A Mixed Methods Analysis of Mental Health, Physical Activity, and Bioelectrical Impedance Body Composition Indicators Amongst College Aged Students In The Rio Grande Valley:

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BACKGROUND

Mental health concerns, including depression, anxiety, and stress, are increasingly prevalent among college students and have been associated with several physiological and behavioral health factors (Alimoradi et al., 2025; Wang et al., 2024). Higher levels of adiposity, including increased body mass index (BMI), body fat percentage, and visceral fat, have been linked to poorer psychological well-being, whereas greater skeletal muscle mass may be associated with more favorable health outcomes (Kyriazi et al., 2024; Dewi et al., 2021; McMahon, 2022). Additionally, lifestyle factors such as physical activity, sleep quality, diet quality, and hydration status have demonstrated significant relationships with mental health, with physically active individuals and those reporting better sleep and healthier lifestyle behaviors generally exhibiting lower levels of depression, anxiety, and stress (Abdullah et al., 2023; Alimoradi et al., 2025; Haghighatdoost et al., 2018; Wang et al., 2024). Despite these findings, limited research has examined the combined influence of body composition and lifestyle factors on mental health outcomes among college students. Therefore, this study investigated the relationships among body composition, physical activity, sleep quality, and mental health indicators in students attending the University of Texas Rio Grande Valley.

PURPOSE AND HYPOTHESIS

Purpose:
The purpose of this study was to investigate the relationships among body composition indicators, physical activity, sleep quality, and mental health outcomes in college-aged students at the University of Texas Rio Grande Valley. Specifically, this study examined whether body composition variables were associated with depression, anxiety, and stress; whether sleep quality and physical activity were related to mental health outcomes; and whether body composition indicators could significantly predict depression scores.

Hypotheses
H1: Lower BMI, body fat percentage, and visceral fat, as well as higher skeletal muscle mass, will be associated with lower levels of depression, anxiety, and stress.

H2: Higher levels of physical activity will be associated with lower levels of depression, anxiety, and stress.

H3: Better sleep quality will be associated with lower levels of depression, anxiety, and stress.

H4: Body composition indicators (BMI, body fat percentage, visceral fat, and skeletal muscle mass) will significantly predict depression scores among college students.

MATERIALS AND METHODS

Study Design & Participants: A cross-sectional study was conducted among undergraduate and graduate students at the University of Texas Rio Grande Valley (UTRGV). A total of 54 participants were recruited through departmental email distribution and recruitment flyers; one participant withdrew, resulting in a final sample of 53 college-aged students (18-40 years). Participants provided informed consent prior to participation.

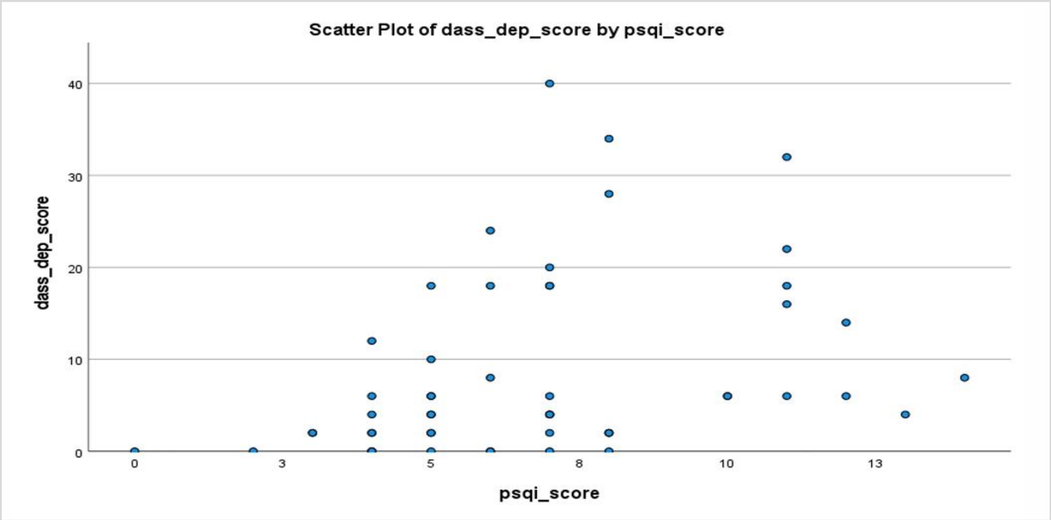
Instruments & Measures:

Body Composition & Anthropometrics
1. InBody 770 Bioelectrical Impedance Analyzer
   - BMI Percent Body Fat (%BF)
   - Skeletal Muscle Mass (SMM)
   - Visceral Fat
   - Total Body Water (TBW)
2. Stadiometer (height)
3. Measuring tape (waist and hip circumference)
4. OMRON Automated Blood Pressure Monitor (resting heart rate)

Lifestyle Measures
5. International Physical Activity Questionnaire (IPAQ-SF): Assessed physical activity and sedentary behavior over the previous 7 days.
6. Pittsburgh Sleep Quality Index (PSQI): Assessed sleep quality and sleep disturbances over the previous month.
7. Starting the Conversation (STC): Assessed overall dietary quality and eating behaviors.
8. Mental Health Measure Depression Anxiety Stress Scales-21 (DASS-21): Assessed symptoms of depression, anxiety, and stress.

Procedures: Participants attended a single testing session during which body composition, anthropometric measurements, resting heart rate, and self-reported questionnaires were completed. Physical activity, sleep quality, dietary habits, and mental health outcomes were assessed using validated survey instruments, while body composition was measured using the InBody 770 system.

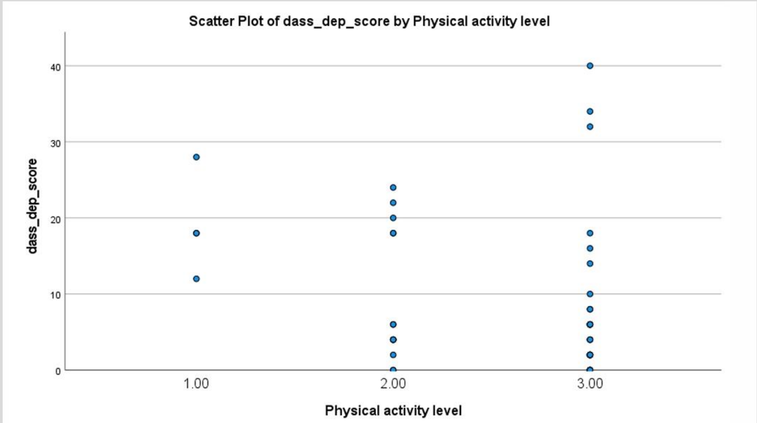
Statistical Analysis: Data were analyzed using IBM SPSS Statistics. Descriptive statistics, Pearson correlations, multiple linear regressions, and one-way ANOVAs were conducted to examine relationships among body composition, lifestyle, and mental health variables. Statistical significance was set at $p < .05$. Normality was assessed using the Shapiro-Wilk and Kolmogorov-Smirnov tests and supported by Q-Q plot inspection, which indicated acceptable distributions for parametric analyses.



RESULTS

Significant positive correlations were observed among depression, anxiety, and stress scores ($p < .001$). Poorer sleep quality was associated with higher depression ($r = .341$, $p = .013$), anxiety ($r = .301$, $p = .028$), and stress ($r = .374$, $p = .006$). Higher physical activity levels were associated with lower depression scores ($r = -.295$, $p = .032$). Although body composition variables were significantly related to one another, they were not significantly associated with depression, anxiety, or stress. Additionally, body composition measures did not significantly predict mental health outcomes in regression analyses.

Key Findings:
- Poor sleep quality was associated with higher depression, anxiety, and stress.
- Higher physical activity was associated with lower depression.
- Body composition variables were not significantly associated with mental health outcomes.
- Body composition measures did not significantly predict depression, anxiety, or stress.



CONCLUSIONS

Behavioral health factors demonstrated stronger associations with mental health outcomes than body composition measures. Poor sleep quality was consistently associated with elevated depression, anxiety, and stress symptoms, while greater physical activity was associated with lower depressive symptoms. These findings emphasize the importance of targeting sleep and physical activity in student health initiatives aimed at improving psychological well-being and reducing mental health burden among college populations..

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