Psychosocial Correlates of Insomnia Severity in Primary Care

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Purpose: **Insomnia is a substantive primary care issue that leads to adverse outcomes. These can be improved by addressing factors that accentuate insomnia severity. Accordingly, this study identifies correlates of insomnia severity and determines whether these relationships vary with sociodemographic attributes.**

Methods: **This correlational cross-sectional study was conducted in a hospital-sponsored primary care clinic and 2 urban, academic family practice centers. Participants consisted of 236 patients 18 years old or older with clinically significant insomnia (Insomnia Severity Index scores of 7 or more). Surveys instruments included the Insomnia Severity Index, SF-8 (Medical Outcomes Study SF-8 global health status measure), CES-D (Center for Epidemiologic Studies-Depression Scale), DBAS (Dysfunctional Beliefs about Sleep scale), SE-S (Self-Efficacy for Sleep Scale), and a researcher-designed demographic survey. Analytic techniques included descriptive statistics to characterize the study sample, Pearson or Spearman Correlation Coefficients to examine individual associations with insomnia severity, and step-wise linear regression to identify net predictors.**

Results: **Insomnia severity was significantly correlated with health status, depression, self-efficacy, and dysfunctional beliefs ($P < .001$) but not with sociodemographic attributes. Linear regression demonstrated insomnia severity was best predicted by low self-efficacy and high depression scores.**

Discussion: **These findings indicate that clinicians treating insomnia should not only manage comorbid depression but also facilitate self-efficacy for sleep-inducing behavioral change. (J Am Board Fam Med 2010;23:204–211.)**

Keywords: **Insomnia, Self-efficacy, Depressive Disorder, Behavior and Behavior Mechanisms, Primary Health Care, Cross-Sectional**

Chronic insomnia is defined as difficulty initiating or maintaining sleep or nonrestorative sleep that impairs daytime functioning.[1] An estimated 40 to 70 million Americans are affected with insomnia intermittently and 10% to 20% are affected chronically.[2] Placed in perspective, this figure is double the prevalence of major depression (6.6% per year).[3] Consequences of insomnia are substantive and include mood disturbances, medication habituation, memory impairment, daytime fatigue, vocational and interpersonal difficulties, increased health care utilization, impaired health status,[4–6] and accidents.[7] Insomnia costs exceed $42 billion each year.[8] Thus, in view of its prevalence, consequences, and costs, insomnia is a primary care concern.

Insomnia severity often leads to distress and resultant help-seeking in primary care.[9,10] Therapeutic responses typically address the sleep disturbance itself.[11] As an adjunctive approach, addressing psychosocial factors that accentuate insomnia severity and help-seeking can also reduce distress and enhance well-being.[12] In the recent literature several psychosocial factors—poor health status,[13] depression,[14] perceptions of low self-efficacy,[15] and dysfunctional beliefs about sleep[16]—have been associ-

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ated with insomnia severity. However, none of these studies nor other major reviews of insomnia in primary care[9–11,17] indicate which of these factors best predict insomnia severity.

Addressing potential predictors of insomnia severity has important clinical management implications. Specifically, if poor health status is most salient, then addressing contributory comorbidities such as arthritis, heart failure, and other chronic medical illnesses should be prioritized. Alternatively, time and resources should be directed to the management of depressive symptoms should these best predict insomnia severity. A net relationship with low self-efficacy would indicate a role for self-efficacy enhancement techniques that facilitate personalized, achievable goal setting and self-care.[18] Preeminence of dysfunctional beliefs would warrant greater emphasis on the integration of cognitive-behavioral approaches in medical settings.[19] Knowing how relationships vary across sociodemographic subgroups can also inform management. Accordingly, this study was conducted to identify individual and net psychosocial correlates of insomnia severity and to determine whether these relationships vary with sociodemographic attributes.

Methods

This nonexperimental, correlational, cross-sectional study assessed the relationships between insomnia severity, health status, depression, self-efficacy, dysfunctional beliefs about sleep, and demographic factors. Participants were recruited consecutively from patients ≥18 years old seen for care at 3 clinical sites. These included a hospital-sponsored primary care clinic (site 1) and 2 urban, academic family practice centers (sites 2 and 3). The study was advertised by flyers posted in waiting rooms and examination rooms. Exclusionary criteria included being younger than 18, illiteracy, or lacking the cognitive capacity to complete informed consent or respond to surveys. Inclusion criteria entailed being 18 years of age or older with clinically significant insomnia as indicated by a score of ≥8 on the Insomnia Severity Index (ISI). The ISI is a 7-item questionnaire that asks respondents to rate the severity of recent problems with sleep onset, sleep maintenance, early waking, and the impact of insomnia using a 5-point Likert scale (where 0 = not at all and 4 = extremely). ISI scores may range from 0 to 28. Higher scores indicate more severe insomnia, within 4 categories: absence of insomnia (0 to 7), mild (8 to 14), moderate (15 to 21), and severe insomnia (22 to 28).[20]

After the approval of the study by the Institutional Review Board, a study coordinator (ACH) obtained informed consent then distributed survey packets to participants. The survey took between 20 and 30 minutes to complete. The coordinator was available to provide clarification if requested. Participants received a $10 cash honorarium at completion. Surveys were then stored without names or other means of personal identification. Data were entered and stored in a secure, password-protected database accessible only to members of the research team.

Measures

Insomnia severity was measured with the ISI, as discussed above. The ISI has a reported Cronbach α >0.70 and documented validity.[21] Calculated Cronbach α for the ISI in this study was 0.84.

Health status was measured with the SF-8,[22] a shorter adaptation of the Medical Outcomes Study SF-36 global health status measure.[23] Participants use a 5-point scale to indicate their health status. The sum of the ratings provides an overall score that can range from 8 (poor) to 40 (excellent). The SF-8 has excellent convergent validity with the SF-36 (correlation coefficients 0.67 to 0.79 for 7 of 8 items) and high test-retest reliability (0.8 to 0.88).[24] Calculated Cronbach α for the SF-8 in this study was 0.88.

Depressive symptoms were assessed with the Center for Epidemiologic Studies-Depression Scale (CES-D), a 20-item self-report screening measure that assesses the frequency of depressive mood and symptoms during the past week.[25] The CES-D has excellent internal consistency (coefficient α >0.85),[26] has test-retest reliability coefficients of 0.40 to 0.70, and correlates well with other depression measures. Responses are scored on a 4-point Likert scale ranging from 0 to 3. Calculated Cronbach α for the CES-D in this study was 0.88. Summed scores may range from 0 to 60 (4 items being reverse-coded). A score of 16 to 21 suggests mild to moderate depression, with higher scores indicating severe disorder.[27]

Self-efficacy was measured by the 9-item Self-Efficacy for Sleep Scale (SE-S).[28] On this measure, participants use a 5-point scale (range, 1 to 5) to indicate their level of confidence when performing various behaviors that are necessary to get to sleep. The sum of the confidence ratings provides an overall score of sleep self-efficacy that can range from 9 to 45, with higher ratings reflecting more confidence. Concurrent validity for the SE-S is constituted through congruence of higher SE-S scores with improved sleep quality scores (Pittsburg Sleep Quality Index)[29]as well as subjective (sleep diary) and objective (actigraphy) total sleep time and sleep efficiency in randomized clinical trials of behavioral sleep treatments.[30,31] Internal reliability for the SE-S in this study (Cronbach α = 0.85) compares favorably with Cronbach α results (0.71 to 0.86) reported in these trials. Test-retest reliability for the SE-S has been established as well.[32]

Dysfunctional beliefs regarding sleep were measured using the 20-item Dysfunctional Beliefs about Sleep (DBAS) scale.[16] On this measure, participants indicate their levels of agreement with statements concerning sleep by placing a mark on a 100-millimeter line ranging from strongly disagree (0.00) to strongly agree (1.00). A higher score indicates more dysfunctional beliefs and attitudes regarding sleep. The total score is calculated from the average score of all items with 1 item reverse scored. Cronbach α of 0.77 to 0.80 has been reported for the DBAS; in this study it was 0.84.

Measured sociodemographic variables included age, gender, race, marital status, and education. All were assessed by a researcher-designed survey. Age was measured as ratio (continuous)-level data. Gender, race, marital status, and educational level were categorical.

Statistical analyses first entailed characterization of participants using descriptive and summary statistics (mean and SD for continuous variables; percentages for categorical variables). Individual associations with insomnia severity were examined using Pearson correlation coefficients for continuous data and Spearman correlation coefficients for noninterval data. All variables were screened for normality before the analysis was conducted. Means were imputed for 5 patients who had <2 missing values for the CES-D. Stepwise linear regression was then conducted to examine health status, depression, self-efficacy, and dysfunctional beliefs as net predictors of insomnia severity.

Results

There were 236 participants, with 163 from site 1, 56 from site 2, and 17 from site 3. As shown in Table 1, mean age was 45 years (range, 19 to 91 years) with 221 participants reporting. Participants were 74% women (n = 236), 74% African American (n = 160), and 36% married (n = 236). Of 235 participants reporting educational level, 64% reported a high school education, 17% were college graduates, and 19% reported postgraduate education. Ten percent (30 participants) 65 years of age or older.

According to Cohen,[33] to obtain an effect size significant enough to achieve a power level $\geq$0.80 while detecting at least a moderate level of difference between correlated variables, n = 125 would be necessary to achieve α = 0.01. This number was exceeded for this study; thus adequate power for practical significance was ensured.

As noted in Tables 1 and 2, there is no significant variation by site with regard to sociodemographic attributes and means for the ISI, SF-8, CES-D, SE-S, and DBAS. Accordingly, data were pooled in subsequent analyses.

Table 2 reports means and SDs for the ISI, SF-8, CES-D, SE-S, and DBAS. Insomnia severity was moderate (mean, 17; range, 8 to 29). Means for hypothesized predictors of insomnia were moderate for health status, as measured by the SF-8 (mean, 24; range, 8 to 42); moderate for depression measured by the CES-D (mean, 22; range, 0 to 49); midrange for DBAS (mean, 0.50; range, 0.06 to 0.94); and moderate for self-efficacy as measured by the SE-S (mean, 23; range, 9 to 45).

Table 3 consists of individual Pearson correlation coefficients for independent variables with ISI scores (insomnia severity). There were no significant associations between insomnia severity and sociodemographic status. However, health status, depression, self-efficacy, and dysfunctional beliefs were all significantly correlated ($P < .01$). As health status and self-efficacy increased, insomnia severity decreased, demonstrating an inverse association. Depressive symptomology and dysfunctional beliefs about sleep had a positive relationship with insomnia severity; as they increased, severity increased.

A stepwise linear regression was then conducted to determined the predictive power of the level of health status, depression, dysfunctional beliefs

Table 1. Study Sample Characteristics

Age	All Sites	Site 1	Site 2	Site 3
Mean	45	45	44	45
Range	19–91	19–83	20–68	22–91
Sex (n = 236)				
Male	61 (26)	45 (28)	16 (29)	1 (6)
Female	175 (74)	118 (72)	40 (71)	16 (94)
Ethnicity (n = 160)				
African American	119 (74)	101 (73)	6 (60)	12 (71)
White	34 (21)	26 (20)	3 (30)	5 (29)
Asian	2 (1)	1 (1)	0 (0)	0 (0)
Hispanic	1 (0.5)	1 (1)	1 (10)	0 (0)
Other	4 (2.5)	4 (3)	0 (0)	0 (0)
Relationship status (n = 236)				
Married	84 (36)	56 (34)	19 (34)	9 (52)
Widowed	17 (7)	11 (7)	5 (9)	1 (6)
Never married	73 (31)	52 (32)	18 (32)	3 (18)
Divorced	62 (26)	44 (27)	14 (25)	4 (24)
Level of education (n = 235)				
Some high school	43 (18)	34 (21)	8 (14)	1 (6)
High school graduate	107 (46)	70 (43)	27 (48)	10 (58)
College graduate	40 (17)	26 (16)	10 (18)	4 (24)
Professional/graduate	45 (19)	32 (20)	11 (20)	2 (12)

Values provided as n (%).

about sleep, and self-efficacy on participant perceptions of their insomnia severity (Table 4). After the completion of the regression, the model providing the best predictive power of insomnia severity included both self-efficacy and level of depression ($R^2 = 0.306$). Reported level of self-efficacy with regard to sleep was the strongest predictor for the model. Neither dysfunctional beliefs ($R^2 = 0.003$) nor health status ($R^2 = 0.014$) approached significance for inclusion in the model.

Discussion

This study was conducted to identify psychosocial correlates of insomnia severity in primary care settings and to examine differences in findings by sociodemographic attributes. Demographic variables were not correlated with sleep severity. However, results did indicate that poor health status, higher depression scores, low self-efficacy, and higher dysfunctional beliefs about sleep all had significant individual associations with insomnia severity. Only low self-efficacy and depressive symptoms had significant net predictive relationships, as indicated by a stepwise linear regression. Poor health status was not a predictor of insomnia severity in the regression models but it did retain strong associations with low self-efficacy and depressive symptoms.

Table 2. Psychosoical Measure Means

	Total		Site 1		Site 2		Site 3	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
ISI	17	5.4	16	5.4	20	4.2	17	7.2
CES-D	22	11.2	22	11.2	23	11.6	24	9.8
SE-S	23	7.2	24	7.4	22	6.1	22	8.9
DBAS	0.50	0.15	0.51	0.16	0.50	0.14	0.52	0.14
SF-8	24	6.8	24	6.9	24	6.7	23	6.2

ISI, Insomnia Severity Index; CES-D, Center for Epidemiologic Studies Depression Scale; SE-S, Self-Efficacy for Sleep Scale; DBAS, Dysfunctional Beliefs about Sleep scale; SF-8, Medical Outcomes Study SF-8 global health status measure.

Table 3. Bivariate Correlations of Study Variables with Insomnia Severity

Variable	Correlation (r)
Relationship status	−0.03
Race	−0.023
Education	0.017
Gender	−0.065
Age	−0.034
SF-8*	0.36
CES-D*	0.39
SE-S*	−0.52
DBAS*	0.31

*$P < .01$.
CES-D, Center for Epidemiologic Studies Depression Scale; SE-S, Self-Efficacy for Sleep Scale; DBAS, Dysfunctional Beliefs about Sleep scale; SF-8, Medical Outcomes Study SF-8 global health status measure.

This study found a strong net relationship between insomnia severity and depression. This is in keeping with other reports.[34] In their seminal study of insomnia in primary care, Simon and VonKorff[17] reported that, compared with controls, insomnia patients were significantly more likely to suffer comorbid depression. More recently, Alattar et al[14] conducted a study using a practice-based research network reaffirming this relationship.

Simon and VonKorff[17] also reported that insomnia patients had greater impairment of health status. Other studies using the SF-36 health status measure, from which the SF-8 is derived, also have found insomnia related to impaired health status.[35] The relationship between insomnia and patient perceptions of impaired health status in this study, however, was indirect. Although health status lost significance in the stepwise linear regression, it was strongly and significantly related to depression ($r = 0.60$; $P < .001$), suggesting that depression accounts for the health status impairment. Together these findings reaffirm the importance of screening for depression in the evaluation of insomnia, especially as the severity of the insomnia complaint increases.

Table 4. Regression Analysis for Insomnia Severity

	R^2	F	Adjusted R^2	β
Model 1				
SE-S*	0.266	84.77	0.263	−0.516
Model 2				
SE-S	0.312	52.78	0.306	−0.427
CES-D*				0.232
Excluded from models				
DBAS			0.003	
SF-8			0.014	

*$P < .001$.
CES-D, Center for Epidemiologic Studies Depression Scale; SE-S, Self-Efficacy for Sleep Scale; DBAS, Dysfunctional Beliefs about Sleep Scale; SF-8, Medical Outcomes Study SF-8 global health status measure.

The other major finding of this study—the strong net relationship between low self-efficacy for sleep and insomnia severity—has not received attention in prior literature. Self-efficacy in general has received limited study in relation to insomnia. Higher self-efficacy is associated with successful hypnotic tapering.[36,37] Improved self-efficacy for sleep is noted as an outcome of behavioral sleep treatment trials.[31,38] Self-efficacy perceptions also predict response and adherence to behavioral treatment for insomnia.[39,40] To our knowledge, no study has related low self-efficacy for sleep to insomnia severity. This finding suggests that interventions aimed at improving self-efficacy for sleep can reduce insomnia severity and the resulting impairment of mood and well-being. This strategy could also increase patient capacity to apply evidence-based behavioral sleep techniques[41] and reduce long-term use of hypnotics, thereby reducing habituation and side effects.

Several other study variables did not relate to insomnia severity. Although age and female gender are consistently recognized as risk factors for insomnia, and other factors such as divorce, race, and socioeconomic status are recognized as risk factors in some studies,[8] these sociodemographic factors did not have a significant relationship with insomnia severity. These findings suggest that primary care approaches to severe insomnia need not vary by sociodemographic status.

In addition, dysfunctional beliefs about sleep did not emerge as a net predictor of insomnia severity. Together these findings suggest that insomnia is a multifaceted phenomenon in that factors that predict occurrence (sociodemographic factors) and perpetuation (dysfunctional beliefs) differ from those related to severity. This multidimensionality argues for a multidimensional treatment approach that addresses both the insomnia itself and the factors that underscore the degree of distress.

Several potential limitations need to be acknowledged in the discussion of these results. First, data were collected at 3 separate sites. Comparison of results by site reveals no observable differences but unrecognized biases may have impacted results. Second, biases resulting from a misunderstanding of survey items, and erroneous or falsified responses may have impacted results. Third, incomplete reporting of ethnicity may have obscured relationships between race and insomnia severity. Nonetheless, the study sample was predominantly female and African American, an attribute that may limit generalizability. On the other hand, this predominantly African-American sample advances understanding of a group at risk for greater insomnia severity and consequences.[42] Fourth, the $10 reimbursement for survey completion may have inflated ISI scores to allow participation. Fifth, the cross-sectional design reveals associations but not cause and effect between insomnia severity and hypothesized predictors. Sixth, despite the significant predictive power of self-efficacy and the level of depression on insomnia severity, it should be noted that these variables only accounted for 30% of insomnia severity variance. Other unmeasured variables also contribute. However, in research concerning psychosocial factors, predictive associations greater than $r > 0.50$ or $R^2 \geq 0.25$ still point to effect sizes that are clinically important.[33]

Further research with longitudinal assessment of predictor and outcome variables would delineate these relationships while confirming findings of this initial study. Future research might also include a broader range of predictors such as anxiety, a control group that does not suffer from insomnia, differentiation of primary versus comorbid insomnia (secondary to medical or psychiatric disorders),[1] and the exclusion of other sleep disorders causing daytime sleepiness.

From a clinical perspective, this study underscores the importance of the assessment and management of comorbid depression as part of an insomnia treatment plan. This conclusion reinforces findings of prior research. In addition, lower degrees of self-efficacy most strongly predicted insomnia severity in this study. This finding argues for insomnia interventions that facilitate self-efficacy for sleep-inducing behavioral change.

Conclusion

Self-efficacy, the belief in one's ability to perform a particular health-related behavior,[43] is a dynamic, modifiable attribute. Primary care clinicians can increase self-efficacy through current office counseling techniques such as motivational interviewing, which help patients experience success through the formulation of personalized, achievable goals.[44] In addition, enhancement of self-efficacy is key to self-care promotion,[45] a core concept in the chronic care model,[46] which underpins the patient-centered medical home.[47]

Self-efficacy enhancement interventions also embody other patient-centered medical home precepts, including whole-person orientation and team-based care through group visits.[48,49] Such interventions have been used to improve diabetes outcomes in family medicine.[50] They have not been examined as a means of increasing patient capacity for successfully undertaking behavioral sleep treatments such as stimulus control, sleep restriction, relaxation, or paradoxical intention.[51] It is noteworthy that prorated self-efficacy for sleep in this preliminary study was 5.2 on a scale of 0 to 10. This level was mid-range such that an intervention is likely to increase levels to a score of 7, the point at which an individual can achieve the desired behavior.[52] Moreover, given the correlation between low self-efficacy and depression, enhancing self-efficacy would probably ameliorate the latter. Self-efficacy enhancement in relation to insomnia therefore merits examination.

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