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Mediating Role of Anxiety and Depression in the Relationship between Posttraumatic Stress Symptoms and Illness Intrusiveness

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ABSTRACT

Background: Posttraumatic stress symptoms (PTSS) in patients with psychological trauma lead to poor health-related quality of life. Understanding of the relationships among PTSS, anxiety, depression, and illness intrusiveness will guide the development of efficient approaches to enhance subjective well-being in patients with psychological trauma. This study investigated whether anxiety and depression mediate the relationship between PTSS and illness intrusiveness in the hope of providing more comprehensive and effective trauma treatment.

Methods: Psychiatric outpatients who visited the trauma clinic of a university hospital (n = 260) participated in this study. Assessments were conducted for PTSS, anxiety, depression, and illness intrusiveness. Structural equation modeling and path analysis were performed to analyze the mediating effects of anxiety and depression on the relationship between PTSS and illness intrusiveness.


Results: PTSS had both direct and indirect exacerbating effects on illness intrusiveness. Anxiety exhibited the largest direct exacerbating effect on illness intrusiveness. The indirect effects of PTSS on illness intrusiveness through anxiety alone and through a depression-to-anxiety pathway were significant, but the indirect effect through depression alone was not.

Conclusion: The findings demonstrate that anxiety, both independently and as part of an interrelated pathway with depression, partially mediates the relationship between PTSS and illness intrusiveness. Appropriate interventions and a comprehensive approach to alleviate anxiety and depression could mitigate the negative effects of PTSS on illness intrusiveness in patients with psychological trauma.

Keywords: Posttraumatic Stress; Anxiety; Depression; Illness Intrusiveness; Psychological Trauma

INTRODUCTION

Trauma exposure is prevalent among the general population and statistics indicate that 50%–60% of people have been exposed to at least one traumatic event in their lifetime.¹ And the rate of posttraumatic stress disorder (PTSD) among the general population is 2%–8%

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Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

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internationally, varying by region and selection of the index trauma (random vs. worst, single vs. multiple).^{1,2} PTSD patients show high rates of comorbidity with anxiety and affective disorders and increased odds of mood (odds ratio [OR], 4.9) and anxiety (OR, 4.3) disorders compared to those who have experienced traumatic events but do not have PTSD.² Research also suggests strong correlations between PTSD symptoms and depression or anxiety in both acute stress disorder and PTSD.³ Therefore, rather than regarding PTSD symptoms as a unique and specific response to trauma, it is desirable to consider them as one potential psychological response related to and coexisting with other responses, such as anxiety and depression.⁴

PTSD is associated with lingering negative consequences in individuals' lives, demonstrated by lower life satisfaction and poor quality of life (QOL).^{5,6} Conceptually distinct from QOL which is defined as the general well-being of individuals, affected broadly by economic, political, cultural, and spiritual factors that are not primary focus on health related factors, health-related QOL refers to the impact of disease and its treatment on the individual's ability to function based on physical, mental, and social well-being.⁷ PTSD symptoms are associated with various problems, including social and interpersonal functioning,⁸ marital and parental functioning,⁹ and occupational functioning.⁸ Furthermore, among the many trauma survivors who do not develop PTSD, trauma exposure or subsyndromal PTSD is still associated with functional impairment, suicidality, and physical health problems.^{10,11} A recent large-scale World Mental Health survey revealed that exposure to trauma per se increased the risks of negative physical health consequences independent of PTSD. Exposure to even one traumatic event significantly elevated the ORs of a wide array of chronic physical illnesses after controlling for demographic factors and mental disorders: arthritis, back and neck pain, headache, heart disease, hypertension, diabetes, and peptic ulcers.¹²

People with PTSD often present with depressive and anxiety disorders.¹³ In fact, this triple comorbidity was the most common pattern of coexisting illnesses among the police responders to 9/11,¹³ war veterans,¹⁴ and survivors of chemical warfare.¹⁵ It was also noted that people with all three comorbid conditions had significantly poorer psychosocial functioning than those with the double comorbidity of PTSD and depression.¹⁴ Even one concurrent condition, a depressive or anxiety disorder, accounts for greater psychosocial and occupational impairments, a higher level of psychopathology, and poorer treatment outcomes.¹⁶ Furthermore, comorbid anxiety and depression were associated with an increase in the number of physical disorders and the degree of disability in an elderly population, compared to anxiety or depression alone.¹⁷

There is a growing recognition that health-related QOL among individuals with PTSD is severely impaired compared with that for people with other anxiety disorders and similar to that of people with major depressive disorder.¹⁸ One underlying determinant of health-related QOL is illness intrusiveness: the degree to which an illness and/or its treatment may interfere with important facets of an individual's life, particularly one's continued participation in valued activities and interests.¹⁹ Illness intrusiveness is thought to derive from illness-related anatomical changes, functional losses, treatment side effects, and illness- and/or treatment-related lifestyle disruptions that impact psychosocial well-being and contribute to increased emotional distress through two complementary pathways: 1) reduced availability of positive life experiences associated with valued activities and interests, and 2) reduced feelings of personal control. Previous research has supported that illness intrusiveness mediates the impact of disease and health-related QOL and illness

intrusiveness could be used as a screening questionnaire to identify who may be experiencing health-related QOL problems and may need more in-depth assessment and intervention. Psychotherapeutic intervention aimed at altering one's perceptions of the illness and how it has interrupted one's life can be useful. Illness intrusiveness has been researched in various medical conditions, including rheumatoid arthritis, systemic lupus erythematosus, multiple sclerosis, end-stage renal disease, cardiac disease, cancer, and psychiatric disorders such as anxiety disorders, sleep disorder, bipolar disorder, and schizophrenia.¹⁹ The findings suggest that illness intrusiveness is a suitable concept for evaluating the psychosocial effects of chronic illnesses and negatively correlates with subjective well-being across the tested medical and psychiatric disorders.¹⁹

Nevertheless, to date, illness intrusiveness has not been examined in patients with PTSD or psychological trauma. Furthermore, no study has documented the mediating effects of anxiety and depression in the relationship between posttraumatic stress symptoms (PTSS) and illness intrusiveness. One study noted that depression and PTSS independently predicted health-related QOL among combat veterans, suggesting that more complex pathways might exist when anxiety symptoms are added.²⁰ PTSS and common mental health problems such as anxiety and depression often present together, affect each other, and could play a mediating role in the overall effects of each condition. Understanding the shared and unique effects of PTSS, anxiety, and depression on illness intrusiveness will have important implications for treatment planning.

The aim of the current study was to test the hypothesis that anxiety and depression mediate the relationship between PTSS and illness intrusiveness among a clinical sample with psychological trauma. First, we tested the prediction that higher levels of PTSS were related to higher anxiety, depression, and illness intrusiveness. Second, we tested the prediction that the associations between PTSS and illness intrusiveness would be mediated by anxiety and depression. We investigated differential relationships among PTSS, anxiety, depression, and illness intrusiveness using structural equation modeling and path analysis.

METHODS

Participants

We examined the psychological data of 260 adult outpatients seeking treatment at the psychiatric trauma clinic at Hanyang University Guri Hospital in Korea. We included participants aged between 18 to 65 who had been exposed to pertinent traumatic events defined in the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV), involving actual or threatened death or serious injury or a threat to the physical integrity of self or others, as reported in the Life Events Checklist.²¹ Their psychiatric diagnoses were made using the Structured Clinical Interview for DSM-IV Axis I Disorders-Clinician Version.²² Among the 284 individuals recruited, 24 were excluded due to 1) a primary psychotic diagnosis, serious medical condition, intellectual disability, or neurocognitive impairment sufficient to interfere with their understanding of the questionnaires ($n = 15$) or 2) missing data for study variables ($n = 9$).

The mean age of the patients was 38.6 (standard deviation [SD], 13.0) years. Most participants were female (65.4%), married/cohabiting (88.9%), had some religious affiliation (60%), and had at least a college/university education (77.7%). Seventy percent

worked or were students or housewives, and 47.7% had a monthly income equivalent to 1,800–5,399 USD. The most common index trauma was accidents, including transportation (n = 165; 63.5%); followed by physical assault (n = 140; 53.8%); traumatic loss (n = 79; 30.4%); sexual assault (n = 64; 24.6%); life-threatening illness/injury (n = 62; 23.8%); and natural disaster (n = 48; 18.5%) (Table 1).

Table 1. Demographic and psychosocial characteristics of participants (n = 260)

Variables	Mean ± SD or No. (%)	Median (range)
Demographic		
Age, yr	38.59 ± 12.97	38 (18–77)
< 60	247 (95)	
≥ 60	13 (5)	
Sex		
Male	90 (34.6)	
Female	170 (65.4)	
Marital status		
Married/cohabiting	231 (88.9)	
Single	29 (11.1)	
Religion		
Christianity	96 (36.9)	
Catholic	15 (5.8)	
Buddhism	41 (15.8)	
Other	4 (1.5)	
None	93 (35.8)	
No response	11 (4.2)	
Education		
≤ High school	51 (19.6)	
College/university	131 (50.4)	
Post-graduate	71 (27.3)	
No response	7 (2.7)	
Employment		
Employed	102 (39.2)	
Unemployed	52 (20)	
Student or housewife	93 (35.8)	
No response	13 (5)	
Monthly income, USD		
< 1,800	96 (36.9)	
1,800–3,599	91 (35)	
3,600–5,399	33 (12.7)	
≥ 5,400	16 (6.2)	
No response	24 (9.2)	
Psychosocial		
Diagnosis		
PTSD	68 (26.2)	
Depressive disorder	56 (21.5)	
Anxiety disorder	72 (27.7)	
Adjustment disorder	40 (15.4)	
Obsessive compulsive disorder	8 (3.1)	
Somatoform disorder	6 (2.3)	
Other ^a	10 (3.8)	
Study variables		
IES-R	40.35 ± 24.68	42 (0–88)
≥ 22	192 (73.8)	
SAS	44.63 ± 9.10	44 (23–72)
SDS	41.11 ± 6.92	40.25 (25–69)
IIRS	47 ± 19.07	45.77 (13–91)

SD = standard deviation, PTSD = posttraumatic stress disorder, IES-R = impact of event scale-revised, SAS = Zung self-rating anxiety scale, SDS = Zung self-rating depression scale, IIRS = illness intrusiveness rating scale.

^aOther: insomnia, personality disorder, impulse control disorder, etc.

Measures

PTSS

PTSS were measured with the Impact of Event Scale-Revised (IES-R), a widely used 22-item self-report questionnaire. It covers three domains (intrusion, hyperarousal, and avoidance) of DSM-IV PTSD symptoms.²³ Each item is rated on a 5-point Likert scale from 'not at all' (0) to 'extremely' (4). The Korean version used in this study displays sound psychometric properties, including high internal consistency (Cronbach's $\alpha = 0.93$) and good construct validity with other PTSD and related symptom measures.

Anxiety

Anxiety was measured with the Zung Self-rating Anxiety Scale (SAS), a 20-item self-report questionnaire that assesses levels of general anxiety in both the affective and somatic domains.²⁴ Respondents rate each item on a 4-point Likert scale from 'none or a little of the time' (1) to 'most of the time' (4) with five reverse-coded items, and their responses provide a total score ranging from 20 to 80. A higher score indicates greater anxiety severity. We used the Korean version, which shows excellent internal consistency (Cronbach's $\alpha = 0.96$) and test-retest reliability and good concurrent validity with other anxiety measures.

Depression

Depression was measured with the Zung Self-rating Depression Scale (SDS), a 20-item self-report measure widely used to assess the affective, psychological, and somatic domains of depression.²⁵ Respondents rate each item on a 4-point Likert scale from 'none or a little of the time' (1) to 'most of the time' (4), with 10 reverse-coded items and a total score ranging from 20 to 80. Higher scores indicate greater depression severity. The Korean version of this study has adequate internal consistency (Cronbach's $\alpha = 0.84$), good test-retest reliability, and good concurrent validity with other depression measures.

Illness intrusiveness

Illness intrusiveness was measured using the Illness Intrusiveness Rating Scale (IIRS),¹⁹ a 13-item self-report that examines how an illness or its treatment has interfered with each of 13 domains of life: health, diet, work, active recreation, passive recreation, financial situation, partner relationship, sex, family relations, other social relations, self-improvement/self-expression, religious activity, and community and civic involvement. Each item is rated on a 7-point Likert scale from 'not very much' (1) to 'very much' (7) and summed to a total score from 13 to 91. The Korean version demonstrates high internal consistency (Cronbach's $\alpha = 0.92$).

Statistical analysis

We applied path analysis and structural equation modeling to estimate the relationships among PTSS, anxiety, depression, and illness intrusiveness.

First, we estimated the direct effects between PTSS and anxiety, PTSS and depression, PTSS and illness intrusiveness, anxiety and illness intrusiveness, and depression and illness intrusiveness. Then, we computed the overall indirect effects of PTSS on illness intrusiveness through anxiety and depression using a bootstrap of 10,000 samples. We used the Sobel test to calculate the indirect effects of PTSS on illness intrusiveness separately through anxiety, through depression, and through depression to anxiety.²⁶ To test the model, we used four different goodness-of-fit indices: Q-statistic, the comparative fit index (CFI), the goodness-of-fit statistic (GFI), and the parsimonious normed fit index (PNFI). A Q-statistic value of 3.00 or lower, CFI and GFI values of 0.90 or higher, and a PNFI value of 0.50 or lower indicate good model fit.²⁷

We considered all P values less than 0.05 to be statistically significant. All statistical analyses were conducted using SPSS, version 21.0, and AMOS 21.0 (SPSS Inc., Chicago, IL, USA).

Ethics statement

The present study was approved by the Institutional Review Board of Hanyang University Guri Hospital (approval No. 2009257). All participants provided written informed consent.

RESULTS

Clinical characteristics

Among psychiatric diagnoses, anxiety disorder (27.7%) and PTSD (26.2%) were common, followed by depressive disorder (21.5%). **Table 1** also shows the mean and SD of PTSS (IES-R), anxiety (SAS), depression (SDS), and illness intrusiveness (IIRS). According to the given cutoff scores, most patients reported severe PTSS (IES-R score ≥ 22 ; 73.8%) (mean, 40.35; SD, 24.68). The mean SAS, SDS, and IIRS scores were 44.63 ± 9.10 (range, 23–72), 41.11 ± 6.92 (range, 25–69), and 47 ± 19.07 (range, 13–91), respectively.

Structural equation models

Fig. 1 portrays our structural model; we hypothesized that anxiety and depression act as mediators of the relationship between PTSS and illness intrusiveness. The path analysis showed a saturated model (the goodness-of-fit indices: Q-statistic = 0, CFI = 1, GFI = 1, and PNFI = 0), and the estimates were statistically significant and showed the right direction.

In the structural model, all the path coefficients were significant except the path from depression to illness intrusiveness. The unstandardized path coefficient from PTSS to illness intrusiveness was 0.122 ($P = 0.023$), which indicates that greater PTSS was associated with higher illness intrusiveness. **Table 2** shows the direct, indirect, and total effects of PTSS on illness intrusiveness. The direct effect of PTSS on illness intrusiveness was significant ($\beta = 0.158$, $P = 0.027$). The total indirect effect of PTSS on illness intrusiveness through anxiety and depression was also significant ($\beta = 0.166$, $P < 0.001$).

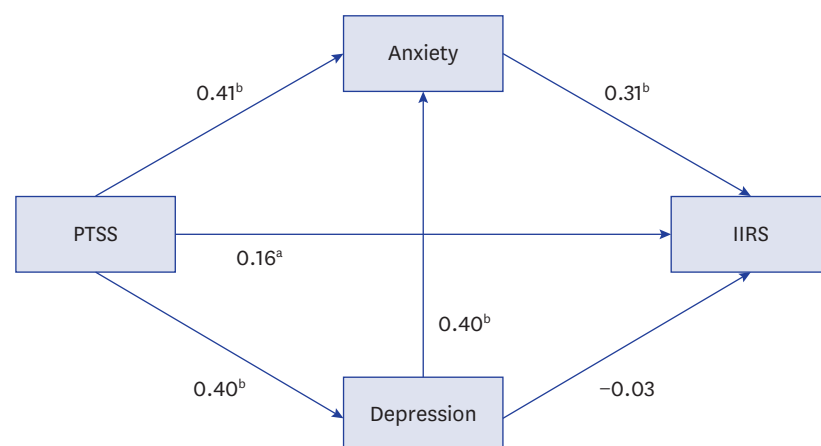


Fig. 1. Final structural model: the mediating effects of anxiety and depression between PTSS and illness intrusiveness.

PTSS = posttraumatic stress symptoms, IIRS = illness intrusiveness rating scale.

^a $P < 0.05$; ^b $P < 0.001$.

Table 2. Standardized direct, indirect, and total effects of PTSS on IIRS

Effects	Anxiety	Depression	IIRS
PTSS			
Direct	0.409 (< 0.001)	0.403 (< 0.001)	0.158 (0.027)
Indirect	0.162 (< 0.001)	-	0.166 (< 0.001)
Total	0.570 (< 0.001)	0.403 (< 0.001)	0.324 (< 0.001)
Anxiety			
Direct	-	-	0.311 (< 0.001)
Indirect	-	-	-
Total	-	-	0.311 (< 0.001)
Depression			
Direct	0.401 (< 0.001)	-	-0.029 (0.686)
Indirect	-	-	0.125 (< 0.001)
Total	0.401 (< 0.001)	-	0.096 (0.085)

Values indicate the coefficient of regression (*P* value).

PTSS = posttraumatic stress symptoms, IIRS = illness intrusiveness rating scale.

Table 3. Individual indirect effects of PTSS on IIRS

Factors	Mediator effect β (SE)	<i>P</i> value
Anxiety	0.127 (0.038)	0.001
Depression	-0.012 (0.029)	0.683
Depression to anxiety	0.050 (0.016)	0.002
Total	0.166 (0.040)	< 0.001

PTSS = posttraumatic stress symptoms, IIRS = illness intrusiveness rating scale, β = standardized path coefficients, SE = standard error of β .

Using the Sobel test, we discovered that the individual indirect effects of PTSS on illness intrusiveness through anxiety alone and through depression to anxiety were significant ($\beta = 0.127$, $P = 0.001$; $\beta = 0.050$, $P = 0.002$, respectively), but the indirect effect through depression alone was not ($\beta = -0.012$, $P = 0.683$) (**Table 3**). These results indicate that greater PTSS is associated with higher illness intrusiveness, and that the relationship between them can be partially mediated by anxiety and a depression-to-anxiety pathway. Among the individual indirect effects, anxiety showed the largest mediation effect on the relationship between PTSS and illness intrusiveness. The total effect (direct plus indirect effects) of PTSS on illness intrusiveness was significant ($\beta = 0.324$, $P < 0.001$).

DISCUSSION

In the present study, many participants with psychological trauma reported severe PTSS, symptoms of anxiety and depression, and illness intrusiveness. Compared with populations with other psychiatric illness, such as bipolar depression (mean \pm SD, 43.8 \pm 19.81)²⁸ and insomnia (34.9 \pm 17.63),²⁹ patients with psychological trauma reported high illness intrusiveness (mean \pm SD, 47 \pm 19.07). Illness intrusiveness in patients with psychological trauma is even higher than in patients with life-threatening medical conditions, such as cancer (breast, 33.0 \pm 18.45; lung, 36.8 \pm 18.54)³⁰ or end-stage renal disease (41.8 \pm 15.67).³¹

PTSS showed both significant direct ($\beta = 0.158$) and indirect ($\beta = 0.166$) effects on increasing illness intrusiveness. Anxiety showed the largest direct effect on increasing illness intrusiveness and acted as a mediator between PTSS or depression and illness intrusiveness. Meanwhile, depression also played a distinct role: although it had no direct effect on illness intrusiveness and did not mediate the relationship between PTSS and illness intrusiveness, it did have an indirect effect on increasing illness intrusiveness via a depression-to-anxiety pathway.

To the best of our knowledge, this is the first study to elucidate the specific mediating effects of anxiety and depression on the relationship between PTSS and illness intrusiveness using a path analysis in a clinical sample of psychological trauma patients. Previously, researchers carried out a path analysis in motor vehicle accident survivors⁵ and demonstrated that PTSD symptoms did not directly influence QOL but rather indirectly affected QOL via anxiety and depression. That study addressed PTSD's effects on QOL, not illness intrusiveness directly, but our findings differ: we found a direct effect of PTSD symptoms on illness intrusiveness. However, the findings of both studies support the importance of examining numerous facets of psychopathology, including anxiety and depression, to understand the amount of illness intrusiveness among trauma survivors. Antony et al.³² found high illness intrusiveness in individuals with anxiety disorders and suggested that it might be attributable to increased emotional distress, rather than disability or treatment aspects. Those results correspond to ours in that anxiety showed the largest direct effect on increasing illness intrusiveness and acted as a mediator between PTSS and illness intrusiveness.

For depression, Robb et al.²⁸ reported that the severity of illness intrusiveness was strongly associated with minimal residual depressive symptoms in patients with bipolar disorder. Furthermore, Devins et al.^{19,33} noted that depressive symptoms in chronic illnesses correlated with illness intrusiveness even when controlling for demographics, medical, contextual, and response-style variables. Our findings also show a positive correlation between depression and illness intrusiveness. However, our path analysis shows that depression has no direct effect on illness intrusiveness in patients with psychological trauma and does not mediate the relationship between PTSS and illness intrusiveness, but it has an indirect effect on increasing illness intrusiveness via a depression-to-anxiety pathway.

Some studies have proposed a dimensional structure for posttraumatic stress symptomatology and examined how that structural factor model relates to external measures of psychopathology, such as depression and anxiety.^{34,35} Those results demonstrate that re-experiencing, avoidance, and anxious arousal symptoms are most strongly linked to anxiety, that numbing symptoms are linked to depression, and that dysphoric arousal symptoms are linked to both anxiety and depression. Pietrzak et al.³⁶ suggested that anxious arousal symptoms (i.e., hypervigilance and exaggerated startle) primarily drive re-experiencing symptoms, whereas dysphoric arousal symptoms (i.e., sleep disturbance, irritability/anger, and concentration difficulties) primarily drive emotional numbing symptoms over time. Those findings and ours emphasize the importance of assessment and intervention for anxiety and depressive symptoms in patients with psychological trauma: an intervention effective for one symptom might also be beneficial in managing other symptoms and could mitigate the influence of many symptoms on trauma survivors.

The present findings have important implications for clinical practice. First, we found that anxiety had the largest direct and indirect effects on illness intrusiveness in patients with psychological trauma. Second, greater increases in depression were associated with increased anxiety, which in turn led to increased illness intrusiveness. Thus, early and accurate diagnosis of co-morbid anxiety and depression and effective psychotherapeutic interventions, in addition to any necessary pharmacotherapy, could mitigate the negative effects of PTSS on illness intrusiveness in patients with psychological trauma. In the case of depression, its early diagnosis and treatment could at least partially prevent the development of anxiety in at-risk patients with psychological trauma. Patients with psychological trauma with higher levels of anxiety and depression may see their illness as more intrusive to central life domains, therapeutic interventions targeting anxiety

and depression beyond PTSS can alter one's perceptions of the illness and how it has interrupted one's life and shift the individual's focus from losses and limitations to other areas that have yet to be affected or could be explored. Patients who can maintain good moods seem to be more willing to practice self-management behaviors and are more likely to report improved well-being.³⁷ Cognitive therapy to cope with common cognitive distortions which are associated with anxiety and depression such as catastrophizing, selective abstraction (an excessive attention to negative detail while ignoring the whole picture), and overgeneralization (a negative conclusion that exceeds the current situation) can be helpful.³⁸ Furthermore, ruminative cognitive style has been linked to PTSS and depression following trauma³⁹ and also has been known to mediate the relationship between anxiety and depression. Integrative treatment including interventions for ruminative thinking, such as mindfulness strategies in Acceptance and Commitment Therapy (ACT) may offer a possible way of approach.⁴⁰ ACT may be beneficial in helping a patient navigate the maladaptive cognitions arising from a traumatic experience and minimize avoidance of trauma reminders. ACT also explores personal values and promotes behavior change that is consistent with those values. As a transdiagnostic approach in patients with PTSS, anxiety, and depression after psychological trauma, integrative intervention with evidence-based trauma-focused therapy such as Prolonged Exposure and Eye Movement Desensitization and Reprocessing Therapy and ACT may improve subjective well-being. It is important to note we did not examine cognitive distortion or rumination in this study and this is just one possible clinical explanation. Psychosocial interventions aimed at minimizing illness intrusiveness and increasing participation in valued life activities may be important strategies to help people with psychological trauma improve their subjective well-being.

Our findings have several limitations. First, although the results of our study from structural equation modeling imply possible causal relationships, the cross-sectional study design limits us from deducing explicit causality between variables. We looked at anxiety and depression as mediators of illness intrusiveness; however, it is likely that this relationship is bi-directional such that greater illness intrusiveness leads to greater distress. Future research with a longitudinal design is warranted to gain a deeper understanding of the temporal changes in and causal relationships among the variables of interest. Second, participants in this study were treatment-seeking at a psychiatric facility that specializes in trauma, and it is possible that those with severe trauma were over-represented. In addition, although we focused on the effects of psychological trauma and aimed to investigate the pathway from PTSS to illness intrusiveness, various diagnoses and the heterogeneity of the participants may have a potential influence on the outcomes. Third, dissociative symptoms are associated with a more severe trauma history including childhood maltreatment and greater symptom complexity, so considering these symptoms would be valuable in future studies to expand our findings.

In conclusion, we delineated the mediating effects of anxiety and depression on the relationship between PTSS and increasing illness intrusiveness among patients with psychological trauma. This study is the first to outline the mediating roles of depression and anxiety in the relationship between PTSS and illness intrusiveness. We expect our results to contribute to a deeper understanding of the relationships among PTSS, anxiety, depression, and illness intrusiveness in patients with psychological trauma and to guide the development of efficient approaches for addressing PTSS and mental health problems in those patients.

Finally, future research is needed to explore specific mechanisms of these mediation effects and evaluate whether clinical interventions to treat anxiety or depression further minimize illness intrusiveness and enhance subjective well-being in patients with psychological trauma.

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REFERENCES

1. Atwoli L, Stein DJ, Koenen KC, McLaughlin KA. Epidemiology of posttraumatic stress disorder: prevalence, correlates and consequences. *Curr Opin Psychiatry* 2015;28(4):307-11.
[PUBMED](#) | [CROSSREF](#)
2. Pietrzak RH, Goldstein RB, Southwick SM, Grant BF. Prevalence and Axis I comorbidity of full and partial posttraumatic stress disorder in the United States: results from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions. *J Anxiety Disord* 2011;25(3):456-65.
[PUBMED](#) | [CROSSREF](#)
3. Wang CH, Tsay SL, Bond AE. Post-traumatic stress disorder, depression, anxiety and quality of life in patients with traffic-related injuries. *J Adv Nurs* 2005;52(1):22-30.
[PUBMED](#) | [CROSSREF](#)
4. Brady KT. Posttraumatic stress disorder and comorbidity: recognizing the many faces of PTSD. *J Clin Psychiatry* 1997;58 Suppl 9:12-5.
[PUBMED](#)
5. Gudmundsdottir B, Beck JG, Coffey SF, Miller L, Palyo SA. Quality of life and post trauma symptomatology in motor vehicle accident survivors: the mediating effects of depression and anxiety. *Depress Anxiety* 2004;20(4):187-9.
[PUBMED](#) | [CROSSREF](#)
6. Solomon Z, Mikulincer M. Posttraumatic intrusion, avoidance, and social functioning: a 20-year longitudinal study. *J Consult Clin Psychol* 2007;75(2):316-24.
[PUBMED](#) | [CROSSREF](#)
7. Guyatt GH, Feeny DH, Patrick DL. Measuring health-related quality of life. *Ann Intern Med* 1993;118(8):622-9.
[PUBMED](#) | [CROSSREF](#)
8. Norman SB, Stein MB, Davidson JR. Profiling posttraumatic functional impairment. *J Nerv Ment Dis* 2007;195(1):48-53.
[PUBMED](#) | [CROSSREF](#)
9. Birkley EL, Eckhardt CI, Dykstra RE. Posttraumatic stress disorder symptoms, intimate partner violence, and relationship functioning: a meta-analytic review. *J Trauma Stress* 2016;29(5):397-405.
[PUBMED](#) | [CROSSREF](#)
10. Marshall RD, Olfson M, Hellman F, Blanco C, Guardino M, Struening EL. Comorbidity, impairment, and suicidality in subthreshold PTSD. *Am J Psychiatry* 2001;158(9):1467-73.
[PUBMED](#) | [CROSSREF](#)
11. Zlotnick C, Franklin CL, Zimmerman M. Does "subthreshold" posttraumatic stress disorder have any clinical relevance? *Compr Psychiatry* 2002;43(6):413-9.
[PUBMED](#) | [CROSSREF](#)
12. Scott KM, Koenen KC, Aguilar-Gaxiola S, Alonso J, Angermeyer MC, Benjet C, et al. Associations between lifetime traumatic events and subsequent chronic physical conditions: a cross-national, cross-sectional study. *PLoS One* 2013;8(11):e80573.
[PUBMED](#) | [CROSSREF](#)
13. Bowler RM, Kornblith ES, Li J, Adams SW, Gocheva VV, Schwarzer R, et al. Police officers who responded to 9/11: comorbidity of PTSD, depression, and anxiety 10-11 years later. *Am J Ind Med* 2016;59(6):425-36.
[PUBMED](#) | [CROSSREF](#)
14. Ginzburg K, Ein-Dor T, Solomon Z. Comorbidity of posttraumatic stress disorder, anxiety and depression: a 20-year longitudinal study of war veterans. *J Affect Disord* 2010;123(1-3):249-57.
[PUBMED](#) | [CROSSREF](#)
15. Hashemian F, Khoshnood K, Desai MM, Falahati F, Kasl S, Southwick S. Anxiety, depression, and posttraumatic stress in Iranian survivors of chemical warfare. *JAMA* 2006;296(5):560-6.
[PUBMED](#) | [CROSSREF](#)
16. Zlotnick C, Warshaw M, Shea MT, Allsworth J, Pearlstein T, Keller MB. Chronicity in posttraumatic stress disorder (PTSD) and predictors of course of comorbid PTSD in patients with anxiety disorders. *J Trauma Stress* 1999;12(1):89-100.
[PUBMED](#) | [CROSSREF](#)

17. Kang HJ, Bae KY, Kim SW, Shin HY, Shin IS, Yoon JS, et al. Impact of anxiety and depression on physical health condition and disability in an elderly Korean population. *Psychiatry Investig* 2017;14(3):240-8.
[PUBMED](#) | [CROSSREF](#)
18. Rapaport MH, Clary C, Fayyad R, Endicott J. Quality-of-life impairment in depressive and anxiety disorders. *Am J Psychiatry* 2005;162(6):1171-8.
[PUBMED](#) | [CROSSREF](#)
19. Devins GM. Using the illness intrusiveness ratings scale to understand health-related quality of life in chronic disease. *J Psychosom Res* 2010;68(6):591-602.
[PUBMED](#) | [CROSSREF](#)
20. Pittman JO, Goldsmith AA, Lemmer JA, Kilmer MT, Baker DG. Post-traumatic stress disorder, depression, and health-related quality of life in OEF/OIF veterans. *Qual Life Res* 2012;21(1):99-103.
[PUBMED](#) | [CROSSREF](#)
21. Gray MJ, Litz BT, Hsu JL, Lombardo TW. Psychometric properties of the life events checklist. *Assessment* 2004;11(4):330-41.
[PUBMED](#) | [CROSSREF](#)
22. First MB, Spitzer RL, Gibbon M, Williams JB. *Structured Clinical Interview for DSM-IV Axis I Disorders-clinician Version (SCID-CV)*. Washington, D.C.: American Psychiatric Press; 1997.
23. Weiss DS, Marmar CR. The impact of event scale - revised. In: Wilson JP, Keane TM, editors. *Assessing Psychological Trauma and PTSD*. New York, NY: Guilford Press; 1997, 399-411.
24. Zung WW. A rating instrument for anxiety disorders. *Psychosomatics* 1971;12(6):371-9.
[PUBMED](#) | [CROSSREF](#)
25. Zung WW. A self-rating depression scale. *Arch Gen Psychiatry* 1965;12(1):63-70.
[PUBMED](#) | [CROSSREF](#)
26. Taylor AB, MacKinnon DP, Tein JY. Tests of the three-path mediated effect. *Organ Res Methods* 2008;11(2):241-69.
[CROSSREF](#)
27. Hooper D, Coughlan J, Mullen M. Structural equation modelling: guidelines for determining model fit. *Electron J Bus Res Methods* 2008;6(1):53-60.
28. Robb JC, Cooke RG, Devins GM, Young LT, Joffe RT. Quality of life and lifestyle disruption in euthymic bipolar disorder. *J Psychiatr Res* 1997;31(5):509-17.
[PUBMED](#) | [CROSSREF](#)
29. Hossain JL, Ahmad P, Reinish LW, Kayumov L, Hossain NK, Shapiro CM. Subjective fatigue and subjective sleepiness: two independent consequences of sleep disorders? *J Sleep Res* 2005;14(3):245-53.
[PUBMED](#) | [CROSSREF](#)
30. Devins GM, Bezjak A, Mah K, Loblaw DA, Gotowiec AP. Context moderates illness-induced lifestyle disruptions across life domains: a test of the illness intrusiveness theoretical framework in six common cancers. *Psychooncology* 2006;15(3):221-33.
[PUBMED](#) | [CROSSREF](#)
31. Devins GM, Beanlands H, Mandin H, Paul LC. Psychosocial impact of illness intrusiveness moderated by self-concept and age in end-stage renal disease. *Health Psychol* 1997;16(6):529-38.
[PUBMED](#) | [CROSSREF](#)
32. Antony MM, Roth D, Swinson RP, Huta V, Devins GM. Illness intrusiveness in individuals with panic disorder, obsessive-compulsive disorder, or social phobia. *J Nerv Ment Dis* 1998;186(5):311-5.
[PUBMED](#) | [CROSSREF](#)
33. Devins GM, Edworthy SM, Guthrie NG, Martin L. Illness intrusiveness in rheumatoid arthritis: differential impact on depressive symptoms over the adult lifespan. *J Rheumatol* 1992;19(5):709-15.
[PUBMED](#)
34. Carragher N, Mills K, Slade T, Teesson M, Silove D. Factor structure of posttraumatic stress disorder symptoms in the Australian general population. *J Anxiety Disord* 2010;24(5):520-7.
[PUBMED](#) | [CROSSREF](#)
35. Harpaz-Rotem I, Tsai J, Pietrzak RH, Hoff R. The dimensional structure of posttraumatic stress symptomatology in 323,903 U.S. veterans. *J Psychiatr Res* 2014;49:31-6.
[PUBMED](#) | [CROSSREF](#)
36. Pietrzak RH, Feder A, Schechter CB, Singh R, Canelmo L, Bromet EJ, et al. Dimensional structure and course of post-traumatic stress symptomatology in World Trade Center responders. *Psychol Med* 2014;44(10):2085-98.
[PUBMED](#) | [CROSSREF](#)
37. de Ridder D, Geenen R, Kuijjer R, van Middendorp H. Psychological adjustment to chronic disease. *Lancet* 2008;372(9634):246-55.
[PUBMED](#) | [CROSSREF](#)

38. Beck JS. *Cognitive Behavior Therapy: Basics and Beyond*. 2nd ed. New York, NY: Guilford Press; 2011.
39. Ehrling T, Frank S, Ehlers A. The role of rumination and reduced concreteness in the maintenance of posttraumatic stress disorder and depression following trauma. *Cognit Ther Res* 2008;32(4):488-506.
[PUBMED](#) | [CROSSREF](#)
40. Hayes SC, Strosahl K, Wilson KG, Bissett RT, Pistorello J, Toarmino D, et al. Measuring experiential avoidance: a preliminary test of a working model. *Psychol Rec* 2004;54(4):553-78.
[CROSSREF](#)