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SCIENTIFIC INVESTIGATIONS

Differentiating Single and Multiple Suicide Attempters: What Nightmares Can Tell Us That Other Predictors Cannot

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Study Objectives: Although nightmares have been associated with suicidal behavior beyond well-known risk factors, the association between nightmares and multiple suicide attempts remains largely unexplored. This study addressed this gap in the literature by examining whether nightmares differentiated between individuals who reported single versus multiple suicide attempts. The individual contributions of nightmare frequency, distress/severity, and chronicity were also investigated to determine which variable contributed the most variance.

Methods: Participants (n = 225) were recruited as part of a larger data collection through Amazon Mechanical Turk, an online crowdsourcing venue. Participants reported attempting suicide once (n = 107 individuals), multiple times (n = 118), or never (n = 791). Nightmare frequency, distress, and chronicity were assessed with the Disturbing Dreams and Nightmares Severity Index.

Results: Nightmare frequency differentiated multiple from single suicide attempters, even after controlling for symptoms of depression, posttraumatic stress disorder, insomnia, nightmare severity/distress, nightmare chronicity, and age (P = .019). Comparison participants, those not reporting suicide attempts, reported a significantly lower level of nightmare frequency than those reporting single or multiple suicide attempts.

Conclusions: Inconsistent with past research, this study showed that nightmare frequency, and not nightmare chronicity or severity/distress, differentiated between single and multiple suicide attempters. This outcome suggests that the number of nightmares experienced may be more pertinent in predicting repeat suicide attempts than their duration or perceived severity. Study limitations include a cross-sectional design, a convenience sampling approach, a lack of control for previous treatment or length of time since last attempt, and a retrospective nightmare measure.

Keywords: nightmares, nightmare frequency, multiple suicide attempters, sleep and psychiatric conditions, nightmare severity, nightmare chronicity, depression, insomnia, PTSD, psychopathology

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BRIEF SUMMARY

Current Knowledge/Study Rationale: Given continual increases in the suicide rate in the United States, it is critical to improve our understanding of how to assess and treat suicide risk.

Study Impact: This study showed that nightmare frequency differentiated between single and multiple suicide attempters independent of several other risk factors, whereas symptoms of depression, posttraumatic stress disorder, insomnia, and other aspects of nightmares (ie, severity/distress and chronicity) failed to do so. Findings from this study also suggest that assessing nightmare frequency may be important when treating those with nightmares who are at risk of attempting suicide, especially those with a previous suicide attempt. Future research is needed to replicate these findings and assess the efficacy of treating nightmares as a means of reducing suicide risk.

INTRODUCTION

Suicide in the United States has been one of the 10 leading causes of death since 2008, and the suicide rate has increased 25% in the last decade.[1,2] In recent years, the literature on sleep disturbances predicting suicide has dramatically increased, with insomnia symptoms and nightmares emerging as meaningful suicide risk factors. Although most of the literature has focused on insomnia symptoms, nightmares have emerged as a robust, independent predictor of suicidal ideation, attempts, and death by suicide.[3–5] Nightmares have been associated with suicide ideation independent of symptoms of insomnia and depression across multiple samples.[6–9] In a review of current literature, Bernert and Nadorff[10] found that nightmares were consistently associated with increased suicide risk across studies.

Statement of the Problem

Few studies have examined the difference between those who attempt suicide once and those who attempt multiple times. Given that the best predictor of future suicidal behavior is a previous attempt,[11,12] it is important to understand what factors predict repeated attempts. To date, only one study[8] has examined whether nightmares predict additional suicide attempts, and no study to date has examined nightmare frequency, severity, and chronicity together in the same model to determine which aspects of nightmares are associated with suicide attempts. This question may be clinically important, as it can

help identify the aspects of nightmares that are most important to assess when determining suicide risk.

Present Study

Based on previous research,[7,8] the authors first hypothesized that nightmares would independently differentiate multiple suicide attempters from single attempters when statistically controlling for symptoms of insomnia, depression, and posttraumatic stress disorder (PTSD). Further, in a second hypothesis, it was predicted that nightmare frequency, severity, and chronicity would all differentiate single versus multiple suicide attempt status independent of each other and symptoms of depression, insomnia, and PTSD.

METHODS

Participants and Procedures

A total of 1,062 individuals were recruited to complete questionnaires as a part of a large online survey assessing the association between sleep and mental health across the lifespan. Individuals must have been at least 18 years of age and from the United States to participate in the study. From this larger sample, a subsample of 225 individuals (107 individuals self-identifying as one-time attempters and 118 individuals reporting multiple suicide attempts in their lifetime) reporting a past suicide attempt was selected for our analyses. Participants were recruited through Amazon's Mechanical Turk (MTurk), an online workplace created by Amazon in 2005 where workers complete online jobs, including sometimes completing research protocols. Research has demonstrated that MTurk studies are comparable to clinical samples and may also contain greater diversity when compared to studies using American college students.[13,14] Further, a recent study found that MTurk respondents were fundamentally comparable to population-based respondents when researchers controlled for political and demographic variables.[15]

After selecting the study and choosing to participate, participants were shown a consent form and then the battery of self-report measures. At the completion of the study, all participants were given information regarding nationwide mental health resources and crisis line services. Participants were then granted credit to the Amazon MTurk worker account. Although participants were only awarded a nominal fee ($0.25), recent studies suggest that many individuals participating in MTurk studies have motives other than monetary gain, such as entertainment or the desire to advance science and make a difference.[13]

Individuals included in the sample all indicated that they were from the United States, and most individuals who completed this study identified as white (80%) and female (70%). The sample ranged in age from 18 to 64 years (mean = 32.38, standard deviation = 10.25).

Measures

The dependent variable was taken from one item that asked, "How many times have you attempted suicide?" Responses were divided by coding into two groups in order to create a dichotomous variable, with those having multiple attempts being represented by 1 and those with only one attempt being represented by 0.

Nightmares were measured with the Disturbing Dreams and Nightmares Severity Index (DDNSI).[16] The DDNSI measures frequency and severity of nightmares during the most recent year. Items from the DDNSI were broken into scales for nightmare frequency, severity, and chronicity.

The Insomnia Severity Index[17] is a 7-item Likert-type scale of perceived insomnia severity. Response options range in point value from 0 to 4, with a maximum potential score of 28; scores greater than 14 are considered clinically significant.

The Posttraumatic Stress Disorder Checklist—Civilian Version[18] is a 17-item measure of prevalence of PTSD symptoms and the associated difficulty they experience in relation to their most significant life stressor. Items can be rated from 1 (not at all) up to 5 (extremely), with higher total scores suggesting the presence of more severe PTSD symptoms.

The Center for Epidemiologic Studies Depression Scale (CES-D)[19] is a 20-item, self-report measure scored on a 0 to 3 scale that assesses depressive symptoms during the past week. Total scores on this measure range from 0 to 60, with the commonly used cutoff of > 16 for depression symptoms with potential clinical significance.

Analyses

On the basis of the research questions and hypotheses, binary logistic regressions were utilized to determine whether the independent variables could differentiate between individuals who report one suicide attempt versus individuals self-reporting multiple suicide attempts.

For this study, it was predicted that nightmare frequency, severity, and duration/chronicity would independently differentiate between single and multiple suicide attempters when statistically controlling for symptoms of insomnia, depression, and posttraumatic stress, such that individuals reporting greater nightmare duration/chronicity, frequency, and/or severity will be more likely to have multiple suicide attempts. To test this prediction, nightmare frequency and nightmare severity (compiled from items on the DDNSI) and nightmare duration (single item from DDNSI) were used as the independent variables to differentiate the dependent variable regarding suicide attempts, with the following symptom variables being covariates: insomnia, depression, and posttraumatic stress.

RESULTS

Means and correlations for all measures are provided in **Table 1**. Additionally, **Table 2** provides a description of frequencies of nightmares across participants. A *t* test was run to compare the homogeneity of our sample of suicide attempters with the rest of the participants in the sample who did not report suicide attempts. Participants in the control group showed a lower level of nightmare frequency (the mean difference = −0.43 units). A *t* test of the difference between means produced a statistically significant result ($P < .001$), and a Cohen $d = 0.44$. Then, a logistic regression was used to examine whether nightmare

Table 1—Correlations, means, standard deviations, and internal validity (n = 225).

	1	2	3	4	5	6	7	8	9	n	Mean	SD	α
1. Suicide attempts	1.000	0.165*	0.140*	0.180*	0.143*	0.126	0.184**	0.003	−0.132*	225	–	–	–
2. PCL-C score		1.000	0.551**	0.388**	0.165*	0.402**	0.297**	0.007	−0.139*	225	49.54	15.41	.93
3. ISI score			1.000	0.243**	0.140*	0.269**	0.166*	0.013	0.085	224	14.62	5.82	.85
4. DDNSI score				1.000	0.180*	0.878**	0.921**	0.092	−0.088	224	9.31	8.60	.87
5. CES-D score					1.000	0.334**	0.275**	0.012	−0.103	224	30.67	13.94	.92
6. NM severity						1.000	0.627**	0.119	−0.095	225	6.24	4.74	.91
7. NM frequency							1.000	0.061	−0.065	224	5.13	5.61	.81
8. Sex								1.000	−0.059	225	–	–	–
9. Age, years									1.000	224	32.38	10.25	–

Asterisks indicate statistical significance: * = $P < .05$; ** = $P < .001$. Suicide attempts categorized as single versus multiple suicide attempts. Items from the DDNSI were broken into scales for nightmare frequency and severity. CES-D = Center for Epidemiologic Studies Depression Scale, DDNSI = Disturbing Dreams and Nightmares Severity Index, ISI = Insomnia Severity Index, NM = nightmare, PCL-C = Posttraumatic Stress Disorder Checklist-Civilian Version, SD = standard deviation.

Table 2—Frequencies of nightmares.

Item Response	Single Suicide Attempters (n)	Multiple Suicide Attempters (n)	Nonattempters (n)	Missing Data (n)
Never	3	9	111	–
Yearly	28	22	244	–
Monthly	45	32	264	–
Weekly	31	55	172	–
Total n	107	118	791	46

Data taken from item 1 of the Disturbing Dreams and Nightmares Severity Index: "How often do you have disturbing dreams and/or nightmares?"

Table 3—Regression coefficients: nightmare frequency and severity predicting multiple suicide attempts.

Predictors	R^2	β	SE	*t*	*P*
Step 1	0.067				
Age		−.029	0.014	0.971	.040
Sex		−.077	0.304	0.926	.799
Depressive symptoms		.006	0.016	1.006	.706
PTSD symptoms		.008	0.015	1.008	.622
Insomnia symptoms		.038	0.029	1.038	.196
Step 2	0.105				
Age		−.031	0.015	0.969	.034
Sex		−.134	0.312	0.875	.668
Depressive symptoms		.004	0.016	1.004	.813
PTSD symptoms		.003	0.016	1.003	.853
Insomnia symptoms		.042	0.030	1.043	.159
Nightmare frequency		.084	0.036	1.088	.021
Nightmare severity		−.024	0.040	0.976	.551

The R^2 value used is Nagelkerke R squared. PTSD = posttraumatic stress disorder, SE = standard error.

frequency and severity/intensity differentiated between the groups independent of symptoms of depression, PTSD, and insomnia (see **Table 3**). The overall regression model was statistically reliable in distinguishing between single and multiple attempters [−2 log likelihood = 287.846, $\chi^2(1) = 6.808$, $P = .033$] and correctly classified 61.1% of cases (see **Table 2**). The first part of the hypothesis was supported: nightmare frequency significantly predicted multiple suicide attempts (β = .084, $t = 1.088$, $P = .021$). However, the same was not true when looking at nightmare severity (β = −.024, $t = 0.976$, $P = .551$); nightmare severity was not supported as a predictive component of nightmares for multiple suicide attempts. Age also significantly differentiated the two groups, whereas symptoms of insomnia, depression, and PTSD failed to differentiate.

We ran an additional logistic regression to see whether the results held after adding nightmare duration/chronicity to the

Table 4—Regression coefficients: nightmare frequency, severity, and duration/chronicity predicting multiple suicide attempts.

Predictors	R^2	β	SE	*t*	*P*
Adjusted model final step	0.122				
Age		−.027	0.015	0.974	.074
Sex		−.070	0.316	0.933	.825
Depressive symptoms		.004	0.016	1.004	.786
PTSD symptoms		.003	0.016	1.003	.840
Insomnia symptoms		.037	0.030	1.038	.213
Nightmare frequency		.087	0.037	1.091	.019
Nightmare severity		.004	0.043	1.004	.933
Nightmare duration/chronicity		−.022	0.013	0.978	.089

The R^2 value used is Nagelkerke R squared. PTSD = posttraumatic stress disorder, SE = standard error.

model (see **Table 4**). In this model, nightmare chronicity/duration was added in the final step. Overall, the adjusted logistic regression model was not statistically reliable in distinguishing between single and multiple attempters [−2 log likelihood = 284.842, $\chi^2(1) = 3.004$, $P = .083$] but correctly classified 58.8% of cases. When nightmare chronicity/duration was added into the model, nightmare chronicity/duration was not a significant predictor of multiple suicide attempts (β = −.022, $t = 0.978$, $P = .089$), but nightmare frequency remained a significant predictor (β = .087, $t = 1.091$, $P = .019$) independent of symptoms of depression, PTSD, and insomnia. Age no longer differentiated the groups once nightmare chronicity was added to the model (β = −.027, $t = 0.974$, $P = .074$).

In summary, results showed that comparison participants, those not reporting suicide attempts, showed a lower level of nightmare frequency and that only nightmare frequency differentiated multiple suicide attempters from single attempters, even after controlling for symptoms of depression, PTSD, insomnia, nightmare severity/distress, nightmare chronicity, and age.

DISCUSSION

The present study yielded clinically relevant findings that have the potential to inform both sleep and suicide assessment literature. Sleep specialists or physicians may see individuals for concerns about sleep before an individual is seen for mood concerns, suicidal ideation, or suicidal intent. This may be especially true for individuals working in specific careers, such as the military, where reporting of suicidality could result in actionable consequences to their job performance or duties assigned. The purpose of a suicide risk assessment is to identify heightened risk and adequately estimate the potential for suicide-related behavior.[20,21] Therefore, knowing what factors are associated with subsequent attempts is valuable, and providing routine screening for nightmares could be a quick and actionable way to identify suicide risk. The current study is an important first step in demonstrating the potential importance of nightmare frequency in assessing suicide risk, especially among individuals who have previously attempted suicide. Further, asking about sleep disturbances may provide a less threatening way to assess for the presence of suicidal ideation or intent and open the door to disclosure of previous attempts.[22] It is possible that sleep disturbances may be viewed as less stigmatized than suicidality, and therefore people may be more willing to disclose nightmares than suicide risk.

Results from this study are the first to show that nightmare frequency was predictive of multiple suicide attempts independent of symptoms of depression, PTSD, insomnia, nightmare severity, and nightmare chronicity. Further, findings showed that individuals with suicide attempts have a higher level of nightmare frequency than those without a suicide attempt. These findings support prior research[8,23] showing that nightmares may be an independent risk factor for suicide. Although the effect sizes of the results were small, these results are meaningful given that symptoms of depression, PTSD, and insomnia, well-known predictors of suicidality,[16] did not significantly predict multiple suicide attempts in either of the analyses. In addition to being significant, whereas depressive symptoms were not, the effect of nightmares was 24% larger than depression. Further, given meta-analytic research showing that a circumscribed group of suicide risk factors do no better than chance at predicting suicide attempts over the long term,[24] finding novel suicide risk factors, even those with small effects, may have clinical relevance.

Nightmare severity refers to the intensity of one's nightmares, and this intensity may only represent a small piece of overall despair experienced by individuals who have suicidal thoughts and are engaging in attempts. Sjöström and colleagues[8] followed suicide attempters for 2 years after an attempt; they found that persistent nightmares were stronger predictors of future suicide attempts than merely having nightmares at baseline. The present study built upon these findings by accounting for all attempts, not just attempts requiring hospitalization, which is pertinent as many attempts do not result in necessary medical intervention.[25–27] Further, the present study expanded on their findings by differentiating severity and frequency, accounting for PTSD symptoms, and capturing an American sample, which differs in suicide rates compared to the Swedish sample from Sjöström and colleagues.[8] Although it may follow that chronicity is a driving force, as chronic health conditions are often associated with suicide risk,[28] the current authors argue that nightmares occurring once a year for 20 years would not have comparable impact with nightmares occurring 20 nights out of the month for 3 months. Clinical studies of nightmares typically find that treatment effects are seen for individuals who begin

treatment with at least weekly nightmares (moderate severity per the Diagnostic and Statistical Manual of Mental Disorders, fifth edition).

Nightmare frequency has been shown to longitudinally predict death by suicide.[29] Hochard et al.[30] also showed that individuals experiencing frequent nightmares have a reduced capacity for distress tolerance, which has been previously associated with lifetime suicide attempts.[31] Nightmare frequency fits as a driving predictor of suicide attempts, but even more so as a predictor of multiple attempts, when considering the level of despair an individual could experience from being plagued by nightmares on a nearly nightly basis. Not only would those individuals experience the distress of the nightmares when they occur, but often the feelings and/or images from the nightmares tend to follow individuals throughout the daytime. It is possible that a continued inability to escape nightmares and the subsequent consequences may lead to increased fear of existence and a need to escape from the heightened levels of distress and hopelessness. Because there is a lack of knowledge both publicly and professionally regarding treatments available for nightmares, it is likely that individuals are not seeking treatment and/or are not receiving the most widely supported nightmare treatment.[32]

Limitations

In addition to the strengths of the study, several limitations should be considered. This study had participants complete a retrospective nightmare severity assessment tool to measure nightmare symptoms, which may provide an underestimation of current nightmare and bad dream frequency.[33] However, the nightmare measure used in this study has frequently been used in studies that were published in top sleep research journals. Although multiple known risk factors were accounted for, it was not feasible to control for all known variables that may have influenced the outcome. This study was unable to account for alcohol use, formal diagnoses of sleep-wake disorders or psychopathology, or history of treatment use and type, which may have contributed to reports of frequent nightmares.

Also, it should be noted that participants in this study were primarily white and female, which may not generalize to the general population. However, the participants may be indicative of a representative sample of individuals who jointly report frequent nightmares and suicide attempts in tandem.[8] Furthermore, Shapiro and colleagues[25] provided research demonstrating similarities between MTurk and clinical samples, which suggests that the results in the current study may also generalize to a clinical sample. Lastly, as these findings are the product of cross-sectional data instead of longitudinal data, causality cannot be inferred. However, the present study lays the groundwork for future longitudinal research examining the impact of nightmares on future suicidal behavior.

CONCLUSIONS

Nightmares, but particularly nightmare frequency, were found to significantly differentiate between those without attempts and those with single and multiple suicide attempts when other leading risk factors for suicide failed to do so. With knowledge that nightmares are often underreported, and thus untreated,[32] this finding may have clinical implications. A routine assessment of all sleep concerns, but specifically nightmares, in general clinical practice may represent a positive effort toward reducing the risk of suicide attempts and deaths by suicide. Further, other research[34] suggests that integrating detailed assessments of sleep disturbances in medical settings may serve as an individually treatable target for suicide prevention. In addition to increasing assessment of nightmares, viewing nightmares as a suicide risk factor suggests that providing treatment for nightmares is pertinent. Although both pharmacological and psychological interventions exist for the treatment of nightmares, Imagery Rehearsal Therapy has emerged as a well-established nightmare treatment[35–37] (for a review of nightmare treatment, see Nadorff et al.[38]).

The psychological and medical literature would also benefit from examination of the longitudinal effects of nightmare treatment on subsequent suicidal ideation, behaviors, and deaths by suicide. Another potential consideration for future studies would be a replication of this study using other outcome variables, such as current suicidal thoughts and risk, as well as testing it in broader samples of suicide attempt survivors. As this is the first known study comparing the constructs of frequency, severity or distress, and duration of nightmares individually when differentiating suicide attempters, replication is warranted in a longitudinal study.

In sum, this study suggests that assessment of nightmares, especially nightmare frequency, may be clinically useful in predicting repeat suicide attempts.

ABBREVIATIONS

CES-D, Center for Epidemiologic Studies - Depression Scale
DDNSI, Disturbing Dreams and Nightmares Severity Index
MTurk, Amazon's Mechanical Turk
PTSD, posttraumatic stress disorder

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