



EXAMINING SLEEP PATTERNS AND OBESITY IN MEDICAL COLLEGE STUDENTS: A COMPREHENSIVE REVIEW"

Tazyeen Fatima^{1*}, Anjali Gupta², Anju Sharma³, Asha Gandhi⁴, Jay Prakash Singh Rajput⁵

¹*Ph.D. Scholar Physiology, SGT Medical College and Hospital, Budhera, Gurugram

²Tutor, Department of Physiology, Sarojini Naidu Medical College, Agra, Uttar Pradesh

³Ph.D. Scholar Physiology, SGT Medical College and Hospital, Budhera, Gurugram

⁴Professor Department of Physiology, SGT Medical College and Hospital, Gurugram

⁵Assistant Professor, MM College of Medical Science & Research, Sadopur, Ambala

***Correspondence Author:** Tazyeen Fatima

¹*Ph.D. Scholar Physiology, SGT Medical College and Hospital, Budhera, Gurugram,

E-mail: tazyeen.fatima2610@gmail.com

Abstract

Purpose of review: This review summarizes the most recent research, focused on studies involving college student that connects inadequate sleep length and quality to obesity.

Recent findings: Epidemiological research and published and unpublished health assessmentsurveys indicate that since 1980, the prevalence of obesity has doubled globally. One in ten adults in 2008 were fat, with women being more likely than males to be obese. A trend towardshorter sleep duration has mirrored the obesity epidemic. Another common problem is the lackof sleep, which is caused by poor sleep quality. Short sleep duration and poor sleep quality arebecoming risk factors for the onset of obesity, according to growing evidence from both laboratory and epidemiological studies.

Summary: A lack of sleep has been linked to metabolic and endocrine changes, including decreased glucose tolerance, decreased insulin sensitivity, increased evening cortisol concentrations, increased levels of ghrelin, decreased levels of leptin, and increased hunger andappetite. Sleep is a key regulator of neuroendocrine function and glucose metabolism. Recentepidemiological and laboratory data support earlier findings that a lack of sleep increases the risk of obesity.

Key words: leptin, ghrelin, sleep, sleep quality, obesity

INTRODUCTION:

Medical college students face unique challenges that can significantly impact their health and well-being. The demanding nature of their studies, long hours, irregular schedules, and high levels of stress can disrupt their sleep patterns and potentially contribute to the development of obesity. Understanding the relationship between sleep patterns and obesity in medical college students is of great significance for several reasons.

Firstly, sleep patterns have a profound impact on overall health and well-being. Adequate sleep is essential for cognitive function, emotional regulation, and physical health. Poor sleep quality or insufficient sleep duration can lead to impaired concentration, decreased academic performance, mood disturbances, and compromised immune function. By examining the sleep patterns of medical college students, we can better understand the potential consequences of sleep deprivation on their

health and academic success.

Secondly, obesity has become a significant public health concern, with rising prevalence rates worldwide. Medical college students are not immune to the obesity epidemic, and their unique lifestyle challenges may put them at increased risk. Sleep patterns have been found to influence weight regulation, with both insufficient sleep and poor sleep quality being associated with higher body mass index (BMI) and increased obesity risk. By studying the relationship between sleep patterns and obesity in medical college students, we can identify potential risk factors and develop targeted interventions to promote healthier lifestyle choices.

Additionally, medical college students serve as future healthcare professionals who will play a crucial role in patient care and health promotion. By addressing the impact of sleep patterns on obesity in this specific population, we can raise awareness among medical students and equip them with the knowledge to promote healthy sleep habits and weight management strategies not only for themselves but also for their future patients. It becomes even more imperative to prioritize the well-being of medical college students, as their own health can influence their ability to provide optimal care to others.

Sleep is a restorative process that plays an important role in the balance of psychological, emotional, and physical health. Increasing evidence suggests that not having enough sleep maybe associated with adverse health effects, such as obesity, type 2 diabetes, hypertension, and cardiovascular disease.¹⁻³

Reduced sleep duration and sleep quality are increasingly frequent in modern society and are likely linked to changes in the socio-economic environment and lifestyle.⁴ The percentage of adults who reported sleeping 6 hours or less increased by 5%–6% between 1985 and 2004.⁵ Most studies in college students indicate that they are chronically sleep-deprived with self-reported average sleep duration of around 7 hours per night⁶ versus the 9–10 hours usually recommended for adolescents.

Simultaneously, obesity has become a major public health epidemic worldwide. In the past three decades, obesity rates for adults have doubled, and rates for children have tripled.⁷ The increasing prevalence of obesity affects all industrialized countries. In 2008, 1.46 billion adults worldwide had a body mass index (BMI) of 25 kg/m² or greater, and, of these, 205 million men and 297 million women were obese (BMI > 30 kg/m²).⁸ The prevalence of obesity is not distributed equally across nations and socio-economic groups; for example, in France, national epidemiological data in 2012 showed that 32% of adults were overweight and 15% obese.⁹ Asian countries, in comparison with others countries such as USA, have lower but increasing rates of overweight and obesity.¹⁰ Economic development, industrialization, urbanization, decreased physical activity, and disturbed food habits may probably partly explain this increasing prevalence of obesity observed.

Furthermore, the combined estimated prevalence of overweight and obesity (BMI ≥ 25) for 2000 among adults was 68%. This increase in BMI has been observed across all ages, with overweight and obesity in children and adolescents reaching 31.8% in 2010.¹¹ Similarly elevated rates have been estimated among college students; with over one-third reporting BMI ≥ 25. Although it is well established that an imbalance between caloric intake and physical activity are key factors responsible for the current obesity problem¹², there is emerging evidence suggesting that other factors may be important contributors to the obesity problem. One of the factors in question is sleep. There is growing interest in studying the environmental and behavioral factors that may be contributing to the problem.¹³ Emerging evidence suggests an association between body weight and problems in sleeping patterns, particularly its duration and quality. Furthermore, research studies exploring the association between sleep and BMI among adolescents, suggest the relationship is complex. In many studies sleep duration and disturbances are combined to estimate sleep quality, making it difficult to evaluate their independent effects on BMI.¹⁴⁻¹⁶

Obesity is a multifactorial disease occurring as the result of complex interactions between genetic and environmental factors.¹⁷ The dramatic increase in obesity prevalence observed in the last decade seems to be largely attributable to environmental changes promoting the intake of energy-dense foods and/or the reduction in physical activity associated with the high number of sedentary jobs, available transportation systems, and increasing urbanization.¹⁷ Although poor diet and reduced physical activity both play a major role in the risk of weight gain and the obesity epidemic, other factors may also be involved.

Reduced sleep duration was proposed as a possible contributing factor 15 years ago.²³ In adults, short sleep is usually defined as reported sleep duration of 'less than 6 hours per regular (working or active) day' including night sleep, napping, and resting.²⁵ Epidemiological studies suggest that sleeping for less than 6 h is associated with increased morbidity in terms of development of obesity, type 2 diabetes, cardiovascular disease, and risk of accidents.²⁶

Causes of Obesity:

The main cause of obesity is an imbalance between calories consumed and calories expended, although in a small number of cases, genetics and diseases such as hypothyroidism, Cushing's disease, depression, and use of medications such as antidepressants and anticonvulsants are responsible for fat accumulation in the body.²⁷ The main treatment for obesity is dieting, augmented by physical exercise and supported by cognitive behavioral therapy. Calorie-restriction strategies are one of the most common dietary plans. Low-calorie diet refers to a diet with a total dietary calorie intake of 800-1500, while very low-calorie diet has less than 800 calories daily. These dietary regimes need to be balanced in macronutrients, vitamins, and minerals.²⁸ Fifty-five percent of the dietary calories should come from carbohydrates, 10% from proteins, and 30% from fats, of which 10% of total fat consist of saturated fats. After reaching the desired body weight, the amount of dietary calories consumed can be increased gradually to maintain a balance between calories consumed and calories expended. Regular physical exercise enhances the efficiency of diet through increase in the satiating efficiency of a fixed meal, and is useful for maintaining diet-induced weight loss.²⁹

Leptin and Ghrelin:

Leptin and ghrelin are two essential hormones in the maintenance of the body's energy balance. These two hormones have opposite effects on the body. Leptin induces a satiety and fullness, and ghrelin, hunger and appetite. Leptin is primarily released by adipose tissue into the bloodstream and send the brain signals regarding the energy state of the body. Leptin signals receptors at the hypothalamus, which affect hypothalamic neurons and various neuropeptides. Leptin is known to have anorexigenic (appetite suppressing) effects. Ghrelin, is released primarily by the stomach and signals the hypothalamus, which thereafter has orexigenic (appetite inducing) effects.³⁰ Because of the correlation found between sleep and weight gain, it is presumed that perhaps leptin and ghrelin, which are closely related to food intake and regulation, are affected by sleep restriction.

Sleep deprivation and Obesity:

Sleep deprivation occurs when an individual's biological sleep need is not met. In epidemiological studies, definitions vary, but sleep deprivation is typically considered obtaining less than 7 hours of sleep. There are numerous studies in the scientific literature that suggest that sleep deprivation has metabolic effects that predispose to weight gain. Currently, developed nations are facing an epidemic of obesity. For example, the prevalence of obesity in the USA increased from 22.9% in 1988-1994 to 37.7% in 2013-2014.³¹ By 2014, the rate of obesity had reached 35.0% among adult men and 40.4% among adult women. Also, data indicate that the adult population in the USA is getting less sleep,³² and a significant proportion receives less than the recommended 7 hours of sleep per night.³³ In 1998, 26% of people reported sleeping less than 8 hours, whereas in 2005, the proportion was 35%. In the National Health Interview survey of 110 442 civilian employed workers between 2004 and 2007, the weighted prevalence of self-reported short sleep duration, defined as ≤ 6 hours per day, was 29.9%.³⁴

The Correlation between sleep quality and Obesity Rates:

The decrease in sleep duration and increase in sleep complaints in modern society³⁵ raise concerns for a negative impact of chronic sleep disturbances on health in general, not only mental health.

Duration of sleep, the quality of sleep, and the frequency of sleep are topics for discussion when it comes to research into the world of sleep and its consequences on our bodies and health. Current statistics from the American Sleep Association indicate the 50-70 million individuals in the United States have a sleeping disorder. In present demographic data, 37% of 20-39 yearsold report short sleep duration, and 38% of adults have a BMI higher than 30kg/m² classifiedas obese. (ASA, 2018)

The relationship between sleep and obesity is likely mediated by multiple pathways. An upregulation of the activity of orexin neurons and changes in appetite-regulating hormones may affect food intake. It has been previously shown that ghrelin, a hormone promoting hunger, increases with sleep restriction, whereas leptin, a hormone contributing to satiety perception, decreases. More recently, Spiegel et al.³⁶ analyzed the 24 h ghrelin profile in relation to meal and sleep in 14 healthy young men and showed an inhibitory effect of sleep on ghrelin secretion.

During the last few decades, the worldwide prevalence of obesity has doubled since 1980. Thisobesity epidemic has been paralleled in modern society by a trend of reduced sleep duration.³⁷More evidences both from laboratory and epidemiological studies shows that short sleep duration is a new risk factor for the development of obesity and its complications. Sleep is an important modulator of neuroendocrine function and glucose metabolism and sleep loss has been shown to result in metabolic and endocrine alterations, including decreased glucose tolerance and alteration of appetite regulating hormone.³⁸

Sleep, like physical activities and diet, plays an important role in the growth, maturation, and health of children and adolescents by allowing for the diurnal rhythm of hormones related to growth, maturation, and energy homeostasis. Sleep is important in preventing obesity.³⁹ Goingto sleep early and waking up later, increasing sleep, may help prevent childhood obesity. Someresearch supported how long sleep duration made the risk of childhood obesity lower, while short sleep duration increased the risk of childhood obesity. Chen et al (2007) find that childrenwith shorter sleep duration had a 58% higher risk of being overweight, and children with shortest sleep duration had an even higher risk.³⁹ Using the meta-analysis, which supported gender difference in the association between sleep and obesity, boys had a harder time with sleep than girls. Another literature written by⁴⁰ Leproult et al (2010) also talked about how obesity can interfere with sleep for children and adults.

CONCLUSION:

An epidemic, obesity has a high cost to society, the economy, and health. It has significant negative effects on both health and healthcare costs. In addition to requiring treatment on its own, obesity increases the risk of developing numerous other health conditions, including osteoarthritis, gallstones, certain types of cancer, cardiovascular disease, hypertension, type 2 diabetes, stroke, and problems with female fertility.⁴¹

According to studies, if the obesity epidemic continues, 86.3 percent of American adults will be overweight or obese by 2030, with 51.1 percent obese. This could result in health-care costs ranging from \$860.7-956.9 billion.⁴² Obesity has many social costs for both adults and children. Obese people may face physical activity limitations, and there are stigmas associated with being severely overweight that may cause obese people to be treated differently in the workplace and social settings.⁴³ In light of the foregoing, if sleep deprivation plays a role in thegrowing obese population, intervention is required not only to treat obesity and its side effects, but also to counsel people on good sleeping habits. Starting with school-aged children, they must be educated on the importance of getting enough

sleep. Parents should try to help their children develop healthy sleeping habits. Adults should be cautious to try to maintain a regular sleep schedule when social and work obligations do not necessitate late bedtimes. Overall, the public needs to be made more aware that sleep deprivation has serious negative consequences.

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