

Sleep quantity, not stress, is associated with SIgA levels in males

Background

Secretory IgA (SIgA) is the major class of immunoglobulins in mucosal secretions and is considered to be a major effector of host defense against microorganisms causing illnesses such as upper respiratory tract infections.

Increasingly, researchers have been examining the influence of sleep debt (chronic partial sleep deprivation) on health and there is emerging evidence that sleep debt has an impact on physical health.

The primary aim of the present study was to examine the extent to which baseline levels of SIgA are associated with self-perceived stress and self-reported sleep quantity.

Method

Two hundred and eighteen undergraduate students attended group sessions ranging in size from three to eighteen students. After a five minute quiet sitting period, each participant provided a three-minute timed saliva sample and then completed a packet of paper-and-pencil measures.

The measures included demographic and health behavior questions, measures of sleep quality (Pittsburgh Sleep Quality Index [PSQI]), daytime sleepiness (Epworth Sleepiness Scale [ESS]), health complaints (Pennebaker Inventory of Limbid Languidness [PILL] and the Cohen-Hoberman Inventory of Physical Symptoms [CHIPS]), a scale assessing self-perceived stress (the Perceived Stress Scale [PSS]) and a stress scale based on a listing of life-events [ICSRLE]).

Saliva samples from one hundred and twenty of the subjects (mean age 22.4 (4.7), 66% female, 89% Hispanic) were analyzed for SIgA. Outliers (+/- 2.5SD from mean) were excluded from the analysis).

Results

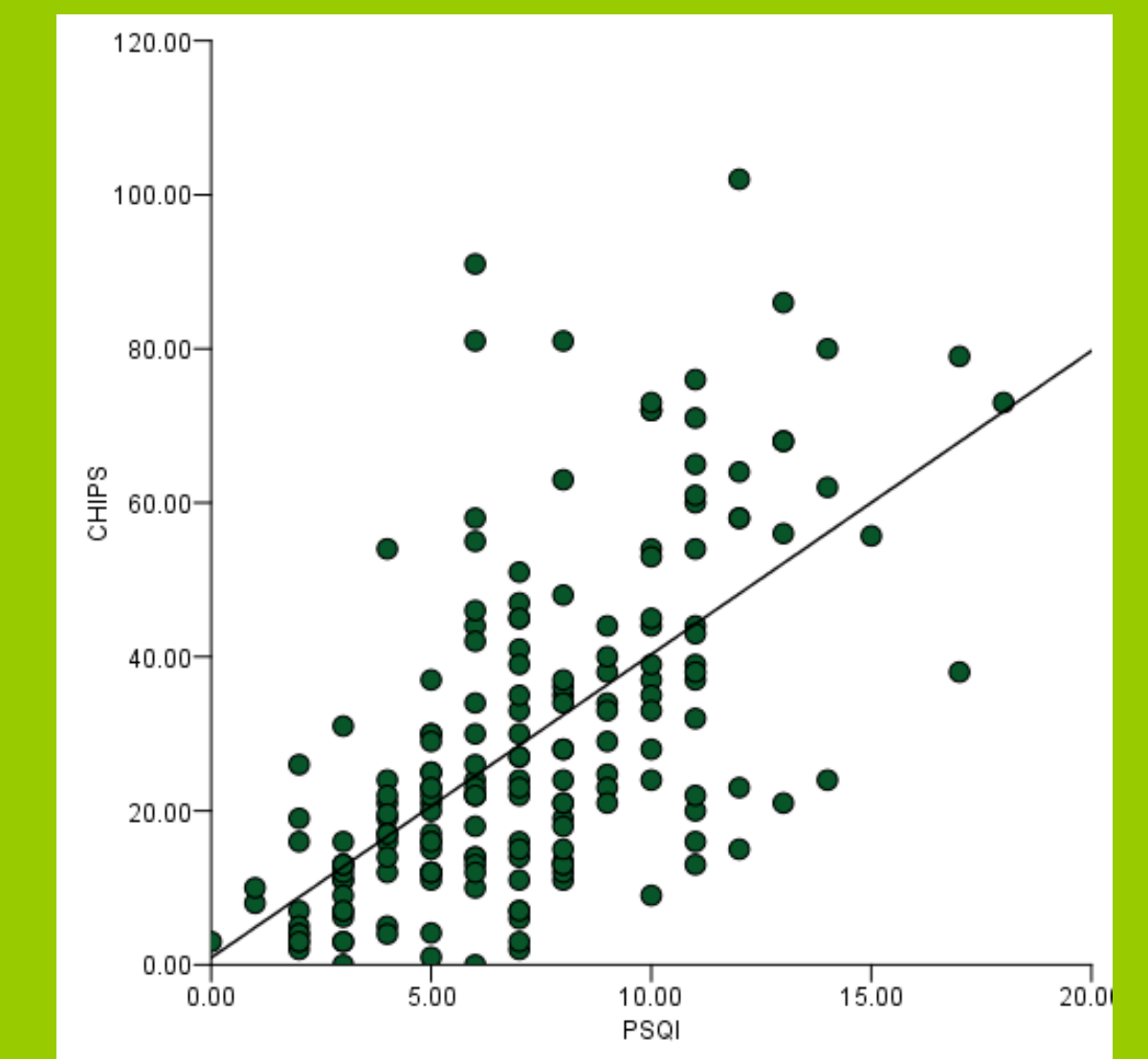
Correlations between sleep, stress, and health/illness measures.

	PSQI	ESS	PSS	ICSRLE	CHIPS	PILL
PSQI	1	-.389	-.318	-.381	-.636	-.517
ESS		1	.407	.492	.535	.498
PSS			1	.634	.459	.404
ICSRLE				1	.534	.486
CHIPS					1	.781
PILL						1

Spearman's rho
All correlations were $p < .001$

Self-Report:

Our analyses revealed a significant negative correlation between **sleep quality** (PSQI) and **health complaints** as assessed by both the CHIPS ($r(185) = -.636, p < .001$) and the PILL ($r(186) = -.517, p < .001$) and a significant correlation between **sleepiness** (ESS) and **health complaints** for 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** ($r(216) = .459, p < .001$; and $r(217) = .404, p = .001$ for CHIPS and PILL respectively), **partial correlations between sleep measures and health complaints still proved significant when controlling for stress**.

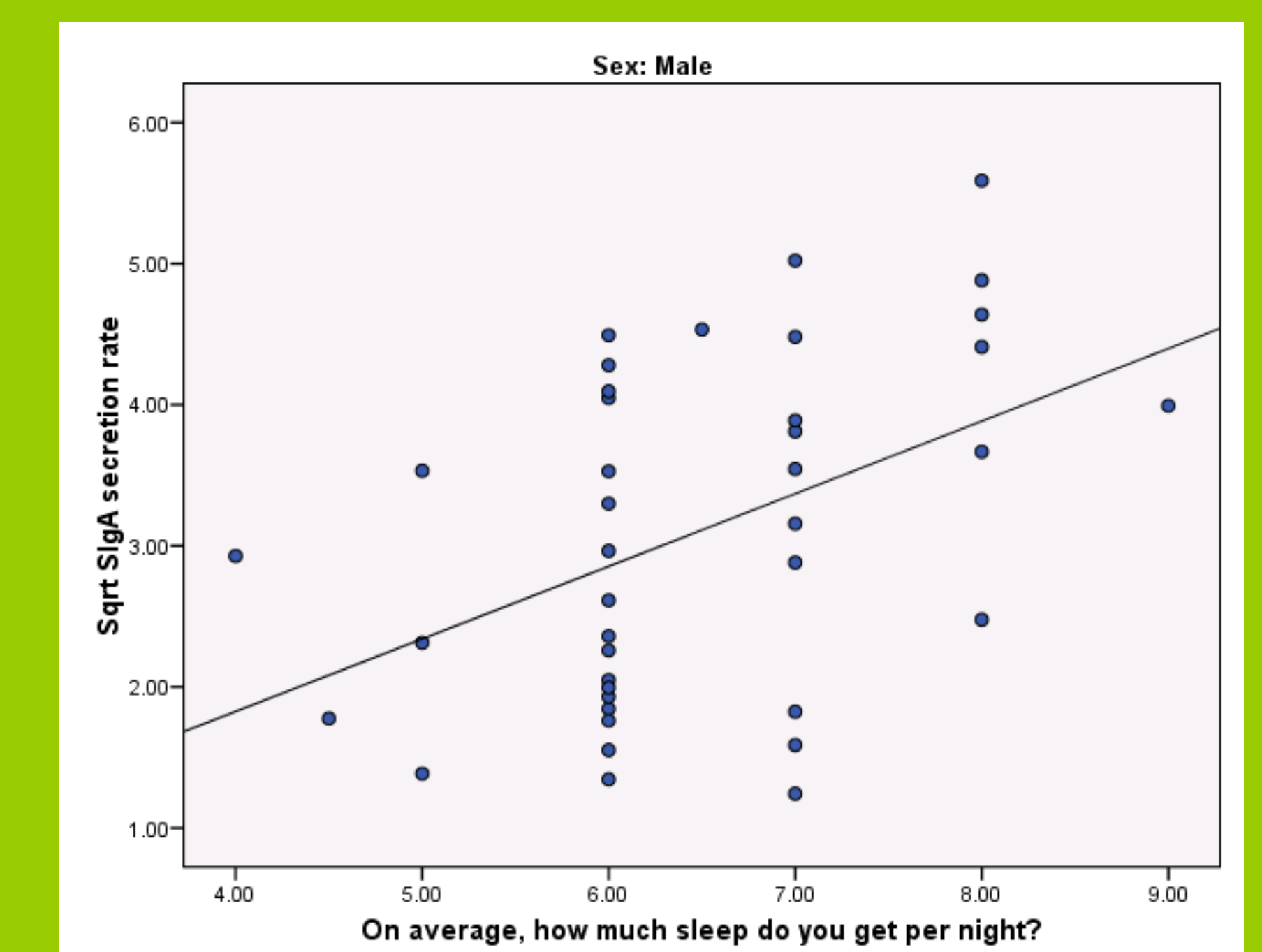
Additionally, a regression model that included both stress measures and both sleep measures as predictor variables **accounted for 39% of the variance in PILL scores and 54% of the variance in CHIPS scores**.

Secretory Immunoglobulin A (SIgA):

Results showed no association between sleep quality (PSQI) and SIgA secretion rate (square-root transformed) when males and females were combined ($r(107) = -.08, ns$), nor when males and females were examined independently ($r(35) = -.13, ns$ and $r(71) = -.03, ns$, respectively).

Sleep quantity ("On average, how many hours of sleep do you get per night?") was not associated with SIgA when males and females were combined ($r(122) = .09, ns$). **Sleep quantity was significantly associated with SIgA secretion rate for males ($r(40) = .45, p = .002$), but not for females ($r(80) = .01, ns$).**

Daytime sleepiness (ESS) was not associated with SIgA secretion rate when examined using males and females combined ($r(122) = -.09, ns$, nor for males and females separately ($r(40) = -.14, ns$ and $r(80) = -.09, ns$, respectively). Self-perceived stress (PSS) was not associated with SIgA secretion rate when examined using males and females combined ($r(122) = -.04, ns$, nor for males and females separately ($r(40) = .01, ns$ and $r(80) = .01, ns$, respectively). While self-perceived stress was correlated with both of the health scales (PILL and CHIPS), baseline SIgA levels were not correlated with either. However, a number of specific symptoms associated with upper respiratory tract infections (e.g., sore throat and strep throat) were correlated with SIgA for male subjects.



Discussion

Our results support the notion that sleep debt may be an important factor in physical health. Self-reported sleep measures were correlated with self-reported health measures and, for males, baseline SIgA secretion rate is positively correlated with sleep quantity. Additional research is needed to determine whether or not these findings are replicable and, if so, to elucidate why the disparity between males and females exists.