Insomnia Symptoms, Nightmares, and Suicidal Ideation in Older Adults

Michael R. Nadorff,[1] Amy Fiske,[1,2] Jeannie A. Sperry,[3] Rachel Petts,[1] and Jeffrey J. Gregg[1]

[1]Department of Psychology, West Virginia University.
[2]Injury Control Research Center, West Virginia University.
[3]Department of Family Medicine, West Virginia University.

Objectives. Prior research has found that insomnia symptoms and nightmares are associated with suicidal ideation, suicide attempts, and death by suicide. However, to the best of our knowledge, no research has examined the relation between insomnia symptoms, nightmares, and suicidal ideation in older adults. The current project aimed to fill this void by investigating the relation between insomnia symptoms, nightmares, and suicidal ideation in an older adult sample.

Method. The study utilized a cross-sectional design. The sample consisted of 81 older adult patients (age ≥ 65 years) recruited from a family medicine clinic. The participants were asked to complete surveys about their sleep, symptoms of depression, and suicidal ideation.

Results. Insomnia symptoms, but not nightmares, were significantly related to suicidal ideation. In addition, insomnia symptoms were related to suicidal ideation independent of nightmares. Furthermore, the relation between insomnia symptoms and suicidal ideation was mediated by depressive symptoms.

Discussion. These findings have implications for the identification and treatment of suicidal ideation in older adults.

Key Words: Insomnia symptoms—Nightmares—Sleep disturbances—Suicidal ideation.

IF suicide is a problem in the United States, then suicide among older adults is a crisis. In 2008, the suicide rate for adults aged 65 and older was more than 30% higher than the suicide rate for those below age 65 (Centers for Disease Control and Prevention, 2012). In addition, suicidal behavior among older adults is more likely to be fatal than suicidal behavior at younger ages. The older adult attempt/death ratio of 4:1 reflects much greater lethality than either the overall attempt/death ratio of 25:1 or the 100–200:1 ratio found in those who are young (Chan, Draper, & Banerjee, 2007). Older adult suicidal behavior also differs in several other important ways from suicidal behavior earlier in the lifespan (e.g., gender ratio; Chan et al., 2007), suggesting that research using younger age groups may not generalize to older adults. Thus, more research investigating suicidal behaviors specifically among older adults is urgently needed.

Suicide is a difficult topic to study due to the statistical rarity of the event. Thus, research often focuses on suicidal behavior and suicidal ideation, as both are risk factors for death by suicide. Studying suicidal ideation is important because it is not only a risk factor for suicidal behavior, but a vital component, as suicidal behavior is not suicidal without suicidal ideation and intent (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007). Thus, suicidal ideation is an important part of suicidal behavior and risk.

A potential risk factor for suicidal ideation and behavior that warrants investigation among older adults is sleep disturbance. Sleep difficulties have been shown to be related to suicidal ideation and behavior in young adults and mixed age samples (Cukrowicz et al., 2006; Nadorff, Nazem, & Fiske, 2011; Sjöström, Wærn, & Hetta, 2007), but this relation has not yet been examined specifically in older adults. It would be particularly important to know if there is a relation between sleep disturbance and suicidality in this age group, as it has been estimated that up to 50% of older adults complain of sleep difficulties (Vitiello, Larsen, & Moe, 2004). To date, two types of sleep disturbance have been examined in relation to suicidal ideation and behavior—insomnia symptoms and nightmares.

Insomnia Symptoms

Insomnia is more prevalent among older adults than in any other age group (Thase, 2005). Research has shown that many older adults, especially men, struggle with insomnia without complaint as they change what they view as acceptable sleep (Vitiello et al., 2004). Despite being common, insomnia and its effects are often underreported to physicians (Leger & Poursain, 2005), and therefore may be left untreated.

Several possible mechanisms by which insomnia may be related to suicidal ideation and behavior have been posited.

A recent qualitative study investigating insomnia found that those who reported persistent insomnia experienced a cumulative negative effect on work and social activities (Kyle, Espie, & Morgan, 2010). In other words, the longer an individual had insomnia, the more severe the negative consequences. Participants also reported feeling isolated, as well as lacking life aspirations (Kyle et al., 2010). Given that thwarted belongingness is hypothesized to be related to one's desire for suicide (Van Orden et al., 2010), insomnia may be important in predicting suicidal ideation. In addition, insomnia can be a symptom or, more often, a predecessor of depression (Breslau, Roth, Rosenthal, & Andreski, 1996; Ford & Kamerow, 1989; Morphy, Dunn, Lewis, Boardman, & Croft, 2007), which is a well-established risk factor for suicidal behavior in late life (Conwell & Brent, 1995).

Several studies have directly tested the relation between insomnia and suicidal ideation and behavior. Barbe and colleagues (2005) found that symptoms of insomnia were significantly more common in depressed youth who reported suicidal ideation (72.1%) than in depressed youth who did not report suicidal ideation (45.6%). Similarly, we examined the association between insomnia symptoms and suicidal ideation in college students (Nadorff et al., 2011). Utilizing a sample of 583 undergraduate students, we found that insomnia symptoms were significantly related to suicidal ideation independent of the effects of nightmares. However, the relation between insomnia symptoms and suicidal ideation was mediated by depressive symptoms.

Insomnia symptoms have also been shown to be related to overt suicidal behavior. Hall, Platt, and Hall (1999) conducted an uncontrolled study of 100 individuals who had made medically serious suicide attempts (attempts that require hospitalization) and found that 64% reported global insomnia symptoms (defined as having onset, maintenance, and terminal insomnia) and 92% reported partial insomnia symptoms (defined as having onset, maintenance, or terminal insomnia, but not all three). Additionally, McGirr and colleagues (2007) conducted a controlled psychological autopsy study that found that those who died by suicide were more likely to have had symptoms of insomnia than were the depressed controls.

Prospective research has also shown a relation between insomnia and death by suicide. Fujino, Mizoue, Tokui, and Yoshimura (2005) followed 15,597 Japanese adults aged 30–79 for 14 years and found that insomnia symptoms were a risk factor for dying by suicide independent of age. Of those who died by suicide in the sample, 19% reported symptoms of onset insomnia, 35% reported symptoms of maintenance insomnia, and 25% reported symptoms of terminal insomnia at the beginning of the study. Similarly, Fawcett and colleagues (1990) found that global insomnia symptoms, defined as endorsing difficulty falling asleep, difficulty staying asleep, and early morning awakenings, significantly predicted death by suicide within a year.

Despite the compelling evidence that insomnia is associated with suicidal ideation and behavior in younger adults and mixed age samples, very little research has examined the relation between insomnia and suicidal ideation and behavior in older adult populations. Bernert, Turvey, Conwell, and Joiner (2007) studied sleep quality in relation to suicide deaths in older adults. They found that poor sleep quality at baseline significantly predicted death by suicide, even when controlling for depression. This finding is valuable as it shows that sleep disturbances are related to suicide in older adults, as has been found in younger and middle-aged adults. However, due to the fact that sleep quality is a broader construct than insomnia symptoms, it is impossible to determine whether insomnia symptoms, specifically, are related to suicide in older adults based upon the study by Bernert and colleagues.

Thus, evidence shows that insomnia symptoms are related to suicidal ideation, attempts, and death in younger and mixed age samples. Although research has demonstrated an association between sleep quality and suicide in older adults, research has not yet examined the relation between insomnia, specifically, and suicidal ideation in older adults.

NIGHTMARES

Nightmares are defined as disturbing dreams that awaken the individual (Levin & Nielsen, 2007). Although nightmares are often viewed as a childhood disorder, Salvio and colleagues (1992) found that 4.3% of healthy older adults report having a nightmare problem. Further, older adults with depression or anxiety may have more nightmares than older adults without these disorders. A study of Swedish older adults found that although only 2.2% of all older adults reported having nightmares, 11.4% of those with clinically significant depressive symptoms, and 17.1% of those with clinically significant anxiety symptoms reported having nightmares (Mallon, Broman, & Hetta, 2000).

There are several hypotheses for why nightmares are related to suicidal ideation. It is possible that distress, unpredictability, and even terror reported by nightmare sufferers may lead directly to suicidal thinking. The sleep fragmentation or deprivation associated with nightmares (Davis & Wright, 2005) may also lead to suicidal thinking. Alternatively, nightmares may be related to suicidal ideation due to their association with traumatic events (Wood, Bootzin, Rosenhan, Nolen-Hoeksema, & Jourden, 1992) and posttraumatic stress disorder (PTSD) or other forms of psychopathology.

Similar to insomnia symptoms, several studies have shown a relation between nightmares and suicidal ideation and behavior, even independent of symptoms of psychopathology. Unfortunately, to date, none of them has examined this relation in older adults.

Cukrowicz and colleagues (2006) found that disturbing dreams or nightmares were related to increased risk of suicidal ideation independent of insomnia symptoms. In our previous research, we built upon the work of Cukrowicz and colleagues by showing that nightmares are associated with suicidal ideation after controlling for symptoms

of depression, anxiety, and PTSD in a sample of college students (Nadorff et al., 2011).

Nightmares have also been examined in relation to suicide attempts and death by suicide. Sjöström and colleagues (2007) studied 165 patients aged 18–68 years (*M* = 35.3 years) who had been admitted to the hospital following a medically serious suicide attempt. They found that onset insomnia, terminal insomnia, and nightmares were all significantly associated with higher scores on a measure of suicidality. However, only nightmares remained significantly related to high suicidality after controlling for DSM axis I disorders, depressive symptoms, and anxiety symptoms. Further, a follow-up study found that nightmares predicted future suicide attempts in the next 2 years in the same sample (Sjöström, Hetta, & Wærn, 2009).

Evidence also exists that nightmares are associated with death by suicide. In a large mixed age prospective study, Tanskanen and colleagues (2001) found that nightmares were significantly related to death by suicide. When compared with individuals without nightmares, those reporting occasional nightmares were at 57% greater risk to die by suicide. Further, participants reporting frequent nightmares were at 107% greater risk of suicide when compared with those without nightmares. However, it should be noted that the authors did not control for other types of psychopathology that may explain the impact of nightmares on suicide.

Research utilizing younger adult and mixed age samples suggests that nightmares are significantly related to suicidal ideation, suicide attempts, and death by suicide. Further, the relation between nightmares and suicidal ideation, as well as suicide attempts remains after statistically controlling for related disorders such as depression, anxiety, and PTSD. However, there have been no studies examining the association between nightmares and suicidal ideation specifically in older adults.

Statement of the Problem

Research has shown that both insomnia and nightmares may be related to suicidal ideation and behavior. Insomnia symptoms and nightmares have both been associated with suicidal ideation (Nadorff et al., 2011), suicide attempts (Hall et al., 1999; Sjöström et al., 2009), and death by suicide (Fujino et al., 2005; Tanskanen et al., 2001). Additionally, research has shown that nightmares, but not insomnia symptoms, may be associated with suicidal ideation and behavior independent of several types of psychopathology (Nadorff et al., 2011; Sjöström et al., 2007, 2009). Nonetheless, research has not yet assessed whether insomnia and nightmares are related to suicidal ideation in older adults, who are at elevated risk for suicide (Centers for Disease Control and Prevention, 2012). Determining whether the effects of insomnia and nightmares contribute to suicidal thoughts and behaviors in older adults is needed to determine whether insomnia and nightmares confer increased risk of suicide in older adults.

Present Study

The present study aimed to characterize the relation between insomnia symptoms, nightmares, and suicidal ideation in older adults. This study has great clinical relevance as sleep problems are very common in late life (Vitiello, 2006), and older adults are at increased risk for suicide (Centers for Disease Control and Prevention, 2012). Given that sleep difficulties and suicidal ideation have been shown to be associated in younger and mixed age samples, it is important to understand whether sleep difficulties are associated with suicidal ideation for older adults, which is the focus of the present study.

Based on prior published findings, our first hypothesis was that insomnia symptoms would be significantly related to suicidal ideation in a sample of older adults. Similarly, our second hypothesis was that nightmares would be significantly related to suicidal ideation. The third hypothesis predicted that insomnia symptoms and nightmares would be related to suicidal ideation independent of each other in this sample. In addition to these three hypotheses, there was one exploratory hypothesis that depressive symptoms would mediate the relation between insomnia symptoms and suicidal ideation, but would not mediate the relation between nightmares and suicidal ideation. Theoretically, depressive symptoms may mediate the relation between insomnia symptoms and suicidal ideation because insomnia has been shown to precede depression in older adults (Perlis et al., 2006), and hence may lead to the development of depression, and subsequently, suicidal ideation. This hypothesis was consistent with the literature (e.g., Cukrowicz et al., 2006), but was considered exploratory as the current study was not adequately powered to test mediation.

METHOD

Participants

Participants were recruited from the waiting room of a primary care clinic in a large public university in the mid-Atlantic United States. Participants were awarded $5 for completing the questionnaires. A total of 81 participants (ages 65–94, *M* age 73.9; 60% women; 94.9% Caucasian) completed the questionnaires and were included in the study. The current study was conducted in accordance with an approved IRB protocol.

Measures

The Insomnia Severity Index (Bastien, Vallieres, & Morin, 2001).—The Insomnia Severity Index (ISI) is a 7-item self-report scale that assesses the individual's subjective report of insomnia for the past 2 weeks. Each item is scored on a 0–4 scale with total scores ranging from 0 to 28. Scores of 0–14 are considered to be subclinical insomnia or no insomnia, 15–21 are considered moderate insomnia, and

22–28 are considered to be severe insomnia. The ISI has been shown to have adequate test-retest reliability for more than 3 months and concurrent validity with sleep diaries and polysomnography, and has been used in previous research as a measure of insomnia severity (Bastien et al., 2001; Savard, Savard, Simard, & Ivers, 2005). The ISI has also been used to determine the presence or absence of clinically significant insomnia symptoms using a cutoff of 15 (Bernert et al., 2007; Tang, Wright, & Salkovskis, 2007). In the current sample the mean was 5.2 (standard deviation [*SD*] = 5.2), with good reliability (α = .89), with 8.70% of participants scoring above the clinical cutoff of 15. The mean score on the ISI was similar to the mean reported from another primary care older adult sample (5.77; MacGregor, Funderburk, Pigeon, & Maisto, 2012).

The Disturbing Dreams and Nightmare Severity Index (Krakow et al., 2002).—The Disturbing Dreams and Nightmare Severity Index (DDNSI) is a revised version of the Nightmare Frequency Questionnaire (Krakow et al., 2000) and was used to measure nightmare severity and frequency for the last year. It measures the number of nights with nightmares per week (0–7 nights) and number of total nightmares per week (0–14 nightmares). The DDNSI also measures the severity and intensity of the nightmare on a Likert-type scale ranging from no problem (0) to extremely severe problem (6) as well as how often nightmares result in awakenings ranging from never/rarely (0) to always (4). The measure is scored on a 0–37 scale by summing items measuring the number of nights per week with nightmares, total nightmares per week (with a maximum score of 14), frequency with which nightmares wake up the individual, severity of the nightmares, and intensity of the nightmares. A total score greater than 10 may indicate the presence of a nightmare disorder (Krakow et al., 2002). In the current sample, the mean was 2.0 (*SD* = 5.4) and 6.67% of participants were above the clinical cutoff of 10, which is similar to the rate of nightmares found in another older adult sample (4.3%; Salvio et al., 1992). The DDNSI demonstrated good internal consistency (α = .93) in the present sample.

Center for Epidemiologic Studies Depression Scale—Revised (Eaton, Smith, Ybarra, Muntaner, & Tien, 2004).—The CESD-R is a revised version of the Center for Epidemiologic Studies Depression Scale (Radloff, 1977). It is a 20-item measure of depressive symptoms, with each item scored 0–3 and total scores ranging from 0 to 60. For the current project, the two insomnia symptoms and two suicidal ideation items were removed to minimize overlap with other measures. In the current sample, the mean of the CESD-R with the four items removed was 5.4 (*SD* = 7.5) with good reliability (α = .90). The mean for the CESD-R with all items included was 6.95, with 10.4% of participants above the clinical cutoff for depressive symptoms. This appears to be slightly higher than the percent above

the clinical cutoff found in a similar older adult sample using the nonrevised version of the CESD (6.7%; Knight, McMahon, Green, & Skeaff, 2004).

The Geriatric Suicide Ideation Scale (Heisel & Flett, 2006).—The Geriatric Suicide Ideation Scale (GSIS) is a 31-item measure of suicide risk designed specifically for older adults. The suicide ideation subscale of the GSIS (range 10–50), which has previously been validated as a measure of current suicidal ideation (Heisel & Flett, 2006), was used as the measure of suicidal ideation in this study. Sample items include "I want to end my life," "I have recently been thinking a great deal about specific ways of killing myself," and "I might do something to end it all if I could only muster the energy to do so" (Heisel & Flett, 2006). The items are scored on a 1–5 Likert-type scale that is summed, with one representing strongly disagree and five representing strongly agree. Clinically significant suicidal ideation was present in the sample, as seven individuals (9.46%) scored higher on the suicidal ideation subscale of the GSIS than the mean of the measure found in a psychiatric sample (GSIS suicidal ideation scores ≥ 19; Heisel & Flett, 2006). In order to meet the assumptions of our analyses, the suicidal ideation subscale was log transformed to help reduce the nonnormality. In the current sample the mean was 12.2 (*SD* = 3.64), with good reliability (α = .91) prior to transformation.

Procedure

The data collection occurred between April and August 2010. Participants were recruited from the waiting room of a family medicine department that is associated with a large mid-Atlantic public university. Patients aged 65 or older awaiting appointments in a family medicine clinic during survey periods were invited to take part in the research study. If the potential participant was willing to take part in the study, the researchers obtained informed consent.

The researchers then provided the participants with a set of self-report measures to complete. The participants had the option of completing the measures in the waiting room or returning them to the research assistant before they left the family medicine clinic. Completed questionnaires were reviewed upon receipt for evidence of clinically significant depressive symptoms or active suicidal ideation. Participants who endorsed such symptoms were referred to a licensed psychologist on-site, so that depression and suicidal ideation could be further assessed. All participants received a list of mental health referrals as well as $5 to compensate them for their time. All analyses were conducted using SAS (version 9.2) statistical software.

RESULTS

Descriptive statistics can be found in Table 1. Preliminary analyses examining whether age or sex were related to

Table 1. Descriptive Statistics for Primary Study Variables

Measure	N	M	SD	Range	Clinical cutoff	% Above clinical cutoff
Insomnia symptoms	69	5.23	5.24	0–19	15	8.70%
Nightmares	74	1.99	5.36	0–30	11	6.76%
Depressive symptoms[a]	77	6.95	8.89	0–42	16	10.39%
Suicidal ideation[b]	74	12.20	3.64	10–25	19	9.46%

Note. SD = standard deviation.

[a]Statistics for depressive symptoms are for the entire CESD-R, before questions pertaining to sleep and suicide were removed, in order to allow for comparisons to the established clinical cutoff.

[b]For suicidal ideation, the psychiatric mean was used as the clinical cutoff (Heisel & Flett, 2006).

Table 2. Correlations of Study Variables

Variables	1	2	3	4	5	6
1. Nightmares	—	.45**	.70**	.19	−.05	−.01
2. Insomnia symptoms		—	.63**	.32**	.15	.06
3. Depressive symptoms			—	.42**	.09	−.17
4. Suicidal ideation				—	.23*	−.14
5. Age					—	−.12
6. Sex						—

Note. Depressive symptom total score excludes sleep and suicide items.
p < .05. **p* < .01.

Table 3. Insomnia Symptoms and Nightmares Predicting Suicidal Ideation

Predictors	R^2	B	SE	t	p
Step 1	.06				<.01
Age		.01	.004	2.18	<.05
Step 2	.24				<.01
Age		.01	.004	2.89	<.01
Insomnia		.02	.006	3.06	<.01
Nightmares		.00	.01	0.12	.90

Note. SE = standard error.

suicidal ideation were first conducted. For the suicide ideation subscale of the GSIS, age was significantly associated with suicidal ideation, $F(1,71) = 4.11$, $p < .05$, but sex was not, $F(1,71) = 1.40$, $p = .24$. Age and sex were not related to any of the independent variables. The statistical analyses were conducted with and without controlling for age and sex, finding no differences in the results. The results controlling for age and sex, if significantly associated with the dependent variable, are presented in the following paragraphs. Correlations among the study measures can be found in Table 2.

To test the first hypothesis, which predicted that insomnia symptoms would be associated with suicidal ideation, linear regressions were utilized. The regression model was significant, $F(2,64) = 9.13$, $p < .01$, and insomnia symptoms were significantly related to suicidal ideation, $B = .012$ ($SE = .004$), $p < .01$. Insomnia symptoms explained 11.8% of the variance in suicidal ideation. Therefore, the first hypothesis was supported, as individuals with insomnia symptoms also reported significantly higher levels of suicidal ideation.

The second hypothesis posited that nightmares would be associated with suicidal ideation. The regression model was significant, $F(2,67) = 4.20$, $p < .05$, although nightmares were not significantly associated with suicidal ideation, $B = .009$ ($SE = .005$), $p = .07$. Therefore, the second hypothesis was not supported, as greater severity of nightmares was not related to higher levels of suicidal ideation.

The third hypothesis was that insomnia symptoms and nightmares would be associated with suicidal ideation independent of each other (see Table 3). Insomnia symptoms were associated with suicidal ideation independent of nightmares, but nightmares were not significantly related with suicidal ideation independent of insomnia symptoms, $B = .00$ ($SE = .01$), $p = .90$.

Thus, overall, the third hypothesis was partially supported as insomnia symptoms, but not nightmares, were associated with suicide ideation independent of the other.

The fourth hypothesis, which was exploratory due to power, was examined using the bootstrapping method of testing mediation using the bootstrapping macro designed by Preacher and Hayes (2008). Bootstrapping is a method of estimating the indirect effects of variables in a way that is robust to nonnormality and requires fewer participants than other tests of mediation (Preacher & Hayes, 2008). The indirect effect is a measure of the impact of the mediator variable on the relation, with a score of zero indicating no effect. If the 95% confidence interval (CI) of the indirect effect does not include 0, it can be inferred that the two-tailed *p* value for the effect is less than .05, indicating that the mediation effect is significant. We utilized 95% bias-corrected and accelerated bootstrap CIs resampled 5,000 times. Examining whether depressive symptoms mediated the relation between insomnia symptoms and suicidal ideation, the unstandardized coefficient for the indirect effect was 0.0094, with the 95% bias-corrected CIs being 0.0012 and 0.020. Because 0 was not in the CI range, we were able to conclude that depressive symptoms mediated the relation between insomnia symptoms and suicidal ideation. Because nightmares were not significantly associated with suicidal ideation, we were unable to test whether depression mediated the relation between nightmares and suicidal ideation.

Thus, the fourth hypothesis was partially supported. As predicted, the relation between insomnia symptoms and suicidal ideation was mediated by depressive symptoms. In other words, depressive symptoms were found to explain the relation between insomnia symptoms and suicidal ideation. We were unable to test whether depressive symptoms mediated the relation between nightmares and suicidal ideation because that relation failed to reach significance.

Last, due to our results differing from those found using younger samples, we conducted a post hoc analysis examining the correlations found in this work with those found utilizing a college student sample (Nadorff et al.,

2011). Using Fisher's *z* transformation to examine the difference in strengths between two correlations, we found that the relation between insomnia symptoms and nightmares was statistically stronger ($p = .02$) in older adults ($r = .45$) when compared with college students ($r = .21$). However, the differences between the correlations for insomnia symptoms and suicidal ideation, as well as nightmares and suicidal ideation, were not significantly different between the two samples.

DISCUSSION

The current study was the first to examine the relations between insomnia symptoms, nightmares, and suicidal ideation in an older adult sample. Insomnia symptoms, but not nightmares, were significantly related to suicidal ideation. Further, we found that depressive symptoms mediated the relation between insomnia symptoms and suicidal ideation.

This study yields important information for identifying and treating suicidal ideation in older adults, suggesting that insomnia symptoms may be important factors for mental health providers to consider while working with older adults. Further, we found that depressive symptoms mediated the relation between insomnia and both suicidal ideation. Research has demonstrated that insomnia precedes depression more often than it comes subsequent to depression (Ohayon & Roth, 2003), and has been shown to precede depression in late life (Perlis et al., 2006), so the impact of sleep problems should not be dismissed. Moreover, untreated insomnia has been shown to significantly reduce the efficacy of depression treatment (Pigeon et al., 2008). Thus, insomnia symptoms may be a risk factor for depressive symptoms and ultimately suicidal ideation. Based upon these findings, it is recommended that health care providers screen older adults for insomnia symptoms. Further, health care providers should assess older adults reporting insomnia symptoms and depression for suicidal ideation, and should be aware that older adults who have insomnia are at increased risk of developing depression.

Interesting differences emerge when comparing the results of this study to prior research in younger and mixed age samples. When insomnia symptoms and nightmares were considered together, it was insomnia symptoms that emerged as the independent predictor of suicidal ideation. Previous research with younger adults has found nightmares to be related to suicidal ideation independent of insomnia symptoms (Cukrowicz et al., 2006; Nadorff et al., 2011). Further, prior research has found that depressive symptoms do not mediate the relation between nightmares and suicidal ideation. Yet, nightmares were not associated with suicidal ideation in the current study. Although contrary to our hypothesis, this result is not entirely unexpected, as older adults experience significantly fewer nightmares than college students (Salvio et al., 1992), and given that many aspects of sleep change with aging (Vitiello, 2006). It is

possible that the nightmares experienced by older adults are quite different from those experienced by younger adults. This interpretation is consistent with the fact that the nature of sleep and sleep disorders is often different in older adulthood (e.g., less slow-wave sleep, greater wake after sleep onset; Vitiello, 2006). It is also supported by our finding that the correlations between insomnia and nightmares statistically differed in this sample of older adults when compared with a college student sample (Nadorff et al., 2011). Thus, there is reason to believe that the difference in our results compared with studies utilizing younger samples are potentially due to changes in sleep in late life. It is also possible that our lack of findings for nightmares are due to having few older adults reporting nightmares, as only five participants scored above the cutoff on the DDNSI.

The present study has a few limitations. First, the use of a nonmental health sample recruited from a family medicine clinic may limit the generalizability of our findings as fewer individuals would be expected to be at risk of suicide. Despite our sample being recruited from primary care, clinically significant suicidal ideation was present, as 9.46% had scores on the suicidal ideation subscale of the GSIS that were higher than the average found in a psychiatric sample. Further, there is reason to believe that primary care is an ideal place to intervene for those at risk of suicide. Prior studies have demonstrated that older adults most often seek and receive mental health services in general medical settings (i.e., from primary care physicians; Harman, Veazie, & Lyness, 2006), and, as such, primary care is an ideal setting for a study examining mental health in older adults. Similarly, a review of the literature by Luoma and colleagues (2002) suggests that older adults are more likely than younger adults to visit their primary care physician within 1 month of suicide, with the majority of older adults visiting this physician within 1 year of suicide. Thus, although suicidal ideation is not as prevalent in primary care as it is in psychiatric samples, research examining suicide in primary care is important as it is one of the few places where suicidal individuals often present close to the time of their suicide, and it is a place where individuals at risk of suicide are often missed (Luoma et al., 2002).

Second, the use of a cross-sectional design limits the interpretation of the directionality of effects. For example, it is unclear whether suicidal ideation causes insomnia symptoms or whether insomnia symptoms cause suicidal ideation. Additionally, our mediation analyses are limited as one cannot be sure that insomnia symptoms precede depressive symptoms. To address some these limitations, future studies addressing this topic should consider utilizing a prospective design to better understand the causal relations among these variables.

These limitations notwithstanding, the current project is the first to examine the relations between insomnia symptoms, nightmares, and suicidal ideation specifically in older adults. This is notable because older adults are at high risk of suicide

compared with younger age groups (Centers for Disease Control and Prevention, 2012). The results indicate that insomnia symptoms may be an important factor to consider when evaluating risk of suicide in older adults. Furthermore, insomnia symptoms represent modifiable risk factors for suicide in late life. Cognitive behavioral therapy for insomnia is an evidence-based treatment of insomnia symptoms in late life and has also been shown to decrease comorbid depressive symptoms and chronic pain (Manber et al., 2008; Vitiello, Rybarczyk, Von Korff, & Stepanski, 2009).

Older adults are disproportionally affected by suicide compared with the general population (Centers for Disease Control and Prevention, 2012). With the improved knowledge of risk factors for death by suicide, steps can be taken to ensure that suicidal older adults can receive the help that they need.

CORRESPONDENCE

Correspondence should be addressed to Michael R. Nadorff, MS, Department of Psychology, Mississippi State University, P.O. Box 6161, Mississippi State, MS 39762. E-mail: michael@nadorff.com.

REFERENCES

Barbe, R. P., Williamson, D. E., Bridge, J. A., Birmaher, B., Dahl, R. E., Axelson, D. A., & Ryan, N. D. (2005). Clinical differences between suicidal and nonsuicidal depressed children and adolescents. *Journal of Clinical Psychiatry*, *66*, 492–498. doi:10.4088/JCP.v66n0412

Bastien, C. H., Vallieres, A., & Morin, C. M. (2001). Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Medicine*, *2*, 297–307. doi:10.1016/S1389-9457(00)00065-4

Bernert, R. A., Turvey, C. L., Conwell, Y., & Joiner, T. E. (2007). Sleep disturbance as a unique risk factor for completed suicide. *Sleep*, *30*, A344.

Breslau, N., Roth, T., Rosenthal, L., & Andreski, P. (1996). Sleep disturbance and psychiatric disorders: A longitudinal epidemiological study of young adults. *Biological Psychiatry*, *39*, 411–418. doi:10.1016/0006-3223(95)00188-3

Centers for Disease Control and Prevention. (2012). *Web-based injury statistics query and reporting system*. Retrieved February 10, 2012, from http://www.cdc.gov/injury/wisqars/index.html

Chan, J., Draper, B., & Banerjee, S. (2007). Deliberate self-harm in older adults: A review of the literature from 1995 to 2004. *International Journal of Geriatric Psychiatry*, *22*, 720–732. doi:10.1002/gps.1739

Conwell, Y., & Brent, D. (1995). Suicide and aging: I. Patterns of psychiatric diagnosis. *International Psychogeriatrics*, *7*, 149–164. doi:10.1017/S1041610295001943

Cukrowicz, K. C., Otamendi, A., Pinto, J. V., Bernert, R. A., Krakow, B., & Joiner, T. E., Jr. (2006). The impact of insomnia and sleep disturbances on depression and suicidality. *Dreaming*, *16*, 1–10. doi:10.1037/1053-0797.16.1.1

Davis, J. L., & Wright, D. C. (2005). Case series utilizing exposure, relaxation, and rescripting therapy: Impact on nightmares, sleep quality, and psychological distress. *Behavioral Sleep Medicine*, *3*, 151–157. doi:10.1207/s15402010bsm0303_3

Eaton, W. W., Smith, C., Ybarra, M., Muntaner, C., & Tien, A. (2004). Center for Epidemiologic Studies Depression scale: Review and revision (CESD and CESD-R). In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment: Volume 3: Instruments for adults* (3rd ed., pp. 363–377). Mahwah, NJ: Lawrence Erlbaum Associates.

Fawcett, J., Scheftner, W. A., Fogg, L., Clark, D. C., Young, M. A., Hedeker, D., & Gibbons, R. (1990). Time-related predictors of suicide in major affective disorder. *American Journal of Psychiatry*, *147*, 1189–1194.

Ford, D. E., & Kamerow, D. B. (1989). Epidemiologic study of sleep disturbances and psychiatric disorders. An opportunity for prevention? *JAMA: Journal of the American Medical Association*, *262*, 1479–1484. doi:10.1001/jama.262.11.1479

Fujino, Y., Mizoue, T., Tokui, N., & Yoshimura, T. (2005). Prospective cohort study of stress, life satisfaction, self-rated health, insomnia, and suicide death in Japan. *Suicide & Life-Threatening Behavior*, *35*, 227–237. doi:10.1521/suli.35.2.227.62876

Hall, R. C., Platt, D. E., & Hall, R. C. (1999). Suicide risk assessment: A review of risk factors for suicide in 100 patients who made severe suicide attempts. Evaluation of suicide risk in a time of managed care. *Psychosomatics*, *40*, 18–27. doi:10.1016/S0033-3182(99)71267-3

Harman, J. S., Veazie, P. J., & Lyness, J. M. (2006). Primary care physician office visits for depression by older Americans. *Journal of General Internal Medicine*, *21*, 926–930. doi:10.1007/bf02743139

Heisel, M. J., & Flett, G. L. (2006). The development and initial validation of the Geriatric Suicide Ideation Scale. *The American Journal of Geriatric Psychiatry*, *14*, 742–751. doi:10.1097/01.JGP.0000218699.27899.f9

Knight, R. G., McMahon, J., Green, T. J., & Skeaff, C. M. (2004). Some normative and psychometric data for the Geriatric Depression Scale and the Cognitive Failures Questionnaire from a sample of healthy older persons. *New Zealand Journal of Psychology*, *33*, 163–170.

Krakow, B. J., Melendrez, D. C., Johnston, L. G., Clark, J. O., Santana, E. M., Warner, T. D., … Lee, S. A. (2002). Sleep dynamic therapy for Cerro Grande Fire evacuees with posttraumatic stress symptoms: A preliminary report. *Journal of Clinical Psychiatry*, *63*, 673–684. doi:10.4088/JCP.v63n0804

Krakow, B., Hollifield, M., Schrader, R., Koss, M., Tandberg, D., Lauriello, J., … Kellner, R. (2000). A controlled study of imagery rehearsal for chronic nightmares in sexual assault survivors with PTSD: A preliminary report. *Journal of Traumatic Stress*, *13*, 589–609. doi:10.1023/A:1007854015481

Kyle, S. D., Espie, C. A., & Morgan, K. (2010). "…Not just a minor thing, it is something major, which stops you from functioning daily": Quality of life and daytime functioning in insomnia. *Behavioral Sleep Medicine*, *8*, 123–140. doi:10.1080/15402002.2010.487450

Leger, D., & Poursain, B. (2005). An international survey of insomnia: Under-recognition and under-treatment of a polysymptomatic condition. *Current Medical Research and Opinion*, *21*, 1785–1792. doi:10.1185/030079905X65637

Levin, R., & Nielsen, T. A. (2007). Disturbed dreaming, posttraumatic stress disorder, and affect distress: A review and neurocognitive model. *Psychological Bulletin*, *133*, 482–528. doi:10.1037/0033-2909.133.3.482

Luoma, J. B., Martin, C. E., & Pearson, J. L. (2002). Contact with mental health and primary care providers before suicide: A review of the evidence. *American Journal of Psychiatry*, *159*, 909–916. doi:10.1176/appi.ajp.159.6.909

MacGregor, K. L., Funderburk, J. S., Pigeon, W., & Maisto, S. A. (2012). Evaluation of the PHQ-9 Item 3 as a screen for sleep disturbance in primary care. *Journal of General Internal Medicine*, *27*, 339–344. doi:10.1007/s11606-011-1884-5

Mallon, L., Broman, J.-E., & Hetta, J. (2000). Sleeping difficulties in relation to depression and anxiety in elderly adults. *Nordic Journal of Psychiatry*, *54*, 355–360. doi:10.1080/080394800457192

Manber, R., Edinger, J. D., Gress, J. L., Pedro-Salcedo, M. G. S., Kuo, T. F., & Kalista, T. (2008). Cognitive behavioral therapy for insomnia enhances depression outcome in patients with comorbid major depressive disorder and insomnia. *Sleep*, *31*, 489–495.

McGirr, A., Renaud, J., Seguin, M., Alda, M., Benkelfat, C., Lesage, A., & Turecki, G. (2007). An examination of DSM-IV depressive symptoms and risk for suicide completion in major depressive disorder: A psychological autopsy study. *Journal of Affective Disorders*, *97*, 203–209. doi:10.1016/j.jad.2006.06.016

Morphy, H., Dunn, K. M., Lewis, M., Boardman, H. F., & Croft, P. R. (2007). Epidemiology of insomnia: A longitudinal study in a UK population. *Sleep*, *30*, 274–280.

Nadorff, M. R., Nazem, S., & Fiske, A. (2011). Insomnia symptoms, nightmares, and suicidal ideation in a college student sample. *Sleep*, *34*, 93–98.

Ohayon, M. M., & Roth, T. (2003). Place of chronic insomnia in the course of depressive and anxiety disorders. *Journal of Psychiatric Research*, *37*, 9–15. doi:10.1016/S0022-3956(02)00052-3

Perlis, M. L., Smith, L. J., Lyness, J. M., Matteson, S. R., Pigeon, W. R., Jungquist, C. R., & Tu, X. (2006). Insomnia as a risk factor for onset of depression in the elderly. *Behavioral Sleep Medicine*, *4*, 104–113. doi:10.1207/s15402010bsm0402_3

Pigeon, W. R., Hegel, M., Unützer, J., Fan, M.-Y., Sateia, M. J., Lyness, J. M., … Perlis, M. L. (2008). Is insomnia a perpetuating factor for late-life depression in the IMPACT cohort? *Sleep*, *31*, 481–488.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879–891. doi:10.3758/brm.40.3.879

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401. doi:10.1177/014662167700100306

Salvio, M. A., Wood, J. M., Schwartz, J., & Eichling, P. S. (1992). Nightmare prevalence in the healthy elderly. *Psychology and Aging*, *7*, 324–325. doi:10.1037/0882-7974.7.2.324

Savard, M. H., Savard, J., Simard, S., & Ivers, H. (2005). Empirical validation of the Insomnia Severity Index in cancer patients. *Psycho-Oncology*, *14*, 429–441. doi:10.1002/pon.860

Silverman, M. M., Berman, A. L., Sanddal, N. D., O'Carroll, P. W., & Joiner, T. E., Jr. (2007). Rebuilding the Tower of Babel: A revised nomenclature for the study of suicide and suicidal behaviors: Part 1: Background, rationale, and methodology. *Suicide and Life-Threatening Behavior*, *37*, 248–263. doi:10.1521/suli.2007.37.3.248

Sjöström, N., Hetta, J., & Wærn, M. (2009). Persistent nightmares are associated with repeat suicide attempt: A prospective study. *Psychiatry Research*, *170*, 208–211. doi:10.1016/j.psychres.2008.09.006

Sjöström, N., Wærn, M., & Hetta, J. (2007). Nightmares and sleep disturbances in relation to suicidality in suicide attempters. *Sleep*, *30*, 91–95.

Tang, N. K., Wright, K. J., & Salkovskis, P. M. (2007). Prevalence and correlates of clinical insomnia co-occurring with chronic back pain. *Journal of Sleep Research*, *16*, 85–95. doi:10.1111/j.1365-2869.2007.00571.x

Tanskanen, A., Tuomilehto, J., Viinamäki, H., Vartiainen, E., Lehtonen, J., & Puska, P. (2001). Nightmares as predictors of suicide. *Sleep*, *24*, 844–847.

Thase, M. E. (2005). Correlates and consequences of chronic insomnia. *General Hospital Psychiatry*, *27*, 100–112. doi:10.1016/j.genhosppsych.2004.09.006

Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review*, *117*, 575–600. doi:10.1037/a0018697

Vitiello, M. V. (2006). Sleep in normal aging. *Sleep Medicine Clinics*, *1*, 171–176. doi:10.1016/j.jsmc.2006.04.007

Vitiello, M. V., Larsen, L. H., & Moe, K. E. (2004). Age-related sleep change: Gender and estrogen effects on the subjective-objective sleep quality relationships of healthy, noncomplaining older men and women. *Journal of Psychosomatic Research*, *56*, 503–510. doi:10.1016/S0022-3999(04)00023-6

Vitiello, M. V., Rybarczyk, B., Von Korff, M., & Stepanski, E. J. (2009). Cognitive behavioral therapy for insomnia improves sleep and decreases pain in older adults with co-morbid insomnia and osteoarthritis. *Journal of Clinical Sleep Medicine*, *5*, 355–362.

Wood, J. M., Bootzin, R. R., Rosenhan, D., Nolen-Hoeksema, S., & Jourden, F. (1992). Effects of the 1989 San Francisco earthquake on frequency and content of nightmares. *Journal of Abnormal Psychology*, *101*, 219–224. doi:10.1037/0021-843X.101.2.219