

ASSOCIATION BETWEEN SLEEP QUALITY, ACADEMIC STRESSORS, AND OBESITY AMONG UNIVERSITY STUDENTS IN THE WEST MIDLANDS, UK

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ABSTRACT

Objective: To assess the association between sleep quality, academic stressors, and obesity among university students.

Study Design: Cross-sectional quantitative study.

Place and Duration of Study: Universities in the West Midlands, United Kingdom, from June 2025 to December 2025.

Methodology: A total of 206 undergraduate and postgraduate students aged ≥ 18 years were recruited through convenience sampling. Data were collected using a structured self-administered online questionnaire assessing demographic characteristics, sleep quality, academic stressors, eating behaviour, and self-reported height and weight. Body mass index was calculated and classified according to World Health Organization criteria. Data were analysed using IBM SPSS Statistics version 29.

Results: Most participants were aged 18–29 years (152, 73.8%) and female (172, 83.5%). Among 165 participants with valid anthropometric data, 34 (20.6%) were overweight and 14 (8.5%) were obese. Poor overall sleep quality was reported by 34 (16.5%) participants, while 53 (25.7%) slept for less than six hours per night. High or very high academic stress was reported by 65 (31.6%) students. Participants with high or very high academic stress had significantly higher odds of poor sleep quality (OR=2.89, 95% CI: 1.34–6.20, $p=0.005$), sleep duration <6 hours (OR=3.14, 95% CI: 1.62–6.09, $p<0.001$), and moderate/significant stress-related sleep impairment (OR=3.70, 95% CI: 1.68–8.14, $p<0.001$).

Conclusion: Academic stress was significantly associated with poorer sleep quality and shorter sleep duration among university students, while obesity was not significantly associated with the measured sleep or academic stress variables.

KEYWORDS: Academic stress; Body mass index; Obesity; Sleep duration; Sleep quality; University students.

INTRODUCTION

Sleep, along with the other vital biological functions, is one whose deprivation is known to have profound effects on negatively affecting physical health, cognitive function, and emotional well-being¹. Although several metabolic impairments can be eliminated by high-quality sleep, it causes several adverse health effects that have been consistently reported, such as cardiovascular disease, diabetes mellitus, obesity, immune disorders, decreased life span, and poor academic performance due to weakened attention, memory, and efficient learning processes². Students at the University face a range of stressors, including academic, psychological, social and lifestyle that can impact on their health³. This can bring with it a lot of stress including the rigor of the coursework, exams, deadlines, financial responsibilities, a change in living environment, and greater personal responsibility when moving into the higher education environment. These can lead to increased academic stress and negative behavior patterns, such as poor sleep, irregular eating and drinking, less physical activity, and weight gain⁴. These factors often go hand-in-hand, so it is significant to understand how they relate to each other when trying to encourage student health and academic well-being. Sleep is a core aspect of physical and psychological well-being and is crucial for several important functions, such as memory consolidation, emotional control, metabolic regulation, and cognitive function⁵. Late-night study, exam schedules and a lack of consistency in daily routines, social activity and excessive screen time are all contributing to poor sleep quality or inadequate sleep among University students. Symptoms of poor sleep can include long sleep latency, a reduced total sleep time, multiple arousals during sleep, excessive sleepiness during the day or overall dissatisfaction with sleep. Sleep disturbance can lead to poor concentration and school performance, and can affect a person's appetite and glucose metabolism, which can also alter their energy balance⁶.

Another common worry among university students is academic stress. Psychological strain can arise from a variety of factors such as workload, exam preparations, deadlines to submit work, anxiety about academic achievement, lack of institutional support, language challenges and financial difficulties. While moderate

amounts of stress can be positive and can promote motivation and productivity, high and chronic stress can have a negative impact on physical and mental health⁷. Students who are having high academic stress can resort to unhealthy coping habits such as sleep deprivation, overeating, eating energy-dense foods, and sedentary behavior⁸. These behaviors can present a route for academic pressure to add to excess pounds. The youthfulness of obesity is a significant public health problem as weight acquisition in college can have lasting effects throughout adulthood, thereby raising the risk of developing cardiometabolic disease⁹. Various factors affect body weight, such as diet, exercise, genetic predisposition, psychological factors, and sleep. Poor sleep has been linked to hormonal and behavioral changes that can lead to increased hunger, food choice and decreased energy expenditure. Similarly, academic stress can lead to emotional eating and erratic eating habits which could raise the risks of overweight and obesity⁹. Poor sleep quality is a common complaint among students, with a study among university students in Turkey reporting that 36.3% of them had poor sleep quality, and another large multi-regional study involving over 17,000 Chinese university students reporting poor sleep quality in about 57.9% of the students. Academic stress is also widespread, and can lead to mental health issues as well as unhealthy habits and weight gain. A study of 27,343 Chinese college students found that about 23% experienced high academic stress and that higher levels of academic stress significantly increased the risk of overweight and obesity¹⁰. The excess body weight itself is an important concern among young adults, one multinational study revealed that among the 15,686 students at university in 22 countries, 22.0% were overweight or obese. Similar issues have been reported in Saudi Arabia, where a study of King Abdulaziz University students revealed that 24.0% were overweight and 12.7% were overweight, and more than half of the students had not slept for a long time¹¹. Sleep disturbances and obesity could be connected to changes in appetite control, meal timing, metabolism and energy balance, and academic stress could also stimulate emotional eating, unpredictable feeding, and decreased movement. In one prospective study of first year university students, the average weight gain was 1.8 ± 2.4 kg and a less regular sleep pattern was related to being overweight¹².

Objective

To determine the relationship between sleep quality, academic stressors, and obesity among university students and to identify sleep- and stress-related factors associated with obesity.

METHODOLOGY

A quantitative cross-sectional study was conducted at Universities in the West Midlands, United Kingdom, from June 2025 to December 2025, among undergraduate and postgraduate university students aged ≥ 18 years enrolled at higher education institutions in the West Midlands, United Kingdom. The data were obtained from a self-administered structured online questionnaire, in September and October. The following criteria were applied for inclusion: (1) age 18 years old or older, (2) understanding of English, and (3) willingness to provide electronic informed consent after being enrolled into an undergraduate or postgraduate programme. Students with a diagnosis of a sleep disorder or any serious medical or psychiatric condition that would likely independently impact stress, sleep, or body weight were excluded. A minimum sample size of 84 participants was calculated with a medium effect size of $r=0.30$, 80% statistical power, and using a 2-tailed α of 0.05. To enhance precision and enable a subgroup analysis a larger sample was recruited. Convenience sampling was conducted, and about 300 invitations were sent via university e-mail lists, student networks, and social media. There were 206 participants in total.

Data Collection

Demographic, sleep quality, academic stressors, lifestyle factors and anthropometric measurements were collected using a structured online questionnaire. Sleep-related items evaluated overall sleep quality, sleep latency, sleep duration, nighttime awakening, sleep disturbances and sleep medication use. Academic stressors included workload, examinations and testing, deadlines, lack of institutional support, financial problems, language barrier, and anxiety about academic performance. BMI was determined by self-reported weight and height as body mass index ($BMI = \text{weight (kg)}/\text{height (m)}^2$). BMI was classified according to WHO criteria as underweight ($<18.5 \text{ kg/m}^2$), normal weight ($18.5\text{--}24.9 \text{ kg/m}^2$), overweight ($25.0\text{--}29.9 \text{ kg/m}^2$), and obese ($\geq 30.0 \text{ kg/m}^2$). BMI analysis was only performed on those who had reliably interpretable height and weight. A questionnaire was pre-tested with 10-15 university students to check the clarity, readability, flow and time taken to complete the questionnaire. Pilot responses were not included in the analysis and minor wording changes were made prior to the main data collection.

Statistical Analysis

Analysis of data was done using IBM SPSS Statistics version 29. All categorical variables were summarized as frequency and percentages and all continuous variables were summarized as mean $\pm$ standard deviation. Chi-square and Fisher Exact tests were used for categorical variables, independent-samples t test for continuous variables, and Spearman correlation for ordinal variables. Odds ratios (and 95% confidence intervals when applicable) were computed. A p value <0.05 in both tailed was regarded as statistically significant.

RESULTS

A total of 206 university students were included in the study. Most participants were aged 18–29 years, accounting for 152 (73.8%) of the sample, while 37 (18.0%) were aged 30–39 years, 8 (3.9%) were aged 40–49 years, and 2 (1.0%) were aged 50–59 years. Females constituted the majority of participants, with 172 (83.5%),

compared with 27 (13.1%) males. Smoking was uncommon, as only 2 (1.0%) participants reported smoking, whereas 195 (94.7%) were non-smokers. Regarding sleep characteristics, 56 (27.2%) participants rated their sleep quality as very good and 106 (51.5%) as fairly good, while 25 (12.1%) reported fairly bad and 9 (4.4%) very bad sleep quality. Sleep latency was less than 30 minutes for 134 (65.1%) participants, whereas 63 (30.6%) required more than 30 minutes to fall asleep.

Table 1. Demographic Characteristics of University Students (N=206)

Variable	Category	n (%)
Age	18–29 years	152 (73.8)
	30–39 years	37 (18.0)
	40–49 years	8 (3.9)
	50–59 years	2 (1.0)
	Missing	7 (3.4)
Gender	Female	172 (83.5)
	Male	27 (13.1)
	Missing	7 (3.4)
Smoking status	Yes	2 (1.0)
	No	195 (94.7)
	Missing	9 (4.4)
Overall sleep quality	Very good	56 (27.2)
	Fairly good	106 (51.5)
	Fairly bad	25 (12.1)
	Very bad	9 (4.4)
	Missing	10 (4.9)
Sleep latency	<15 minutes	57 (27.7)
	15–30 minutes	77 (37.4)
	31–60 minutes	39 (18.9)
	>60 minutes	24 (11.7)
	Missing	9 (4.4)
Sleep duration	>7 hours	67 (32.5)
	6–7 hours	78 (37.9)
	5–6 hours	38 (18.4)
	<5 hours	15 (7.3)
	Missing	8 (3.9)
Night awakening	Not at all	54 (26.2)
	<1 time/week	44 (21.4)
	1–2 times/week	59 (28.6)
	≥3 times/week	41 (19.9)
	Missing	8 (3.9)
Pain-related sleep disturbance	Not at all	47 (22.8)
	<1 time/week	54 (26.2)
	1–2 times/week	63 (30.6)
	≥3 times/week	33 (16.0)
	Missing	9 (4.4)
Sleep medication use	Yes	23 (11.2)
	No	173 (84.0)
	Missing	10 (4.9)

Moderate academic stress was reported by 88 (42.7%) students, while 45 (21.8%) reported high stress and 20 (9.7%) very high stress. Increased workload was frequently or always stressful for 89 (43.2%) participants. Upcoming examinations were frequently or always stressful for 97 (47.1%), while tight deadlines affected 90 (43.7%) participants at the same frequency. Lack of university support was frequently or always stressful for 80 (38.9%) students.

Table 2. Academic Stress Level and Major Academic Stressors (N=206)

Variable	Category	n (%)
Overall academic stress	Very low	23 (11.2)
	Low	19 (9.2)
	Moderate	88 (42.7)
	High	45 (21.8)
	Very high	20 (9.7)
	Missing	11 (5.3)

Variable	Category	n (%)
Increased workload	Never	25 (12.1)
	Occasionally	82 (39.8)
	Frequently	61 (29.6)
	Always	28 (13.6)
	Missing	10 (4.9)
Upcoming examinations	Never	36 (17.5)
	Occasionally	63 (30.6)
	Frequently	44 (21.4)
	Always	53 (25.7)
	Missing	10 (4.9)
Tight deadlines	Never	39 (18.9)
	Occasionally	66 (32.0)
	Frequently	55 (26.7)
	Always	35 (17.0)
	Missing	11 (5.3)
Lack of university support	Never	55 (26.7)
	Occasionally	61 (29.6)
	Frequently	37 (18.0)
	Always	43 (20.9)
	Missing	10 (4.9)
Financial difficulties	Yes	119 (57.8)
	No	78 (37.9)
	Missing	9 (4.4)
Language barriers	Yes	73 (35.4)
	No	123 (59.7)
	Missing	10 (4.9)
Academic-performance anxiety	Never	24 (11.7)
	Occasionally	91 (44.2)
	Frequently	57 (27.7)
	Always	24 (11.7)
	Missing	10 (4.9)

Sleep was reported to be moderately affected by academic stress in 81 (39.3%) participants and significantly affected in 56 (27.2%). Overall, 137 (66.5%) students reported moderate or significant stress-related sleep impairment. In addition, 150 (72.8%) participants believed that better sleep could reduce academic stress. Academic stress was also perceived to contribute to overeating or unhealthy eating behavior in 129 (62.6%) participants.

Table 3. Perceived Effects of Academic Stress on Sleep and Eating Behavior (N=206)

Variable	Category	n (%)
Sleep affected by academic stress	Not at all	59 (28.6)
	Moderately	81 (39.3)
	Significantly	56 (27.2)
	Missing	10 (4.9)
Better sleep believed to reduce academic stress	Yes	150 (72.8)
	No	44 (21.4)
	Missing	12 (5.8)
Academic stress contributed to overeating/unhealthy eating	Yes	129 (62.6)
	No	66 (32.0)
	Missing	11 (5.3)

Poor overall sleep quality was reported by 18 of 65 (27.7%) students with high or very high stress compared with 15 of 128 (11.7%) students with lower stress levels. This difference was statistically significant ($\chi^2=7.76$, $p=0.005$), and high or very high stress was associated with 2.89 times greater odds of poor sleep quality (95% CI: 1.34–6.20). Similarly, sleep duration of less than six hours was reported by 27 of 65 (41.5%) highly stressed students compared with 24 of 130 (18.5%) students with lower stress, yielding a significant association ($\chi^2=11.95$, $p<0.001$; OR=3.14, 95% CI: 1.62–6.09).

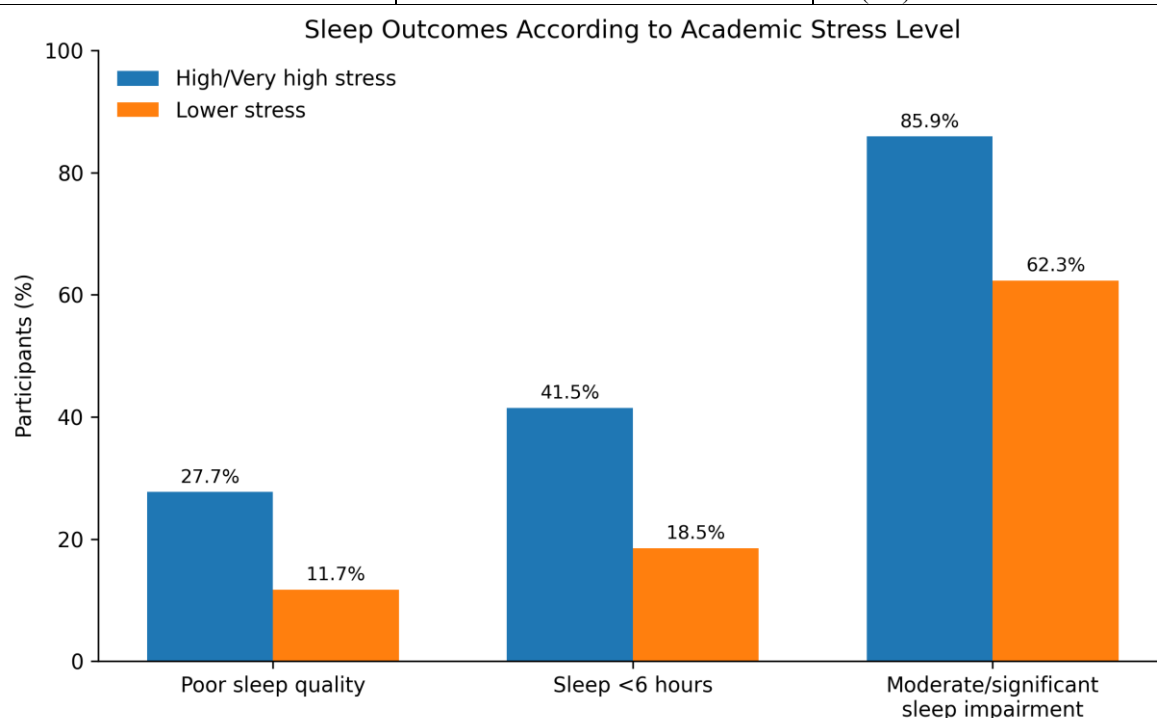
Table 4. Association Between Academic Stress and Sleep Outcomes

Outcome	High/Very High Stress n/N (%)	Lower Stress n/N (%)	Test Statistic	p-value	OR (95% CI)
Poor overall sleep quality	18/65 (27.7)	15/128 (11.7)	$\chi^2=7.76$	0.005	2.89 (1.34–6.20)
Sleep duration <6 hours	27/65 (41.5)	24/130 (18.5)	$\chi^2=11.95$	<0.001	3.14 (1.62–6.09)
Moderate/significant stress-related sleep impairment	55/64 (85.9)	81/130 (62.3)	$\chi^2=11.43$	<0.001	3.70 (1.68–8.14)

Poor overall sleep quality was reported by 18 of 65 (27.7%) students with high or very high stress compared with 15 of 128 (11.7%) students with lower stress levels. This difference was statistically significant ($\chi^2=7.76$, $p=0.005$), and high or very high stress was associated with 2.89 times greater odds of poor sleep quality (95% CI: 1.34–6.20). Similarly, sleep duration of less than six hours was reported by 27 of 65 (41.5%) highly stressed students compared with 24 of 130 (18.5%) students with lower stress, yielding a significant association ($\chi^2=11.95$, $p<0.001$; OR=3.14, 95% CI: 1.62–6.09).

Table 5. Anthropometric Status and Obesity Among Participants With Valid Height and Weight Data

Variable	Category	n (%) / Mean $\pm$ SD
Weight (kg), n=197		60.9 $\pm$ 15.4
Height (m), valid n=165		1.63 $\pm$ 0.09
BMI (kg/m ²), valid n=165		23.4 $\pm$ 5.4
BMI category, n=165	Underweight	25 (15.2)
	Normal weight	92 (55.8)
	Overweight	34 (20.6)
	Obese	14 (8.5)

*Figure 1. Sleep outcomes according to academic stress level.*

DISCUSSION

The present study investigated the relationship between sleep quality, academic stressors, and obesity among college students. The results indicated that while most students had fairly good or very good sleep quality, there was a significant portion whose sleep quality was compromised by extended sleep latency, decreased sleep time, frequent nighttime awakenings, and sleep medication use. Academic stress was also prevalent with almost one-third of the participants indicating high or very high academic stress. These results suggest sleep disturbances and academic stress are significant health issues among the university students. One important finding in the study was the important relationship between academic stress and negative sleep outcomes¹³. The odds for poor sleep quality and very low sleep duration (< 6 hours per night) were nearly three times higher, and more than three times higher, respectively, among students with high or very high academic stress compared with their

counterparts with low or very low academic stress. Likewise, there was a significantly higher risk of experiencing moderate and severe stress-related sleep problems, with highly stressed students being at a higher risk. The magnitude of the positive correlation between academic stress and sleep quality is another indicator of the close connection between academic stress and sleep disturbance¹⁴.

A pattern of academic stressors was also identified to gain insight into potential stressors of distress for students. The most common stressors were financial problems, looming examinations, deadlines, workload, and anxiety about academic performance. These pressures can also lead to sleep onset problems, poor sleep quality, and irregular sleep patterns. To note, over 2/3 of participants reported that academic stress had an impact on their sleep, which further supports the perception of academic demands on sleep health. One additional significant finding was that there was a high percentage of students who reported stress-related changes in eating behaviors¹⁵. Almost two-thirds reported overeating/ unhealthy eating due to academic stress, indicating stress a potential indirect way of affecting body weight via dietary behavior. In the present sample, however, although linked in behavior, no significant relationship between obesity and poor sleep quality, short sleep duration, high academic stress, financial stress or overeating due to stress were observed¹⁶⁻¹⁸. The study also showed that most of the respondents thought that with better sleep, they would be able to reduce academic stress. This discovery has real-world applications for university health promotion. Sleep hygiene, reducing examination-related stress, time management and the provision of readily available academic and psychological assistance and advice may enhance students' well-being. Financial stress, school workload and performance anxiety may also be helpful¹⁹. There are some restrictions to be taken into account. The cross-sectional design does not enable causal inferences and may restrict generalisability of the results to the broader university population because of convenience sampling. Sleep quality, stress, height, and weight were self-reported, and hence, there was a possibility of recall and reporting bias. Inconsistent height reporting reduced the number of participants available for BMI analysis and the low number of obesity cases did not allow obesity-related comparisons to be made with high statistical power. However, the findings from the study can be used as helpful evidence for the strong relationship between academic stress and sleep outcomes in university students.

CONCLUSION

The academic stress was found to be highly correlated with sleep quality and sleep duration in university students. Students who had high or very high academic stress more likely to report poor sleep quality, less than 6 hours of sleep, and more likely to experience greater sleep impairment due to academic stress. While overweight and obesity was found in the study population, there was no statistically significant relationship between obesity and sleep or academic stress measures. The results indicate the need to pay attention to academic stress and encourage healthy sleep in universities. Stress management, sleep hygiene, academic support and healthy lifestyle behavioral interventions can be used to enhance the wellbeing of university students.

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