

THE ASSOCIATION BETWEEN BMI AND SLEEP DURATION IN FEMALE STUDENTS OF QASSIM UNIVERSITY

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ABSTRACT

There are some evidences that the state of weight could affect the quality as well as the duration of sleep. We designed a small study (size=50) to study the possible correlation between sleep hours and Body Mass Index (BMI) in female collegestudents in Qassim. Our results indicate a trend towards less sleeping hours with obesity, but found no significant difference between the parameter tested.

Key Words: BMI, Sleep Deprivation, Obesity and Female

INTRODUCTION

Sleep is the body's rest cycle when the senses and motor activity are relatively suspended. It is associated with a total or partial unconsciousness, and all voluntary muscles are inactive. Different studies have shown, although diverse, an effect of partial sleep deprivation on body weight management (Luxton et al., 2011; Jean-Louis et al., 2014). The intriguing relationship between partial sleep deprivation and excess adiposity makes partial sleep deprivation a factor of interest in body weight regulation, and it was concluded that lack of sleep could be a cause of weight gain (Wheaton et al., 2012, Watanabe et al., 2010). The BMI is a statistical measurement derived from body height and weight. Although it does not measure the percentage of body fatbit, it still can indicate the presence of obesity and many studies suggested a link between BMI and incidence of obesity (Gangwisch et al., 2005, Shlisky et al. 2012).

MATERIALS AND METHODS

The study carried out in Qassim University among female college students including (50 female, age 19-25), using cross-sectional study design to determine the association between sleep duration (in hours) and BMI in the female Saudi population. The sample was selected based on published statistical tables and we aimed at ± 0.5 degrees of accuracy for a population of 55. We send out 60 survey form, and we received 50. The questioners involved questions regarding Sleep duration and sleep pattern, how many hour you sleep per weeknight and per weekend (<5hr, 7 to 8hr, >9 hr), if the sleep was continuous through the night or interrupted by or the waking up periods. The results were analyzed using SPSS program, and by estimating chi-square and p-value were calculated to find out the association of BMI status to hours of sleep considering $p < 0.05$ as significant. Height and weight measurement were carried out using tapes and medical scales. The study was conducted during the period January to May 2014.

RESULTS

In this study sample (50), we found in the weeknight, the frequency of participants who sleep ≤ 5 hr is 72% and who sleep > 9 hr is 4%. We also found a negative association ($P = .981$) between sleep duration and BMI table (1). The percentage of participants who has ≤ 5 hr sleep in weeknight and classified as obese is (11.1%), overweight (30.6%), normal (52.8%) and underweight (5.6%), we concluded that there is a negative association between sleep hour per weeknight and BMI since p-value (> 0.05).

Table 1: Frequency of sleep hours on week night

sleep hour in the weeknight		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	equal or less than 5 hr	36	72.0	72.0	72.0
	7-9 hr	12	24.0	24.0	96.0
	more than 9 hr	2	4.0	4.0	100.0
	Total	50	100.0	100.0	

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We also found a negative association ($P = 0.453$) between sleep hour during weekend and BMI. The percentage of participant's who sleep ≤ 5 hr during the weekend and have obesity is (10%). Other group results are (50%) for overweight, (40%) for normal weight and zero % for participants with underweight. According to the calculated BMI value, 6% of this sample is underweight, 52% are normal weight, 30% are overweight and 12 % are obese (Table 3).

Table 2: Frequency sleep hours on the weekend

sleep hour in the weekend		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	equal or less than 5 hr	10	20.0	20.0	20.0
	7-9hr	19	38.0	38.0	58.0
	more than 9 hr	21	42.0	42.0	100.0
	Total	50	100.0	100.0	

Table 3: Measurement of BMI and state of weight

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	underweight	3	6.0	6.0	6.0
	normal	26	52.0	52.0	58.0
	overweight	15	30.0	30.0	88.0
	obese	6	12.0	12.0	100.0
	Total	50	100.0	100.0	

Table 4: Correlation of sleep hour in weeknight to body weight

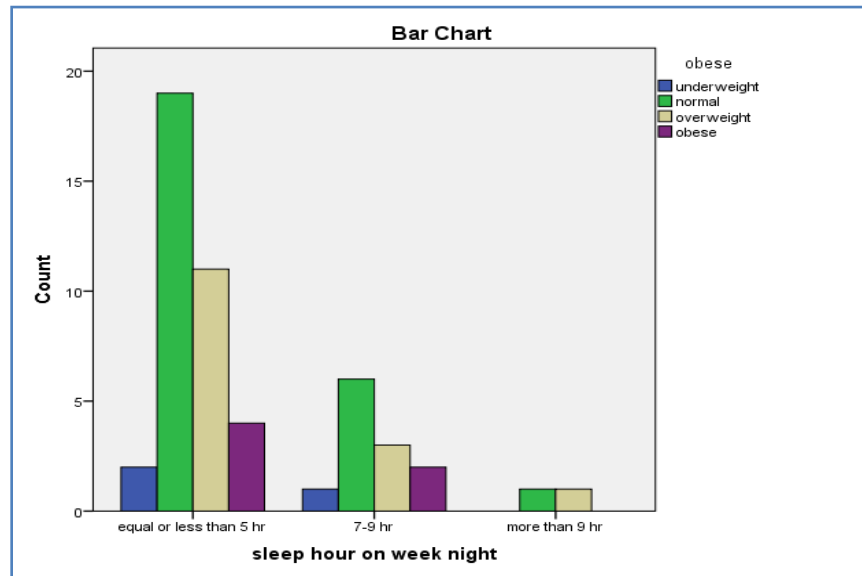
Crosstab			Obese				Total
			underweight	normal	overweight	Obese	
sleep hour on a weeknight	equal or less than 5 hr	Count	2	19	11	4	36
		% within sleep hour on week night	5.6%	52.8%	30.6%	11.1%	100.0%
		% within obese	66.7%	73.1%	73.3%	66.7%	72.0%
	7-9 hr	Count	1	6	3	2	12
		% within sleep hour on week night	8.3%	50.0%	25.0%	16.7%	100.0%
		% within obese	33.3%	23.1%	20.0%	33.3%	24.0%
	more than 9 hr	Count	0	1	1	0	2
		% within sleep hour on week night	0.0%	50.0%	50.0%	0.0%	100.0%
		% within obese	0.0%	3.8%	6.7%	0.0%	4.0%
Total	Count	3	26	15	6	50	
	% within sleep hour on week night	6.0%	52.0%	30.0%	12.0%	100.0%	
	% within obese	100.0%	100.0%	100.0%	100.0%	100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.108 ^a	6	.981

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.147	.981
N of Valid Cases		50	



DISCUSSION

We found a negative association between sleep duration and BMI. The participant with ≤ 5 hr sleep on weeknight and have obesity was (11.1%), overweight was (30.6%), normal was (52.8%) and underweight was (5.6%). There is a negative association between sleep hour per weeknight and calculated BMI in our sample; the P value is = 0.981. We set the significant value at $P (> 0.05)$ (Table 4).

We also found that Participant's sleep ≤ 5 hr during the weekend and have obesity was (10%), overweight was (50%), normal was (40%) and underweight was zero and P value = 0.453. The results show that there is a negative association between sleep hour during weekend and BMI. Our finding is not consistent with what has been reported in other studies showing a relationship between inadequate sleep (< 7 or > 8 hours) and obesity Body Mass (Ford et al., 2013 and Wheaton et al., 2008). However, our sample is very small in comparison and included only a female population.

CONCLUSION

The measurement of BMI could be a good tool to study the state of obesity. However, we are unable to detect any positive correlation between BMI and duration of sleep. As shown in the chart a trend toward more sleep hours in healthy participants sleep 7 to 9 hours could be seen but not significant. Our sample size was selected according to published in statistical table. However, studying sleep habits might require a larger population to show the exact pattern and correlation to BMI.

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