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Complex post-traumatic stress disorder (cPTSD) and suicide risk: A multigroup mediation analysis exploring the role of post-traumatic symptomatology on hopelessness

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ABSTRACT

Complex post-traumatic stress disorder (cPTSD) is a clinical condition that features not only PTSD symptoms, but also disturbances in self-organization. Patients with cPTSD have a higher incidence of psychiatric comorbidities, including suicidality. A key construct tightly related to suicidality is hopelessness, described as a feeling of despair, with a state of mind giving low or negative expectancies regarding one's future. Since there is a paucity of studies investigating the link between cPTSD and hopelessness as a risk factor for suicidality, the aim of this study was to examine the role of post-traumatic symptomatology as the primary driver of suicidality, as measured by hopelessness.

211 patients were enrolled and divided into two groups: PTSD (143 patients) and cPTSD (78 patients). A set of standardized measures was administered to study post-traumatic symptomatology, depression, and hopelessness.

The results showed that compared to PTSD, cPTSD patients experienced more severe symptoms in all clinical outcomes ($p < 0.001$). The mediation analysis revealed a significant positive association between post-traumatic symptomatology and hopelessness in the cPTSD group, which was not significant in the PTSD group. Among PTSD patients, depression mediated 43.37% of the impact of post-traumatic symptomatology on suicidal ideation.

Our results contribute to a better understanding of complex post-traumatic symptomatology, further highlighting its role in the pathogenesis of suicidality. Hence, these findings have important clinical implications, suggesting that targeted, trauma-focused interventions might effectively prevent hopelessness and therefore suicide risk in patients with cPTSD.

1. Introduction

Post-traumatic stress disorder (PTSD) is a leading cause of disability, with a lifetime prevalence of 2.3–6.1% in the general population and 30% in veterans (Di Lorenzo et al., 2020; Shalev et al., 2017; Yehuda et al., 2015). PTSD arises when a person is exposed to stressful events like natural calamities or violent or life-threatening accidents. According to the Diagnostic and Statistical Manual of Mental Disorders – 5th revision – Text Revision (DSM-5-TR), diagnostic criteria for PTSD feature re-experiencing the trauma, avoidance behaviors, disturbances in threat perceptions and reactivity, and negative alterations in cognitions and mood (American Psychiatric Association, 2022).

The International Classification of Diseases – 11th revision (ICD-11) has inserted complex PTSD (cPTSD) as a clinical entity distinct from PTSD (World Health Organization, 2020). In addition to hyperarousal, re-experiencing, and avoidance, the diagnosis of cPTSD requires what has been defined as disturbances of self-organization (DSO), i.e., difficult interpersonal relationships, affective dysregulation, and persistent negative self-concept (Brewin, 2020; Maercker et al., 2022; Rossi et al., 2022). Typically, cPTSD follows exposure to dreadful, prolonged, interpersonal, traumatic events, especially in early life, from which chances of escaping are meager (i.e., sexual abuse, domestic violence, torture, slavery, etc.) (Brewin, 2020). People having cPTSD or PTSD indeed differ in the type of traumatic event that has caused the stress

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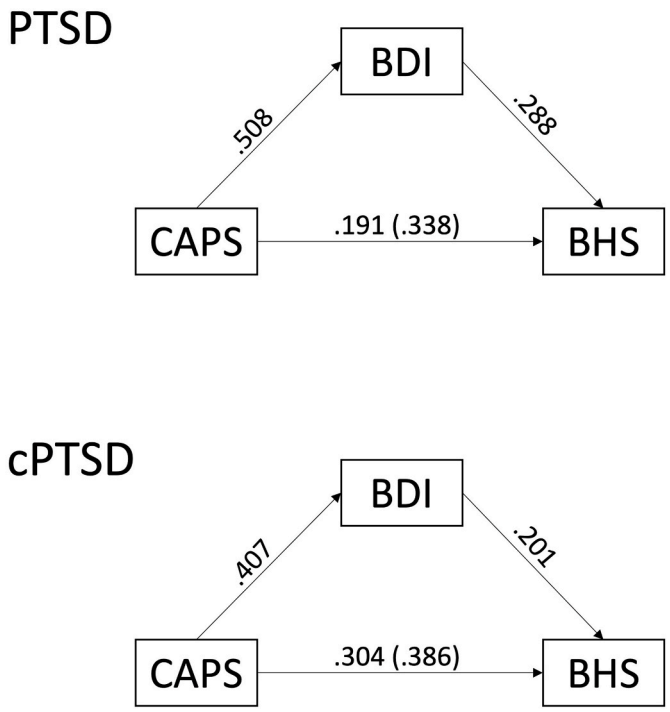

Fig. 1. Proposed multigroup mediation model in the two clinical populations, with direct effects and, in parenthesis, total effects – CAPS: Clinician-administered PTSD Scale; BDI: Beck Depression Inventory; BHS: Beck Hopelessness Scale; PTSD: Post-Traumatic Stress Disorder; cPTSD: complex PTSD.

disorder (Frost et al., 2019; Karatzias et al., 2019). While cPTSD is generally linked with interpersonal and early-life traumas, PTSD is generally caused by non-interpersonal and later-life traumas. cPTSD is indeed described by the Psychodynamic Diagnostic Manual (PMD) as a developmental trauma disorder (Lingiardi and McWilliams, 2017). PMD marks out cPTSD highlighting how major traumatic events between birth and adulthood can affect one's personality, emotional and self-regulation, identity, and self-worth.

Patients with cPTSD have a high incidence of co-occurring psychiatric comorbidities. These include dissociation, ranging from dissociative neurological disorders to psychogenic dissociation (Longo et al., 2019a,b; Rossi et al., 2019), quasi-psychotic symptoms, e.g., ego-dystonic auditory or visual illusions (Brewin, 2020; Maercker et al., 2022; Rossi et al., 2023), and substance and behavioral addictions, with odds ratios of 2 for alcohol abuse and of 4 for drug abuse (Facer-Irwin et al., 2022; Karatzias et al., 2019). Such comorbidities should not be interpreted as co-existing actual psychiatric conditions (for instance, major depressive or dissociative disorders) but rather co-occurring symptomatology within the PTSD spectrum that can manifest with dissociative, depressive, or even psychotic symptoms.

Among psychiatric comorbidities, PTSD has long been considered a well-established risk factor for self-directed violence and suicidal behavior (Law et al., 2019; Nock et al., 2009). In addition, such association is highly increased when these patients have comorbid depression (Nichter et al., 2019; Panagioti et al., 2009).

A key construct tightly related to suicidality is hopelessness. Hopelessness is described as a feeling of despair, with a state of mind giving low or negative expectancies regarding one's future. The concept of hopelessness is integral to theories such as the Hopelessness Theory of Suicidality and the Interpersonal Theory of Suicide, among others (Abramson et al., 2002; Joiner, 2005). These theories propose that hopelessness arises from a combination of stressful life events, a lack of social support, and negative cognitive styles, leading to the perception that the future will be filled with insurmountable obstacles and no opportunity for improvement. The presence of hopelessness can drive an individual towards thoughts of suicide as they see it as the only way to escape the unendurable and unbearable pain they are experiencing (Hawton and van Heeringen, 2009). The presence of emotional dysregulation, negative self-concept, and probably higher levels of mental pain in patients with cPTSD may furthermore directly contribute to the development of hopelessness and suicide risk (Maercker et al., 2022; Pompili et al., 2022; Pompili et al., 2022). The elevated levels of mental pain that individuals with cPTSD might experience can be overwhelming and unbearable. Such pain often stems from unresolved trauma, ongoing triggers, and the cumulative effects of long-term distress (Pompili et al., 2022). The intensity of mental pain can be debilitating and may lead individuals to consider suicide to escape their suffering.

To this end, a wide piece of literature reported hopelessness as a robust predictor of suicidality in general and clinical populations (Ribeiro et al., 2018), especially among patients with PTSD (Boffa et al., 2018; Florez et al., 2018).

Although the relationship between PTSD, suicidality, and hopelessness is well established, very little is known about these pathways in cPTSD patients, as to date, only three case reports (Chaperot et al., 2017; Rosenfield et al., 2018; Sigurdardottir et al., 2012) and scarce epidemiological evidence is present in the literature (Hyland et al., 2018; Karatzias et al., 2019; Longo et al., 2019; Spikol et al., 2022).

Since there is a paucity of studies investigating the link between cPTSD and hopelessness as a risk factor for suicidality, we aim to enhance the understanding of the basis for this association. We hypothesize a stronger association between hopelessness and cPTSD compared to PTSD. That post-traumatic symptomatology is the primary driver of hopelessness in cPTSD patients, holding a different mediation role for depression in PTSD *versus* cPTSD. To test this hypothesis, we examined the relationship between post-traumatic symptomatology, depression, and hopelessness in a large clinical population of 221 individuals with PTSD/cPTSD.

2. Methods

2.1. Study design and participants

The present cross-sectional study involved outpatients from the Psychiatry clinic at the University of Rome Tor Vergata Hospital. Study participants were consecutively admitted, assessed, and diagnosed by an expert clinician using the criteria of the ICD-11 and thus divided into two groups: PTSD and cPTSD. Those who did not meet the requirements for inclusion, i.e., under 18 or over 65 years of age, having neurological comorbidities or intellectual disabilities and those who did not sign the informed consent were excluded from the study. All procedures in the study adhered to the ethical standards outlined in the 1964 Helsinki Declaration and its subsequent amendments and were approved by the local ethics committee.

2.2. Measures

The study participants were evaluated using psychometric measures to assess different psychopathological dimensions. The assessment included the Clinician-Administered PTSD Scale (CAPS), which measured the severity of the post-traumatic symptomatology (Blake et al., 1995). The Beck Depression Inventory (BDI) was used to measure the severity of depressive symptomatology (Beck et al., 1961). Finally, the Beck Hopelessness Scale (BHS) was used to measure suicide risk, using the total score as a continuous variable and a cutoff value of 9 to detect individuals with clinically relevant suicide risk (Beck et al., 1974; Pompili et al., 2022; Sueki, 2022).

2.3. Statistical analysis

Data are shown as mean ± standard deviation (SD) and frequency

(and percentage). The Shapiro-Wilk test was applied to each continuous variable to determine the normality of the data distribution. Upon the Shapiro-Wilk test, all variables were non-normally distributed ($p < 0.05$). Univariate statistics (using the Mann-Whitney *U* test and Chi-squared test) were conducted to explore data and find differences in sociodemographic and psychopathological variables between the PTSD and cPTSD groups. Rank biserial correlation (RBC) and Phi-coefficient were used to compute effect size estimates for the Mann-Whitney test and Chi-Square test, respectively.

A multigroup mediation model was fitted on BHS total score, with CAPS total score as the independent variable and BDI total score as the mediator. This analysis was conducted separately in the cPTSD and PTSD groups, controlling for the variable gender. Mediation was tested by bootstrapping the indirect effect at 5000 replications. The significance of the bootstrapped indirect effects was ascertained by inspecting the 95% confidence intervals. To test for multicollinearity, we inspected the Variance Inflation Factors (VIF) of both models. Statistical significance was set at $p < 0.05$.

All statistical analyses were conducted using the packages tidyverse and lavaan for R (R Foundation for Statistical Computing).

3. Results

The sample comprised 221 participants consecutively admitted; 143 were diagnosed with PTSD (60.1% women) and 78 with cPTSD (82.1% women). All the study participants met the inclusion criteria. For this reason, none of the individuals was excluded from the study. Gender differed across groups ($\chi^2_2 = 10.13$; $p = 0.001$). The mean age was 36.44 (±12.19) and did not differ across groups ($p = 0.484$ – see Table 1).

The severity of all outcome measures differed across groups, with the cPTSD group showing higher values in all variables (BHS: $W = 2781.5$, $p < 0.001$; BDI: $W = 3097.5$, $p < 0.001$; CAPS: $W = 1926$; $p < 0.001$ – see Table 1). 50.35% of individuals with PTSD and 80.76% of those with cPTSD showed a BHS total score ≥9, indicating a clinically higher suicide risk in the cPTSD group than the PTSD group ($\chi^2_2 = 18.30$; $p < 0.001$), with an Odds Ratio (OR) of 4.14.

The mediation analysis showed a significant positive association between post-traumatic symptomatology and hopelessness in the cPTSD group [$b = 0.304$; 95% confidence intervals (CI) = 0.007–0.569], which instead was not significant in the PTSD group ($b = 0.191$; 95% CI = −0.040 – 0.430 – see Fig. 1 and Table 2). The total effects of CAPS on BHS were $b = 0.386$ (95% CI = 0.132–0.664) in the cPTSD group and $b = 0.338$ (95% CI = 0.107–0.564) in the PTSD group. Among individuals with PTSD, depression mediated 43.37% of the impact of post-traumatic symptomatology on hopelessness. Nevertheless, the same relation was not significant among those with cPTSD (Table 2). In both models, no multicollinearity was found between the selected variables (VIF = 1).

Table 1
– Sample characteristics; CAPS: Clinician-administered PTSD Scale; BDI: Beck Depression Inventory; BHS: Beck Hopelessness Scale.

Variables	PTSD (%/±SD)	cPTSD (%/±SD)	Statistic (χ^2 or Mann-Whitney as appropriate)	p-value	Effect size[a]
age	37.08 (±13.02)	35.39 (±10.67)	4999	0.484	0.059
gender	M: 57 (39.9%) F: 86 (60.1%)	M: 14 (18%) F: 64 (82%)	10.13	0.001	0.224
BHS ≥9	71 (50.35%)	63 (80.76%)	18.30	<0.001	0.299
CAPS total score	70.04 (±25.31)	101.47 (±23.89)	1926	<0.001	−0.617
BDI total score	16.61 (±9.84)	23.60 (±10.23)	3097	<0.001	−0.380
BHS total score	8.31 (±2.84)	10.85 (±2.74)	2781	<0.001	−0.494

[a] Note: Rank Biserial Correlation and Phi-coefficient are the effect size measures for the Mann-Whitney test and Chi-Square test, respectively.

Table 2
Association between post-traumatic symptomatology, depression, and suicidality; CAPS: Clinician-administered PTSD Scale; BDI: Beck Depression Inventory; BHS: Beck Hopelessness Scale.

	PTSD		cPTSD	
	b (95% CI)	*p*	b (95% CI)	*p*
CAPS → BHS	0.191 (−0.040 – 0.430)	0.110	0.304 (0.007–0.569)	0.034
CAPS → BDI	0.508 (0.331–0.687)	<0.001	0.407 (0.150–0.662)	0.002
BDI → BHS	0.288 (0.087–0.472)	0.003	0.201 (−0.001 – 0.401)	0.05
indirect effect	0.147 (0.044–0.267)	0.010	0.082 (0.00–0.210)	0.103
total effect	0.338 (0.107–0.564)	0.004	0.386 (0.132–0.664)	0.003

4. Discussion

Most early studies point out how suicidality is dramatically associated with PTSD. Since cPTSD has a more complex phenotype than PTSD, we hypothesized that suicide risk, as indexed by hopelessness, would be significantly more severe in the former condition. For this reason, the present article aims to analyze hopelessness as a measure of suicide risk in a large clinical sample of individuals with PTSD and cPTSD.

This study found significant differences between the two groups regarding their psychopathology. Specifically, individuals with cPTSD reported experiencing more severe symptoms of post-traumatic stress and depression compared to those with PTSD. To this end, it is important to underline that PTSD is a condition that can develop in response to a single traumatic event, such as a car accident. In contrast, cPTSD develops due to prolonged, repeated exposure to traumatic events, such as childhood abuse, neglect, or domestic violence (Maercker et al., 2022). This leads to more frequent flashbacks, severe avoidance, and higher hyperarousal states, which could explain higher CAPS scores. As other Authors have already suggested, heavier traumas are also responsible for a wide range of affective dysregulations, ranging from anxiety to depression, that indeed are reported to be consistently higher in patients with cPTSD than in those with PTSD (Fung et al., 2022; Gilbar, 2020; Hyland et al., 2018).

Our study found a great difference also in hopelessness, with cPTSD individuals scoring significantly higher than those with PTSD. Additionally, from an epidemiological perspective, more people with cPTSD reported clinically significant hopelessness (score of ≥9 on the BHS total score), which indexes higher suicide risk than those with PTSD.

Higher suicidality in cPTSD (OR = 4.14) aligns with previous research, with evidence showing ORs between 3.43 and 4.32 for the suicide risk (Hyland et al., 2018; Karatzias et al., 2019; Longo et al., 2019; Spikol et al., 2022). Gelezelyte and colleagues consistently reported that cPTSD could mediate between sexual abuse and suicide risk (Gelezelyte et al., 2022).

Apart from one study that used BHS for indexing suicide risk (Longo et al., 2019), the others were limited by their assessment without using specific measures for suicidality and their small sample sizes, ranging from 50 to 106 patients. Notably, two of these studies report on non-clinical populations, further limiting the generalizability of their findings.

Our multigroup mediation analysis further highlighted why individuals with cPTSD had increased levels of suicide risk. Indeed, the cPTSD group reported post-traumatic symptomatology to directly and more severely predict suicide risk than the PTSD group. While the first did not show any mediation, in the latter, this relation was fully mediated by depressive symptomatology without any direct causal relation.

In contrast, depression may mediate the same pathway in those with PTSD, where emotional dysregulation and negative self-concept are not core features (Law et al., 2019). In other words, our data suggest that, while cPTSD could represent a sufficient risk factor in itself for suicidality, PTSD would require some depressive symptoms to yield a suicidal risk. It is also possible that the differences in the mechanisms underlying suicide risk in cPTSD and PTSD are related to differences in the severity and chronicity of the disorders. For instance, individuals with cPTSD may be associated with more severe and chronic symptoms, which could increase hopelessness and, consequently, suicidality. In contrast, those with PTSD may be more likely to occur in response to a single traumatic event, thus resulting in a less direct pathway from post-traumatic symptomatology to suicide risk.

Taken together, our results contribute to a better understanding of complex post-traumatic symptoms, further highlighting its role in the pathogenesis of suicidality. Upon our findings, we also hypothesize that the same post-traumatic symptomatology can be involved in other cPTSD worse clinical outcomes (e.g., dissociation, psychosis, and drug dependence), possibly with similar psychopathological mechanisms.

The present study has some limitations that need to be considered. One limitation is the cross-sectional nature of the study, which limits the causal inference between the variables measured in this study, as the data were collected at a single point. Furthermore, cross-sectional studies capture data at a single time point, making it challenging to determine the temporal sequence of events. In this study, we made *a priori* decisions based on existing theory and literature to examine the associations mentioned above; however, it is difficult to rule out other similar relationships definitively. For instance, it is plausible that enduring and persistent symptoms of PTSD/cPTSD can contribute to hopelessness, subsequently leading to depressive symptoms. Longitudinal studies that follow patients over time are needed to establish the directionality of the relationships between post-traumatic symptomatology, depression, and suicide risk. Another study limitation is the need for a structured clinical interview to diagnose cPTSD, as the diagnosis was entirely based on clinical assessment. However, this may be a minor limitation, as clinical assessment can be more sensitive in detecting complex presentations, which standardized diagnostic interviews may not fully capture. Moreover, the free clinical interview used in this study considers the complex shades required to characterize the traumatic events that produced the condition as complex or non-complex trauma, which is often difficult to yield using standardized instruments.

Our study was also conducted without considering the participants' sociodemographic characteristics and the role of other possible comorbidities that could have impacted the aforementioned relationships. As PTSD/cPTSD is often associated with comorbid conditions, ranging from substance use to personality disorders, which entails composite pharmacotherapies, further studies should look in more detail at these results in light of such clinical variables.

Another major limitation is related to the fact that, although hopelessness is a well-established risk factor for suicidality, our study did not rely on a comprehensive assessment of suicidal behavior, which features suicidal ideation and a lifetime history of suicide attempts.

Lastly, the combination of clinician-administered and self-reported measures may have introduced potential biases due to differences in the assessment methods.

In conclusion, our study sheds light on one of the most complex and debilitating consequences of cPTSD and provides a better understanding of the factors contributing to suicide risk in this population. Investigating hopelessness in a large clinical sample highlighted the key role of post-traumatic symptomatology, rather than depression, as a primary driver of suicide risk in patients with complex post-traumatic clinical presentations. However, it is important to note that while the BHS might assess the risk of suicidality, it primarily measures hopelessness. Therefore, caution should be exercised when drawing definitive conclusions about suicidality. Nevertheless, these findings of our study suggest that targeted interventions, such as eye movement desensitization and reprocessing, or trauma-focused cognitive behavioral therapy, might play a role in preventing high hopelessness levels and, therefore, suicidality in individuals with cPTSD.

Contributors

TBJ: conceptualization, methodology, formal analysis, data curation, writing – original draft.

LL: writing – editing and review.

RR: data curation, writing – editing and review.

CN: writing – editing and review; AS: writing – editing and review.

GDL: conceptualization, supervision.

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None.

Declaration of competing interest

The authors have no conflicts of interest to disclose.

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