Nightmare Distress as a Mediator Between Nightmare Frequency and Suicidal Ideation

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Previous studies investigating the relationship between nightmares and suicidal ideation have been equivocal. In this study, we investigated the role of nightmare distress in the relationship between nightmare frequency and suicidal ideation. Study participants were 280 undergraduate students (M_{age} = 21.84, ±2.14 SD, 77.9% women), who answered "yes" to experiencing nightmares in the past year. All participants completed questionnaires on nightmare frequency (Nightmare Frequency Questionnaire), nightmare distress (Nightmare Distress Questionnaire), suicidal ideation (Depressive Symptom Inventory—Suicidality Subscale), and insomnia (Insomnia Severity Index). Mediation analyses determined that nightmare distress fully mediated the relationship between nightmare frequency and suicidal ideation after controlling for insomnia. Although the total effect on the relationship between nightmare frequency and suicidal ideation (B = .21, SE = .08, p = .009), the direct effects of nightmare frequency on suicidal ideation were not significant after accounting for the effects of nightmare distress and insomnia (B = .12, SE = .08, p = .16). Additionally, the indirect effect of nightmare distress on the relationship between nightmare frequency and suicidal ideation was significant bootstrapped 95% confidence interval (CI) [0.0306, 0.1946]. Finally, gender moderated the mediated effect of nightmare distress between nightmare frequency and suicidal ideation. Our results support that both nightmare frequency and nightmare distress should be evaluated in clinical and research settings, especially for women, in the context of suicidal risk assessment.

Keywords: nightmare distress, nightmare frequency, suicidal ideation, sleep, mediation

Nightmares are vivid and disturbed dreams that are accompanied with negative emotion and awakened the dreamer from sleep (Zadra & Donderi, 2000). Previous research indicates a close relationship between nightmares and psychopathology, including depression (Agargun et al., 2007; Cukrowicz et al., 2006;

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Lancee, Spoormaker, & Van den Bout, 2010; Levin, 1998; Levin & Fireman, 2002; Li, Lam, Chan, Yu, & Wing, 2012; Liu, 2004; Roberts & Lennings, 2006; Tanskanen et al., 2001), anxiety (Levin, 1998; Levin & Fireman, 2002; Nielsen et al., 2000; Roberts & Lennings, 2006; Tanskanen et al., 2001; Zadra & Donderi, 2000), schizophrenia-spectrum disorders (Hartmann, Russ, Oldfield, Sivan, & Cooper, 1987; Hartmann, Russ, Van der Kolk, Falke, & Oldfield, 1981), and borderline personality disorder (Claridge, Davis, Bellhouse, & Kaptein, 1998; Semiz, Basoglu, Ebrinc, & Cetin, 2008). Additionally, nightmares are frequently found individuals with posttraumatic stress disorder (PTSD; Germain & Nielsen, 2003; Krakow et al., 2002a), and are listed as diagnostic criteria of PTSD in the *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition* (*DSM-5*; American Psychiatric Association, 2013).

Previous research (Nadorff, Nazem, & Fiske, 2011; Wong, Brower, & Zucker, 2011) has also found a significant relationship between nightmares and suicide, independent of insomnia, depression, anxiety, and PTSD. Furthermore, nightmare in research settings has been reported as a significant predictor of suicide ideation both clinical populations (Agargun et al., 2007; Li et al., 2012; Semiz et al., 2008; Sjostrom, Hetta, & Waern, 2009; Sjostrom, Waern, & Hetta, 2007; Wong et al., 2011) and general student samples (Cukrowicz et al., 2006; Liu, 2004; Nadorff et al., 2011; Nadorff, Nazem, & Fiske, 2013; Roberts & Lennings, 2006; Tanskanen et al., 2001). Despite nightmares being an important and clinically significant factor, objective criteria, and consensus about the definition of nightmares and nightmare disorders are unclear, with most definitions being based on nightmare frequency. However, not only is the present criteria for nightmare disorder inconsistent with previous studies, there is also insufficient evidence for using nightmare frequency as a criteria to define pathological nightmares (American Psychiatric Association, 2013). The definition of nightmares in the context of Nightmare Disorders are "repeated occurrences of extended, extremely dysphoric, and well-remembered dreams that usually involve efforts to avoid threats to survival, security, or physical integrity," according to the *DSM–5* (American Psychiatric Association, 2013). In research settings, no specific definition has been presented (Cukrowicz et al., 2006; Krakow et al., 2002a; Li et al., 2012; Liu, 2004; Nadorff et al., 2013; T. A. Nielsen et al., 2000; Roberts & Lennings, 2006; Sjostrom et al., 2009, 2007; Tanskanen et al., 2001; Wong et al., 2011) and operational definitions vary considerably (Agargun et al., 2007; Blagrove, Farmer, & Williams, 2004; Lancee et al., 2010; Levin, 1998; Levin & Fireman, 2002; Nadorff et al., 2011; Semiz et al., 2008; Zadra & Donderi, 2000). Conventionally, most investigators have asked participants the frequency of their nightmares through retrospective questionnaires (Agargun et al., 2007; Cukrowicz et al., 2006; Li et al., 2012; Liu, 2004; Nadorff et al., 2011, 2013; Roberts & Lennings, 2006; Semiz et al., 2008; Sjostrom et al., 2009, 2007; Tanskanen et al., 2001; Wong et al., 2011).

There is a growing body of recent empirical literature (Blagrove et al., 2004; Lancee et al., 2010; Levin & Fireman, 2002) that differentiates nightmare distress and nightmare frequency, especially the differential impact it has on psychopathology. Previous studies (Blagrove et al., 2004; Lancee et al., 2010; Levin & Fireman, 2002) that have investigated both nightmare distress and nightmare frequency separately indicate that nightmare distress has a more significant impact than nightmare frequency for a wide range of psychiatric conditions (Blagrove et al.,

2004; Lancee et al., 2010; Levin & Fireman, 2002). In one study, Levin and Fireman (Levin & Fireman, 2002) reported that nightmare distress was related with higher scores over all psychopathological disturbance as measured by the Symptom Checklist-90-Revised (SCL-90–R; Derogatis, 1994) and other measures, although nightmare frequency was not associated with depression and anxiety. Specifically, participants who had high nightmare frequency but low distress reported lower levels of psychological disturbance compared with individuals who had low frequency and highly distressing nightmares. Similarly, Lancee and colleagues (2010) found that nightmare frequency was linked to subjective sleep quality and insomnia, whereas nightmare distress was associated with psychological disturbance such as depression, neuroticism as well as sleep variables. Blagrove and colleagues (2004) also found a stronger correlation between psychological well-being with nightmare distress compared with nightmare frequency.

Finally, gender differences on both nightmare frequency and nightmare distress have been reported in previous studies (Schredl, Berres, Klingauf, Schellhaas, & Göritz, 2014; Schredl & Reinhard, 2011). Women report having substantially more nightmares than men (Schredl & Reinhard, 2011). Additionally, women tend to report more negative overall emotional tone of dreams in the context of experiencing more nightmares, and nightmare distress is also higher in women compared with men even after controlling nightmare frequency (Schredl et al., 2014).

To the best of our knowledge, however, the differential effect of nightmare distress and frequency has not been demonstrated in connection with suicidal outcomes. To better understand how nightmares confer risk for suicide, the aim of the present study was to investigate the effect of nightmares on suicidal ideation, considering nightmare distress and nightmare frequency separately. We hypothesized the following: (a) Both nightmare frequency and nightmare distress would be significantly related to suicidal ideation; (b) nightmare distress will mediate the relationship between nightmare frequency and suicidal ideation; and (c) whether gender would moderate the mediated effect.

Method

Participants

The current study used a subset of individuals from a larger study (Chu et al., 2016). The original sample consisted of 554 college students recruited from universities in Seoul and Daejeon, Korea. Among this sample, we selected 309 participants who answered "yes" to experiencing nightmares within the past year (55.7%), which was defined as "an unpleasant and vivid dream that awakens the dreamer from sleep" in this study. After removing missing data for main variables from the dataset, 280 individuals were used for final analysis.

Procedure

Participants completed each of the following self-report questionnaires for the study. All participants provided informed consent before participation and were

compensated with course credit after completion of the study. This research was approved by the local Institutional Review Board where data was collected.

Measure

All questionnaires below were translated from English to Korean, and then back-translated from Korean to English and compared with the original version by an independent translator who was bilingual and a native English speaker.

Demographic information. Participants responded to questions asking about age, and gender.

Nightmare Frequency Questionnaire (NFQ). The Nightmare Frequency Questionnaire (NFQ) is a self-retrospective measure that considers nightmare frequency as a continuous variable (Krakow et al., 2000). There are two sections about the frequency the nights with nightmares and the number of nightmares in a given interval per unit of time (i.e., weekly, monthly, or yearly). In our research, however, respondents were instructed to only report the nights with nightmares on average. We used the standardized result by the week according to Krakow's literature (Krakow et al., 2000). The total score ranges from 0.02 to 7.

Nightmare Distress Questionnaire (NDQ). The Nightmare Distress Questionnaire (NDQ) is a self-report questionnaire that assesses degree of waking distress participants experienced as a result of their nightmares (Belicki, 1992a). Participants are instructed to complete the NDQ, only if they answered "yes" to experiencing nightmares. Each item is scored on a 0–4 Likert scale, with total scores ranging from 0–52. Higher scores reflect greater degree of nightmare distress. Internal consistency was acceptable in our sample ($\alpha = .83$).

Depressive Symptom Inventory–Suicidality Subscale (DSI-SS). The DSI-SS is a 4-item self-report questionnaire designed to assess suicidal ideation in the past 2 weeks developed by Metalsky and Joiner (1997). Items are rated from 0 to 3 with a maximum score of 12 points and clinical cut-off point is 3. Internal consistency was acceptable in our sample ($\alpha = .92$).

Insomnia Severity Index (ISI). The ISI is a 7-item self-report scale that assesses nocturnal (item 1–3) and daytime symptoms (items 4–7) of insomnia (Bastien, Vallieres, & Morin, 2001). Each item is scored on a 5-point Likert scale ranging from 0 to 4, with higher scores reflecting greater insomnia symptom severity. Scores range from 0–28, and can be divided into four groups based on total scores: Not clinically significant (0–7), subthreshold (8–14), moderate severity (15–21), and severe severity (22–28). Internal consistency was acceptable in our sample ($\alpha = .77$).

Statistical Analyses

Missing data was handled using the Missing Value Analysis (MVA) module. Within each instrument, the MVA module first examined missing data patterns with the Little's Missing Completely at Random (MCAR) test (Little & Rubin, 1987). The Little's MCAR tests performed within the NDQ ($\chi^2 = 20.3$, $df = 60$, $p = 1.00$), DSI ($\chi^2 = .3$, $df = 3$, $p = .94$), and ISI ($\chi^2 = 2.35$, $df = 6$, $p = .88$) were all

nonsignificant, suggesting that data were MCAR, and data were simple dropped entries with missing data. Accordingly, of the original 309 participants in the dataset, 29 (9.38%) were removed from the dataset to missing data for main variables, resulting in data from 280 individuals being used for final analysis.

The study measures were also investigated for normality of their distribution. The Nightmare Frequency Questionnaire deviated from normality (skewness = 4.16, kurtosis = 22.52), because most of the values for the nightmare frequency per week was 0 more and less than 1, despite the value ranging to 7. Thus, we used natural log transformation to correct for nonnormality. After the transformation, both skewness (.22) and kurtosis (−.69) were reduced and less than |1|, indicating that the transformed data did not deviate significantly from normality.

To examine the hypothesis that nightmare distress was a mediator between nightmare frequency and suicidal ideation, simple mediation analysis was conducted, with NFQ entered as a predictor of NDQ total score and DSI-SS total score, controlling for ISI total score (Model 4 in PROCESS). To test whether gender had an effect on the presented mediation model, we administered moderation analysis between NFQ and DSI-SS total score with gender entered as a moderator first, controlling for ISI total scores (Model 1 in PROCESS). Since the interaction between NFQ and gender to suicidal ideation was not significant (B = .2, SE = .2, p = .2), we analyzed gender using a moderated mediation model and not a mediated moderation model (Muller, Judd, & Yzerbyt, 2005). Thus, moderated mediation analysis was conducted, with gender entered as a moderator in both path a and path b in Figure 1 (Model 58 in PROCESS). The bootstrapping technique recommended by Shrout and Bolger (2002) was used to test for the mediating effects of nightmare distress on the relationship between nightmare frequency and suicidal ideation, controlling for insomnia. Both simple mediation analysis and moderated mediation analysis were conducted using the PROCESS macro for SPSS, following procedures recommended by Hayes (2013, 2015). The mediation effect of nightmare distress on the relationship between nightmare frequency and suicidal ideation and the index of moderated mediation based on the presented mediation model were evaluated using a bootstrapping resampling procedure: 5,000 bootstrapped samples were drawn from the data, and bias-corrected 95% confidence intervals (CIs) were used to estimate the indirect effects of each of the resampled data sets (Hayes, 2013; Shrout & Bolger, 2002). All analyses were conducted using Statistical Package for Social Science 21.0 (IBM Corp., Armonk, NY). The p value was set at $< .05$ for statistical significance.

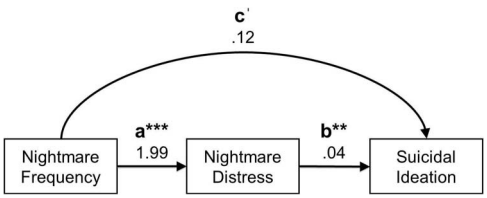

Figure 1. Nightmare distress fully mediate the relationship between nightmare frequency and suicidal ideation after controlling for insomnia (N = 280). Path a = predictor → mediator; path b = mediator → outcome (controlling for predictor); path c′ = predictor → outcome (controlling for mediator); Indirect effect (predictor → mediator → outcome) is .09 significantly (Bootstrapped 95% confidence interval [0.0306, 0.1946]). ** $p < .01$. *** $p < .001$.

Results

Demographic Information and Clinical Correlates

The sample consisted of 77.9% women (n = 218) and men 22.1% (n = 62), with an age range of 18–29 years (M_{age} = 21.84 years, ±2.14 SD). The age frequencies mean that most of the participants were likely juniors or seniors. Table 1 reports the means and correlations for all measures. There were significant correlations between all main variables, including nightmare frequency, nightmare distress, suicidal ideation, and insomnia symptoms. In particular, NDQ scores was positively associated with suicidal ideation, r = .274, $p < .001$, nightmare frequency, r = .437, $p < .001$, and insomnia symptoms, r = .281, $p < .001$.

Nightmare Distress as a Mediator Between Nightmare Frequency and Suicidal Ideation

To test whether nightmare distress mediated the relationship between nightmare frequency and suicidal ideation after controlling for insomnia symptoms, we conducted bootstrapped simple mediation analysis. When we controlled for insomnia symptoms, the overall regression model explained a significant portion of the variance in suicidal ideation, R^2 = .12, $F(3, 276)$ = 12.631, $p < .001$. The total effect on the relationship between nightmare frequency and suicidal ideation was significant (B = .21, SE = .08, p = .009). Although nightmare frequency significantly predicted nightmare distress (B = 1.99, SE = .29, $p < .001$; path a in Figure 1) and nightmare distress significantly predicted suicidal ideation (B = .04, SE = .01, p = .004; path B in Figure 1), the direct effects of nightmare frequency on suicidal ideation were not significant after accounting for the effects of nightmare distress and insomnia (B = .12, SE = .08, p = .16; path c' in Figure 1). The indirect effect of nightmare distress on the relationship between nightmare frequency and suicidal ideation was estimated to be between 0.0306 and 0.1946 (Bootstrapped 95% CI), indicating significance (see Figure 1). Thus, nightmare distress had a full mediation effect in the relationship between nightmare frequency and suicidal ideation.

Table 1
Correlations and Descriptive Statistics for Study Variables

Variable	1	2	3	4	*M*	*SD*
1. Suicidal ideation	—	.233***	.274***	.268***	1.11	1.83
2. NFQ/week		—	.437***	.340***	.48	.83
3. NDQ			—	.281***	7.74	6.97
4. ISI				—	8.90	4.79

Note. NFQ = Nightmare Frequency Questionnaire; NDQ = Nightmare Distress Questionnaire; ISI = Insomnia Severity Index. All values represent raw, nonstandardized scores.
*** $p < .001$.

Gender as a Moderator on the Mediation Effect

To test the association between an indirect effect on the presented mediation model with gender as a moderator, we conducted bootstrapped moderated mediation analysis. The result is presented in Table 2. The significant index of moderated mediation (Index = .11, *SE* = .05, Bootstrapped 95% CI [0.0153, 0.2407]), which is the parameter of a function linking the indirect effect to values of a gender (Hayes, 2015), indicated significant moderated mediation in the model. Additionally, the conditional indirect effects of the model demonstrated differences in significance according to gender (men: Effect = .008, *SE* = .02, Bootstrapped 95% CI [−0.0257, 0.0716] vs. women: Effect = .12, *SE* = .05, Bootstrapped 95% CI [0.0341, 0.2516]). Thus, the mediation effect between nightmare frequency and suicidal ideation through nightmare distress was significant in women only.

Discussion

The current study investigated the effect of nightmares on suicidal ideation, considering both nightmare distress and nightmare frequency in this relationship. We demonstrated that nightmare distress completely mediated the relationship between nightmare frequency and suicidal ideation after controlling for other variables. Thus, these findings suggest that nightmares have a negative effect on suicidal ideation solely through nightmare distress and not nightmare frequency.

Many previous studies regarding the relationship between nightmare and suicidality have demonstrated that nightmare is a risk factor for suicide (Cukrowicz et al., 2006; Nadorff et al., 2011; Sjostrom et al., 2009, 2007; Tanskanen et al., 2001). However, the differential effect of nightmare distress and frequency has not been demonstrated in connection with suicidal outcomes. Only one study (Roberts & Lennings, 2006) on suicidal ideation surveyed both factors, but suicidal ideation was assessed with only one question asking the extent of wanting to end one's life. Additionally, this study (Roberts & Lennings, 2006) did not focus on the relationship between nightmare and suicidal ideation. Furthermore, the majority of studies (Cukrowicz et al., 2006; Li et al., 2012; Liu, 2004; Nadorff et al., 2011, 2013; Roberts & Lennings, 2006; Semiz et al., 2008; Sjostrom et al., 2009, 2007; Tanskanen et al., 2001; Wong et al., 2011) on nightmare and suicidal outcome focus on nightmare frequency without nightmare distress. Previous studies have reported a strong relationship between nightmare distress and measures of psychopathology (Bla-

Table 2
Moderated Mediation and Conditional Indirect Effects According to Gender

Moderator	Index of moderated mediation (*SE*)	Boot LLCI, Boot ULCI	Indirect effect (*SE*)	Boot LLCI, Boot ULCI
Male	.11 (.05)	.0153, .2407	.008 (.02)	−.0257, .0716
Female			.12 (.05)	.0341, .2516

Note. Boot LLCI = Lower levels for confidence interval of indirect effect using bootstrapping; Boot ULCI = Upper levels for confidence interval of indirect effect using bootstrapping; Mediator = Nightmare distress.

grove et al., 2004; Lancee et al., 2010; Levin & Fireman, 2002; Roberts & Lennings, 2006), but no studies have investigated the relationship between nightmare distress and suicidal ideation. Furthermore, nightmare distress, but not nightmare frequency, was significantly associated with psychological factors, such as psychological adjustment (Belicki, 1992b), stress-related symptoms (Zadra, Germain, Fleury, Raymond, & Nielsen, 2000), and physical complaints (Köthe & Pietrowsky, 2001).

Although some studies (Cukrowicz et al., 2006; Nadorff et al., 2011, 2013) have used the Disturbing Dreams and Nightmares Severity Index (DDNSI; Krakow et al., 2002b) that assesses nightmare frequency, severity, and intensity, this questionnaire does not consider nightmare distress and frequency as distinct constructs. Most of these studies have focused on nightmare frequency (Agargun et al., 2007; Liu, 2004; Sjostrom et al., 2009, 2007; Tanskanen et al., 2001; Wong et al., 2011) or DDNSI adding up frequency and intensity (Cukrowicz et al., 2006; Nadorff et al., 2011, 2013), as the main index of assessing nightmares, and nightmare distress has rarely been investigated separately (Li et al., 2012). Although nightmare frequency has been shown to be associated with suicidality (Agargun et al., 2007; Li et al., 2012; Sjostrom et al., 2009, 2007; Wong et al., 2011), the measure of nightmare frequency does not account for any variance beyond that accounted for by nightmare distress based on our results. The results of this study indicate that nightmare distress plays a crucial role in the relationship between nightmares and of suicidal ideation. Thus, we suggest that nightmare distress may be a more important index of nightmares compared with nightmare frequency. The clinical implications based on the findings of our study suggest that when assessing nightmares, both nightmare frequency and nightmare distress should be evaluated in clinical and research settings, especially in the context of suicidal risk assessment.

Furthermore, results from previous studies investigating the relationship between nightmare frequency and suicidality have been equivocal (Agargun et al., 2007; American Psychiatric Association, 2013; Cukrowicz et al., 2006; Li et al., 2012; Nadorff et al., 2011; Roberts & Lennings, 2006; Sjostrom et al., 2009, 2007; Tanskanen et al., 2001; Wong et al., 2011). Agargun and colleagues (2007) showed that frequent nightmares were not associated with increased suicidal tendency in depressed patients without melancholic features. In a study of adolescents who experienced frequent nightmares, Roberts and colleagues (2006) found that there was no significant relationship between nightmare frequency and psychopathology, including suicidal thoughts. In a prospective study with adolescents of high risk alcoholic families, Wong and colleagues (2011) showed that there was no significant relationship between nightmare frequency and suicidal ideation at baseline and behavior at follow-up. Nightmare distress was not assessed in any of these studies, which may have contributed to inconsistent findings.

One possible explanation about why nightmare frequency is connected to suicidal ideation through nightmare distress may be that nightmare distress reflects emotional distress and stressful reactions to daily events (Levin & Nielsen, 2007). Based on the mood regulation theory of dreams, dreams reflect recent emotion-related experiences as well as also functioning as a mood-regulating mechanism during the night (Cartwright, 2005). Nightmares may reflect the failure of mood regulation, and distress induced by nightmares might simply be a proxy in expressing and experiencing general affective distress. Thus, considering that

nightmare distress reflects emotional distress during the daytime, nightmare distress may also be highly associated with suicidal ideation.

Another finding of our study was that the mediation effect found for nightmare distress between nightmare frequency and suicidal ideation was gender specific, being significant to women only. This is first study to explore that the effect of gender in the path between nightmare frequency and nightmare distress, and also between nightmare distress and suicidal ideation. Supported by past studies that have highlighted gender differences in nightmare frequency and nightmare distress, nightmare distress is an important factor to consider in the association between nightmare frequency and suicidal ideation, especially for women.

Despite our findings, the limitations to this study should be noted. First, according to previous studies (Nielsen & Zadra, 2011), important factors that may have contributed to the relationship between nightmares and suicidal ideation such as nightmare chronicity and coping style were not considered. Future studies are needed to present a more complete model underlying nightmares and suicidality. Second, because our sample was comprised of students and was a nonclinical population, the results may not be generalizable for clinical samples. Third, we did not assess psychiatric diagnoses in participants by using clinical interviews. Thus, it was difficult for us to disentangle clear relationships between anxiety disorder, depression, and nightmares and their relationship with suicidality (Agargun et al., 2007; Cukrowicz et al., 2006; Li et al., 2012; Liu, 2004; Roberts & Lennings, 2006). However, because Sjöström and colleagues (2007) found that nightmares were related with a significantly increased risk for suicidality independent of psychiatric diagnosis even after controlling for depression and anxiety, our findings can be supported in this context. Even though, considering the effect of mood in the relationship between nightmare and suicidality (Agargun et al., 2007; Cukrowicz et al., 2006; Li et al., 2012; Liu, 2004; Roberts & Lennings, 2006), these measures should be part of future studies. Finally, the present study used a cross-sectional design, so it is insufficient to verify a causal pathway between nightmare frequency, nightmare distress and suicidal ideation. Despite these limitations, the present findings are consistent with previous findings demonstrating the distinction between nightmare distress and nightmare frequency.

Conclusion

The current study found nightmare distress completely mediated the relationship between nightmare frequency and suicidal ideation, after controlling for insomnia. Nightmare distress may be an important index of nightmares and both nightmare frequency and nightmare distress should be evaluated in clinical and research settings, especially for women in the context of suicidal risk assessment.

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