



# Sleep: An Important Consideration in Stress-Health Relationships



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## Abstract

The current study revealed that poor sleep quality, daytime sleepiness, and psychological stress are all significant predictors of illness symptoms. However, no significant association was found between illness symptoms and sleep quantity. A regression model using both sleep and stress as predictors accounted for 49% of the variance in ill-health.

## Introduction

Research has progressively revealed the deleterious effects of chronic partial sleep deprivation (sleep debt) on both cognitive functioning and physical health. An association between insufficient sleep duration and self-reported health/illness has been found (Steptoe, Peacey, & Wardle, 2006; Stranges et al., 2008). Moreover, research is revealing that psychological stress also has negative impacts, with both acute stress and chronic stress effecting physical health. Research has begun to investigate the relationship shared between sleep, stress, and health simultaneously. In a recent study, psychological stress, daytime sleepiness, and poor sleep quality, but not sleep quantity, were all negatively associated with health (Benham, 2009). The purpose of the current study was to replicate the findings regarding the relationship between a number of sleep-related measurements, psychological stress, and self-reported health/illness.

## Procedure

### Participants:

- 120 undergraduate students
  - mean age=22.7, SD=5.7
  - 53% female, 47% male

### Procedure:

- Participants were recruited on a voluntary basis and offered extra credit by their respective professors for participation
- Participants attended afternoon data collection sessions to anonymously complete a paper-and-pencil survey

## Measures:

### Stress

- Perceived Stress Scale [PSS]** (Cohen & Williamson, 1988)  
Measures perceived stress. 10-item Likert-type scale. "In the last week, how often have you..." and includes items such as "felt nervous and stressed?", "felt that you were unable to control the important things in your life?" Response choices range from (0) "Never" to (4) "Very Often", with a maximum possible score of 40 points.
- Inventory of College Students' Recent Life Experiences [ICSRLE]** (Kohn, Lafreniere, & Gurevich, 1990)  
Measures which stressors have been recently experienced (e.g. "financial conflicts with family members" or "finding courses uninteresting").

### Sleep

- Pittsburgh Sleep Quality Index [PSQI]** (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989)  
-Differentiates "poor" from "good" sleep by measuring seven areas: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the last month. The subject self-rates each of these seven areas of sleep based on the past month's sleep behaviors
- Epworth Sleepiness Scale [ESS]** (Johns, 1991)  
Measures daytime sleepiness. 8 items, self-ratings based on a four-point scale. Subjects indicate the likelihood of dozing in a variety of situations (e.g. "Watching TV").

### Health/Illness

- Cohen-Hoberman Inventory of Physical Symptoms (CHIPS)** (Cohen & Hoberman, 1983)  
33-item Likert-type scale that asks respondents to rate how much a particular symptom has bothered or distressed them during the last two weeks. Includes such items as "Back pain" and "Diarrhea". Responses range from (0) "Not been bothered by the problem" to (4) "The problem has been an extreme bother".

## Results

As predicted, poor sleep quality was positively correlated with both self-perceived stress (PSS;  $r(97)=.28, p=.002$ ) and stressful life events (ICSRLE;  $r(95)=.36, p<.001$ ). Illness symptoms were positively correlated with both stress measures (PSS  $r(118)=.49, p<.001$ ; ICSRLE  $r(118)=.51, p<.001$ ), poor sleep quality (PSQI  $r(98)=.53, p<.001$ ), and daytime sleepiness (ESS  $r(119)=.41, p<.001$ ), **but not sleep quantity** ( $r(119)=-.14, p>.05$ ). Controlling for participants' sex, a regression model using stress (PSS and ICSRLE) and sleep (PSQI and ESS) as predictors of illness symptoms (CHIPS) was significant  $F(5,88)=16.82, p<.001$ . The stress+sleep model accounted for 49% of the variance in health. All variables, except life events (ICSRLE), contributed significantly to the model.

## Correlations between sleep, stress, and health/illness measures

	PSQI	Hours of sleep per night	ESS	PSS	CLEI	CHIPS
PSQI	1	-0.356**	0.282**	0.284**	0.362**	0.532**
Hours of sleep per night		1	-0.151	0.008	-0.162*	-0.138
ESS			1	0.246**	0.325**	0.405**
PSS				1	0.641**	0.489**
CLEI					1	0.514**
CHIPS						1

## Coefficients

Model	Standardized Coefficients (Beta)	t-values	p-values
Sex	.385	4.001	.000
PSS	.232	2.343	.021
CLEI	.076	.762	.448
ESS	.195	2.418	.018
PSQI	.352	4.290	.000

## Conclusion

Our results support the notion that both sleep and stress may be important factors in physical health, but suggest that the actual number of hours one sleeps (sleep quantity) may not be as critical a factor as the quality of one's sleep or one's daytime sleepiness.