

The relationship between daytime sleepiness, psychological stress, and physical health

Background

Research has progressively revealed the deleterious effects of chronic partial sleep deprivation (sleep debt) on both cognitive functioning and physical health. The purpose of the current study was to examine the relationship between a number of sleep-related measures, psychological stress, and self-reported health/illness.

MEASURES:

Stress

Perceived Stress Scale (PSS) is a 10-item Likert-type scale that asks respondents “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) scale is a 49-item measure of the number and intensity of hassles experienced during the past month (e.g., “Financial conflicts with family members” or “finding courses uninteresting”).

Sleep

Pittsburg Sleep Quality Index (PSQI) 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) is an 8-item scale in which subjects indicate the likelihood of dozing in a variety of situations (e.g., “Watching TV”).

Health/illness

Cohen-Hoberman Inventory of Physical Symptoms (CHIPS) is a 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, and includes items such as “Back pain” and “Diarrhea”. Responses range from (0) “not been bothered by the problem” to (4) “the problem has been an extreme bother”. The scale will be modified to ask “during the last 7 days..”.

Pennebaker Inventory of Limbic Languidness (PILL) is a 54-item scale that assesses the frequency of occurrence of 54 common physical symptoms and sensations such as racing heart, heartburn, and sore throat. The response options range from “Never or almost never” to “More than once every week”. The final PILL score ranges from 0 to 54 and is calculated by summing up the total number of items on which individuals rate the symptom as occurring once or more per month.

Method

Two hundred and eighteen undergraduate students completed a packet of surveys that included measures related to stress, sleep, and health/illness.

Participants ranged in age from 18 to 48 (M=22.6, SD=5.18). Approximately three-fourths of the sample (74%) was female and the large majority (93%) of participants classified themselves as Hispanic.

Research sessions were conducted in groups of 10-15 participants, during which the surveys were completed individually and responses were collected anonymously.

Results & Discussion

Students slept an average of 6.4 (SD=1.3) hours and stress scores ranged from 1 to 35 on the PSS.

Our analyses revealed a significant negative correlation between **sleep quality** (“During the past month, how would you rate your sleep quality overall?”) and **health complaints** as assessed by both the CHIPS ($r(216) = -.523, p < .001$) and the PILL ($r(217) = -.403, p < .001$) and a significant, but smaller, correlation between **sleep quantity** (“On average, how much sleep do you get per night?”) and **health complaints** for both the CHIPS ($r(216) = -.255, p < .001$) and the PILL ($r(217) = -.220, p = .001$).

Daytime sleepiness (as assessed by the ESS) was positively correlated with both the CHIPS ($r(216) = .535, p < .001$) and the PILL ($r(217) = .498, p = .001$).

Although **self-perceived stress** was also associated with **health complaints** ($r(216) = .454, p < .001$; and $r(217) = .405, p = .001$ for CHIPS and PILL respectively), **partial correlations between sleep measures and health complaints still proved significant when controlling for stress**.

Additionally, a regression model that included stress (ICSRLE) and sleep quality as predictor variables **accounted for 41% of the variance in CHIPS scores**.

Our results support the notion that sleep debt may be an important factor 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. Additionally, a model that integrates both sleep quality and stress may be a better predictor of health than either variable alone.

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

	Hours sleep per night	Sleep quality	ESS	PSS	ICSRLE	CHIPS	PILL
Hours sleep per night	1	.421	-.232	-.003	-.054	-.255	-.220
Sleep quality		1	-.407	-.319	-.251	-.523	-.403
ESS			1	.407	.492	.535	.498
PSS				1	.634	.459	.404
ICSRLE					1	.534	.486
CHIPS						1	.781
PILL							1

Bolded blue values signify $p < .001$

