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Determinants of suicide-related ideation in Late Life Depression: Associations with perceived stress

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Abstract

Objectives: Perceived stress is emerging as a potential contributing factor in suicide-related ideation in older adults. We hypothesized higher levels of perceived stress would be associated with increased self-reported suicidal ideation independent of depressive symptom severity.

Methods: This study used data from community-dwelling older adults aged ≥ 65 with current diagnosis of major depression. Eligible participants completed measures of depression symptom severity (Hamilton Depression Rating Scale-17 item), current suicidal ideation (Geriatric Suicide Ideation Scale), and perceived stress (Perceived Stress Scale).

Results: Participants were 225 older adults with a mean age of 71.4 ($SD = 5.6$). Sixty-five percent of the sample was female. Fifteen percent of the variance in suicidal ideation was accounted for by lower education ($p = .03$), male sex ($p = .03$) and higher current perceived stress ($p < .001$). Specifically, stress accounted for 12% of the variance.

Conclusions: Perceived stress is an important avenue to increase identification of individuals with higher risk of suicide-related ideation among older adults with a current diagnosis of major depression.

Clinical Implications: Screening for perceived stress may allow for improved screening and prevention of suicidal activity in depressed older adults.

Keywords

aging; screening tests; stress; suicide; mood assessment; GSIS; PSS; Ideation

INTRODUCTION

The CDC estimates over 8.3 million adults in the US have experienced one or more episodes of suicidal-related ideation in the past 12 months [1, 2]. Despite recent initiatives targeting suicide prevention, the overall rates for suicide among males and females increased by 21%

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and 50% respectively between 2000 and 2017 [3, 4]. Older adults are an at-risk population for suicide [5-10]. In fact, among older adults the likelihood of a fatal first attempt is significantly greater than younger adults [11]. Although 2017 statistics have shown that the suicide rate for older adults have significantly declined since 2000, the rate for older adult males still remains the highest of all age groups and the rates for older adult females have begun to increase [3, 4]. These rates indicate that suicide and suicide risk in late life remains a prevalent public health problem.

Given the lethality of first attempts in older adults, suicide-related ideation is an important target for risk identification. Suicide-related ideation (or suicidal ideation), defined by Silverman et al., 2007 and Nock et al., 2010 as specific thoughts of killing oneself, is thought to be the first step leading toward a suicide attempt (i.e., engagement in self-injurious behavior with intent to die) and thus is strongly associated with the increased risk of mortality and death by suicide [8, 12-16]. Additionally, few older adults seek mental health resources for suicidal ideation, but rather primarily report depressive symptomatology to their primary care physicians [17] – which, though an important risk factor for suicide, is not a sensitive predictor of suicidal activity in the absence of other factors [18].

Previous diagnoses of Major Depression has been one of the most commonly studied risk factors for suicidal behavior, including suicide-related ideation, suicide attempt, and death by suicide [7, 19-21]. Depressive symptoms are common in late life, with 16% of older adults reporting some form of depressive symptomatology [22]. Although suicide rates for older adults with depression are high when compared to older adults without depression, not all older depressed adults engage in suicidal activity [23]. While previous literature has consistently shown that depression is strongly associated with suicide risk, the relationship between suicide and additional risk factors in an already diagnosed depressed population is complex, and depression severity alone is not enough to accurately predict suicidal behavior [18]. Thus, it is important to target additional risk factors of suicidal behavior in older adults with depression to inform prevention efforts.

One such factor often associated with both increased depressive symptomatology and suicidal activity is perceived stress [24-26]. Although there is a modest literature on how perceived stress and stress coping mechanisms are related to suicidal behavior in younger adults [27-30], little research has been done on the behavioral nature of stress complaints and the detrimental effects of chronic stress perception in older populations, who are also at heightened suicide risk. Stress is also an important factor in Late Life Depression (LLD) [31, 32], and older adults have shown to be more vulnerable to the negative effects of high stress levels on depressed mood when compared to other age groups [32-34].

Stress has many components and is a multidimensional psychological phenomenon. Indeed, much of the extant literature has focused on psychological distress [35, 36] and the impact of negative life events on suicidal activity in depressed older adults [37-39]. However, many stress inventories have been criticized for focusing on the number of stressful events without taking into account the individual's perception of the events. Utilization of the Perceived Stress Scale (PSS) [40] allows for the measurement of how unpredictable, uncontrollable, or overwhelming individuals find their current situation. Additionally, the PSS is a measure of

global stress that has been differentiated from the concept of psychological distress [24, 40], which has been previously found to be highly associated with suicidal behavior [35, 36, 39]. Use of the PSS allows for the assessment of perceived stress more broadly, in domains beyond psychological distress, negative life events, or other external stressors, and may be relevant to suicidal ideation in LLD.

Multidimensional approaches to assess patient suicide-related ideation have also been recently identified as having an advantage over limited screening approaches [13]. Unfortunately, much of the research focused on identifying additional risk factors of suicidal ideation utilizes relatively limited screening means of suicidal ideation, particularly one question on the Patient Health Questionnaire [41] or Hamilton Depression Rating Scale [42], rather than multidimensional questionnaires which can account for nuance and multidimensionality of late life suicidal activity. With a broader and more nuanced assessment of suicidal ideation like the Geriatric Suicide Ideation Scale [43], other psychological factors that may impinge on ideation in older depressed adults may be better identified.

Thus far, research has struggled to predict suicidal ideation and subsequent behavior in a way that is both sensitive and specific [13]. Perceived stress is a potentially valuable means of adding additional predictive value to depression severity in an already high-risk population of older depressed adults. Thus, the objective of this study was to examine perceived stress in patients with late life major depression and to determine the association between stress, depression severity, and suicidal ideation. Our hypothesis was that higher levels of perceived stress would be associated with increased self-reported suicidal ideation independent of depressive symptom severity.

METHODS

Participants and Procedures

This study used data from community-dwelling older adults with current diagnosis of major depression. The sample was drawn from two studies run by the UCSF Late Life Depression Research Program, which both contained the same inclusion and exclusion criteria and baseline study procedures. These participants provided informed consent upon their enrollment in a study investigating behavioral and biomarker correlates of cognition in late life depression. The research was conducted in line with the Declaration of Helsinki for protection of human subjects and was approved by the institutional review board of the University of California, San Francisco. Inclusion criteria were age over 65, a current diagnosis of Major Depressive Disorder diagnosed using the Structured Clinical Interview (SCID) for the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition [44], with symptom severity of ≥ 15 on the 17-item Hamilton Depression Rating Scale [42]. Diagnoses of Generalized Anxiety Disorder and simple phobias were allowed as comorbidities in the current study; however, individuals with other comorbid psychiatric disorders were excluded from participation. Also excluded were those with significant current neurologic disease, such as epilepsy, Parkinson's disease, traumatic brain injury, cortical stroke, or evidence of dementia determined by a score <25 on the Mini Mental State Exam [45].

Participants were recruited in the San Francisco Bay Area. All eligible participants underwent initial phone screening to collect demographic and medical history. Participants were then brought into the clinic where they underwent clinical assessment (SCID and HDRS-17), lifetime psychiatric history, a comprehensive neuropsychological assessment, and completed self-report measures including current suicide-related ideation and perceived stress. Participants were informed they could discontinue participation at any time. Not all participants completed all self-report measures. Ten participants had missing or incomplete primary outcome variables (i.e. Geriatric Suicide Ideation Scales or Perceived Stress Scales) and were thus excluded from the analysis.

Measures

Depression Symptom Severity: Current severity of depression symptoms were assessed using the 17-item Hamilton Depression Rating Scale (HDRS) [42], administered by trained research coordinators. To decrease potential overlap between predictor and outcome variables in our analyses, the suicide ideation question of the HDRS was removed from the total depression severity score.

Perceived Stress: The Perceived Stress Scale (PSS) is a measure of global perceptions of stress [24, 40, 46]. The PSS is comprised of 14 questions used to appraise the degree to which an individual's life situations are deemed uncontrollable, unpredictable, and overwhelming. Each item ranges from zero to four (0 = never, 1 = almost never, 2 = sometimes, 3 = almost always, 4 = always). The scores with positive connotations (4, 5, 6, 7, 9, 10, and 13) are reverse scored. The remaining items are directly summed. The total value of the scale is the sum of all 14 questions with possible total score values ranging from zero to 56 with higher scores reflecting greater perceived stress and subjective appraisal of stressful/negative life events [40]. Participants are requested to respond regarding how often in the past month they have experienced each item, examples of which include "*been upset because of something that happened unexpectedly*," "*felt that you were unable to control the important things in your life*," and "*found that you could not cope with all the things you had to do*" among others. The PSS has strong internal consistency (Cronbach's alpha > .70) as well as satisfactory test-retest reliability [24, 40, 47].

Geriatric Suicide Ideation Scale: Suicide-related ideation was measured utilizing the self-report Geriatric Suicide Ideation Scale (GSIS). The GSIS is a multidimensional 31-item Likert scale developed specifically for measuring suicidal ideation in older adults. The GSIS contains a total score and subscale scores; including suicide ideation, perceived meaning of life, loss of personal self-worth, and death ideation. The GSIS has demonstrated strong internal reliability ratings for the total score ($\alpha = .93$) and each subscale, i.e. Suicide Ideation ($\alpha = .82$), Perceived Meaning of Life ($\alpha = .82$), Loss of Personal and Social Worth ($\alpha = .82$), and Death Ideation ($\alpha = .84$). The GSIS has also shown strong concurrent validity with other measures of suicide ideation, like the Scale for Suicide Ideation-Clinician Version [43, 48, 49]. The GSIS total score ranges from 31 – 155 with higher scores reflecting greater total suicidality. The GSIS suicide ideation subscale ranges from 5 – 50 with higher scores reflecting greater active suicide ideation.

Data Analysis

Statistical analyses were conducted using SPSS version 25 [50]. Descriptive statistics, including demographic and clinical characteristics of the participants were obtained. Pearson correlation coefficients between perceived stress and the multiple suicide subscale scores were obtained. All four suicide subscales and correlations are presented below; however, with suicide-related ideation as our primary aim, we utilized only the suicide ideation subscale in further analyses. A linear regression analysis was then conducted, assessing the relationship of perceived stress to suicidal ideation (both total score of the GSIS, and the suicidal ideation subscale score), controlling for the effects of age, education, sex, and depression symptom severity.

RESULTS

Participants were 225 older adults with a mean age of 71.4 ($SD = 5.6$) and 64.9% of the sample being female. Average HDRS-17 depression severity was 17.9 ($SD = 3.0$), with Mini Mental State Exam score mean of 29.0 ($SD = 1.1$). Other descriptive characteristics of the sample are presented in Table 1.

Pearson correlation coefficients were obtained in order to assess the relationship between perceived stress and the various subscales of the GSIS – including total score. Perceived stress was significantly correlated with all subscales of the GSIS; specifically, more current self-reported stress was related to higher GSIS total score ($r = .33, p < .001$), greater suicide ideation ($r = .27, p < .001$), endorsement of perceived meaninglessness ($r = .25, p < .001$), greater loss of worth ($r = .44, p < .001$), and more death ideation ($r = .21, p < .01$) (see Table 2).

Two regression analyses were conducted, assessing the relationship of stress to suicidal ideation specifically, and suicidal activity more broadly as measured by the GSIS total score, controlling for age, education, sex and depression symptom severity (see Table 3). In the first analysis, 10% of the variance in suicidal ideation was accounted for by the full model. Significant predictors of suicidal ideation were male sex ($B = -.15, p = .02$) and perceived stress ($B = .27, p < .001$), with perceived stress showing the strongest linear relationship with suicidal ideation in this sample. Perceived stress explained 7% of the variance in suicidal ideation, independent of these other factors. Depression severity was not significantly related to suicidal ideation in this model (Table 3).

Similarly, when assessing the relationship of these factors with suicidal activity as a broader construct encapsulating suicide-related ideation as well as loss of self-worth, death ideation and perceived meaning of life, stress continued to be the most significant factor, even accounting for demographic and symptom severity. In this model, 15% of the variance in suicide-related thoughts and behavior (GSIS total score) was accounted for by the variables assessed. In particular, lower education ($B = -.14, p = .03$), male sex ($B = -.14, p = .03$), and higher current perceived stress ($B = .35, p < .001$) were significantly related to higher suicidal activity. Stress specifically accounted for 12% of the variance in GSIS total score. Similar to the previous analysis, depression severity was not significantly associated with suicidal ideation in this model.

DISCUSSION

The current study adds important empirical data to the literature on factors associated with suicidal ideation in late life major depression – specifically, the role of perceived stress independent of current depressive symptom severity. Our findings coincide with earlier studies that demonstrate exposure to higher perceived stress is associated with increased suicidal risk among depressed adults [51-53] and advance the literature by examining perceived stress and suicide-related ideation in an older adult population with major depression. Current perceived stress may be an important identification tool for primary care providers and mental health practitioners when assessing suicidal ideation in a depressed population of older adults [54]. Because of the stigma related to depression and suicide [55, 56], there may be a reduction in reporting ideation to clinical professionals, which adds additional risk to this already vulnerable patient population [57, 58].

Our findings suggest that perceived stress might be an important factor for those more likely to think about suicide – and a potentially less threatening avenue for questioning by providers to broach the topic of current suicide-related ideation. This avenue is especially promising given the strength of the relationship between stress and suicide-related ideation in a population that is already at higher risk for suicide given demographic and clinical factors. Thus, when thinking about suicide risk identification, discussing stress, in addition to direct questions about suicide-related ideation, may provide a unique approach for clinicians to broach this sensitive topic with older patients.

Our finding that depression severity was not significantly associated with suicidal ideation independent of perceived stress may be related to the clinical nature of our sample population. All enrolled participants met criteria for Major Depression, thus restricting the range of depression severity scores by study design. Although we recognize that depression severity is likely still the strongest predictor of suicide-related ideation in the general population of all older adults, other identification factors may add additional value in a clinically depressed sample. Thus when screening for suicide-related ideation in an already depressed older population, perceived stress may provide utility in assessing increased suicidal risk. In addition, previous research by Kuiper et al, found that for patients with low perceived stress, negative life changes had only a minimal impact on depression symptoms but high levels of perceived stress often caused overwhelming feelings, increasing depression and leading to diminished abilities to adapt and cope with their environment [59]. Thus, clinician focus on adaptive methods of coping strategies to mitigate high perceived stress may both alleviate depression severity and be a valuable avenue for suicide-related ideation reduction [60].

Our findings also provide additional evidence to the Strain Theory of Suicide, which postulates that conflicting pressures in an individual's life usually often precedes suicidal behavior [35-38]. Specifically, perceived stress falls under the deficient coping strain source, which states that individuals lacking the coping skills necessary to manage incoming stressors and life challenges will experience greater levels of strain [35]. Additionally, these findings relate to theories of suicide that suggest people engage in suicidal acts to escape perceived intolerable circumstances instead of coping through adaptive methods like seeking

mental health treatment [14]. In this way, the investigation of stress, as well as a perceived inability to cope with stressors, may act as a potential vulnerability factors related to suicidal ideation in older depressed individuals.

When considering treatment intervention, research on suicide-related ideation and stress in younger adults found that teaching mindfulness-based stress reduction strategies was an important method to reduce chronic perceived stress and subsequent suicidal ideation [61], indicating that coping strategies to reduce perceived stress could be directly implemented in patients with suicidal ideation as a way to reduce ideation in addition to treatment for depression. Further, directly addressing stress burden in older depressed adults as part of treatment for depression may help ameliorate some of the distressing suicide-related thoughts that can impede progress in treatment. Thus, an increased focus on the perception of stress in evidence-based treatments for late life major depression and the addition of this dimension to therapeutic interventions and assessment by other providers may aid in both assessing those depressed older adults who may be at current suicide risk, as well as improve functioning by problem-solving current stressors.

There are limitations to our findings. Eighty percent of the sample was white and participants had a relatively high level of education for a typical cohort of depressed older adults, so interpretation and generalization of findings to a larger population should be a focus of future research. Our study protocol operationalize dementia as a score of <25 of the MMSE. However, non-dementing adults with depression, low education, or English as a second language (ESL) may also show poor performance on this measure. We recognize the impact this cut-off score may have on relatability to the general population. Further, the current study assessed only current suicidal ideation and not previous or future suicide attempt or death by suicide, limiting the ability to investigate the role of perceived stress in suicidal attempt or completion. In addition, it is unclear how these states (stress, ideation), change over time in response to intervention because this study was cross-sectional, and these factors are state-based rather than dispositional. Further research should be conducted focusing on stress in relation to suicidal ideation, particularly longitudinally, and in response to treatment, with a more diverse sample of older depressed adults. Additionally, our preliminary correlations found significant relationships between other Geriatric Suicide Ideation Scale subscales and perceived stress, including perceived meaning of life, loss of self-worth, and death ideation. Future research should explore the relationship between these subscales and the Perceived Stress Scale, in addition to depression characteristics, in older adults with suicide-related ideation.

Late life depression and late life suicide are pressing public health concerns, with significant psychosocial and financial burdens on communities and healthcare systems [62]. Understanding particular factors that are associated with increased ideation among older depressed adults may aid in identification of those at particular risk in ways that depression symptom severity fail to capture. Further, addressing and problem-solving perception of and coping mechanisms for current stressors in older depressed adults will hopefully improve quality of life and functional outcomes in this vulnerable patient population.

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CLINICAL IMPLICATIONS

- Understanding determinants of risk is especially important among older adults and particularly salient in late life depression, as older depressed adults are already a high-risk group.
- Perceived stress, i.e., self-appraisal of life events as uncontrollable or unpredictable, may be an important factor of those more likely to experience suicide-related ideation in addition to depressive symptoms.
- By screening for perceived stress, early intervention and prevention may be possible in depressed older adults who may be at higher risk for suicide and coping strategies to reduce perceived stress could be directly implemented in depressed patients with suicidal ideation.
- Our findings highlight the potential utility of a brief self-reported stress scale to screen for late-life suicide-related ideation in clinical practice, in addition to more traditional depression screeners.

Table 1:

Sample Demographics

Variable	n	Mean	SD
Age	225	71.40	5.60
Education	225	16.24	1.97
MMSE	225	29.00	1.14
HDRS-17	225	18.64	3.06
GSIS Total Score	225	74.28	21.52
GSIS SI Subscore	224	20.38	8.06
PSS Total Score	225	24.48	5.83

MMSE = Mini Mental State Examination, HDRS-17 = Hamilton Depression Rating Scale – 17 item, GSIS = Geriatric Suicide Ideation Scale, SI = Suicide Ideation, PSS = Perceived Stress Scale, SD = Standard Deviation.

Table 2:

Pearson Product correlation coefficients between perceived stress (PSS), depression severity (HDRS-17) and suicide ideation (GSIS Total and subscales)

	1.	2.	3.	4.	5.	6.	7.
1. PSS Total	-	.18 **	.33 ***	.27 ***	.25 ***	.44 ***	.21 **
2. HDRS-17		-	.10	.12	.02	.15 *	.02
3. GSIS Total			-	.95 ***	.80 ***	.74 ***	.89 ***
4. GSIS SI				-	.70 ***	.62 ***	.86 ***
5. GSIS PML					-	.51 ***	.64 ***
6. GSIS LW						-	.52 ***
7. GSIS DI							-

PSS = Perceived Stress Scale, GSIS = Geriatric Suicide Ideation Scale, HDRS-17 = Hamilton Depression Rating Scale – 17 item with suicide question removed, SI = Suicide Ideation Subscale, PML = Perceived Meaning of Life Subscale, LW = Loss of Personal Worth Subscale, DI = Death Ideation Subscale.

*
p<.05;

**
p<.01;

p <.001.

Table 3:

Standardized beta values for demographics and stress variables as predictors of suicide ideation.

Independent Variables	Geriatric Suicide Ideation Measure					
	GSIS Total Score			GSIS Suicide Ideation Subscale		
	std beta	p	R ²	std beta	p	R ²
Age	-.006	.93	<.001	-.009	.89	<.001
Education	-.138	.03	.019	-.090	.17	.001
Gender	-.143	.03	.021	-.147	.02	.022
HDRS-17	.023	.73	<.001	.060	.36	.004
PSS Total Score	.347	<.001	.120	.274	<.001	.075

HDRS-17 = Hamilton Depression Rating Scale – 17 item, GSIS = Geriatric Suicide Ideation Scale, SI = Suicide Ideation, PSS = Perceived Stress Scale