Posttraumatic Stress Disorder and Risk of Suicide Reattempt in the French ALGOS Study

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Abstract

Objective: The specific role of posttraumatic stress disorder (PTSD) in individuals who have attempted suicide, along with the influence of comorbid psychiatric conditions on the risk of suicide reattempt, remains unexplored. This study aims to assess the association between PTSD and suicide reattempt at 6 months among suicide attempt (SA) survivors, while controlling for prevalent psychiatric disorders.

Method: We analyzed data from a cohort of 972 participants enrolled in the ALGOS study between January 2010 and February 2013. We assessed the risk of suicide reattempt at 6 months and rehospitalization in both psychiatric and nonpsychiatric settings. A multivariable logistic regression model was performed, controlling for depression, generalized anxiety disorder, and alcohol use disorder.

Results: Among all participants, 79 had a lifetime diagnosis of PTSD. At 6 months, 117 participants (13.3%) had reattempted suicide. After controlling for randomization group, age, sex, and comorbid psychiatric conditions, PTSD was statistically associated with suicide reattempt at 6 months (odds ratio [OR] with 95% CI, 2.33 [1.39–3.89], $P < .01$), rehospitalization in psychiatric settings (OR = 2.24 [1.39–3.61], $P < .01$), and nonpsychiatric settings (OR = 3.06 [1.90–4.93], $P < .01$).

Conclusion: Almost 1 in 10 SA survivors suffer from PTSD. These individuals are at a higher risk of suicide reattempt and appear more generally to be in poorer health, with a higher risk of hospitalization in psychiatric and nonpsychiatric settings. Recognizing and effectively managing PTSD among individuals admitted after an SA is thus imperative for reducing the risk of subsequent suicide reattempts.

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Posttraumatic stress disorder (PTSD) is a psychiatric disorder characterized by exposure to a traumatic event (death, threatened death, actual or threatened serious injury, or sexual violence), resulting in persistent intrusion symptoms, avoidance of trauma-related stimuli, negative alterations in cognitions and mood, and arousal symptoms, all of which persist for more than 1 month.[1] Affecting around 1% of the general population, PTSD is a prevalent disorder[2–4] and stands as a crucial public health concern, in particular because of its association with elevated mortality risk due to cancer, cardiovascular diseases, and, notably, suicide.[5–7]

Several studies have established a heightened risk of death by suicide, suicide attempts (SAs), and suicidal ideation among individuals with PTSD.[8–10] Moreover, PTSD frequently co-occurs with other psychiatric disorders, such as depression, substance abuse, and anxiety disorders, in up to 90% of cases.[11,12] These comorbid conditions themselves are associated with a high risk of SAs and death by suicide.[13,14] Given this significant overlap, it is crucial to study the link between PTSD and suicidal behavior while controlling for comorbid psychiatric disorders.[15] Previous research has primarily focused on specific populations, such as those with depression or substance use disorders.[9,10] A recent meta-analysis revealed that among individuals with comorbid psychiatric conditions, PTSD was associated with a 3 times higher risk of SA (based on 8 studies), but a lower risk of death by suicide (based on 1 study) compared to those with PTSD alone.[10] However, there is a notable gap in the literature, as very few studies have assessed this association in more diverse populations with psychiatric comorbidities.[10] This underscores the need for further research to better understand the

Editor's Note
We encourage authors to submit papers for consideration as a part of our Focus on Suicide section. Please contact Philippe Courtet, MD, PhD, at pcourtet@psychiatrist.com.

Clinical Points

- Few studies have examined the importance of posttraumatic stress disorder (PTSD) among individuals who have attempted suicide, particularly regarding its role in suicide reattempts and rehospitalization.
- Almost 1 in 10 individuals who attempted suicide suffer from PTSD. They are at a higher risk of hospitalization in psychiatric and nonpsychiatric settings.
- This study underscores the importance of routinely screening for PTSD in patients who have attempted suicide and implementing evidence-based treatments.

relationship between PTSD and suicidal behavior across broader groups.

Since having a history of SA is the most powerful predictor of future completed suicide,[13] it is important to identify the impact of PTSD on further SAs within this population. Among SA survivors, the specific role of PTSD in suicide reattempt has been rarely studied, often subsumed within the category of anxiety disorders.[16–18] To our knowledge, the only study that examined the association between PTSD and the risk of suicide reattempt found a 2 times higher risk of SA in individuals with PTSD.[18] Furthermore, no studies have assessed the impact of comorbidities on the association between PTSD and suicide reattempt.[8,9,19]

Additionally, those with PTSD are twice as likely to have a nonpsychiatric condition, including chronic pain, inflammation, cardiometabolic disorders, cancer, and dementia.[3,5,20–24] All these comorbidities may develop prior to trauma exposure, or arise either alongside PTSD due to trauma exposure, shared causal factors, or as a consequence of PTSD itself.[20] Consequently, individuals with PTSD exhibit elevated rates of health care service utilization, indicating a particularly heavy burden of disease.[25–27] Still, no study has investigated the broader mental and physical health outcomes experienced by individuals who have survived SAs and have PTSD. It appears, therefore, necessary to study hospital readmission in this population, particularly after adjusting for frequently co-occurring psychiatric conditions.

This study aims to estimate the rate of PTSD among SA survivors and address these critical gaps by investigating the specific contribution of PTSD to the risk of suicide reattempt within a 6-month period (ie, the most at-risk period for suicide reattempt),[28] among individuals with a history of SA, controlling for prevalent psychiatric comorbidities also known to be associated with SA. Second, the impact of PTSD on mental and physical health will be determined by estimating the risk of rehospitalization in psychiatric and nonpsychiatric units.

We hypothesize that PTSD is associated with suicide reattempt in this high-risk population, even after adjusting for other psychiatric disorders. This hypothesis is based on the strong links between PTSD and recurrence found in the aforementioned meta-analysis. Furthermore, considering that individuals with PTSD often have various mental and physical comorbidities, we anticipate that the risk of rehospitalization will also be higher than among those without PTSD, both in psychiatric and nonpsychiatric settings.

METHOD

Study Design

A prospective observational cohort of 972 subjects from the ALGOS (a French acronym for "algorithm following an SA") study, enrolled between January 26, 2010, and February 28, 2013, was included in the analysis.[29] The ALGOS study is a multicentric, prospective, single-blind, randomized, and controlled clinical trial with 2 parallel groups. Patients were recruited from 23 French emergency services within the 7 days following an SA. The intervention group received a brief contact intervention for 6 months,[30] and the control group did not receive any intervention. Inclusion criteria comprised individuals aged 18 and above. Exclusion criteria included those with no suicidal intent, homelessness, under guardianship, or with more than 4 SAs in the last 3 years. Multirepeaters were excluded from the ALGOS trial, as brief contact interventions have been demonstrated to be less effective for these individuals.[31] Thus, a total of 68 individuals were excluded: 53 withdrew their consent, and 15 did not meet the inclusion criteria. All participants in the ALGOS study provided signed consent.

This study received authorization from AFFSAPS (number NCT01123174) and was approved by the Committee for the Protection of Persons in the North-West Region (CPP North-West decision 09/63). The study was registered in ClinicalTrials.gov (NCT01123174).

Collected Data

At inclusion, sociodemographic characteristics (age, sex, family, and work status) were collected for all subjects. At 6 months, trained psychologists conducted a standardized telephone interview to assess lifetime psychiatric diagnoses using the Mini International Neuropsychiatric Interview (MINI).[32] During the telephone interview, participants were specifically asked if they had made a suicide reattempt and/or if they had been hospitalized in psychiatric or nonpsychiatric units in the previous 6 months.

Primary and Secondary Outcomes

The primary outcome was suicide reattempt at 6 months. The secondary outcomes were hospitalization in psychiatric or nonpsychiatric units at 6 months.

Statistical Analysis

Descriptive statistics were calculated for sociodemographic characteristics and psychiatric diagnoses. Continuous variables are presented as means and SDs. The 95% CIs were calculated using the central limit theorem. Discrete variables are expressed as frequencies and percentages. Missing data were imputed using the multiple imputation method, assuming data were missing at random.[33] The covariates used to generate the multiple imputed datasets included all data collected at inclusion and at 6 months. Fifty imputed datasets were generated and combined according to Rubin's rules using the MICE package in R software. Then, the association between PTSD and suicide reattempt at 6 months was assessed using a multivariable logistic regression model, adjusting for sex, age, randomization group, history of previous SA, and frequent comorbid psychiatric diagnoses (depression, generalized anxiety disorder, and alcohol use disorder). Statistical significance was considered for *P* values below .05. The secondary outcomes were evaluated with the same method. R software Version 3.6.1 was used for all analyses.

RESULTS

Patients at Inclusion

A total of 972 participants who made SA were included in the study, of whom 480 (49.4%) were included in the intervention group (see Table 1). The majority were women (63.6%), single (53.1%), and employed (63.9%). The participants had an average age of 38 (±13.3) years.

Lifetime diagnoses were assessed for 785 participants. Among them, 79 (10.1%) had PTSD, 533 (67.9%) had depression, 148 (18.8%) had generalized anxiety disorder, and 198 (25.2%) had alcohol use disorder.

Missing Data

At 6 months, 81 participants (8.3%) were lost to follow-up, and 106 (10.9%) did not respond to all the questions during the phone call. Information regarding suicide reattempts was missing for 92 participants (9.5%), psychiatric hospitalization data were missing for 113 (11.6%), nonpsychiatric hospitalization data were missing for 115 (11.8%), and lifetime diagnoses were missing for 187 participants (19.3%). The sociodemographic characteristics of those with missing data on suicide reattempt and hospitalization were as follows: 29.6% were under 26 years old, 58.3% were between 26 and 50 years old, 12.1% were over 50 years old; 54.8% were women; 51.3% were first-time attempters; 42.6% were in a relationship; and 58.3% were employed.

Table 1.

Baseline Characteristics of Participants

	All cohort (N = 972)
	n (%)
Intervention group	
Control	492 (50.6)
ALGOS[a]	480 (49.4)
Sex	
Female	618 (63.6)
Male	354 (36.4)
Age	
18–26 y	226 (23.3)
26–50 y	558 (57.4)
>50 y	188 (19.3)
First attempt	518 (53.3)
Marital status	
Single	515 (53.1)
In couple	455 (46.9)
Work status	
Employed	619 (63.7)
Unemployed	349 (36.1)
Lifetime psychiatric diagnosis	
PTSD	79 (8.1)
MDD	533 (54.8)
GAD	148 (15.2)
Panic disorder	121 (12.4)
Social phobia	48 (4.9)
OCD	12 (1.2)
AUD	198 (20.4)
SUD	58 (6)
Psychotic disorder	8 (0.8)

[a]Received a brief contact intervention for 6 mo.
Abbreviations: AUD = alcohol use disorder, GAD = generalized anxiety disorder, MDD = major depressive disorder, OCD = obsessive-compulsive disorder, PTSD = posttraumatic stress disorder, SUD = substance use disorder.

Suicide Reattempt at 6 Months

At 6 months, 117 out of 880 participants (13.3%) had reattempted suicide (see Table 2). Among those with a PTSD diagnosis, 16 individuals (20.3%) reattempted, most of whom were women (13 individuals), aged between 26 and 50 years old (11 individuals), and had a history of previous attempts (14 individuals). After controlling for the randomization group, age, sex, history of previous SA, and comorbid psychiatric conditions, PTSD and AUD were statistically associated with suicide reattempt in the multivariable logistic regression model (odds ratio [OR] with 95% CI, 2.33 [1.39–3.89], $P < .01$ and OR = 2.57 [1.64–4.02], $P < .01$, respectively).

Hospitalization at 6 Months

Moreover, 119 persons (13.8%) were hospitalized in psychiatric units and 119 (13.8%) in nonpsychiatric units, of which 8 were hospitalized in both units. PTSD was also associated with hospitalization in psychiatric units (OR = 2.24 [1.39–3.61], $P < .01$) and nonpsychiatric units (OR = 3.06 [1.90–4.93], $P < .01$). In multivariate logistic regression model, AUD and generalized anxiety disorder

Table 2.

Association Between PTSD and Suicide Reattempt, and Hospitalization in Psychiatric Units and Nonpsychiatric Units Within 6 mo (N = 972)

	Suicide reattempt (n = 117)			Hospitalization in psychiatric units (n = 119)			Hospitalization in nonpsychiatric units (n = 119)		
	n	Adjusted OR (95% CI)[a]	*P*[a]	n	Adjusted OR (95% CI)[a]	*P*[a]	n	Adjusted OR (95% CI)[a]	*P*[a]
Posttraumatic stress disorder	16	2.33 (1.39–3.89)	<.01	16	2.24 (1.39–3.61)	<.01	21	3.06 (1.90–4.93)	<.01
Covariates									
Intervention group									
Control	66	Ref.		57	Ref.		60	Ref.	
ALGOS	51	0.68 (0.47–1.00)	.05	62	0.87 (0.62–1.24)	.44	59	0.85 (0.59–1.21)	.36
Sex									
Female	71	Ref.		76			78		
Male	46	1.31 (0.89–1.93)	.17	43	1.15 (0.80–1.67)	.45	41	1.16 (0.80–1.66)	.43
Age									
18–26 y	14	Ref.		13	Ref.		29	Ref.	
26–50 y	78	1.44 (0.87–2.38)	.15	78	1.26 (0.81–1.97)	.31	63	0.80 (0.53–1.22)	.31
> 50 y	25	1.49 (0.79–2.79)	.22	28	1.21 (0.69–2.13)	.50	27	0.92 (0.54–1.58)	.77
History of previous SAs									
Non–first-time attempter	74	Ref.		72	Ref.		60	Ref.	
First-time attempter	43	0.68 (0.46–1.01)	.06	47	0.75 (0.52–1.07)	.11	59	0.88 (0.61–1.26)	.49
Lifetime psychiatric diagnosis									
MDD	70	0.83 (0.53–1.31)	.42	93	1.18 (0.75–1.86)	.47	76	0.69 (0.45–1.05)	.08
GAD	23	1.55 (0.96–2.50)	.07	29	1.82 (1.18–2.80)	.01	25	1.44 (0.90–2.30)	.13
AUD	44	2.57 (1.64–4.02)	<.01	47	2.45 (1.63–3.70)	<.01	28	1.04 (0.67–1.62)	.85

[a]Odds ratio and *P* value estimated by multivariate logistic regression model.
Abbreviations: AUD = alcohol use disorder, GAD = generalized anxiety disorder, MDD = major depressive disorder, PTSD = posttraumatic stress disorder, SAs = suicide attempts.

were also associated with hospitalization in psychiatric units at 6 months after an SA (OR = 2.45 [1.63–3.70], *P* < .01 and OR = 1.82 [1.18–2.80], *P* = .01, respectively).

DISCUSSION

Our study, including 972 SA survivors, revealed that 10.1% had a lifetime diagnosis of PTSD. Individuals who have attempted suicide and suffered from PTSD were at a higher risk of suicide reattempt, even after controlling for depression, generalized anxiety disorder, and alcohol use disorder at 6 months after their SA. Moreover, they had also an increased risk of being hospitalized in psychiatric or nonpsychiatric units within the same period.

The prevalence of PTSD among suicide attempters in our study, at 10%, aligns with findings from other studies, reporting prevalence rates ranging from 2% to 12%.[17,18,34] Interestingly, our study is one of the first to analyze the impact of frequent psychiatric comorbidities on the association between PTSD and suicide reattempt, using a multivariate regression model that adjusts for other common psychiatric disorders. Our results revealed that PTSD and AUD were the only 2 diagnoses associated with an increased risk of suicide reattempt after controlling for comorbid psychiatric diagnosis (OR = 2.33 [1.39–3.89] and OR = 2.57 [1.64–4.02] respectively). These findings agree with results from 2 other studies highlighting the impact of PTSD on suicide reattempt.[17,18] In the study conducted by Monnin et al,[18] the association between PTSD and suicide reattempt appears to be particularly significant in women. Consistent with existing literature, our findings show that a significant proportion of individuals with PTSD who reattempted suicide were women, reinforcing the well-documented trend of higher SA rates and elevated PTSD prevalence among females.[13,35] Interestingly, it has also been demonstrated in literature that childhood maltreatment, assaultive violence, and peacekeeping traumas are associated with the highest rates of SAs and that suicidality increases with the number of traumas.[36]

Beyond the link with suicide reattempt, our study also investigated the association between PTSD and subsequent hospitalization among individuals who committed an SA. While previous studies exploring the predictors of early readmission in psychiatric units identified personality disorder or schizophrenia/schizoaffective disorder as the main clinical risk factors,[37–40] our findings underscore a heightened risk of psychiatric rehospitalization among individuals with PTSD, potentially due to suicidal ideation or behaviors within the 6 months after the SA. Moreover, PTSD is frequently associated with personality disorders,[41] which

were not assessed in our study. This co-occurrence of psychiatric diagnoses may contribute to a greater disease burden and an increased risk of hospitalization in psychiatric units.

In addition, PTSD was also associated with an elevated risk of hospitalization in nonpsychiatric units. Our results are consistent with previous research indicating that individuals with PTSD have a higher risk of hospitalization in nonpsychiatric settings than those without PTSD.[42,43] This association may be explained by the medical management of the physical consequences of the trauma or the higher vulnerability to nonpsychiatric illnesses (ie, cardiometabolic disease, Alzheimer disease, cancer) in the long term.[44,45] Detecting and treating PTSD in individuals who have attempted suicide thus appears to offer an opportunity to reduce the medicoeconomic impact of the disease. Detecting and treating PTSD effectively is crucial, and it involves implementing routine screening for PTSD in primary care settings, especially among high-risk populations. These individuals should be provided with contact information for professionals who practice evidence-based treatments, such as cognitive behavioral therapy and eye movement desensitization and reprocessing.[12] Ensuring access to these treatments is essential for effective PTSD management and can help mitigate the impact of PTSD on patients' overall well-being.

Strengths and Limitations

Our study is, to our knowledge, one of the few assessing the link between PTSD and suicide reattempt in a cohort of suicide attempters and the first assessing the impact of psychiatric comorbidities. This study is also one of the first to analyze other health outcomes, such as the risk of rehospitalization in psychiatric and nonpsychiatric settings.

The main limitation of our study is the large amount of missing data at 6 months of follow-up. However, this bias was reduced by using multiple imputation for missing data, generating 50 imputed tables that were combined for the analyses. Although this method helps reduce bias, it assumes that data are missing at random, which may not fully account for patients lost to follow-up. Additionally, the retrospective nature of information collection during telephone interviews at 6 months after inclusion, including identification of psychiatric disorders, may introduce self-reporting bias and potential information loss. Another notable limitation of our study is the small number of individuals diagnosed with PTSD who had a suicide reattempt, with only 16 cases identified. As our study is an ancillary study based on the ALGOS trial, we conducted a post hoc power analysis, which indicated an achieved power of 0.96. In the ALGOS trial, additional information on the trauma, such as the type of trauma and when it occurred, and certain factors frequently associated with PTSD, such as education, were not collected. Moreover, multirepeaters were excluded from the study leading to a selection bias. As such, our findings should be interpreted with caution. Ultimately, we determined the lifetime psychiatric diagnoses using the MINI assessment, which only evaluates specific psychiatric disorders. Our study also did not assess the impact of the co-occurrence of PTSD with other frequent psychiatric disorders, nor did it examine how the number of comorbidities affects the risk of suicide reattempt and rehospitalization.

Perspectives

We recommend that future research replicate our analysis with larger samples of PTSD-diagnosed individuals and better characterization of the trauma to provide more robust and generalizable estimates. Future research should address the impact of PTSD and its comorbidities on suicide reattempt to provide a more comprehensive understanding of the relationship between PTSD and other psychiatric conditions, as well as their implications for clinical outcomes.

CONCLUSION

Our study indicates that almost 1 in 10 individuals who attempted suicide suffer from PTSD and that those individuals are at higher risk of suicide reattempt, and hospitalization in both psychiatric and nonpsychiatric settings. Individuals PTSD appear thus to be in poorer health condition than others, and it appears, therefore, imperative to diagnose and manage PTSD among individuals admitted for a SA to reduce recidivism and improve overall health. Furthermore, it is noteworthy to highlight that there are evidence-based guideline treatments available for PTSD with promising results,[12] emphasizing the potential for effective intervention in this population.

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