The Differential Roles of Trauma, Posttraumatic Stress Disorder, and Comorbid Depressive Disorders on Suicidal Ideation in the Elderly Population

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ABSTRACT

Objective: Although depression is the strongest predictor for the full spectrum of suicidal ideation, several other mental disorders, eg, posttraumatic stress disorder (PTSD), are associated with suicidal ideation too. This study investigates whether suicidal ideation is specifically associated with PTSD or if this association is fully or partially mediated by comorbid depressive disorders.

Method: A representative sample of 1,659 people aged 60–85 years from the German general population was examined by using self-rating instruments for PTSD, depression, and suicidal ideation in May and June 2008 in a cross-sectional study. Participants were diagnosed with PTSD when they met criteria A, B, C, and D for PTSD according to *DSM-IV-TR*. Suicidal ideation was used as the primary outcome measure.

Results: In our sample, 7.3% of subjects reported suicidal ideation within the last 2 weeks. Suicidal ideation was associated with a higher number of traumatic experiences (mean = 1.13 vs 0.78; $t = -3.20$; $P \leq .001$) and prevalence of PTSD (12.4% vs 3.4%, $\chi^2 = 23.39$, $P < .001$) than in subjects without suicidal ideation. In logistic regression analyses including age and sex, traumatic experiences were associated with suicidal ideation (OR = 1.16, $P = .011$). After including PTSD in the model, this association was fully explained by PTSD. Moreover, PTSD was associated with suicidal ideation (OR = 3.33, $P < .001$), but after including depression in the model, the association of PTSD and suicidal ideation was fully mediated by depression (OR = 1.61, $P < .001$).

Conclusions: The results of our study indicate that PTSD is associated with suicidal ideation, but this association was fully explained by comorbid depressive symptoms in the elderly general population. Thus, screening for depressive symptoms as well as administering an appropriate therapy seems the best way to prevent suicide attempts in the elderly, even in those patients with traumatic experiences and/or PTSD.

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Suicidal ideation is part of a spectrum of suicidality that also includes suicide plans, suicide attempts, and completed suicide as more severe manifestations. Several population-based studies have revealed point prevalences of suicidal ideation in the general population ranging from 5% to 10%.[1–4] Thus, suicidal ideation is not rare, and understanding its correlates is important in order to prevent suicidal ideation and, consequently, suicide attempts and completions. Mental disorders, eg, depressive disorders, substance use disorders, or personality disorders, are the primary risk factors of suicidality.[5] Moreover, several socioeconomic characteristics, such as female gender,[5] lower income,[5,6] or living without a partner,[4,5] are associated with increased risk of suicidal ideation.

Depression is a well-established risk factor for the full spectrum of suicidality.[7] Moreover, anxiety disorders have also been found to be associated with suicidal ideation and attempts.[8] Among anxiety disorders, posttraumatic stress disorder (PTSD) shows the most consistent relationship with suicidal ideation.[8,9] Nevertheless, there is a controversial debate as to whether suicidal ideation is specifically associated with anxiety disorders or whether this association is due to comorbid depressive disorders.[8–12] Moreover, traumatic experiences are associated with suicidal ideation, but full or partial PTSD as a consequence of the traumatic experiences explains this association for the most part.[13–15]

Several studies have investigated the relative contributions of PTSD and depressive disorders to suicidal ideation. Posttraumatic stress disorder was consistently associated with increased rates of suicidal ideation in different samples (eg, community samples or veterans of war), with odds ratios indicating a 4 to 5 times higher risk of suicidal ideation in participants with PTSD compared to those participants without PTSD.[9–12] Most of these studies addressed the additive effects of comorbid mental disorders, especially those of depressive disorders. The presence of 1 comorbid disorder results in a nearly doubled risk of suicidal ideation in people with PTSD; the presence of another 2 or more mental disorders leads to a further increase of suicidal ideation.[10–12] A systematic review[9] showed that controlling comorbid mental disorders weakened the association of suicidal ideation and PTSD, yet this association was not eliminated. Nevertheless, there are some studies in which comorbid depressive disorders fully explain the association of suicidal ideation and PTSD.[7] In a study[16] using path analysis in a sample of African American women who were victims of intimate partner violence, PTSD was not directly associated with suicidal ideation, but there was an association of PTSD with depression and, consequently, with suicidal ideation. In summary, the role of PTSD and depression in suicidal ideation is still under debate, and studies especially addressing elderly general population samples are missing to date.

Only few general-population studies on the epidemiology of trauma and PTSD in the elderly are available to date.[17–22] In the European countries that were broadly involved in World War II, where the present elderly population experienced that war as children or adolescents, an

Clinical Points

- In our sample, 7.3% of the elderly general population reported suicidal ideation within the last 2 weeks. This prevalence is comparable to the findings of other population-based studies.
- Suicidal ideation was positively associated with number of traumatic events and posttraumatic stress disorder (PTSD), but this finding seems due to comorbid depressive symptoms.
- To address suicidal ideation, it seems worthwhile to assess depressive symptoms in people with traumatic experiences and PTSD.

essential number of individuals have experienced war-related traumatic stress. For instance, in a German population-based study, the frequency of war-related traumatic experiences increased from 19.2% in the group aged 60–64 years to 59.7% in the age group 75 years and above.[19] Compared to the younger age groups, the German elderly carry an increased traumatic burden.[21] Consequently, the German elderly are more often affected by posttraumatic symptomatology; the prevalence of PTSD increases from 1.31% in the youngest age group (14–29 years) to 3.44% in the age group 60 years and older.[21] Including partial syndromes, 7.2% of the German war-generation are still affected by PTSD.[19] The increased prevalence rates of PTSD in the German elderly is an important finding, since other studies, eg, from Switzerland[23] or Australia,[17] could not show elevated prevalence rates of PTSD in the elderly. Moreover, war-related traumatic experiences in elderly Germans are related to other worse mental and physical health outcomes,[24–27] as well as to increased health care utilization.[28]

Because of Germany's historical background and the effects the second World War had on its people, the German elderly population is of special interest as a group in which to study the association of traumatic experiences and PTSD with suicidal ideation and to investigate the contributions of comorbid depressive symptoms.

METHOD

Subjects and Study Protocol

A representative sample of the German general population was selected with the assistance of a demographic consulting company (USUMA, Berlin, Germany). The area of Germany was separated into 258 sample areas representing the different regions of the country. Households of the respective area and members of these households fulfilling the inclusion criteria (age at or above 14 years, ability to read and understand the German language) were selected randomly. The sample was representative in terms of age and sex. A first attempt was made to reach selected individuals at 8,368 addresses, of which 8,116 were valid. If not at home, a maximum of 3 attempts was made to contact the selected person. All subjects were visited by a study assistant, informed about the investigation, and handed self-rating questionnaires. Among the subjects, 1,982 (24.4%) refused participation, 1,029 (12.7%) were not reached after 4 attempts, and 67 (0.8%) refused participation because of severe health problems. Five interviews (0.06%) were not usable because of incompleteness. A total of 5,033 people agreed to participate and completed the self-rating questionnaires in May and June 2008 (participation rate: 62.1%). The assistant waited until participants answered all questionnaires and offered help if the meaning of questions was not clear. Among the participants, 1,659 (32.9%) were aged 60 to 85 years. Because of missing data for suicidal ideation, we excluded 5 participants. The remaining 1,654 participants are included in the analysis presented here. The survey met the ethical guidelines of the international code of marketing and social research practice by the International Chamber of Commerce and the European Society of Opinion and Marketing Research. The study was reviewed and approved by the institutional ethics review board.

Instruments

Corresponding to the trauma list of the PTSD module[29] of the Munich Composite International Diagnostic Interview,[30] 8 potentially traumatizing events were given (eg, "You were the victim of a rape"; "You were the victim of a natural disaster"; "You received strong bodily threats [as with a weapon], were attacked, injured, or tortured"; "You had horrible experiences during war service"), and an open-answer question asked about "another terrible event or a catastrophe." Additionally, an inquiry was made concerning 3 war-related events ("You were bombed"; "You were driven out of your homeland"; "You had awful experiences during war effort").

The diagnostic criteria for PTSD according to *DSM-IV* were assessed with part 3 of the Posttraumatic Diagnostic Scale.[31] The Posttraumatic Diagnostic Scale is a renowned diagnostic instrument for the assessment of PTSD in clinical study settings. It consists of 17 items that assess the 3 symptom clusters (intrusions, avoidance, and arousal). The answers to each item refer to the symptom occurrence in the last month on a 4-point scale ranging from 0 ("not at all") to 3 ("several times per week/almost always"). The total score of the Posttraumatic Diagnostic Scale, including symptom clusters B, C, and D, ranges from 0 to 51 and represents severity of posttraumatic symptoms. Participants were diagnosed with PTSD when they met criteria A, B, C, and D according to *DSM-IV*.[32]

To assess suicidal ideation (the primary outcome measure) and depressive symptoms, the depression module of the 9-item Patient Health Questionnaire (PHQ-9)[33,34] was applied. The PHQ-9 contains 9 items assessing depressive symptoms. It shows high sensitivity and specificity levels.[35] Response categories for these items range from 0 ("not at all") to 3 ("nearly every day"). For the present study, item 9 ("Thoughts that you would be better off dead, or of hurting

Table 1. Sociodemographic Characteristics of the Study Sample (N = 1,654)

Characteristic	With Suicidal Ideation[a] (n = 121 [7.3%])	Without Suicidal Ideation[a] (n = 1,533 [92.7%])	Entire Sample (N = 1,654)	Statistic
Age group, n (%), y				
60–64	26 (21.5)	373 (24.3)	399 (24.1)	
65–69	24 (19.8)	416 (27.1)	440 (26.6)	$\chi^2 = 7.11$
70–74	29 (24.0)	352 (23.0)	381 (23.0)	
75–79	22 (18.2)	231 (15.1)	253 (15.3)	
80–85	20 (16.5)	161 (10.5)	181 (10.9)	
Sex, n (%)				
Female	61 (50.4)	825 (53.8)	886 (53.6)	$\chi^2 = 0.52$
Male	60 (49.6)	708 (46.2)	768 (46.4)	
Traumatic events				
No. of traumatic events, mean (SD)[b]	1.13 (1.54)	0.783 (1.32)	0.76 (1.34)	$t = -3.20$***
No. of war-related traumatic events, mean (SD)[c]	0.61 (0.98)	0.38 (0.74)	0.39 (0.77)	$t = -3.22$***
At least 1 traumatic event, n (%)	58 (47.9)	554 (36.1)	612 (37.0)	$\chi^2 = 6.69$**
PHQ-8 score, mean (SD)[d]	9.5 (3.5)	2.7 (2.9)	3.2 (3.4)	$t = -24.20$***
PTSD, n (%)[e]	15 (12.4)	52 (3.4)	67 (4.1)	$\chi^2 = 23.39$***
Posttraumatic Diagnostic Scale score, mean (SD)[f]	5.2 (8.2)	1.5 (4.1)	1.8 (4.6)	$t = -8.46$***

[a]Item 9 of the 9-item Patient Health Questionnaire.
[b]From the trauma list of the Munich Composite International Diagnostic Interview.
[c]Including war effort, bombing, displacement from home, or prisoner/hostage.
[d]Total score of the PHQ-8.
[e]According the Posttraumatic Diagnostic Scale.
[f]Total score of the Posttraumatic Diagnostic Scale (clusters B, C, D).
**$P < .01$; ***$P < .001$.
Abbreviations: PHQ-8 = 8-item Patient Health Questionnaire, PTSD = posttraumatic stress disorder.

yourself in some way") was used to assess suicidal ideation. The other 8 items (PHQ-8) were used to assess depressive symptoms. The PHQ-8 is an established and valid measure for depressive disorders in large-scale population-based studies.[36] In our analyses, we used the total score of the PHQ-8, ranging from 0 to 24, with higher scores indicating higher amount of depressive symptoms as a severity measure of depressive symptoms.

Statistical Analyses

Statistical analyses were conducted with the SPSS for Windows, version 18.0 (IBM Corp, San Francisco, California). Suicidal ideation was assessed by using item 9 of the PHQ-9. Those who indicated 0 (not at all) were classified as participants without suicidal ideation. All other participants indicating 1 (several days) to 3 (nearly every day) were classified as participants with suicidal ideation. Characteristics of both subgroups (those with and those without suicidal ideation) were tested by using χ^2 and *t* tests. To determine the association of suicidal ideation with the number of traumatic events, we used PTSD and depressive symptoms logistic regression analyses. To assess the mediating effect of PTSD and depressive symptoms, we compared 3 different models. Model 1 includes age, sex, and number of traumatic events; model 2 includes age, sex, number of traumatic events, and current PTSD; and model 3 includes age, sex, number of traumatic events, PTSD, and depressive symptoms.

RESULTS

Study Sample

Table 1 gives an overview of the demographic characteristics of the study sample (N = 1,654) and of both subgroups (with suicidal ideation/without suicidal ideation). Of the participants, 7.3% (n = 121) indicated suicidal ideation within the last 2 weeks. The subgroups with suicidal ideation and without suicidal ideation did not differ significantly with respect to age and sex. Those participants with suicidal ideation had a higher number of traumatic events across the lifespan and a higher number of war-related traumatic events, and a larger proportion of this group had at least 1 traumatic event. Moreover, participants with current suicidal ideation showed a higher number of depressive and posttraumatic symptoms as well as a higher prevalence of current PTSD (12.4% vs 3.4%).

Association of Suicidal Ideation With Traumatic Experiences, PTSD, and Depressive Symptoms

Table 2 presents the results of the logistic regression analyses. Suicidal ideation was significantly associated with the number of traumatic events (model 1). After including PTSD, the significant association of suicidal ideation with the number of traumatic events disappeared, but PTSD showed a significant association with suicidal ideation (model 2). Model 3 additionally included depressive symptoms. In this model, suicidal ideation was significantly associated with depressive symptoms; the number of traumatic events as well as PTSD were no longer associated with suicidal ideation.

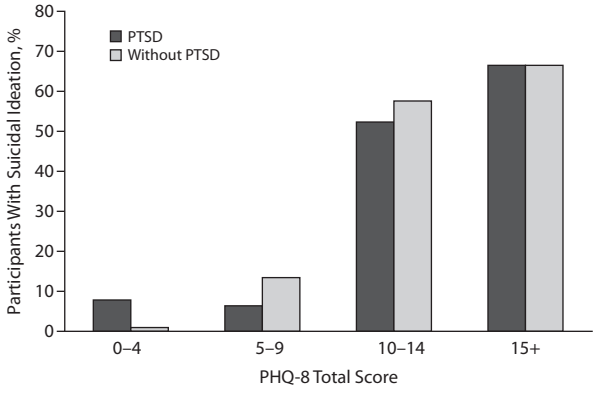
Figure 1 illustrates the association of suicidal ideation with depressive symptoms in participants with and without PTSD. With increasing depressive symptomatology, the prevalence of suicidal ideation also increased. The commonly used cut point for depressive disorders for the PHQ-8 (≤ 10) was associated with a surge of suicidal ideation. But, this increase was comparable in both groups; thus, there

Table 2. Multiple Logistic Regression Models for the Association of Suicidal Ideation With Trauma, Posttraumatic Stress Disorder (PTSD), and Depressive Symptoms

	Model 1		Model 2		Model 3	
Characteristic	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*
Sex	0.85 (0.59–1.24)	.411	0.85 (0.58–1.23)	.380	0.74 (0.46–1.18)	.204
Age[a]	1.13 (0.98–1.31)	.094	1.14 (0.98–1.32)	.084	0.92 (0.77–1.10)	.373
No. of traumatic events[b]	**1.16 (1.03–1.30)**	**.011**	1.10 (0.97–1.25)	.142	1.01 (0.86–1.19)	.923
PTSD[c]	…	…	**3.33 (1.75–6.33)**	**.000**	0.60 (0.25–1.43)	.247
Depressive symptoms[d]	…	…	…	…	**1.61 (1.51–1.72)**	**.000**
Model	Adjusted $R^2_{3,1628} = 0.017$		Adjusted $R^2_{4,1627} = 0.034$		Adjusted $R^2_{5,1626} = 0.453$	
	$P < .01$		$P < .001$		$P < .001$	

[a]In 5 groups, according to Table 1.
[b]Sum of all traumatic events from the trauma list.
[c]According to the Posttraumatic Diagnostic Scale.
[d]Total score of the 8-item Patient Health Questionnaire.

Figure 1. Prevalence of Suicidal Ideation in Association With Depressive Symptoms in Participants With and Without PTSD



Abbreviations: PHQ-8 = 8-item Patient Health Questionnaire, PTSD = posttraumatic stress disorder.

was no additive effect of depressive symptoms and PTSD for suicidal ideation.

DISCUSSION

The present study examines the association of traumatic experiences, PTSD, and depressive symptoms with suicidal ideation in a representative sample of the German elderly aged 60 to 85 years. To our knowledge, this is the first representative general population study in the elderly on this topic.

In our sample, 7.3% of subjects reported suicidal ideation within the last 2 weeks. This finding is comparable to those of other studies[1–3] and especially with another German population-based representative study[4] across all age groups reporting a prevalence rate of suicidal ideation of 8.0%. In accordance with previous studies, suicidal ideation was associated with a higher number of traumatic experiences and depressive symptoms as well as a higher prevalence of PTSD in our study sample.

To investigate the differential impact of traumatic experiences, PTSD, and depression on suicidal ideation, we calculated 3 logistic regression analyses. In the first step, traumatic experiences were associated with suicidal ideation. After including PTSD in the second step, the association with traumatic experiences disappeared. Thus, the association of traumatic experiences and suicidal ideation was explained by the association of traumatic experiences with PTSD, and traumatic experiences do not have an association with suicidal ideation independent of PTSD. In the third step, depressive symptoms were included in the analyses. Consequently, suicidal ideation was associated with depressive symptoms but not with traumatic experiences and not with PTSD. Thus, the association of suicidal ideation with PTSD was fully mediated by depressive symptoms in our study, and there was no additive effect of PTSD and depressive symptoms.

The present study converges with previous studies failing to find a direct relationship between PTSD and suicidal ideation,[7,16] but it diverges from other studies by demonstrating a main effect of PTSD, even in the presence of depression.[9–12] These mixed results in the literature might be attributable to the presumably complex relationship of PTSD, depression, and suicidal ideation. Moreover, they might be attributable to methodological differences in the studies, such as different samples (representative population samples, clinical samples, veterans of war), different assessment methods (self-report vs clinical interviews, different questionnaires), or different diagnostic approaches (dimensional vs categorical). In our study, which used a large population-based representative sample, the association was fully mediated by depressive symptoms. As we used a dimensional approach for the assessment of depressive symptoms, not only depressive disorders but also subthreshold depressive symptoms were considered in the models. Moreover, the different studies used different assessments for suicidal ideation ranging from 1 item[7] to a 19-item scale (the 19-Item Scale for Suicidal Ideation).[16] This divergent complexity of the assessment of suicidal ideation might influence the findings of the different studies. Least, there is a possible lump of the full range of suicide-related phenomena (eg, desire for death, suicidal ideation, suicide plans) in the literature. The interpersonal theory of suicide by van Orden et al[37] differentiates the desire for suicide from the capability to engage in suicidal behavior. According to

this theory, suicidal ideation could be associated with a heightened desire for suicide, which is more strongly related to depressive symptoms, whereas traumatic experiences and PTSD contribute to the capability to engage in suicidal behavior.[37] Consistent with this conceptualization, depression would be expected to be associated with suicidal ideation, whereas PTSD would be associated with suicide attempts. Further research is needed to test the possibility that PTSD and depression are related to different stages of the spectrum of suicidality.[7]

Although our study has some major strengths (eg, population-based approach, large sample size, first population-based study in the elderly), some factors limit the interpretation and generalizability of our findings. First, PTSD as well as traumatic experiences and depressive symptoms were assessed by using a self-rating instrument and not a clinical interview. This might cause a slight overestimation of PTSD prevalence, although the Posttraumatic Diagnostic Scale shows good psychometric properties.[38] On the other hand, the prevalence of traumatic experiences might be underestimated, since higher rates have been found in other studies.[23] Second, our study focuses on the elderly. The proportion of people living in nursing homes increases with age, and nursing home admission is associated with impaired physical and mental health. As nursing home residents were not included in our study, prevalence rates of mental disorders might be underestimated. Third, our cross-sectional approach allows no causal statements because we are not able to determine the chronological sequence and long-term course of traumatic experiences, PTSD, depressive symptoms, and suicidal ideation. Traumatic events were assessed for lifetime, PTSD symptoms were assessed over the last month, and depressive symptoms and suicidal ideation were assessed for the last 2 weeks. We added 3 events to the original trauma list of the Munich Composite International Diagnostic Interview to support the assessment of specific war-related experiences in our cohort. This might lead to hindsight bias and a possible increase of type I error. Last, the study was conducted in a unique population of elderly people who lived through World War II in Germany. These people have a very specific experience, and it is possible that our results may not be fully generalizable to other elderly populations.

To our knowledge this is the first population-based representative study in the elderly investigating the differential role of trauma, PTSD, and depression on suicidal ideation. Our study indicates that suicidal ideation in the elderly population is associated with depressive symptoms and not with traumatic experiences and PTSD itself. Although traumatic experiences are very common in the German elderly, and traumatic experiences are often associated with PTSD, suicidal ideation is associated with depressive symptoms. Thus, screening for depressive symptoms in health care for the elderly seems the best way to prevent suicide attempts, even in those patients with traumatic experiences and/or PTSD.

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