001
Depressive disorders	6.1	21.3	84.94	<0.001
Bipolar disorders	0.2	0.4	0.60	0.385
Psychotic disorders	0.5	3.8	41.78	<0.001
Anxiety disorders	8.2	21.5	50.65	<0.001
Somatoform disorders	1.5	2.2	0.73	0.392
Eating disorders	0.1	1.3	17.66	0.006

SD: standard deviation

psychiatric disorder on the relationship between childhood trauma and suicide attempts was explored by including an interaction term in the models. An interaction term was constructed by multiplying the two main components, childhood trauma and each psychiatric disorder. To meet the assumptions of the model, all variables except age (continuous variable) were converted into dummy variables as follows: childhood trauma (0=absence, 1=presence), each psychiatric disorder (0=absence, 1=presence), sex (0=male, 1=female), and marital status (0=married, 1=unmarried).

SPSS (version 21.0; SPSS Inc., Chicago, IL, USA) was used to perform all statistical analyses, and a p-value less than 0.05 was considered significant.

RESULTS

Table 2 shows the association between childhood trauma and suicidal behaviors. The lifetime prevalence of suicidal ideation (AOR=3.19, 95% CI=2.42−4.20), suicide plans (AOR=4.15, 95% CI=2.68−6.43), and suicide attempts (AOR=4.52, 95% CI=2.97−6.88) was significantly associated with CTE after adjusting for covariates (sex, age, and marital status). These associations weakened after further adjustment for psychiatric disorders, but they were not eliminated.

Table 3 shows the modulation of the relationship between childhood trauma and suicide attempts by the presence of each psychiatric disorder. There was a significant association between childhood trauma and suicide attempts after controlling for sex, age, and marital status (Unstandardized regression coefficients, B=0.37, p<0.001). Model 1, which included each psychiatric disorder, childhood trauma, sex, age, and marital status as independent variables, revealed a significant association between all psychiatric disorders and suicide attempts as well as an association between childhood trauma and suicide attempts (all p<0.001). Model 2, which included an interaction term to investigate the possible modulation of childhood trauma by each psychiatric disorder, revealed a significant interaction between CTE and alcohol use disorders (B=0.29, p= 0.007), depressive disorders (B=0.35, p=0.002), or eating disorders (B=2.26, p<0.001), but the interactions between childhood trauma and psychotic disorders, anxiety disorders, or somatoform disorders were not significant.

DISCUSSION

We found that a history of childhood trauma is associated with an increased risk of suicidal ideation, suicide plans, and suicide attempts. These risks were somewhat reduced in magnitude, but most remained significant, after controlling for psychiatric disorders, suggesting partial mediation of the childhood trauma-suicide relationship by psychiatric disorders.

Our results are consistent with previous studies,[2,4,11] that found that the psychopathology, such as depression, associated with childhood trauma only partially mediates the relationship between childhood trauma and suicidal behaviors. However, this result differs somewhat from the findings of other studies. In a longitudinal cohort study of adolescents in New Zealand, Fergusson et al.[18] found that controlling for psychiatric disorders and stressful life events eliminated the association between childhood adversity and suicidal behaviors and concluded that mental illness and stressful life events fully mediate this relationship. Martin et al.[19] also found that depression completely mediated the association between childhood sexual abuse and suicidality in girls. The disparate results (i.e., partial mediation by psychiatric disorders in the present study and complete mediation by psychiatric disorders in the previous studies) can be accounted for differences in trauma type and participants ages. At the time of investigation, participants' ages were at age 18 in the study by Fergusson et al.[18] and were aged 14 years on average in the study by Martin et al.,[19] while our participants' ages ranged from 18 to 74 years. Previous two studies investigated only examined the childhood sexual abuse, but we investigated various type of trauma including sexual abuse.

Interestingly, we found that certain psychiatric disorders may have a modulating effect as well as a mediating effect on the relationship between childhood trauma and suicide attempts. The risk of suicide attempts related to childhood trauma increased with the presence of a concurrent alcohol use, depressive, or eating disorder (Figure 1). In other words, a Korean who had both a childhood trauma and an alcohol use disorder (or depressive disorder or eating disorder) had a higher risk of suicide attempts than another one who had only childhood trauma. Our results indicate that preventing depression, alcohol use disorders, and eating disorders may be an effective way to prevent suicide among people with a history of childhood trauma. In contrast, the risk of suicide attempts related to childhood trauma was not different according to the presence or absence of a psychotic disorder, anxiety disorder, or somatoform disorder, although these psychiatric conditions were significantly associated with such attempts. However, the size of the some diagnostic groups (i.e., psychotic disorder, eating disorder, and somatoform disorder) did not provide sufficient statistical power to detect modest differences. Therefore, negative findings must be interpreted with caution.

This study has several limitations. First, like most epidemiologic studies, this study did not use an in-depth or validated index of trauma or a complete list of potentially traumatic events. Thus, we may have underestimated the prevalence of

Table 2. Lifetime prevalence of suicidality among subjects with and without childhood trauma exposure (CTE)

	No CTE (%, N=5,782)	CTE (%, N=240)	AOR (95% CI)*	p	AOR (95% CI)†	p
Suicidal ideation	14.8	36.4	3.19 (2.42–4.20)	<0.001	2.12 (1.55–2.91)	<0.001
Suicide plans	2.9	11.3	4.15 (2.68–6.43)	<0.001	2.28 (1.37–3.79)	0.002
Suicide attempts	2.8	12.5	4.52 (2.97–6.88)	<0.001	2.42 (1.49–3.93)	<0.001

*adjusted for age, sex, and marital status, †adjusted for alcohol use disorders, depressive disorders, anxiety disorders, psychotic disorders, and eating disorders as well as for age, sex, and marital status. AOR: adjusted odd ratio

Table 3. Results of multiple linear regression models exploring the effect of psychiatric disorders and childhood trauma on suicide attempts

	Model 1			Model 2		
	B	p	F (df=5)	B	p	F (df=6)
Constant	0.81	<0.001	44.20	0.82	<0.001	38.09
Childhood trauma	0.34	<0.001		0.26	<0.001	
Alcohol use disorders	0.29	<0.001		0.27	<0.001	
Trauma×Alcohol use disorders				0.29	0.007	
Constant	0.96	<0.001	71.07	0.96	<0.001	60.87
Childhood trauma	0.30	<0.001		0.23	<0.001	
Depressive disorders	0.56	<0.001		0.52	<0.001	
Trauma×Depressive disorders				0.35	0.002	
Constant	0.93	<0.001	26.65	0.93	<0.001	22.66
Childhood trauma	0.35	<0.001		0.34	<0.001	
Psychotic disorders	0.62	<0.001		0.51	<0.001	
Trauma×Psychotic disorders				0.45	0.103	
Constant	0.95	<0.001	55.45	0.95	<0.001	46.45
Childhood trauma	0.31	<0.001		0.28	<0.001	
Anxiety disorders	0.42	<0.001		0.41	<0.001	
Trauma×Anxiety disorders				0.14	0.231	
Constant	0.95	<0.001	26.23	0.95	<0.001	21.93
Childhood trauma	0.34	<0.001		0.34	<0.001	
Somatoform disorders	0.45	<0.001		0.46	<0.001	
Trauma×Somatoform disorders				-0.21	0.514	
Constant	0.93	<0.001	34.04	0.93	<0.001	31.72
Childhood trauma	0.36	<0.001		0.34	<0.001	
Eating disorders	1.85	<0.001		1.22	<0.001	
Trauma×Eating disorders				2.26	<0.001	

Independent variables are displayed in the first column, and the dependent variable is lifetime suicide attempts. All analyses included sex, age, and marital status as confounding variables (not shown in Table). Model 1 includes sex, age, marital status, childhood trauma, and each psychiatric disorder as an independent variable; Model 2 includes childhood trauma×each psychiatric disorder interaction term in addition to the variables in model 1. Diagnoses with prevalence rates lower than 0.5%, such as bipolar disorders, were not examined. B: Unstandardized regression coefficients

childhood trauma. Second, the design of this study was cross-sectional, rendering identification of a causal relationship between childhood trauma and suicide attempts impossible. Third, confounding factors, such as social, family, and premorbid factors, such as preexisting disorders, may affect both the prevalence of trauma exposure and the risk for suicide attempts. Additionally, the relationship between the trauma exposure and suicide attempts may have been mediated by any of the aforementioned factors. Finally, because the subjects were asked to recall trauma that they may have experienced in the distant past, the respondents' reports may be characterized by inaccuracies. Therefore, future longitudinal studies are needed to further clarify the causal relationships among childhood trauma, psychopathology, and suicidality.

Even within the context of these limitations, the findings of this study demonstrate that the risk of suicide attempts related

to childhood trauma increased with the presence of a concurrent alcohol use disorder, depressive disorder, or eating disorder. In terms of clinical implications, patients with these disorders and with a history of childhood trauma should be carefully assessed for their suicide risk and aggressively treated for psychiatric disorders.

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