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Predictors of the co-occurrence of posttraumatic stress disorder and depressive disorder in psychiatric outpatients

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ABSTRACT

Introduction: We explored the predictors of co-occurring depressive disorder (DD) in individuals with posttraumatic stress disorder (PTSD) in an outpatient psychiatric setting.

Methods: Participants ($N = 170$; mean age = 40.78, $SD = 16.15$ years; 58.8% women) included 71 adult patients who met the criteria for a PTSD diagnosis and 99 adult patients who met the criteria for a comorbid PTSD/DD diagnosis. Potential predictors included trauma types (focusing on trauma characteristics), history of previous traumatic experiences (i.e., the number of lifetime traumatic events before current trauma and childhood maltreatment), and post-trauma variables (i.e., elapsed time since the current traumatic event and the severity of PTSD symptoms).

Results: A logistic regression analysis—including demographic variables, trauma types, history of previous traumatic experiences, and post-trauma variables that showed significant differences between the two groups—was conducted. The effects of repeated trauma (OR = 13.18, 95% CI [3.44, 50.48], $p < .001$), the number of lifetime traumatic events (OR = 1.04, 95% CI [1.01, 1.51], $p = .044$), and childhood maltreatment (OR = 1.23, 95% CI [1.01, 1.51], $p = .004$) were associated with a greater likelihood of concurrent PTSD/DD.

Conclusion: Cumulative characteristics such as maltreatment and the number of lifetime traumatic events before the current trauma as well as repetitive properties of the most recent trauma present a key risk factor for co-occurring PTSD/DD.

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1. Introduction

It is well established that posttraumatic stress disorder (PTSD) and depressive disorder (DD) are highly comorbid and strongly correlated. Epidemiological studies have found that, among adults with PTSD, 48–55% have co-occurring DD [1,2]. There have been several competing explanations, including that PTSD is a causal risk factor for depression, that the two disorders have a common vulnerability, or that the two are not well-differentiated and comprise confounding factors such as poor definition distinction [3,4]. A more complex model has also been suggested, in which both disorders are independent consequences of trauma, and, at the same time, PTSD is causally related to DD [5]; however, it is still unclear whether the high rates of co-occurring PTSD and DD should be attributed to two overlapping yet distinct constructs, or to a single construct where the disorders are essentially indistinguishable [6,7].

Although there are inconsistent findings concerning whether there are distinct constructs or symptom dimensions between PTSD and DD comorbidity, it seems clear that the comorbidity is associated with greater psychological distress [2,8], decreased quality of life [9], and increased social impairment [8,10]. Furthermore, this comorbidity can further impede recovery after exposure to trauma compared to PTSD alone [11].

Several studies have explored risk factors for the comorbidity of PTSD and depression [9,12]. Regarding trauma type and characteristics, interpersonal trauma, unexpected trauma, and undisclosed trauma predict a greater likelihood of PTSD/Major DD (MDD) comorbidity [12]. Momartin et al. [10] found that traumatic loss and life-threatening experiences were associated with this comorbidity, while only life-threatening experiences were associated with PTSD-only among Bosnian refugees. Further, Rytwinski, Scur, Feeny, and Youngstrom [13], who conducted a meta-analysis of 57 studies, found that military samples and those who experienced interpersonal trauma demonstrated higher rates of MDD among individuals with PTSD than civilian samples or those who experienced natural disasters, respectively.

Although each study included distinct samples (e.g., military samples, men only, women only, civilians, and individuals who experienced the same traumatic event) and focused on distinct types of

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traumas (e.g., war, sexual trauma, and cumulative trauma), these studies have suggested that the interpersonal context and repetitive nature of trauma were associated with PTSD/MDD comorbidity as compared with PTSD alone [12,14]. It has also been reported that intentional traumatic events, the threat of life, or physical injury were related to the severity of PTSD symptoms or various psychopathologies, including depression [10]. To determine what trauma types are associated with negative outcomes and are key predictors of PTSD and DD co-occurrence, it is necessary to compare the effects of these trauma characteristics.

There has been limited literature examining risk variables before and after the current traumatic event associated with concurrent PTSD and DD; however, evidence suggests that preexisting vulnerabilities and subsequent psychosocial stressors may be more closely related to comorbidity development [15,16]. In large sample studies, in which participants have typically experienced a mass conflict or a disaster (e.g., a hurricane), demographic variables do not reveal significant effects; however, other traumatic events (e.g., childhood maltreatment) and pre-existing depression have been reported as predictors for co-occurring PTSD/MDD [13,15]. Further, the number of lifetime traumatic events and experiences of childhood maltreatment have been reported as risk factors for PTSD and overall posttraumatic mental health as well as comorbidity [17]. These two variables can be regarded as properties of the trauma itself such as cumulative trauma or polytraumatization [14]; however, they can also be classified as pre-trauma variables in that they are present before the current trauma. Clearly, there is a need to analyze the effects of these together while considering the impact of the type of the current trauma.

Regarding post-trauma variables, social support and socio-psychological stress are associated with comorbidity [5,18,19]. One crucial variable that has been overlooked is the time elapsed since the trauma. Wanklyn et al. [12] explored the effects of trauma type and post-trauma variables; however, they excluded temporal processes, which they noted as an essential limitation. Considering the hypothesis that PTSD causes depression [5], it is vital to consider the time course from the traumatic event and the severity of PTSD symptoms. More severe PTSD symptoms could be a risk factor for the co-occurrence of depression. Some studies report that PTSD is a longitudinal risk factor for depression comorbidity, even after controlling for baseline depression symptoms [20,21]; therefore, elapsed time and PTSD symptom severity should be examined as critical post-trauma variables.

In summary, we explored the significant predictors of co-occurring DD among individuals with PTSD in an outpatient psychiatric setting. Comorbidity predictors included trauma types (focusing on trauma characteristics), a history of previous traumatic experiences (i.e., the number of lifetime traumatic events and childhood maltreatment), and post-trauma variables (i.e., time elapsed and the severity of PTSD symptoms). Based on existing research, we had two hypotheses. First, we hypothesized that interpersonal, intended, and repeated trauma and traumatic events that accompanied injury would increase the likelihood of membership in the PTSD/DD group, but not the PTSD-only group. Second, we hypothesized that individuals with longer elapsed time, more severe PTSD symptoms, and a greater number of previous traumatic experiences would have a greater likelihood of endorsing comorbid PTSD/DD.

2. Methods

2.1. Participants and procedure

Data were collected from 258 outpatients who complained of post-traumatic symptoms such as intrusion, insomnia, and arousal after experiencing traumatic events, excluding brain injury, psychosis, and intellectual disability. Outpatients visiting the psychiatry department of a major medical hospital in Seoul, Korea from March 2014 to December 2016 were recruited. Diagnoses were made by a staff psychiatrist based on the diagnostic criteria of the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [22]. Of the 258 patients, 170 adults, including 71 patients who met the criteria for a PTSD diagnosis and 99 patients who met the criteria for a comorbid PTSD/DD diagnosis, were included in the final analyses. Of the 99 patients, 67 were diagnosed with MDD, 28 with other-specified DD, and 4 with persistent DD.

Among the 88 patients who were excluded from analyses, although they were not diagnosed as having an organic mental disorder, 33 reported consciousness loss or post-concussion syndrome. A further 13 patients were diagnosed with DD without comorbidity, 7 were diagnosed with PTSD and alcohol use disorder, and 23 were diagnosed with adjustment disorder or otherwise not diagnosed. Twelve patients were excluded because of a history of psychiatric treatment before the trauma to minimize the effects of psychopathology before the current trauma. Participants' demographic characteristics, trauma types, and time elapsed since the index traumatic event are presented in Table 1.

Individuals who provided informed consent to participate completed the measures as part of their evaluation. Participants could decline participation at any time without penalty, and there was no compensation for participation. Typically, outpatients completed the assessment within two weeks of their initial consultation. Official diagnoses were made after a follow-up consultation with staff psychiatrists within one week after their psychological assessment. This study was approved by the hospital's Institutional Review Board.

2.2. Measures

2.2.1. Type of trauma and time elapsed since the current traumatic event

Trauma information was collected from existing medical records. The types of trauma were coded as dummy variables according to whether the trauma occurred in an interpersonal context, whether the individuals were harmed intentionally by another person, whether the traumatic event occurred repeatedly, or if it was accompanied with physical injury. Time (in months) since the current traumatic event was also coded. Two clinical experts separately rated the type of trauma and time elapsed; correlations between the two raters ranged from 0.93 to 0.99. When there was a discrepancy between raters, the primary rater's codes were used.

2.2.2. Korean version of the Impact of Event Scale-Revised (IES-R-K)

The IES was originally developed as a self-report measure by Horowitz, Wilner, and Alvarez [23] to measure the central features of

Table 1
Demographic and trauma type information for the entire sample ($N = 170$).

	Entire Sample n (%)/M (SD)
Sex (*n*, %)	
Male	70 (41.2)
Female	100 (58.8)
Age (*M*, *SD*)	40.78 (16.15)
Type of Trauma (*n*, %)	
Transportation accident	87 (51.2)
Physical assault	21 (12.4)
Domestic violence	20 (11.8)
Serious accident/Serious injury	17 (10.0)
Bullying by peers	9 (5.3)
Sexual assault	7 (4.1)
Fire/explosion/disaster	7 (4.1)
Traumatic death of an intimate person	2 (1.2)
Reclassification of trauma type	
Interpersonal trauma	150 (88.2)
Intended harm	60 (35.3)
Physical injury	118 (69.4)
Repeated trauma	41 (24.1)
Time since traumatic event (month) (*M*, *SD*)	20.68 (54.11)
Within 3 month	71 (41.8)
Within 6 month	33 (19.5)
Within 12 month	23 (13.6)
Within 5 years	23 (13.6)
After 5 years	20 (11.7)

PTSD, such as trauma-related symptoms of intrusion and avoidance. Weiss and Marmar [24] revised the version to include symptoms of hyperarousal. The IES-R consists of 22 items representing the subscales of intrusion, avoidance, numbing and dissociation, and hyperarousal, with each item scored on a 5-point Likert scale (e.g., 1 = *not at all*, 2 = *a little*, 3 = *somewhat*, 4 = *severe*, and 5 = *very severe*). The IES-R was translated and validated in Korea [25]. Overall internal consistency in the Korean validation study was 0.77 (subscale range = 0.69 to 0.83). In the present study, internal consistency was 0.91 for the intrusion subscale, 0.89 for avoidance, 0.88 for hyperarousal, and 0.74 for numbing and dissociation.

2.2.3. Beck Depression Inventory

Originally developed by Beck, Ward, Mendelson, Mock, and Erbaugh [26] to assess the degree of depression, the scale was standardized in Korean by Lee and Song [27]. Participants were not specifically instructed to assess depression related to current trauma. The scale consists of 21 items measured using a 3-point Likert scale. Internal consistency in Korea was 0.78, and its test-retest reliability was 0.75 [27]. Internal consistency in the present study was 0.92.

2.2.4. Korean Childhood Trauma Questionnaire

The Korean version of the Childhood Trauma Questionnaire was developed by Yu, Park, Park, Ryu, and Ha [28], and translated by Berstein and Fink [29]. This questionnaire comprises five subscales—emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect—as well as three items pertaining to the validity scale (minimization/denial scale). Each item is scored on a 5-point Likert scale, with higher scores representing a more severe degree of maltreatment. Internal consistency of the Korean version was 0.79, and Cronbach's alpha across the five subscales was 0.80 (emotional abuse), 0.82 (physical abuse), 0.79 (sexual abuse), 0.89 (emotional neglect), and 0.51 (physical neglect) [28]. Cronbach's alpha values for the present study were 0.89 for physical abuse, 0.72 for physical neglect, 0.85 for emotional abuse, 0.88 for emotional neglect, and 0.80 for sexual abuse. Total score was used for the severity of maltreatment.

2.2.5. Life Events Checklist

The Life Events Checklist is a 17-item self-report questionnaire, which was originally included in the Clinician Administered PTSD Scale, a tool developed for diagnosing PTSD [30] and for screening for potential traumatic events. A clinical psychologist who was bilingual in English and Korean translated the original checklist into Korean. Sixteen events that are generally associated with PTSD and distress and one event that was not included in the 16 life events comprised the checklist. Each item inquires whether the individual personally experienced the event, witnessed the event, heard about the event, or had become aware of the event (in addition to *do not know* and *not applicable*). For this study, the number of responses that were rated as *happened to me* were the only ones that were used to calculate the number of lifetime traumatic events before the current trauma. Cronbach's alpha in the present study was 0.74.

2.3. Data analyses

To investigate the predictors of co-occurring DD in individuals with PTSD considering the current trauma type, history of previous traumatic experiences, and post-trauma variables, a binary logistic regression analysis was conducted. To determine variables to be included in the analysis, all variables including participants' demographic characteristics, trauma types, time elapsed, PTSD symptom levels, childhood maltreatment, and the number of lifetime trauma events between the two groups were compared using χ^2 tests and *t*-tests. Missing data were handled via list wise deletion per analysis, because they were <5% [31]. Multicollinearity among potential predictor variables was assessed using the variance inflation factor (VIF) statistics from the equivalent linear regression model, and assessment did not indicate serious multicollinearity (VIF > 10). Standardized *z*-scores of time elapsed were used for analyses because they did not have a normal distribution. In the binary logistic regression analysis, beta coefficients were used to compare the relative contribution of each predictor. All statistical analyses were conducted using SPSS 24.0 (SPSS Inc.; Chicago, Illinois).

3. Results

3.1. Sample characteristics

Participants' demographic information and traumatic event categories are presented in Table 1. Among all 170 participants, the most common traumatic events were transportation accidents (51.2%), physical assault (12.4%), and domestic violence (11.8%). Because of the reclassification of the current trauma in the medical records according to the trauma characteristics, 150 individuals (88.2%) were identified as experiencing interpersonal trauma, and 60 individuals (35.3%) experienced intended harm. Further, 118 individuals (69.4%) were physically injured in the traumatic event, and 41 (24.1%) experienced repeated traumatic events.

3.2. Comparison between the PTSD-only group and the comorbid group

Table 2 shows the result of the χ^2 tests and *t*-tests between the two groups. Compared to the PTSD-only group, the individuals with comorbidity were significantly younger. They were also more likely to have experienced intended harm and repeated traumatic events. The comorbidity group showed significantly higher levels of avoidance and hyperarousal in PTSD symptoms than did the PTSD-only group. A longer time had also elapsed since the traumatic event for the comorbidity group concerning pre-traumatic factors, and the comorbidity group had experienced more lifetime traumatic events and more severe childhood maltreatment than the PTSD-only group. Although the severity of depression was not included as a predictor of the comorbidity, the comorbid group ($M = 48.61$, $SD = 10.20$) was significantly more depressed than the PTSD-only group ($M = 37.08$, $SD = 10.11$, $t\,[1168] = 7.29$, $p < .001$).

3.3. Predictors of co-occurring PTSD and DD

Binary logistic regression analyses were conducted with age, trauma types, time elapsed, PTSD symptoms, childhood maltreatment, and the number of traumatic events as independent variables to assess the effect of each predictor on the probability of a PTSD-only diagnosis versus diagnosis of PTSD/DD comorbidity. Each model fit significantly improved compared to the base model when additional variables were included—$\chi^2\,(7, 170) = 70.63$, $p < .001$; $\chi^2\,(7, 170) = 55.00$, $p < .001$. Participants' age significantly increased the likelihood of having a comorbid diagnosis (OR = 0.97, 95% CI [0.95,0.99], $p = .016$), with those who were older being 0.97 times less likely to have a diagnosis of PTSD/DD. With respect to the current trauma type, individuals experiencing repetitive trauma were 13.2 times more likely to belong to the PTSD/DD group versus the PTSD-only group (OR = 13.18, 95% CI [3.44, 50.48], $p < .001$); however, the effects of experiences that were intended to harm were no longer significant when they were considered together with various potential predictors. The post-trauma variables (i.e., PTSD symptom severity and time elapsed) were also non-significant predictors for comorbidity. The severity of childhood maltreatment (OR = 1.04, 95% CI = 1.01–1.51, $p = .004$) and the number of traumatic events (OR = 1.23, 95% CI = 1.01–1.51, $p = .044$), however, were associated with a greater likelihood of concurrent PTSD/DD versus PTSD-only. (See Table 3.)

Table 2
Comparison of trauma types, PTSD symptoms, and pre-trauma characteristics by diagnosis group ($N = 170$).

		PTSD-only ($n = 71$) M (SD)/n (%)	Comorbidity ($n = 99$) M (SD)/n (%)	χ^2/t
Demographics	Age	46.35 (15.29)	36.78 (15.63)	3.98***
	Gender (women)	44 (62.0%)	56 (56.6%)	0.49
Type of Trauma	Interpersonal	61 (85.9%)	89 (89.9%)	0.63
	Intended	18 (25.4%)	42 (42.4%)	5.28*
	Repeated	3 (4.2%)	38 (38.4%)	26.36***
	Injury	55 (77.5%)	63 (63.9%)	3.72
Time since traumatic event (months)		9.54 (22.63)	29.38 (67.08)	−2.87**
Standardization Z score		0.16 (1.24)	−0.22 (0.42)	
PTSD symptoms	Intrusion	18.91 (4.87)	20.06 (4.81)	−1.54
	Avoidance	19.48 (5.57)	21.33 (6.07)	−2.02*
	Numbing	15.67 (4.53)	16.48 (4.13)	−1.21
	Hyperarousal	21.31 (5.88)	23.43 (5.49)	−2.41*
Childhood maltreatment	Physical abuse	8.20 (4.18)	11.57 (6.00)	−4.07***
	Sexual abuse	6.47 (2.62)	7.98 (4.06)	−2.76**
	Emotional abuse	7.82 (3.90)	11.41 (5.14)	−4.94***
	Physical neglect	8.77 (3.29)	8.77 (3.29)	−3.45**
	Emotional neglect	24.03 (4.35)	27.35 (5.44)	−4.24***
Lifetime Trauma	Number of Traumatic events	2.51 (1.80)	3.58 (2.39)	−3.33**

* $p < .05$.
** $p < .01$.
*** $p < .001$.

4. Discussion

We investigated predictors that might distinguish co-occurring DD in patients with PTSD who visited or were referred to a psychiatric clinic due to psychological distress after trauma. While previous studies have explored the effects of trauma type as experienced by homogeneous samples—such as military personnel or Bosnian refugees—or assessed the effects of pre-trauma variables—such as demographic variables and vulnerabilities—or post-trauma variables—such as social support and psychosocial stress in individuals who experienced the same trauma [12,15,20]—we examined individuals who were diagnosed with PTSD after various traumatic experiences with varied backgrounds in an outpatient psychiatric setting.

This study reclassified traumatic events, such as transportation accidents, natural disasters, and sexual assault, based on key trauma characteristics such as repeatability of trauma, intentionality, physical injury, and interpersonal trauma. In addition, because previous studies have suggested that the high comorbidity of PTSD and DD is due to a shared common factor of dysphoria [4,32], and more severe PTSD symptoms increase the likelihood of co-occurring depression, we included post-trauma variables, such as elapsed time from the trauma and the severity of PTSD symptoms, as predictors [5,11]. This study also included the number of lifetime traumatic events and childhood maltreatment experiences, which have been previously discussed as vulnerable factors [17,33]. In other words, we considered participants' history of previous traumatic experiences, the characteristics of their current traumatic events, and post-trauma variables that were identified in previous studies.

Regarding sample characteristics, if excluded participants are considered (e.g., those with comorbid alcohol use disorder/post-concussion syndrome), the proportion of patients with comorbid PTSD and DD was similar to that reported in previous studies (i.e., 40–45%) [15,34]. The most frequent traumatic events experienced by participants were transportation accidents. Other serious accidents, injuries, physical assaults, and domestic violence accounted for similar proportions, and fire, natural disaster, and sexual harassment accounted for a relatively low percentage. Regarding victims from specific areas who had experienced the same trauma (such as a natural disaster or large-scale accidents), a dedicated service team for the victims is often organized, and sexual assaults are often handled by a public counseling center in Korea.

In comparison to the PTSD-only group, the comorbid group was significantly younger. It is difficult to directly compare and discuss age effects, because no previous study has analyzed the age-related impact in comorbidity; however, some studies are still worthy of reference (e.g., [35]). This epidemiological study of age trends suggested a rise in PTSD prevalence throughout childhood and adolescence, and a relative stabilization of rates until around 60 years of age. Further, MDD shows a peak in prevalence at around 20 years of age, with an increase in prevalence in older age groups. Since being younger is a risk factor for both PTSD and depression, it may also be a risk factor for co-occurring diagnoses. On the other hand, sex differences in this study were not significant. Previous studies have indicated that women have an increased risk of PTSD, depression, and comorbid conditions because they are more likely to experience sexual assault [12,36]. In this study, the proportion of victims of sexual assault was relatively low.

Table 3
Binary logistic regression analyses for the PTSD-only group and comorbidity group.

Dependent variable	Variable	*B*	*SE*	χ^2	OR	95% CI
PTSD-only vs PTSD/DD ($N = 170$)	Age	−0.03	0.01	5.83*	0.97	[0.95, 0.99]
	Intended	−0.78	0.41	3.64	0.46	[0.21, 1.02]
	Repeated	2.58	0.69	14.16***	13.18	[3.44, 50.48]
	Time(Z score)	0.10	0.40	0.06	1.10	[0.51,2.40]
	PTS symptoms	0.02	0.01	2.48	1.02	[0.99, 1.05]
	Maltreatment	0.04	0.01	8.43**	1.04	[1.01, 1.07]
	Number of Trauma	0.21	0.10	4.06*	1.23	[1.01, 1.51]

Intended = intended harm; Repeated = repeated traumatic events; Time = time since traumatic event. OR = odds ratio; CI = confidence interval. R2 = 0.46 (Nagelkerke). Model $\chi^2 = 70.63$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Regarding trauma type, the comorbid group had experienced more intentional harm and repeated trauma than had the PTSD-only group. There was no significant difference between the groups for interpersonal trauma and physical injury. The elapsed time from trauma was significantly longer in the comorbid group. Significant differences were found in the comorbid group PTSD symptoms, especially regarding intrusion and avoidance. Childhood maltreatment and the number of lifetime traumas, categorized as the participants' history of previous traumatic experiences, were higher in the comorbid group as compared to the PTSD-only group.

The results of the logistic regression analysis revealed that the repetitive nature of the current trauma was the most significant predictor to increase the likelihood of membership in the PTSD/DD group compared to the PTSD-only group. Age, history of childhood maltreatment, and the number of trauma events were also significant predictors. On the other hand, intentional harm, time elapsed, and the severity of PTSD symptoms were no longer significant predictors when considered together with other potential risk variables.

In this study, we reclassified each trauma according to its characteristics, and evaluated its effects. Consequently, repeated trauma was the most significant predictor. Individuals who experience prolonged and repeated trauma have more complex symptoms such as more various regulation problems that are not explained by PTSD; therefore, the comorbidity of PTSD and depression may be a complex post-traumatic sequela [37,38]. We focused on depression with the highest frequency of PTSD; however, complex PTSD may be similar to the co-occurrences of PTSD with other psychopathologies. Stein, Wilmot, and Solomon [39] also suggested a more fine-grained differential diagnostic subtyping of PTSD because of the diverse post-traumatic symptoms depending on the type of trauma.

Post-trauma variables included elapsed time from the event and the severity of PTSD symptoms. Based on studies that have suggested that the comorbidity of PTSD and depression is due to more severe PTSD symptoms, or that both PTSD and depression tend to accelerate each other [40], more severe PTSD symptoms may be associated with this comorbidity. In a review of the etiology of depression comorbidity in combat-related PTSD, Stander et al. [5] also proposed that PTSD causes depression by way of accounting for the high comorbidity. However, the severity of PTSD symptoms was not a significant predictor when considered with the other study variables. This result did not provide any evidence to support the hypothesis that PTSD is a causal risk factor for depression or that these two disorders share an overlapping distress component [14]. However, it is difficult to exclude the possibility that the chronic symptoms of PTSD before the current trauma may increase a learned helplessness that may secondarily trigger or maintain a depressive state, since we did not assess chronic PTSD symptoms or depression prior to the current trauma. The effects of elapsed time and PTSD symptom severity may be revealed through a study of trauma victims who do not have chronic PTSD or depression symptoms prior to the current trauma.

Both previous trauma experiences and the severity of childhood maltreatment were significant predictors for comorbidity. The fact that maltreatment is a risk factor has already been reported by several studies [6,33,41]. Morina et al. [9] also indicated that participants with both depression and PTSD reported significantly more pre-war traumatic events than those with PTSD only; however, co-occurring disorders were not associated with more war-related traumatic events. However, in this study, information on psychological vulnerability and depressive tendencies, which are key pre-trauma variables, were not identified.

Previous research has reported that depression after a mass traumatic event is influenced by more intangible qualities of personal vulnerability, in contrast to PTSD, which is primarily influenced by the more tangible qualities of event exposure [16]. It is not clear whether cumulative trauma causes a psychological condition that is vulnerable to further psychopathology, or whether depression is already present. Therefore, it is difficult to understand the mechanisms through which previous experience of trauma or maltreatment increases the likelihood of comorbidity. A prospective study, including an assessment of pre-traumatic depression, would help elucidate this mechanism.

There are several important limitations to this study. First, although a skilled staff psychiatrist made diagnoses based on DSM-5 criteria, it is difficult to rule out the possibility of a misdiagnosis due to the lack of a structured diagnostic interview tool. Second, we did not include trauma types such as “life threatening” and “undisclosed trauma,” which could have significant effects. Third, only direct experiences were counted in the number of lifetime traumatic events, so the effects of witnessing or indirectly experiencing a traumatic event may have been overlooked in this study. In addition, although the CTQ was only checked for childhood maltreatment, reports of sexual assault and physical assault on the LEC may have been duplicated. Finally, our sample was limited to psychiatric patients and was too small to adequately control for confounding variables; therefore, our results cannot be generalized to community samples or those who have experienced mass trauma. Our results should be replicated in a larger sample. Nevertheless, this study has the advantage of indicating predictors for the comorbidity of PTSD and depression considering the combination of the type of trauma, post-trauma variables, and history of previous traumatic experiences in a natural psychiatric setting. Clinically, it is suggested that the repetitive nature of the trauma as well as traumatic experiences before the current trauma should be carefully explored to predict the possibility of comorbidity. An additional strength of this study is that it included post-trauma variables such as time elapsed and the severity of PTSD symptoms, which were rarely addressed by previous studies. Although our design did not include a large sample of individuals who experienced the same trauma or who had a homogeneous background, our psychiatric sample, including patients experiencing various traumas, closely approximated a natural clinical population.

5. Conclusion

Findings suggest that the cumulative characteristics of trauma are a key vulnerability factor for comorbidity. Exploring cumulative trauma, along with the characteristics of traumatic events that are currently being experienced, may be helpful in predicting the likelihood of comorbidity. Furthermore, it may also be advantageous to develop strategies for appropriate therapeutic interventions for individuals with both PTSD and DD, such as a long-term approach to dealing with past trauma as well as the current traumatic event.

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