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Associations between sleep quality of college students and different measures of obesity: A cross-sectional study

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Objective The majority studies focused on obesity prevention on physical activity and eating behavior. However, epidemiological studies have shown that sleep duration and sleep quality could be an adjustable risk factor for obesity. The aim of this study was to examine the associations of sleep quality with different measurement of obesity in Chinese university students.

Methods A total of 481 college students aged 18-25 years volunteered to participate in this study. Sleep quality was assessed by Pittsburgh Sleep Quality Index (PSQI) questionnaire. International Physical Activity Questionnaire (IPAQ) was used to determine the physical activity, Psychological status was assessed by Self-Rating Depression Scale (SDS) and Self-Rating Anxiety Scale (SAS). Body height, weight and waist circumference are measured by a trained researcher. Body composition was evaluated by a bio-impedance device (InBody 230, South Korea). Independent sample t test was applied to compare the sleep characteristics, physical activity, obesity, depression and anxiety in different gender students. The associations among the dependent variables BMI, body fat percentage, and the independent variables age, sleep quality and sleep durations was examined using Multiple linear regression models. SPSS 22.0 (IMB SPSS Inc) was used for all statistical.

Results The BMI (22.9 ± 3.4 vs 21.6 ± 3.2 , $p < 0.001$) of male students were significantly higher than that of female, but the percentage of body fat (18.7 ± 6.9 vs 29.7 ± 7.0 , $p < 0.001$) was lower than that of female. We observed a positive association between sleep quality and body fat percentage ($\beta = 0.166$, $P = 0.037$), and a negative association with age ($\beta = -0.166$, $P = 0.008$) in female students. Sleep quality was associated positively with BMI ($\beta = 0.360$, $P < 0.001$), body fat percentage ($\beta = 0.260$, $P < 0.001$), and age ($\beta = 0.215$, $P < 0.001$) in male students; An inverse correlation between sleep duration and BMI ($\beta = -0.141$, $P = 0.015$), body fat percentage ($\beta = -0.134$, $P = 0.022$) was found, and a positive relationship with anxiety scores ($\beta = 0.331$, $P < 0.001$) in male students. while an inverse relationship was found with WHR ($\beta = -0.236$, $P = 0.001$), waist circumference ($\beta = -0.169$, $P = 0.007$), and a positive association between sleep duration with anxiety scores ($\beta = 0.331$, $P < 0.001$) and depression scores ($\beta = 0.415$, $P < 0.001$) in female students.

Conclusions The obesity of male and female students goes up with the increase of total score of sleep quality, anxiety and depression, and goes down with the increase of sleep duration, physical activity time and energy consumption. Male obesity increases with age, but female obesity decreases with age. Among the importance of males' sleep duration and sleep quality in the obesity risk assessment, BMI and body fat percentages are more accurate, while for females, BMI and waist circumference is of no statistical significance.