

Original Research Article

Impact of COVID-19 Lockdown on Dietary habits, Lifestyle and Psychological Well-being Among Medical Students: A Cross-Sectional Study

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Abstract

Background: The COVID-19 pandemic lockdowns disrupted daily routines and lifestyle behaviors worldwide, with medical students representing a particularly vulnerable population. This study aimed to assess changes in physical activity, dietary habits, sedentary behavior, and psychological well-being among undergraduate medical students during lockdown. **Methods:** A cross-sectional online survey was conducted among 44 undergraduate medical students. Data were collected on anthropometric measurements, physical activity patterns (vigorous, moderate, walking), dietary behaviors (meal frequency, fast food consumption, late-night snacking, breakfast skipping, binge eating), screen time, sitting duration, and happiness scores using the Oxford Happiness Questionnaire. Statistical analysis included paired t-tests, chi-square tests, Pearson/Spearman correlations, and linear and logistic regression analyses. **Results:** Mean age was 19.5 ± 1.0 years (68.2% male). Significant mean weight gain of 2.2 kg was observed ($t(39)=4.56$, $p<0.001$). Median daily screen time was 7.0 hours (IQR: 5.0-10.0) and median sitting time was 7.0 hours (IQR: 5.0-10.0). Breakfast skipping was reported by 68.2% and binge eating by 54.5%. Sitting time showed moderate positive correlation with weight gain ($r=0.35$, $p=0.03$) and was a significant predictor in linear regression ($\beta=0.32$, $p=0.02$). Binge eating was associated with nearly three-fold higher odds of low happiness scores (OR=2.8, 95%CI: 1.1-7.2, $p=0.03$). **Conclusions:** Lockdown was associated with significant weight gain, increased sedentary behavior, and adverse dietary changes among medical students. The strong association between binge eating and lower happiness scores highlights the need for integrated interventions addressing both physical and mental health in this population.

Keywords: COVID-19, medical students, physical activity, sedentary behavior, binge eating, mental health

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic, declared by the World Health Organization in March 2020, prompted unprecedented public health measures including lockdowns, social distancing, and educational institution closures. Medical students, already recognized as a population with elevated prevalence of depression, anxiety, and psychological distress compared to the general population,¹ were particularly vulnerable to additional pandemic-related stressors.

Physical activity (PA)—defined as bodily movement performed by skeletal muscles requiring energy expenditure²—confers well-established health benefits. According to World Health Organization guidelines, adults should engage in 150-300 minutes of moderate-intensity aerobic PA or 75-150 minutes of vigorous-intensity PA weekly.³ Physical inactivity is associated with increased risk of cardiovascular disease, obesity, and metabolic disorders.⁴

Lockdown measures dramatically altered daily routines, with university students losing incidental physical activity from commuting and between-class movement.⁵ Simultaneously, the rapid shift to online learning increased screen time and sedentary behavior. International evidence demonstrates substantial lifestyle impacts on medical students during the pandemic, with approximately 80% classified as inactive, 42.4% experiencing weight gain, and 53.6% reporting negative psychological impacts.⁶ Longitudinal research from Germany showed reduced physical activity and increased screen time during the pandemic, with only partial improvement post-pandemic.⁷

Understanding the multifaceted impact of lockdown on medical students' lifestyle behaviors is essential for developing targeted interventions for future public health emergencies. The present study evaluated changes in physical activity, dietary habits, screen time, sitting duration, and

psychological well-being among undergraduate medical students during COVID-19 lockdown.

Research Methodology

Study Design and Participants: This cross-sectional, questionnaire-based study was conducted among undergraduate medical students during the COVID-19 lockdown period. Participants were recruited via online platforms including WhatsApp and other social media networks. All undergraduate medical students who voluntarily agreed to participate and could understand and complete the questionnaire were included. Students with incomplete responses or implausible data entries were excluded from specific analyses.

Data Collection Instrument: The self-administered online questionnaire collected:

Demographic variables: Age, gender

Anthropometric measurements: Pre-lockdown weight, current weight, height

Physical activity: Frequency and duration of vigorous activities, moderate activities, and walking (days/week and minutes/session), adapted from standard physical activity questionnaires

Sedentary behavior: Daily sitting time (hours)

Dietary habits: Meal frequency, fast food consumption, late-night snacking, breakfast skipping, binge eating, water intake, attention to nutrition facts

Psychological well-being: Oxford Happiness Questionnaire score

Body Mass Index (BMI) was calculated as weight (kg)/height (m)². Participants were classified according to WHO BMI categories: underweight (<18.5), normal weight (18.5-24.9), overweight (25-29.9), and obese (≥30). Binge eating was defined for participants as "frequently consuming

unusually large amounts of food in one sitting and feeling that eating behavior is out of control."

Data Cleaning and Preparation: Raw data were reviewed for inconsistencies and outliers. One entry with an implausibly high Oxford Happiness Score was excluded from happiness analyses. Physical activity and walking times were standardized to minutes. Sitting time was standardized to hours. Participants with missing height or weight data were excluded from BMI-specific calculations using list-wise deletion.

Statistical Analysis: Statistical analysis was performed using SPSS (version 26.0; IBM Corp., Armonk, NY). Significant level was set at $p < 0.05$ with 95% confidence intervals.

Descriptive statistics: Categorical variables were presented as frequencies (n) and percentages (%). Normality of continuous variables was assessed using Shapiro-Wilk test and visual inspection of histograms and Q-Q plots. Normally distributed data were reported as mean $\pm$ standard deviation (SD); non-normally distributed data as median with interquartile range (IQR).

Comparative analysis: Weight change was analyzed using paired t-test for within-subject comparisons before versus during lockdown.

Association analysis: Chi-square test was used for categorical variables (gender vs. late-night snacking). Independent samples t-test was used for gender comparisons of happiness scores.

Correlation analysis: Pearson correlation was applied for normally distributed continuous variables (sitting time vs. weight gain). Spearman's rank correlation was used for non-normally distributed data (screen time vs. happiness score).

Regression analysis: Multiple linear regression was performed with weight gain as dependent variable and sitting time, physical activity days, gender, and late-night snacking frequency as independent variables. Logistic regression was performed with happiness score dichotomized at the median (low happiness < 4.5 vs. high happiness ≥ 4.5) as dependent variable and screen time, binge eating frequency, breakfast skipping, and gender as independent variables, reporting adjusted odds ratios (OR) with 95% confidence intervals.

Results

Participant Characteristics: A total of 44 medical students participated. Table 1 presents demographic and baseline characteristics.

Characteristic	Category	n (%)	Mean $\pm$ SD / Median (IQR)
Age (years)			19.5 $\pm$ 1.0
Gender	Male	30 (68.2)	
	Female	14 (31.8)	
BMI Classification	Underweight	5 (11.4)	
	Normal weight	28 (63.6)	
	Overweight	7 (15.9)	
	Missing data	4 (9.1)	

Table 1. Demographic and Baseline Characteristics of Study Participants (N=44).
Abbreviations: SD, standard deviation; IQR, interquartile range; BMI, body mass index.

Mean age was 19.5±1.0 years. The majority were male (68.2%), with females comprising 31.8%. Based on BMI classification, 63.6% were normal weight, 15.9% overweight, and 11.4% underweight.

Lifestyle Parameters During Lockdown Table 2 summarises lifestyle behaviours during lockdown.

Variable	Median (IQR) or n (%)
Screen time (hours/day)	7.0 (5.0-10.0)
Sitting time (hours/day)	7.0 (5.0-10.0)
Vigorous physical activity (days/week)	2.0 (0.0-4.0)
Moderate physical activity (days/week)	3.0 (1.0-5.0)
Walking (days/week)	6.0 (5.0-7.0)
Eat 3+ meals (Always/Often)	27 (61.4)
Fast food consumption (Occasionally/Never)	35 (79.5)
Late night snacking (Sometimes/Often/Always)	27 (61.4)
Skip breakfast (Sometimes/Often/Always)	30 (68.2)
Binge eating (Sometimes/Often/Always)	24 (54.5)
Meet daily water intake (Always/Often)	18 (40.9)
Happiness score (out of 6)	4.5 (4.0-5.0)

Table 2. Lifestyle changes during lockdown. Abbreviation: IQR, interquartile range.

Median daily screen time was 7.0 hours (IQR: 5.0-10.0), and median daily sitting time was similarly 7.0 hours (IQR: 5.0-10.0). Physical activity levels were relatively low, with median vigorous activity of 2 days/week and moderate activity of 3 days/week. Walking was more frequent with median 6 days/week. Regarding dietary habits, 61.4% reported always or often eating three or more meals daily. Most (79.5%) consumed fast food occasionally or never. However, 61.4% reported late-night snacking, and 68.2% reported

skipping breakfast at least sometimes. Notably, 54.5% reported binge eating at least sometimes. Only 40.9% met recommended daily water intake always or often. Median Oxford Happiness Score was 4.5 (IQR: 4.0-5.0) out of 6.

Weight Change: Paired analysis of 40 participants with complete weight data revealed significant increase.

Time Point	Mean ± SD (kg)	Mean Difference	t-statistic	p-value
Pre-lockdown	60.1 ± 10.2	+2.2 kg	T (39)=4.56	<0.001
During lockdown	62.3 ± 11.8			

Table 3. Weight Change During Lockdown (n=400)

Mean weight increased significantly from 60.1±10.2 kg pre-lockdown to 62.3±11.8 kg during lockdown (p<0.001).

Association Analysis: Chi-square analysis revealed no significant association between

gender and late-night snacking ($\chi^2=2.10$, p=0.15), with similar proportions of males (63%) and females (57%) reporting late-night snacking. Independent samples t-test showed no significant difference in mean happiness scores between

males (4.3 ± 0.9) and females (4.7 ± 1.1) ($p=0.21$).

Correlation Analysis: Spearman's rank correlation

revealed weak negative correlation between daily screen time and happiness score ($r_s = -0.21$, $p=0.18$), not reaching statistical significance.

Pearson correlation demonstrated moderate positive correlation between daily sitting hours

and weight gain ($r=0.35$, $p=0.03$). Students with longer sitting times tended to gain more weight.

Regression Analysis: Linear regression: Predicting weight gain

Multiple linear regression was performed with weight gain as dependent variable and sitting time, physical activity days, gender, and late-night snacking frequency as independent variables (Table 4).

Variable	β Coefficient	p-value	95% CI
Sitting time	0.32	0.02	0.06 to 0.58
Physical activity days	-0.15	0.34	-0.42 to 0.12
Gender	0.08	0.67	-0.31 to 0.47
Late-night snacking	0.28	0.09	-0.04 to 0.60

Table 4. Linear Regression Model for Weight Gain ($n=40$). Abbreviation: CI, confidence interval.

The overall model was significant ($F(4,35)=3.89$, $p=0.01$, adjusted $R^2=0.23$). Sitting time emerged as the only significant independent predictor of weight gain ($\beta=0.32$, $p=0.02$), indicating that for each additional hour of daily sitting, weight increased by approximately 0.3 kg, controlling for other factors.

Logistic regression: Predicting low happiness:

Binary logistic regression was performed with happiness score dichotomized at median (low happiness <4.5 vs. high happiness ≥ 4.5). Independent variables included screen time, binge eating frequency, breakfast skipping, and gender (Table 5).

Variable	Odds Ratio	95% CI	p-value
Binge eating	2.8	1.1 to 7.2	0.03
Screen time	1.2	0.9 to 1.6	0.21
Breakfast skipping	1.4	0.6 to 3.2	0.45
Gender	0.7	0.2 to 2.1	0.51

Table 5. Logistic Regression Model for Low Happiness ($n=40$). Abbreviation: CI, confidence interval.

Binge eating was the only significant predictor of low happiness. Students reporting frequent binge eating were nearly three times more likely to have low happiness scores compared to those never binge eating (OR=2.8, 95%CI:1.1-7.2, $p=0.03$).

Discussion

This study investigated the lifestyle impacts of the COVID-19 lockdown among medical students, revealing significant weight gain, high sedentary behaviour, and associations between dietary patterns and psychological well-being. The mean weight gain of 2.2 kg aligns with international findings. Tahir et al reported that over half of

Pakistani medical students experienced weight gain during lockdown,⁸ while Alrushud et al found 42.4% of Saudi medical students gained weight.⁶ The consistency across populations underscores the global nature of pandemic-related lifestyle disruption. Weight gain likely results from multiple factors including reduced physical activity, increased sedentary time, and altered dietary patterns. Median daily screen time (7.0 hours) and sitting time (7.0 hours) reflect the dramatic shift to online learning and reduced movement opportunities. These findings parallel Liebig et al's documentation of increased screen time among German medical students during the pandemic.⁷ The significant positive correlation between sitting time and weight gain ($r=0.35$, $p=0.03$) provides

quantitative evidence linking sedentary behavior to adverse anthropometric changes. Furthermore, sitting time emerged as the sole significant predictor of weight gain in regression analysis ($\beta=0.32$, $p=0.02$), emphasizing that interventions targeting sedentary behavior may be particularly effective for preventing weight gain during restricted movement periods.

Physical activity levels were notably low, with median vigorous activity of 2 days/week and moderate activity of 3 days/week. These findings are comparable to Alrushud et al, reporting approximately 80% of Saudi medical students classified as inactive during lockdown.⁶ Closure of gyms, sports facilities, and outdoor exercise restrictions eliminated both intentional and incidental physical activity.⁵ Interestingly, walking frequency remained relatively high (median 6 days/week), suggesting students may have used walking as an accessible form of physical activity during lockdown, consistent with previous observations.⁸

Dietary habits revealed concerning patterns. Breakfast skipping was reported by 68.2% of students, and 54.5% reported binge eating. The high prevalence of binge eating is particularly noteworthy given its strong association with psychological well-being. Students reporting frequent binge eating were nearly three times more likely to have low happiness scores ($OR=2.8$, $p=0.03$). This finding extends Tahir et al's observation that 54.6% of students found physical activity reduced their anxiety,⁸ suggesting bidirectional relationships between psychological distress and unhealthy coping behaviors. Binge eating may represent a maladaptive coping mechanism for pandemic-related stress, anxiety, and isolation. The association remained significant after controlling for screen time and other factors, highlighting the independent contribution of eating behaviors to mental health outcomes.

The median Oxford Happiness Score of 4.5 out of 6 suggests moderate happiness levels in this sample, though direct pre-pandemic comparisons are limited by cross-sectional design. The lack of significant gender differences in happiness scores or late-night snacking patterns suggests both male and female medical students experienced similar psychological and behavioral impacts during lockdown.

Clinical and Public Health Implications

These findings have several important implications for lifestyle medicine practice. First,

the significant weight gain and high sedentary behavior underscore the need for interventions promoting physical activity even during restricted movement periods. Healthcare providers should counsel patients about home-based exercise options, breaking up prolonged sitting, and maintaining regular physical activity during public health emergencies. Second, the strong association between binge eating and low happiness scores highlights the importance of screening for maladaptive eating behaviors and addressing psychological distress in comprehensive lifestyle medicine assessments. Third, the high prevalence of breakfast skipping suggests opportunities for nutrition education emphasizing regular meal patterns for both physical and mental health.

Strengths and Limitations

Study strengths include comprehensive assessment of multiple lifestyle domains and application of appropriate statistical methods including regression analyses controlling for potential confounders. Several limitations must be acknowledged. The cross-sectional design precludes causal inferences. The relatively small sample size ($n=44$) limits generalizability and statistical power for detecting smaller effects. Reliance on self-reported data introduces potential recall and social desirability biases. The absence of pre-lockdown baseline data for many lifestyle parameters limits quantification of change magnitude. Future studies should employ longitudinal designs with objective measures and larger, more diverse samples.

Conclusion

The COVID-19 lockdown was associated with significant weight gain, increased sedentary behavior, and adverse dietary changes among medical students. The strong association between binge eating and lower happiness scores highlights the psychological impact of the pandemic and the need for integrated interventions addressing both physical and mental health. Medical institutions and healthcare providers should implement targeted programs promoting physical activity, healthy eating, and psychological well-being to support individuals during public health emergencies and beyond. Future research should investigate long-term persistence of these lifestyle changes and effectiveness of intervention strategies.

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