

Original Article  
Psychiatry & Psychology



# The Association of Childhood Maltreatment with Adulthood Mental Disorders and Suicidality in Korea: a Nationwide Community Study

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OPEN ACCESS

Received: Feb 7, 2021  
Accepted: Aug 2, 2021

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## ABSTRACT

**Background:** Although childhood maltreatment is a known risk factor for adulthood mental health, the impact of different types of childhood maltreatment on mental disorders is not yet clear. This study explored the association of each type of childhood maltreatment with adulthood mental disorders and suicidality in South Korea.

**Methods:** A total of 5,102 individuals from the general populations over the age of 18 responded to the Korean version of the Composite International Diagnostic Interview and questions about childhood maltreatment (emotional neglect, psychological abuse, physical abuse, and sexual abuse). To evaluate the odds ratio for mental disorders and suicidality associated with each type of childhood maltreatment, we used logistic regression analysis.

**Results:** About 17.0% of the respondents reported having experienced a type of maltreatment in childhood. According to the type, 9.4% reported physical abuse, 9.3% reported emotional neglect, 7.9% reported psychological abuse, and 3.8% reported sexual abuse. Exposure to each type of childhood maltreatment was associated with most types of mental disorders after adjusting for sociodemographic factors. Each type of childhood maltreatment victim was associated with suicidality (suicidal ideations, suicide plans, and suicide attempts). Dose-response patterns for suicide attempts were observed in all types of victims. Moreover, the respondents who experienced frequent childhood emotional neglect were 14 times more likely to have attempted suicide.

**Conclusion:** Childhood maltreatment was associated with mental health in adulthood. The findings show the need for early detection and intervention of victims of childhood maltreatment to minimize its negative impact on adult mental health.

**Keywords:** Child Abuse; Mental Disorders; Mental Health; Suicide; Korea

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### Funding

This study was supported by the Korean Ministry of Health and Welfare (2016).

### Disclosure

The authors have no potential conflicts of interest to disclose.

### Author Contributions

Conceptualization: Lee J, Kim BS, Hong JP. Data curation: Kim BS, Kim H, Hong JP, Jeon HJ. Formal analysis: Lee J, Kim BS. Investigation: Chang SM, Lee DW, Hahm BJ, Cho SJ, Park JI, Kim BS, Seong SJ. Methodology: Lee J, Kim BS, Chang SM, Hong JP. Writing - original draft: Lee J, Kim BS. Writing - review & editing: Kim BS, Park JE.

## INTRODUCTION

Despite various efforts to prevent child maltreatment, child maltreatment incidents are increasing in number, creating a social resentment that goes beyond grief. The experience of abuse or neglect in childhood is a serious hazard to social and psychological development and adaptation throughout the entire growth process, from infancy to early adulthood.<sup>1</sup> Childhood maltreatment causes a variety of internal and external problems, as well as unstable attachment and emotional control difficulties.<sup>2</sup> Furthermore, childhood maltreatment has been a risk factor for adulthood mental disorders (such as depressive disorders or anxiety disorders), as well as more negative prognoses and poorer social adaptation.<sup>3</sup> There are reports that parents who have experienced maltreatment in childhood have negative or abusive behavior toward their children, suggesting an intergenerational transmission of child maltreatment experiences.<sup>4</sup> In short, childhood maltreatment is a major worldwide public health issue.

The characteristics of childhood maltreatment might differ from country to country based on their social and cultural background.<sup>5</sup> In Korea, corporal punishment for children has been condoned in a cultural atmosphere that emphasizes a hierarchical social structure and parental authority.<sup>6</sup> In a previous study, the pattern of child maltreatment in Korean families differed from that of non-Korean families in Los Angeles.<sup>7</sup> Compared with all other groups, immigrant Korean families were 4 times more likely to be accused of physical abuse but were less likely to be accused of neglect.<sup>7</sup> This previous study was conducted on Korean immigrants living in Los Angeles. There is a need to explore the prevalence of childhood maltreatment and its impact on mental health in the general population of Korea.

So far, there have been limited data on mental health of adults who had experienced childhood maltreatment. Some studies have evaluated the difference in symptoms with and without childhood maltreatment in specific disease groups (i.e., depression, psychosis) in clinical settings.<sup>8,9</sup> Another study investigated the association of childhood maltreatment with mental health based on symptoms such as depressive mood rather than by diagnosis.<sup>10</sup> In Korea, there have been no large-scale studies on the impact of childhood maltreatment on mental disease (diagnosis) in the general population. Although several large-scale general population studies have been conducted in other countries, additional studies are needed in Korea due to social and cultural differences. There is also a need to investigate and address mental illness outcomes based on the diagnosis rather than the symptoms, given that the prognosis and treatment strategies might vary depending on the diagnosis of maltreatment in individuals who exhibit the same symptoms.

We employed data from the 2016 Korean Epidemiologic Catchment Area study (KECA-2016) and analyzed the association of each type of childhood maltreatment with mental disorders and suicidality in adults. We also assessed whether there is a dose-response relationship: i.e., as the frequency of each childhood maltreatment increases, the odds ratios (ORs) of adverse mental health increases.

## METHODS

### Data sample and design

We conducted the KECA-2016, a nationwide study of mental disorders, from April to November in 2016. This study was conducted on the general population aged 18 or older with South Korean citizenship. We employed a multistage stratified cluster sampling design for this study, which was based on the 2010 population and housing census of Korea to maintain the population's representativeness. We selected one person per household using the last-birthday method. Interviewers underwent 5 days of training according to the standard materials provided by the World Health Organization (WHO).<sup>11,12</sup> The final 5,102 respondents replied to face-to-face interview in the private space of each respondent's home. Detailed methods of the KECA-2016 have been described elsewhere.<sup>13</sup>

### Assessment of sociodemographic factors

Through interviews, we obtained data on the sociodemographic factors: age (18–29 years, 30–44 years, 45–59 years, and  $\geq 60$  years), area of residence (rural/urban), employment status (unemployed/employed), gender (men/women), marital status (married/never married/widowed, divorced, or separated) and years of education ( $\leq 12$  years or  $\geq 13$  years).

### Assessment of childhood maltreatment exposure

We assessed four types of childhood maltreatment through structured interviews: emotional neglect, psychological abuse, physical abuse, and sexual abuse. The concept of each childhood maltreatment exposure was redefined in this study with reference to previous studies.<sup>14-17</sup> Considering that a large number of questions may decrease the response rate, we developed four questions, one for each type of childhood maltreatment.<sup>18</sup> After that, three psychiatrists verified the validity of the content (each item's item-content validity index = 1.0 [all], and scale-content validity index = 1.0). The questionnaire represented appropriate internal consistency in this study (Cronbach's alpha value = 0.72). Respondents answered four questions regarding exposure to each type of maltreatment according to the following explanations provided for each definition:

- 1) Emotional neglect: Having “emotional neglect” means for example that the family members have not listened to you, that the family members ignored the difficulties you have had, that you have felt you couldn't get any attention or help from the family members.
- 2) Psychological abuse: Having “psychological abuse” means for example that being insulted, being poorly treated compared to brothers or sisters, being punished unfairly, or being threatened.
- 3) Physical abuse: Having “physical abuse” means that you have been beaten, kicked, punched or you have experienced any other kind of physical abuse.
- 4) Sexual abuse: “Sexual contact” means that someone touched your sexually sensitive area, or forced you to touch their body even though you did not want to, or someone forced you to have sexual intercourse even though you did not want to.

The response options were “none”, “once”, “a few times”, and “many times”, and we considered respondents who selected any option other than “none” as having experienced childhood maltreatment. We used two categories to assess the frequency of each maltreatment. “Occasional victims” included respondents who experienced each maltreatment “once” or “a few times”; while “frequent victims” included respondents who experienced each maltreatment “many times”.

### Assessment of the mental disorders

In this study, we employed the Korean version of the Composite International Diagnostic Interview 2.1 (K-CIDI).<sup>19</sup> The mental disorders evaluated using the Diagnostic and Statistical Manual of Mental Disorders, fourth edition criteria in this study were alcohol use disorders (alcohol abuse and alcohol dependence), anxiety disorders (agoraphobia, generalized anxiety disorder [GAD], obsessive-compulsive disorder [OCD], panic disorder, post-traumatic stress disorder [PTSD], social phobia, and specific phobia), and mood disorders (bipolar disorder, dysthymic disorder, and major depressive disorder), nicotine use disorders (nicotine dependence and nicotine withdrawal), and psychotic disorders (brief psychotic disorder, delusional disorder, schizoaffective disorder, schizophrenia, and schizophreniform disorder). To assume that exposure to the childhood maltreatment preceded the onset of mental disorder, only cases with an onset of the mental disorder at the age of 18 years or older were considered in the adulthood prevalence assessment.

### Assessment of the suicidality (suicidal ideations, plans, and attempts)

We examined suicidality by employing the modified Suicide Prevention Multisite Intervention Study on Suicidal Behaviors that was developed by the WHO.<sup>20</sup> To determine the suicidal ideations, the interviewer asked the respondents, "Have you ever seriously thought about committing suicide?" To determine the suicide plans, the interviewer asked the respondents, "Have you ever made a plan for committing suicide?" To determine the suicide attempts, the interviewer asked the respondents, "Have you ever attempted suicide?" All suicidality variables were assessed as binomial (absent or present). To establish a temporal relationship with childhood maltreatment, we considered only cases with an onset of suicidality at 18 years of age or older. Thus, cases of suicidality that occurred before childhood maltreatment began were excluded.

### Statistical analysis

In order to adjust for the differential probabilities of selection, the standardized weights were allocated in proportion to the ratio of the population with respect to gender and age defined in the 2015 census of the Korea National Statistical Office. We compared the sociodemographic characteristics between the non-victims and maltreatment victims by employing Pearson's  $\chi^2$  test. We also performed logistic regression analyses to evaluate the ORs of the sociodemographic factors for each type of maltreatment. For these analyses, we employed a two-sided test at the 0.05 level to evaluate statistical significance. To evaluate the ORs for the mental disorders, logistic regression analyses were performed using the experience of each type of childhood maltreatment as the independent variable after controlling for sociodemographic factors. For suicidality, logistic regression analyses were performed while controlling for sociodemographic factors and mental disorders (alcohol use disorders, anxiety disorders, mood disorders, nicotine use disorders, and psychotic disorders). To reduce the likelihood of false-positive results when performing the multiple comparisons, the original *P* value for the individual tests was divided by the number of hypotheses (Bonferroni correction). We performed all statistical analyses using the Statistical Package for Social Science, version 25.0 (IBM Co., Armonk, NY, USA).

### Ethics statement

The institutional review board of Samsung Seoul Hospital granted permission for this study (No. 2016-05-014). We provided all respondents with information on the aims and methods of this study, and then all of the respondents gave their written informed consent before participation.

## RESULTS

### Sociodemographic distribution

The study sample consisted of 4,971 respondents who completed the full psychiatric diagnostic interview including questions on childhood maltreatment. About 1 in 6 (17.0%) individuals in the general population in Korea reported having experienced childhood maltreatment. By type, 9.4% reported physical abuse, 9.3% reported emotional neglect, 7.9% reported psychological abuse, and 3.8% reported sexual abuse. The sociodemographic characteristics of non-victims and victims of each type of childhood maltreatment are presented in **Table 1**. Victims of all types were more likely to be younger (**Table 2**). The psychological abuse and sexual abuse were associated with being women, and emotional neglect was associated with being unemployed. There were no significant differences in terms of the area of residence, educational level, and marital status.

### Associations of each type of childhood maltreatment with mental disorders in adulthood

**Table 3** shows the prevalence and ORs of mental disorders in adulthood. Exposure to each type of childhood maltreatment was associated with numerous types of mental disorders after controlling for sociodemographic factors, but there were differences in the association with mental disorders according to the type of maltreatment. Childhood maltreatment showed an association to anxiety disorder groups, but the association of each individual disease (specific diagnosis) was different. The association was found only in PTSD, GAD, and agoraphobia, and, in particular, the association between maltreatment and PTSD was high. The ORs for emotional neglect were higher than those for other types of childhood maltreatment in the anxiety disorders. Dose-response patterns were observed between the

**Table 1.** Sociodemographic characteristics of the participants<sup>a</sup>

Variables	Total (n = 4,971)	Non-victims (n = 4,137)	Victims (n = 834)	Emotional neglect (n = 468)	Psychological abuse (n = 416)	Physical abuse (n = 452)	Sexual abuse (n = 173)	P value <sup>b</sup>
Gender								0.024
Men	1,894 (49.5)	1,592 (50.2)	302 (46.0)	167 (45.4)	130 (37.6)	193 (53.9)	46 (38.0)	
Women	3,077 (50.5)	2,545 (49.8)	532 (54.0)	301 (54.6)	286 (62.4)	259 (46.1)	127 (62.0)	
Age, yr								< 0.001
18–29	750 (19.5)	576 (17.9)	174 (27.1)	109 (31.7)	80 (24.4)	88 (23.4)	38 (30.7)	
30–44	1,269 (28.0)	1,011 (27.5)	258 (30.0)	130 (26.7)	124 (28.9)	146 (31.4)	72 (38.0)	
45–59	1,370 (29.7)	1,145 (30.1)	225 (27.7)	120 (24.4)	117 (29.7)	130 (30.6)	42 (20.3)	
≥ 60	1,582 (22.9)	1,405 (24.5)	177 (15.2)	109 (17.2)	95 (17.0)	88 (14.6)	21 (10.9)	
Education, yr								< 0.001
≤ 12	2,682 (46.8)	2,299 (48.3)	383 (39.2)	220 (40.3)	208 (43.1)	220 (42.3)	64 (33.3)	
≥ 13	2,289 (53.2)	1,838 (51.7)	451 (60.8)	248 (59.7)	208 (56.9)	232 (57.7)	109 (66.7)	
Area of residence								0.001
Urban	3,171 (66.2)	2,606 (65.2)	565 (71.0)	313 (71.1)	272 (69.0)	317 (71.3)	128 (75.5)	
Rural	1,800 (33.8)	1,531 (34.8)	269 (29.0)	155 (28.9)	144 (31.0)	135 (28.7)	45 (24.5)	
Employment								0.133
Employed	1,886 (43.8)	1,567 (44.3)	319 (41.5)	161 (36.9)	155 (43.1)	195 (48.4)	68 (42.2)	
Unemployed	3,085 (56.2)	2,570 (55.7)	515 (58.5)	307 (63.1)	261 (56.9)	257 (51.6)	105 (57.8)	
Marital status (missing = 2)								< 0.001
Married	3,038 (64.0)	2,559 (65.2)	479 (58.2)	256 (54.3)	231 (58.4)	254 (59.2)	112 (61.3)	
Never married	1,027 (25.2)	795 (23.6)	232 (33.1)	140 (37.0)	120 (31.5)	129 (31.0)	43 (31.9)	
Widowed/divorced/separated	904 (10.8)	782 (11.2)	122 (8.7)	71 (8.7)	64 (10.2)	69 (9.8)	18 (6.8)	

Values are presented as number (%).

<sup>a</sup>The number of study participants was not weighted, but other demographic characteristics were assigned standardized weighted values with respect to gender and age as defined by the 2015 census of Korea National Statistical Office. <sup>b</sup>We performed Pearson's  $\chi^2$  test to compare the sociodemographic characteristics between non-victims and maltreatment victims.

**Table 2.** Results of the logistic regression of sociodemographic factors associated with each type of childhood maltreatment<sup>a</sup>

Variables	Any victims	Emotional neglect	Psychological abuse	Physical abuse	Sexual abuse
<b>Gender</b>					
Men	1.00	1.00	1.00	1.18 (0.98–1.43)	1.00
Women	1.21 (1.04–1.41)*	1.19 (0.98–1.45)	1.73 (1.40–2.14)***	1.00	1.72 (1.28–2.32)***
<b>Age, yr</b>					
18–29	2.27 (1.75–2.95)***	2.46 (1.84–3.28)***	1.85 (1.34–2.56)***	1.97 (1.44–2.70)***	3.60 (2.17–5.97)***
30–44	1.62 (1.26–2.09)***	1.45 (1.07–1.98)*	1.47 (1.08–2.01)*	1.83 (1.36–2.47)***	3.04 (1.86–4.97)***
45–59	1.44 (1.14–1.83)**	1.21 (0.89–1.65)	1.40 (1.03–1.91)*	1.67 (1.24–2.24)**	1.49 (0.87–2.55)
≥ 60	1.00	1.00	1.00	1.00	1.00
<b>Education, yr</b>					
≤ 12	1.00	-	-	-	-
≥ 13	1.18 (0.99–1.40)	-	-	-	-
<b>Area of residence</b>					
Urban	-	-	-	-	-
Rural	-	-	-	-	-
<b>Employment</b>					
Employed	1.00	1.00	-	-	-
Unemployed	1.15 (0.97–1.36)	1.26 (1.02–1.57)*	-	-	-
<b>Marital status</b>					
Married	-	-	-	-	-
Never married	-	-	-	-	-
Widowed/divorced/separated	-	-	-	-	-

Values are presented as odds ratio (95% confidence interval).

<sup>a</sup>Adjusted for other sociodemographic factors in the multiple logistic regression analyses with a backward stepwise method.

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

frequency of any childhood maltreatment and the ORs of alcohol use disorders, anxiety disorders, and mood disorders (results not shown).

### Association of each type of childhood maltreatment with suicidality in adulthood

**Table 4** shows the association between childhood maltreatment and suicidality. When controlled for sociodemographic factors, each type of childhood maltreatment was significantly associated with suicidal ideations, suicide plans, and suicide attempts. In particular, the ORs for emotional neglect were the highest among all types of childhood maltreatment. When analyzed based on the frequency of childhood maltreatment, dose-response patterns for suicide attempts were observed in all types of victims (e.g., frequent victims were associated with larger ORs than occasional victims). The respondents who experienced frequent childhood emotional neglect were 14 times more likely to have attempted suicide (adjusted OR, 13.91; 95% confidence interval, 7.54–25.67). Even when controlling for sociodemographic factors and mental disorders, the associations with suicidality and dose-response patterns for suicidality were also observed in all types of victims.

## DISCUSSION

We explored the association of childhood maltreatment with adulthood mental health in the general community-residing population. Childhood maltreatment was associated with increased rates of mental disorders and suicidality in adulthood, regardless of the sociodemographic characteristics and mental disorders. In all areas of suicidality, we identified the association with each type of childhood maltreatment, and the association was stronger in the more serious form of suicidality (suicide attempts). Dose-response patterns for mental disorders and suicidality (particularly in suicide attempts) were observed in most types of maltreatment victims. Victims of frequent emotional neglect are particularly likely to have attempted suicide.

**Table 3.** Prevalence and adjusted ORs of each type of maltreatment with adult mental disorders<sup>a</sup>

Mental disorders	Prevalence (%)						OR (95% CI) <sup>b</sup>				
	Non-victims	Victims	Emotional neglect	Psychological abuse	Physical abuse	Sexual abuse	Victims	Emotional neglect	Psychological abuse	Physical abuse	Sexual abuse
Alcohol use disorders	10.4	18.2	15.9	16.6	21.8	19.4	1.79 (1.46–2.19)*	1.37 (1.05–1.80)	1.49 (1.13–1.98)	2.21 (1.73–2.81)*	1.68 (1.16–2.44)
Alcohol abuse	6.8	9.5	8.0	6.1	11.3	10.5	1.35 (1.04–1.76)	1.07 (0.75–1.53)	0.80 (0.52–1.22)	1.66 (1.22–2.26)*	1.37 (0.85–2.22)
Alcohol dependence	3.5	8.9	8.0	10.5	10.7	8.9	2.56 (1.90–3.44)*	1.97 (1.35–2.86)*	3.22 (2.23–4.64)*	2.83 (2.02–3.97)*	2.25 (1.33–3.81)
Nicotine use disorders	5.0	8.6	8.9	9.4	11.8	4.7	2.01 (1.50–2.69)*	2.10 (1.46–3.03)*	2.58 (1.76–3.78)*	2.49 (1.80–3.45)*	0.97 (0.48–1.96)
Nicotine dependence	3.8	7.1	7.2	6.9	9.6	3.2	2.17 (1.58–3.00)*	2.13 (1.42–3.18)*	2.33 (1.51–3.61)*	2.66 (1.86–3.80)*	0.68 (0.31–1.53)
Nicotine withdrawal	2.2	2.7	3.1	4.3	3.4	2.1	1.51 (0.94–2.42)	1.87 (1.04–3.35)	2.97 (1.73–5.11)*	1.54 (0.88–2.67)	1.10 (0.37–3.24)
Mood disorders	3.3	11.1	13.2	14.2	11.9	13.0	3.61 (2.73–4.79)*	3.79 (2.76–5.22)*	3.83 (2.76–5.32)*	3.58 (2.59–4.96)*	3.22 (2.04–5.08)*
Major depressive disorder	3.2	10.3	12.2	13.0	11.2	11.1	3.47 (2.59–4.65)*	3.59 (2.58–5.00)*	3.60 (2.56–5.07)*	3.50 (2.50–4.90)*	2.78 (1.71–4.52)*
Dysthymic disorder	0.7	2.7	3.3	3.6	2.1	3.2	4.40 (2.47–7.86)*	4.29 (2.28–8.07)*	4.33 (2.27–8.26)*	2.61 (1.26–5.37)	4.14 (1.70–10.12)*
Bipolar disorder	0.0	0.5	0.7	0.8	0.6	1.6	11.97 (1.30–104.22)	5.65 (0.93–34.21)	6.13 (0.99–38.01)	5.72 (0.92–35.46)	- <sup>c</sup>
Anxiety disorders	3.3	9.9	12.4	10.2	9.9	9.4	3.40 (2.55–4.55)*	3.82 (2.75–5.30)*	2.70 (1.87–3.90)*	2.92 (2.06–4.13)*	2.41 (1.43–4.06)*
Obsessive-compulsive disorder	0.2	1.0	0.9	1.3	0.9	1.6	3.57 (1.27–10.06)	2.51 (0.76–8.28)	3.65 (1.21–11.07)	2.39 (0.72–7.94)	6.27 (1.70–23.14)
Post-traumatic stress disorder	0.6	4.0	5.0	3.8	4.5	4.2	8.09 (4.72–13.88)*	7.52 (4.35–13.00)*	4.23 (2.32–7.70)*	5.76 (3.30–10.05)*	4.30 (1.95–9.52)*
Panic disorder	0.2	0.5	0.4	0.5	0.2	0.5	2.45 (0.72–8.33)	1.47 (0.28–7.78)	1.90 (0.36–10.03)	1.41 (0.25–8.03)	4.27 (0.65–28.20)
Agoraphobia	0.3	1.2	1.7	1.3	0.6	0.5	3.24 (1.39–7.56)	4.09 (1.67–10.01)*	2.57 (0.93–7.11)	1.32 (0.40–4.30)	1.25 (0.19–8.33)
Social phobia	0.4	1.2	1.7	2.0	1.5	1.0	2.25 (1.00–5.08)	3.38 (1.43–7.96)	3.57 (1.48–8.58)	2.79 (1.13–6.89)	1.20 (0.25–5.68)
Generalized anxiety disorder	1.5	5.1	6.3	6.4	5.4	6.3	3.85 (2.56–5.79)*	4.22 (2.69–6.62)*	4.04 (2.52–6.45)*	3.48 (2.18–5.57)*	4.02 (2.14–7.59)*
Specific phobia	0.9	1.3	1.5	1.0	1.1	0.0	1.41 (0.71–2.83)	1.75 (0.79–3.88)	0.93 (0.33–2.63)	1.24 (0.49–3.13)	- <sup>d</sup>
Psychotic disorders	0.3	0.8	1.3	0.8	0.2	0.5	3.22 (1.18–8.79)	4.66 (1.62–13.40)	2.67 (0.76–9.33)	0.27 (0.02–4.54)	1.17 (0.10–13.10)

For the purpose of correcting for multiple testing, the statistical significance was specified by means of the Bonferroni correction.

OR = odds ratio, CI = confidence interval.

<sup>a</sup>Only cases in which the age of onset was 18 years or over were considered. <sup>b</sup>Adjusted for gender, age, number of years of education, employment status, area of residence, and marital status. <sup>c</sup>The number of participants with bipolar disorder was too small for the analysis of association with sexual abuse. We were therefore unable to perform the analysis due to a lack of statistical power. <sup>d</sup>No cases of specific phobia in the sexual abuse group.

\* $P < 0.003$ .

In previous studies, the prevalence of childhood maltreatment in the adult general population varied greatly from study to study. The prevalence of physical abuse ranged from 8.4% to 46.0%,<sup>10,21</sup> that of emotional neglect ranged from 7.1% to 9.4%,<sup>22,23</sup> that of psychological abuse ranged from 7.9% to 33.1%,<sup>24,25</sup> and that of sexual abuse ranged from 6.0% to 16.2%.<sup>21,24</sup> These differences might be due to a lack of consistent definitions as to what constitutes each type of childhood maltreatment, and the lack of consensus on the methodology to assess the maltreatment (e.g., rating scale).<sup>26</sup> In addition, differences in study characteristics (e.g., adult participant's age distribution), data collection methods (e.g., face-to-face method, telephone surveys, self-completed questionnaire) might have affected these differences in prevalence.

In this study, the prevalence of abuse by type was comparable to that of previous studies; however, the prevalence of sexual abuse was much lower than that reported in previous

**Table 4.** Prevalence and adjusted ORs for adult suicidality in each type of maltreatment victim<sup>a</sup>

Suicidalities	Prevalence (%)				OR 1 (95% CI) <sup>b</sup>			OR 2 (95% CI) <sup>c</sup>		
	Non-victims	Victims	Occasional victims	Frequent victims	Victims	Occasional victims	Frequent victims	Victims	Occasional victims	Frequent victims
<b>Any maltreatment</b>										
Suicidal ideations	9.9	18.9	14.7	27.2	2.29 (1.87–2.82)*	1.72 (1.33–2.23)*	3.57 (2.68–4.75)*	2.00 (1.41–2.84)*	1.25 (0.94–1.67)	2.49 (1.83–3.40)*
Suicide plans	1.6	5.2	2.8	9.9	3.74 (2.51–5.58)*	2.05 (1.17–3.60)*	7.01 (4.38–11.23)*	2.12 (1.36–3.30)*	1.09 (0.58–2.05)	3.95 (2.36–6.63)*
Suicide attempts	1.0	5.2	3.5	8.5	6.14 (3.95–9.55)*	4.28 (2.46–7.46)*	9.39 (5.54–15.91)*	3.47 (2.13–5.67)*	2.33 (1.25–4.35)	5.35 (2.99–9.57)*
<b>Emotional neglect</b>										
Suicidal ideations	10.5	20.5	16.2	31.5	2.39 (1.86–3.07)*	1.81 (1.33–2.48)*	4.27 (2.88–6.31)*	1.66 (1.26–2.18)*	1.21 (0.85–1.72)	2.98 (1.95–4.54)*
Suicide plans	1.5	8.8	6.3	15.3	6.88 (4.55–10.41)*	4.90 (2.94–8.18)*	12.30 (7.06–21.45)*	4.14 (2.63–6.54)*	2.86 (1.61–5.09)*	7.61 (4.12–14.06)*
Suicide attempts	1.1	8.0	6.3	12.3	9.16 (5.81–14.44)*	7.22 (4.19–12.43)*	13.91 (7.54–25.67)*	5.42 (3.25–9.07)*	3.91 (2.09–7.30)*	9.21 (4.65–18.25)*
<b>Psychological abuse</b>										
Suicidal ideations	10.7	19.8	15.8	28.5	2.15 (1.64–2.81)*	1.62 (1.14–2.30)	3.37 (2.26–5.03)*	1.43 (1.06–1.92)	1.02 (0.69–1.51)	2.36 (1.53–3.64)*
Suicide plans	1.8	6.6	4.2	11.6	4.25 (2.68–6.73)*	2.64 (1.38–5.06)	7.46 (4.14–13.43)*	2.50 (1.50–4.15)*	1.45 (0.71–2.98)	4.51 (2.37–8.58)*
Suicide attempts	1.4	5.1	4.5	6.2	3.84 (2.27–6.50)*	3.64 (1.91–6.95)*	4.19 (1.93–9.12)*	1.91 (1.06–3.47)	1.80 (0.86–3.76)	2.10 (0.89–4.98)
<b>Physical abuse</b>										
Suicidal ideations	10.7	18.5	15.5	25.7	2.00 (1.55–2.58)*	1.64 (1.19–2.25)	2.92 (1.96–4.34)*	1.34 (1.01–1.79)	1.05 (0.74–1.50)	2.11 (1.38–3.24)*
Suicide plans	1.8	5.7	4.2	9.9	3.50 (2.23–5.51)*	2.55 (1.41–4.61)	5.64 (3.04–10.45)*	2.02 (1.22–3.35)	1.41 (0.73–2.72)	3.43 (1.72–6.83)*
Suicide attempts	1.3	5.7	4.8	7.8	4.84 (3.00–7.79)*	4.22 (2.36–7.56)*	6.07 (3.07–11.98)*	2.75 (1.60–4.72)*	2.44 (1.27–4.67)	3.39 (1.55–7.42)
<b>Sexual abuse</b>										
Suicidal ideations	11.1	19.3	19.8	15.0	2.15 (1.48–3.14)*	2.23 (1.50–3.32)*	1.58 (0.46–5.32)	1.63 (1.07–2.46)	1.70 (1.10–2.63)	1.07 (0.28–4.14)
Suicide plans	2.0	7.3	7.0	9.5	4.69 (2.56–8.59)*	4.64 (2.44–8.81)*	5.07 (1.02–25.22)	3.12 (1.60–6.06)*	3.04 (1.50–6.18)	3.66 (0.67–20.12)
Suicide attempts	1.5	7.3	6.4	10.0	6.37 (3.42–11.88)*	5.89 (3.00–11.58)*	9.97 (2.47–40.33)*	3.93 (1.94–7.96)*	3.49 (1.62–7.50)*	7.99 (1.62–39.31)*

For the purpose of correcting for multiple testing, the statistical significance was specified by means of the Bonferroni correction.

OR = odds ratio, CI = confidence interval.

<sup>a</sup>Only cases in which the age of onset was 18 or over were considered. <sup>b</sup>Adjusted for age, gender, number of years of education, employment status, area of residence, and marital status. <sup>c</sup>Adjusted for age, gender, number of years of education, employment status, area of residence, marital status, and mental disorders.

\* $P < 0.017$ .

studies.<sup>21,23,24</sup> Considering the report that Korean families were less likely to be charged with sexual abuse (1.8%) when compared to non-Korean families in Los Angeles (5.6%), this could be due to cultural influence.<sup>7</sup> Difference in cultural values and beliefs across countries might be the underlying cause affecting the estimated prevalence of childhood sexual abuse.<sup>27</sup> Child sexual abuse is known to be perpetrated mostly by family members and acquaintances.<sup>28,29</sup> In Korea, family harmony is considered important as a way to preserve the ideal family as an intact unit in the culture atmosphere emphasizing family cohesiveness and vertical social structure.<sup>6,30</sup> Individuals might therefore be less likely to commit child sexual abuse so as to preserve family harmony and prevent the loss of family reputation.<sup>30</sup> Meanwhile, we should consider that child sexual abuse might have been underreported. There is a report that experiences of abuse are less disclosed in a collectivist culture such as Korea than in individualistic cultures.<sup>27,31</sup> Within the collective tendency, an individual's identity is embedded in the group to which they belong (e.g., family, community, school), and the needs of the group take precedence over the needs of the individual.<sup>32</sup> Thus, individual family



members may be less likely to disclose the sexual abuse experiences in order to protect the family unity, harmony, and continuity above their own individual well-being.<sup>5,32</sup>

In this study, experience of childhood maltreatment was associated with most types of mental disorders. Previous studies reported that childhood maltreatment victims were associated with alcohol use disorders and nicotine use disorders,<sup>33,34</sup> which was observed in this study. These individuals might use alcohol and tobacco as a coping mechanism to alleviate negative mood and decrease anger and stress.<sup>35,36</sup>

For mood disorders, all types of childhood maltreatment were associated with dysthymic disorder and major depressive disorder. Victims of childhood maltreatment might form a negative cognitive style for depressive disorder as they try to understand why the negative events occurred.<sup>37</sup> Hypothalamic-pituitary-adrenal (HPA) axis hyperactivity and reduced inhibitory feedback are persistent consequences of childhood maltreatment.<sup>38</sup> In addition, the risk of depression from childhood maltreatment is modified by changes in serotonin transporter and brain-derived neurotrophic factor genes.<sup>39</sup>

As in previous studies, childhood maltreatment was associated with anxiety disorders including PTSD, and GAD.<sup>25</sup> Childhood maltreatment can be perceived as an intrusive and persistent threat, which increases the anxiety sensitivity of its victims.<sup>40</sup> Emotional neglect hinders the formation and maintenance of secure attachment relationships, and, consequently, insecure attachment relationships make the victims more vulnerable to anxiety disorders.<sup>25</sup> In particular, the ORs of PTSD were higher than the ORs of other mental disorders in the victims of childhood maltreatment. In terms of biological vulnerability, childhood maltreatment leads to dysregulation of the HPA axis, which might predispose to PTSD in adulthood.<sup>41</sup> Childhood maltreatment can also cause cognitive biases about self, others, and the world, which could contribute to the onset of PTSD in adulthood.<sup>42</sup>

In accordance with previous studies, we found no statistical associations between each childhood maltreatment and OCD, panic disorder, social phobia, and specific phobia.<sup>43,44</sup> Previous studies have reported that the vulnerability to phobias (social phobia and specific phobia) is not directly affected by environmental factors and that it is more likely to be inborn (i.e., heritability: social phobia 65%, specific phobia 63%).<sup>45,46</sup> Pertaining to OCD and panic disorder, genetic factors play a major role in the occurrence of the disease (i.e., heritability: OCD 48%, panic disorder: 48%).<sup>47,48</sup> In this respect, certain anxiety disorders (phobias, OCD and panic disorder) are less likely to be affected by environmental factors such as childhood maltreatment. Although some previous studies have shown significant associations with these disorders, the possibility of a multiple comparisons problem was not considered in these studies.<sup>49-51</sup> Analysis of our data without applying any method to correct type I errors caused by a multiple comparisons problem revealed a statistical significance regarding OCD and social phobia; however, this significance disappeared following the Bonferroni correction.

Meanwhile, our analysis only considered cases of mental disorder with onset at 18 years or older, thereby assuming that childhood maltreatment had occurred before the onset of the mental disorder. As a result, in some disorders wherein the mean age of onset is usually mid-childhood to early adolescence (i.e., specific phobia and social phobia), the number of cases used in the analysis were considerably reduced.<sup>52,53</sup> Hence, results for various disorders with an early age of onset necessitate a more cautious interpretation. Nonetheless, it is very difficult to confirm the causality between childhood experience and disease occurrence in a

cross-sectional study, and thus it is necessary to carry out a large-scale longitudinal study to overcome this limitation.

Victims of all types of childhood maltreatment were associated with suicidality in adulthood. Childhood maltreatment victims experience insecure attachment relationships, impaired emotional awareness and reward processes, and increased impulsiveness.<sup>54</sup> In other words, victims suffer from their impairment in development processes associated with emotional regulation and interpersonal skills.<sup>55</sup> These disruptions might also increase vulnerability to suicidal behavior when the victims face stressful events. In addition, the association of childhood maltreatment and suicidality might result from epigenetic modifications. Childhood maltreatment alters the HPA stress responses through the epigenetic hypermethylation of the *Nr3C1* gene, which increases the risk of suicide.<sup>56</sup> As such, the experience of childhood maltreatment is a significant risk factor for suicidality.

A dose-response relationship has been established for the impact of the number of experienced traumas on adverse mental health.<sup>57</sup> Similar to previous studies, this study found that frequent victims of most of the types of maltreatment were more likely to have mental disorders and suicidality than occasional victims. These findings emphasize the importance of implementing early detection and intervention as an approach to preventing adverse mental health.

In particular, the strongest association with suicidality was found for emotional neglect. Parental rejection and low parental warmth and responsiveness, which are characteristic of emotional neglect, lead to low self-esteem, hopelessness, and a negative view of the world.<sup>25,33</sup> Thus, although emotional neglect might be difficult to discern compared with physical and sexual abuse with the more obvious signs, the importance of evaluating emotional neglect should be emphasized.

As well as emotional neglect, sexual abuse was also strongly associated with suicide attempts after controlling for sociodemographic factors and mental disorders. Sexual abuse in childhood has an impact on stress-induced neurobiological structure changes and susceptibility to environmental influences.<sup>55</sup> Dysregulation of the HPA axis is strongly associated with sexual abuse.<sup>55</sup>

This study has some limitations, the first of which is its cross-sectional design, preventing us from making causal interpretations. To clarify the temporal relationship between child maltreatment and mental disorders, the cases in this study were limited to an onset of disease at the age of 18 years or older. A longitudinal study is needed to confirm a more accurate causal relationship. Second, all childhood maltreatment data were collected retrospectively and only from respondents, which entails the possibility of information bias (i.e., recall bias, reporting bias). Given that the respondents were asked to report on childhood maltreatment that occurred decades ago, there might be recall bias, especially among the older participants. Negative views, stigma, and discrimination against victims are common when it comes to sexual abuse, which can lead to reporting bias. Accordingly, longitudinal studies using information collected through various sources such as neighbors, teachers, and polices, are needed. Nevertheless, our study has the following strengths. Our study was the first to investigate the association of childhood maltreatment with mental disorders and suicidality in the general adult population of Korea. Moreover, we employed a validated structured interview tool (K-CIDI) for the assessments of mental disorders.

In conclusion, this study indicates that childhood maltreatment is associated with mental disorders and suicidality in adulthood. The dose-response patterns show the need for early detection and early intervention of childhood maltreatment. From a public health perspective, policy makers should devise methods to reduce the incidence of childhood maltreatment and clinicians should detect and intervene in the early mental health problems of childhood maltreatment victims.

## ACKNOWLEDGMENTS

The authors' thanks go out to the KECA team, 21 local investigators, and 147 interviewers.

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