

Independent associations of weekday and weekend sedentary behaviour with depression, anxiety, and stress among Nigerian undergraduates

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Abstract

Background

Sedentary behaviour has emerged as a potential risk factor for poor mental health among university students. However, little is known about whether sedentary behaviour accumulated during weekdays and weekends differs in its association with psychological distress among undergraduates. This study aimed to examine the independent associations of weekday and weekend sedentary behaviour with depression, anxiety, and stress among Nigerian undergraduates.

Methods

This cross-sectional study included 501 undergraduate students from a Nigerian university. Sedentary behaviour was assessed using the Sedentary Behaviour Questionnaire (SBQ), while depression, anxiety, and stress were assessed using the Depression Anxiety Stress Scale-21 (DASS-21). Data on sleep duration, moderate-to-vigorous physical activity (MVPA), and sociodemographic characteristics were also collected. Spearman's rank correlation and hierarchical multiple linear regression analyses were performed.

Results

The mean age of the participants was 20.2 ± 2.25 years, and 60.7% were female. Approximately 58.1%, 74.9%, and 42.5% of participants reported at least mild depressive symptoms, anxiety symptoms, and stress, respectively. Mean weekday and weekend sedentary behaviour durations were 4.52 ± 3.45 and 11.7 ± 7.36 hours/day. Spearman's correlation analysis showed that weekday, weekend, and total sedentary behaviour were positively correlated with depression, anxiety, and stress (all $p < 0.05$). After adjusting for sex, age, level of study, family monthly income, MVPA, and sleep duration, weekday sedentary behaviour was independently associated with depression ($\beta = 0.130$, $p = 0.004$) but not anxiety or stress. In contrast, weekend sedentary behaviour was independently associated with depression ($\beta = 0.167$, $p < 0.001$), anxiety ($\beta = 0.109$, $p = 0.018$), and stress ($\beta = 0.113$, $p = 0.015$).

Conclusion

Psychological distress and sedentary behaviour were highly prevalent among Nigerian undergraduates. Weekend sedentary behaviour emerged as the most consistent correlate of depression, anxiety, and stress, whereas weekday sedentary behaviour was independently associated only with depression. These findings suggest that reducing sedentary time, particularly during weekends, may contribute to improved mental health among university students. Longitudinal studies are warranted to establish causal relationships.

Introduction

Mental health problems among university students have become an important global public health concern, with increasing rates of depression, anxiety, and stress reported across diverse educational settings [1–3]. Recent evidence from the World Mental Health International College Student Initiative involving university students across multiple countries showed that approximately 35% of first-year university students met the criteria for at least one common mental disorder, with anxiety and depressive disorders being the most prevalent [4]. Similarly, meta-analyses and systematic reviews have reported that the global prevalence of depressive symptoms among university students ranges from 18.1% to 50%, with substantial proportions also experiencing anxiety and stress-related disorders [5, 6].

University life is often characterised by academic pressure, financial difficulties, lifestyle transitions, and psychosocial challenges that may adversely affect psychological well-being [7]. These mental health conditions have been associated with impaired academic performance, reduced quality of life, substance abuse, and increased risk of suicidal behaviours among students [8–10].

Sedentary behaviour (SB) has emerged as an important behavioural risk factor associated with adverse physical and mental health outcomes [11]. Sedentary behaviour refers to any waking activity characterised by an energy expenditure of ≤ 1.5 metabolic equivalents while in a sitting, reclining, or lying posture [11]. Among university students, prolonged sedentary time is increasingly common due to extensive academic activities, screen-based learning, social media use, and entertainment-related screen exposure. Empirical evidence indicates that university students spend a substantial proportion of their waking hours in SB, with average daily sedentary time often exceeding 7 hours [12]. A multinational study involving university students from 24 low- and middle-income countries reported a high prevalence of SB, with many students spending at least 8 hours daily in sedentary activities [13].

Similarly, evidence from university populations has shown that screen-based sedentary activities, including prolonged smartphone use, television viewing, and computer-related academic work, have increased considerably in recent years, particularly following the expansion of digital learning environments [12, 14]. These patterns raise concerns because prolonged SB has been associated with adverse physical and psychological health outcomes among young adults, including obesity, cardiovascular disease, metabolic disorders, poor sleep quality, and psychological distress [15, 16]. Importantly, SB is now recognised as a construct distinct from physical inactivity, as individuals may achieve recommended levels of moderate-to-vigorous physical activity (MVPA) while still engaging in prolonged SB [11, 17].

Emerging evidence indicates that SB may independently contribute to depression, anxiety, and stress through several behavioural and biological mechanisms [18, 19]. Prolonged sitting and excessive screen exposure may reduce opportunities for social interaction, increase social isolation, disrupt sleep patterns, and contribute to poor emotional regulation [20, 21]. Sedentary behaviour has also been associated with inflammatory processes, altered neuroendocrine responses, and reduced psychological well-being [15, 22]. Furthermore, excessive sedentary time may displace engagement in health-promoting behaviours such as physical activity and recreational participation, thereby worsening mental health outcomes [17].

Recent studies have suggested that SB patterns may differ between weekdays and weekends, with potentially different implications for mental health [23–25]. Weekday SB among university students is often driven by academic-related activities such as lectures, studying, and computer use, whereas weekend SB is more likely to involve recreational and screen-based activities [13]. These behavioural differences may influence the nature and extent of associations with depression, anxiety, and stress. However, evidence examining the independent associations of weekday and weekend SB with specific mental health outcomes remains limited and inconsistent, particularly among university students [26].

Sleep duration is another important behavioural factor closely related to both SB and mental health. Inadequate sleep has been associated with depression, anxiety, stress, cognitive dysfunction, and reduced emotional resilience among university students [27, 28]. Sedentary behaviour may adversely affect sleep duration and quality through prolonged screen exposure, disrupted circadian rhythms, and reduced daytime physical activity [29]. Consequently, sleep duration may influence the relationship between SB and mental health outcomes and should be considered when examining these associations. Similarly, MVPA may influence these relationships, as physically active individuals may experience protective mental health benefits despite prolonged sedentary time [19]. Therefore, examining the independent associations of SB with mental health outcomes requires adjustment for both sleep duration and MVPA.

Although several studies have explored the relationship between SB and mental health among university students, most evidence originates from high-income countries, with limited data available from sub-Saharan Africa [13, 30]. Nigerian undergraduates may experience unique academic, economic, infrastructural, and psychosocial challenges that may influence SB patterns and mental health outcomes differently from students in other settings. These challenges include financial hardship, unstable academic calendars, unemployment concerns, inadequate learning facilities, overcrowded classrooms, poor electricity supply, and increasing academic competition, all of which may contribute to psychological distress and unhealthy lifestyle behaviours among students [31–35].

Meanwhile, studies among Nigerian university students have reported high prevalences of depression, anxiety, stress, poor sleep quality, and sedentary lifestyles, suggesting an important but underexplored interaction between behavioural and mental health factors within this population [31, 36–39]. Furthermore, few studies have simultaneously examined weekday and weekend SB in relation to depression, anxiety, and stress while accounting for sleep duration, MVPA, and sociodemographic characteristics. Therefore, this study aimed to examine the independent associations of weekday and weekend SB with depression, anxiety, and stress among Nigerian undergraduates after adjusting for sleep duration, MVPA, and selected sociodemographic characteristics.

Methodology

Study Design

This study employed a cross-sectional design to examine the independent associations of weekday and weekend SB with depression, anxiety, and stress among Nigerian undergraduates.

Study Setting and Participants

The study was conducted among undergraduate students of Redeemer's University, Nigeria. Undergraduate students aged 16 years and above who were enrolled in full-time academic programmes during the study period were eligible to participate. First-year undergraduate

students were excluded because they were considered newly admitted and might not yet have fully adapted to the academic and lifestyle demands of the university environment. Students with self-reported neurological disorders, psychiatric disorders under active treatment, or physical disabilities limiting mobility were excluded from the study.

Sample Size and Sampling Technique

A total of 501 undergraduate students participated in the study. Participants were recruited using a multistage sampling technique to enhance the representativeness of the study sample. Faculties were first selected from the university through simple random sampling. Subsequently, departments and levels of study within the selected faculties were randomly selected. Eligible students who consented to participate were recruited in proportion to the numbers in the selected classes.

Ethical Considerations

Ethical approval

for the study was obtained from the Health Research Ethics Committee of Redeemer's University (Approval Number: RUN/REC/2026/212). Permission to conduct the study was obtained from the university authorities. All participants provided written informed consent before participation. Confidentiality and anonymity of participants were maintained throughout the study.

Data Collection Procedure

A total of 540 questionnaires were distributed to eligible undergraduates. Of these, 515 were returned (response rate: 95.4%). Fourteen questionnaires with substantial incomplete data were excluded. Consequently, data from 501 participants were included in the final analysis. Data collection was conducted between February 2026 and April 2026. Participants completed a self-administered questionnaire consisting of socio-demographic information and standardised instruments assessing SB, physical activity, sleep duration, and psychological distress.

Measures

Socio-demographic Characteristics

Information obtained included age, sex, family monthly income, and level of study. Participants reported their family's monthly income in Nigerian Naira (₦). Family monthly income was categorised based on the Nigerian minimum wage structure into low income (<₦70,000), moderate income (₦70,000 to <₦140,000), and high income (≥₦140,000).

Sedentary Behaviour

Sedentary behaviour was assessed using the Sedentary Behaviour Questionnaire (SBQ). The SBQ evaluates time spent in common sedentary activities such as watching television, using a computer, reading, and sitting during transportation [40]. Participants reported average sedentary time for weekdays and weekends in hours per day. Total SB time was computed as a weighted average using weekday and weekend sedentary time values. The SBQ has demonstrated acceptable reliability and validity in adult populations [40].

Depression, Anxiety, and Stress

Depression, anxiety, and stress were assessed using the Depression Anxiety Stress Scale-21 (DASS-21). The DASS-21 consists of 21 items divided into three subscales assessing depressive symptoms, anxiety symptoms, and stress symptoms [41]. Each item is scored on a 4-point Likert scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much or most of the time"). Scores for each subscale were summed and multiplied by two according to standard scoring guidelines, with higher scores indicating greater psychological distress.

Depression scores were categorised as normal (0–9), mild (10–13), moderate (14–20), severe (21–27), and extremely severe (≥ 28). Anxiety scores were categorised as normal (0–7), mild (8–9), moderate (10–14), severe (15–19), and extremely severe (≥ 20), while stress scores were categorised as normal (0–14), mild (15–18), moderate (19–25), severe (26–33), and extremely severe (≥ 34) [41]. The

DASS-21 has demonstrated good psychometric properties among Nigerian university students [42]. The Cronbach's α coefficient for the DASS-21 in the present study was 0.872.

Sleep Duration

Participants reported their average nightly sleep duration in hours per night. Sleep duration was treated as a continuous variable in the primary analyses. For descriptive purposes, sleep duration was also categorised based on recommended sleep guidelines for young adults as short sleep duration (< 7 hours/night), normal sleep duration (7–9 hours/night), and long sleep duration (> 9 hours/night) [43].

Moderate-to-Vigorous Physical Activity (MVPA)

Moderate-to-vigorous physical activity (MVPA) was assessed using a modified version of the self-report Patient-Centred Assessment and Counselling for Exercise Plus Nutrition (PACE+) questionnaire [44, 45]. Participants reported the number of days during the previous week on which they engaged in moderate-to-vigorous physical activities such as brisk walking, cycling, gardening, jogging or running, or other recreational activities. Based on the PACE+ scoring guidelines, participants were categorised into low physical activity (0–2 days/week), moderate physical activity (3–4 days/week), and high physical activity (≥ 5 days/week). PACE+ has demonstrated acceptable validity and reliability among youth populations [46]. In the present study, the modified PACE+ questionnaire demonstrated good internal consistency, with a Cronbach's α coefficient of 0.821.

Statistical Analysis

Data were analysed using IBM SPSS Statistics version 23 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including mean, standard deviation, frequency, and percentage, were used to summarise participant characteristics and study variables. Data normality was assessed using the Shapiro–Wilk test. Because some variables were not normally distributed, Spearman's rank correlation analysis was used to examine bivariate associations among SB variables, psychological distress outcomes, sleep duration, MVPA level, age, and sex.

Hierarchical multiple linear regression analyses were conducted to examine the independent associations of sedentary behaviour with depression, anxiety, and stress. Separate regression models were constructed for each psychological outcome. In Model 1, socio-demographic variables (sex, age, level of study, and family monthly income) were entered. In Model 2, behavioural covariates (MVPA level and sleep duration) were added. In Model 3, SB was entered as the primary independent variable. Separate hierarchical regression models were performed using weekday SB, weekend SB, and total SB as the primary exposure variables. The assumptions of linear regression were assessed through examination of residual plots and tests of multicollinearity. Multicollinearity was assessed using the variance inflation factor (VIF) and tolerance statistics. Statistical significance was set at $p < 0.05$.

Results

General Characteristics of the Participants

The general characteristics of the participants are presented in Table 1. A total of 501 undergraduate students participated in this study. The mean age of the participants was 20.2 ± 2.25 years. Female students constituted the majority of the participants (60.7%), while males accounted for 39.3%. Participants were distributed across different levels of study, with 200-level students representing the highest proportion (28.3%), followed by 300-level (26.9%), 400-level (23.6%), and 500-level students (21.2%). Most participants reported high family monthly income levels (93.8%), while 4.2% and 2.0% reported moderate- and low-income levels, respectively. Regarding moderate-to-vigorous physical activity (MVPA), 45.7% of the participants had low MVPA levels, whereas 32.5% and 21.8% demonstrated moderate and high MVPA levels, respectively.

The mean sleep duration of the participants was 6.22 ± 1.65 hours per night. A majority of the participants (62.1%) reported short sleep duration (<7 hours/night), while 35.1% had normal sleep duration and only 2.8% reported long sleep duration (>9 hours/night). The mean weekday SB duration was 4.52 ± 3.45 hours/day, while weekend SB duration was substantially higher at 11.7 ± 7.36 hours/day. The mean total weekly SB duration was 6.57 ± 4.21 hours/day. The mean depression, anxiety, and stress scores were 13.4 ± 10.5 , 14.2 ± 9.56 , and 14.8 ± 9.63 , respectively. Based on DASS categorisation, 58.1% of the participants reported at least mild depressive symptoms, while 74.9% demonstrated at least mild anxiety symptoms. Similarly, 42.5% of the participants reported at least mild stress symptoms. Moderate-to-extremely severe anxiety levels constituted the largest proportion of psychological distress among the participants.

Correlations Among Sedentary Behaviour, Psychological Distress, Sleep Duration, MVPA, Sex, and Age

Table 2 presents the correlations among SB, psychological distress outcomes, sleep duration, MVPA level, sex, and age. Significant positive correlations were observed among the SB variables. Weekday SB was strongly correlated with weekend SB ($r = 0.65$, $p < 0.001$)

and total SB ($r = 0.91, p < 0.001$), while weekend SB was also strongly correlated with total SB ($r = 0.89, p < 0.001$). Weekday, weekend, and total SB were all positively correlated with depression ($r = 0.18\text{--}0.21, p < 0.001$), anxiety ($r = 0.12\text{--}0.13, p \leq 0.010$), and stress ($r = 0.10\text{--}0.14, p \leq 0.026$). Although these correlations were weak, they indicate that higher SB was associated with higher levels of depressive symptoms, anxiety, and stress.

Strong positive correlations were observed among the psychological distress variables. Depression was positively correlated with anxiety ($r = 0.58, p < 0.001$) and stress ($r = 0.56, p < 0.001$), while anxiety was positively correlated with stress ($r = 0.57, p < 0.001$). Sleep duration was not significantly correlated with SB, depression, anxiety, stress, MVPA level, sex, or age ($p > 0.05$). Similarly, MVPA level was not significantly correlated with depression, anxiety, or stress ($p > 0.05$). However, MVPA level showed weak positive correlations with weekday SB ($r = 0.13, p = 0.003$), weekend SB ($r = 0.15, p = 0.001$), and total SB ($r = 0.16, p < 0.001$).

Sex was negatively correlated with weekend SB ($r = -0.19, p < 0.001$), total SB ($r = -0.15, p = 0.001$), and depression ($r = -0.11, p = 0.012$). Given that sex was coded as male = 1 and female = 2, these findings suggest that male students tended to report higher weekend and total SB and higher depression scores than female students. Age demonstrated weak positive correlations with weekday SB ($r = 0.12, p = 0.011$), weekend SB ($r = 0.11, p = 0.014$), and total SB ($r = 0.13, p = 0.004$), indicating that older students tended to spend more time in sedentary activities.

Independent Associations of Sedentary Behaviour with Depression, Anxiety, and Stress

Tables 3–5 present the hierarchical multiple regression analyses examining the independent associations of weekday, weekend, and total SB with depression, anxiety, and stress after adjusting for sex, age, level of study, family monthly income, MVPA level, and sleep duration.

Weekday Sedentary Behaviour

As shown in Table 3, weekday SB was independently associated with depression after controlling for all covariates ($\beta = 0.130, p = 0.004$). However, weekday SB was not significantly associated with anxiety ($\beta = 0.076, p = 0.100$) or stress ($\beta = 0.058, p = 0.209$). Among the covariates, sex remained significantly associated with depression across the models ($\beta = -0.091, p = 0.050$), indicating higher depression scores among male students. The addition of weekday SB in Model 3 explained an additional 1.6% of the variance in depression scores ($\Delta R^2 = 0.016$).

Weekend Sedentary Behaviour

Table 4 shows that weekend SB was significantly and positively associated with all three psychological distress outcomes. Higher weekend SB was associated with higher depression ($\beta = 0.167, p < 0.001$), anxiety ($\beta = 0.109, p = 0.018$), and stress scores ($\beta = 0.113, p = 0.015$) after adjusting for demographic and behavioural covariates. Weekend SB contributed an additional 2.6%, 1.1%, and 1.2% to the explained variance in depression, anxiety, and stress, respectively. None of the other covariates remained significant in the fully adjusted models.

Total Sedentary Behaviour

As shown in Table 5, total SB was independently associated with depression ($\beta = 0.161, p < 0.001$) and anxiety ($\beta = 0.100, p = 0.032$) after controlling for all covariates. However, the association between total SB and stress was not statistically significant ($\beta = 0.090, p = 0.051$). Total SB accounted for an additional 2.4% of the variance in depression scores and 0.9% of the variance in anxiety scores. Similar to the findings for weekend SB, demographic characteristics, MVPA level, and sleep duration were not significantly associated with psychological distress outcomes in the fully adjusted models.

Overall, weekend SB emerged as the most consistent correlate of psychological distress, demonstrating significant associations with depression, anxiety, and stress. In contrast, weekday SB was associated only with depression, while total SB was associated with depression and anxiety but not stress.

Table 1. General characteristics of the participants (N=501)

Variable	Mean $\pm$ SD/ n (%)
Age (years)	20.2 $\pm$ 2.25
Sex	
Male	197 (39.3)
Female	304 (60.7)
Level of study	
200 level	142 (28.3)
300 level	135 (26.9)
400 level	118 (23.6)
500 level	106 (21.2)
Family monthly income	
Low	10 (2.0)
Moderate	21 (4.2)
High	470 (93.8)
MVPA levels	
Low	229 (45.7)
Moderate	163 (32.5)
High	109 (21.8)
Sleep duration (hrs)	6.22 $\pm$ 1.65
Sleep duration pattern	
Short	311 (62.1)
Normal	176 (35.1)
Long	14 (2.80)
Weekday SB duration (hours/day)	4.52 $\pm$ 3.45
Weekend SB duration (hours/day)	11.7 $\pm$ 7.36
Total Weekly SB duration (hours/day)	6.57 $\pm$ 4.21
DASS-D Score	13.4 $\pm$ 10.5
Depression levels	
Normal	210 (41.9)
Mild	68 (13.6)
Moderate	105 (21.0)
Severe	64 (12.8)
Extremely severe	54 (10.8)
DASS-A Score	14.2 $\pm$ 9.56
Anxiety levels	
Normal	126 (25.1)
Mild	27 (5.40)
Moderate	137 (27.3)
Severe	66 (13.2)

Extremely severe	145 (28.9)
DASS-S Score	14.8 ± 9.63
Stress levels	
Normal	288 (57.5)
Mild	63 (12.6)
Moderate	79 (15.8)
Severe	45 (9.00)
Extremely severe	26 (5.20)

MVPA Moderate-Vigorous Physical Activity, DASS-D Depression, Anxiety, Stress Scale-Depression Subscale, DASS-A Depression, Anxiety, Stress Scale-Anxiety Subscale, DASS-S Depression, Anxiety, Stress Scale-Stress Subscale, SB Sedentary Behaviour

Table 2. Spearman correlations among sedentary behaviour, psychological distress outcomes, sleep duration, MVPA, sex, and age

Variable r (p)	SB Weekday 1	SB Weekend 2	SB Weekly/Total 3	Depression 4	Anxiety 5	Stress 6	Sleep duration 7	MVPA 8	Sex 9	Age 10
1	—	0.65 (0.000*)	0.91 (0.000*)	0.18 (0.000*)	0.12 (0.010*)	0.10 (0.026*)	0.006 (0.885)	0.13 (0.003*)	-0.08 (0.076)	0.12 (0.011*)
2		—	0.89 (0.000*)	0.19 (0.000*)	0.12 (0.005*)	0.14 (0.002*)	-0.008 (0.856)	0.15 (0.001*)	-0.19 (0.000*)	0.11 (0.014*)
3			—	0.21 (0.000*)	0.13 (0.004*)	0.14 (0.002*)	-0.004 (0.921)	0.16 (0.000*)	-0.15 (0.001*)	0.13 (0.004*)
4				—	0.58 (0.000*)	0.56 (0.000*)	0.02 (0.634)	0.02 (0.744)	-0.11 (0.012*)	0.05 (0.278)
5					—	0.57 (0.000*)	-0.01 (0.757)	-0.01 (0.802)	-0.05 (0.257)	0.03 (0.511)
6						—	0.02 (0.662)	0.00 (0.992)	-0.05 (0.228)	-0.01 (0.823)
7							—	0.07 (0.149)	0.04 (0.426)	-0.03 (0.488)
8								—	-0.06 (0.192)	0.08 (0.087)
9									—	-0.23 (0.000*)
10										—

r Spearman's rho correlation coefficient, p P-value, SB Sedentary behaviour, MVPA Moderate-Vigorous-Physical Activity, * indicates a significant correlation, Sex code (1 male, 2 female), MVPA code (1 low, 2 moderate, 3 high).

Table 3. Hierarchical multiple regression analysis of the independent association between weekday sedentary behaviour and depression, anxiety, and stress among Nigerian undergraduates

Variable	Depression			Anxiety			Stress		
	β (p-value)			β (p-value)			β (p-value)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Sex	-0.096 (0.038*)	-0.097 (0.037*)	-0.091 (0.050*)	-0.054 (0.243)	-0.056 (0.231)	-0.052 (0.263)	-0.051 (0.270)	-0.051 (0.271)	-0.049 (0.298)
Age	-0.015 (0.815)	-0.020 (0.746)	-0.019 (0.758)	0.067 (0.283)	0.070 (0.262)	0.071 (0.256)	-0.017 (0.780)	-0.021 (0.737)	-0.021 (0.743)
Level of study	0.039 (0.520)	0.049 (0.431)	0.031 (0.613)	-0.073 (0.234)	-0.077 (0.221)	-0.087 (0.167)	-0.014 (0.825)	-0.008 (0.897)	-0.016 (0.800)
Family monthly income	0.037 (0.410)	0.038 (0.397)	0.027 (0.542)	0.004 (0.936)	0.003 (0.938)	-0.003 (0.941)	0.055 (0.225)	0.055 (0.220)	0.051 (0.264)
MVPA	————	-0.015 (0.742)	-0.031 (0.495)	————	-0.028 (0.541)	-0.037 (0.417)	————	0.002 (0.998)	-0.007 (0.875)
Sleep duration	————	0.041 (0.364)	0.038 (0.399)	————	0.031 (0.494)	-0.033 (0.468)	————	0.028 (0.535)	0.027 (0.556)
SB Weekday	————	————	0.130 (0.004*)	————	————	0.076 (0.100)	————	————	0.058 (0.209)
	R ² =0.013	R ² =0.015	R ² =0.031	R ² =0.006	R ² =0.008	R ² =0.014	R ² =0.006	R ² =0.007	R ² =0.010
	Adjusted R ² =0.005	Adjusted R ² =0.003	Adjusted R ² =0.017	Adjusted R ² =0.002	Adjusted R ² =0.004	Adjusted R ² =0.001	Adjusted R ² =0.002	Adjusted R ² =0.005	Adjusted R ² =0.004
	F=1.632	Change in R ² =0.002	Change in R ² =0.016	F=0.803	Change in R ² =0.002	Change in R ² =0.005	F=0.793	Change in R ² =0.001	Change in R ² =0.003
		F=1.235	F=2.245		F=0.685	F=0.977		F=0.591	F=0.734

MVPA Moderate-Vigorous Physical Activity, SB Sedentary behaviour, * indicates a significant association.

Table 4. Hierarchical multiple regression analysis of the independent association between weekend sedentary behaviour and depression, anxiety, and stress among Nigerian undergraduates

Variable	Depression			Anxiety			Stress		
	β (p-value)			β (p-value)			β (p-value)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Sex	-0.096 (0.038*)	-0.097 (0.037*)	-0.078 (0.092)	-0.054 (0.243)	-0.056 (0.231)	-0.043 (0.355)	-0.051 (0.270)	-0.051 (0.271)	-0.038 (0.411)
Age	-0.015 (0.815)	-0.020 (0.746)	-0.019 (0.756)	0.067 (0.283)	0.070 (0.262)	0.071 (0.255)	-0.017 (0.780)	-0.021 (0.737)	-0.020 (0.744)
Level of study	0.039 (0.520)	0.049 (0.431)	0.036 (0.559)	-0.073 (0.234)	-0.077 (0.221)	-0.085 (0.173)	-0.014 (0.825)	-0.008 (0.897)	-0.017 (0.786)
Family monthly income	0.037 (0.410)	0.038 (0.397)	0.020 (0.653)	0.004 (0.936)	0.003 (0.938)	-0.009 (0.844)	0.055 (0.225)	0.055 (0.220)	0.043 (0.339)
MVPA	————	-0.015 (0.742)	-0.041 (0.368)	————	-0.028 (0.541)	-0.045 (0.329)	————	0.002 (0.998)	-0.017 (0.702)
Sleep duration	————	0.041 (0.364)	0.031 (0.490)	————	0.031 (0.494)	-0.038 (0.405)	————	0.028 (0.535)	0.021 (0.638)
SB Weekend	————	————	0.167 (0.000*)	————	————	0.109 (0.018*)	————	————	0.113 (0.015*)
	R ² =0.013	R ² =0.015	R ² =0.061	R ² =0.006	R ² =0.008	R ² =0.019	R ² =0.006	R ² =0.007	R ² =0.019
	Adjusted R ² =0.005	Adjusted R ² =0.003	Adjusted R ² =0.027	Adjusted R ² =0.002	Adjusted R ² =0.004	Adjusted R ² =0.006	Adjusted R ² =0.002	Adjusted R ² =0.005	Adjusted R ² =0.005
	F=1.632	Change in R ² =0.002	Change in R ² =0.026	F=0.803	Change in R ² =0.002	Change in R ² =0.011	F=0.793	Change in R ² =0.001	Change in R ² =0.012
		F=1.235	F=2.990		F=0.685	F=1.396		F=0.591	F=1.360

MVPA Moderate-Vigorous Physical Activity, SB Sedentary behaviour, * indicates a significant association

Table 5. Hierarchical multiple regression analysis of the independent association between total sedentary behaviour and depression, anxiety, and stress among Nigerian undergraduates

Variable	Depression			Anxiety			Stress		
	β (p-value)			β (p-value)			β (p-value)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Sex	-0.096 (0.038*)	-0.097 (0.037*)	-0.083 (0.071)	-0.054 (0.243)	-0.056 (0.231)	-0.047 (0.311)	-0.051 (0.270)	-0.051 (0.271)	-0.044 (0.351)
Age	-0.015 (0.815)	-0.020 (0.746)	-0.019 (0.760)	0.067 (0.283)	0.070 (0.262)	0.071 (0.254)	-0.017 (0.780)	-0.021 (0.737)	-0.020 (0.745)
Level of study	0.039 (0.520)	0.049 (0.431)	0.030 (0.627)	-0.073 (0.234)	-0.077 (0.221)	-0.088 (0.158)	-0.014 (0.825)	-0.008 (0.897)	-0.019 (0.764)
Family monthly income	0.037 (0.410)	0.038 (0.397)	0.022 (0.629)	0.004 (0.936)	0.003 (0.938)	-0.007 (0.872)	0.055 (0.225)	0.055 (0.220)	0.046 (0.309)
MVPA	————	-0.015 (0.742)	-0.039 (0.390)	————	-0.028 (0.541)	-0.042 (0.352)	————	0.002 (0.998)	-0.014 (0.766)
Sleep duration	————	0.041 (0.364)	0.034 (0.449)	————	0.031 (0.494)	-0.036 (0.433)	————	0.028 (0.535)	0.024 (0.595)
Total SB	————	————	0.161 (0.000*)	————	————	0.100 (0.032*)	————	————	0.090 (0.051)
	R ² =0.013	R ² =0.015	R ² =0.039	R ² =0.006	R ² =0.008	R ² =0.018	R ² =0.006	R ² =0.007	R ² =0.015
	Adjusted R ² =0.005	Adjusted R ² =0.003	Adjusted R ² =0.025	Adjusted R ² =0.002	Adjusted R ² =0.004	Adjusted R ² =0.004	Adjusted R ² =0.002	Adjusted R ² =0.005	Adjusted R ² =0.001
	F=1.632	Change in R ² =0.002	Change in R ² =0.024	F=0.803	Change in R ² =0.002	Change in R ² =0.009	F=0.793	Change in R ² =0.001	Change in R ² =0.008
		F=1.235	F=1.632		F=0.685	F=1.256		F=0.591	F=1.057

MVPA Moderate-Vigorous Physical Activity, SB Sedentary behaviour, * indicates a significant association.

Discussion

This study examined the associations of weekday, weekend, and total SB with depression, anxiety, and stress among Nigerian undergraduates. Several important findings emerged from this study. First, a substantial proportion of participants reported psychological distress, particularly anxiety symptoms. Second, SB was positively associated with depression, anxiety, and stress. Third, weekend SB emerged as the most consistent correlate of psychological distress, remaining independently associated with depression, anxiety, and stress after adjustment for socio-demographic characteristics, MVPA, and sleep duration. In contrast, weekday SB was independently associated only with depression, while total SB was associated with depression and anxiety but not stress.

The prevalence of psychological distress observed in this study is concerning. More than half of the participants reported at least mild depressive symptoms, approximately three-quarters reported at least mild anxiety symptoms, and over two-fifths reported at least mild stress symptoms. These findings are consistent with previous studies reporting a high burden of mental health problems among university students globally and in low- and middle-income countries [4–6]. The high prevalence of anxiety symptoms observed in the present study may reflect academic demands, financial concerns, uncertainty regarding future employment, and other psychosocial stressors commonly experienced by university students.

Participants accumulated considerably more sedentary time during weekends than on weekdays. While the average weekday SB duration was 4.52 hours/day, the weekend SB duration exceeded 11 hours/day. This pattern suggests that students may spend a substantial proportion of their leisure time engaging in sedentary pursuits. Similar findings have been reported among university students, where non-academic periods are characterised by prolonged recreational screen use, social media engagement, gaming, and television viewing [12, 15]. The substantially higher weekend sedentary time observed in the present study highlights weekends as a potentially important target period for behavioural interventions.

Consistent with previous research, all SB indicators were positively correlated with depression, anxiety, and stress [18, 19, 47]. Several mechanisms may explain these associations. Prolonged SB may contribute to reduced social interaction, increased screen exposure,

poorer emotional regulation, and adverse neurobiological processes, including low-grade inflammation and dysregulation of neurotransmitter pathways involved in mood regulation [48, 49]. Furthermore, excessive sedentary time may displace opportunities for social engagement, recreation, and other health-promoting activities that support psychological well-being.

The most important finding of this study was that weekend SB was the most consistent correlate of psychological distress. Higher weekend sedentary time was independently associated with depression, anxiety, and stress even after adjustment for socio-demographic characteristics, MVPA, and sleep duration. In contrast, weekday SB was associated only with depression. This finding suggests that the context in which SB occurs may influence its relationship with mental health. Weekday sedentary time among university students is likely to be dominated by compulsory academic activities such as attending lectures, studying, and completing assignments. In contrast, weekend sedentary time is more likely to reflect discretionary sedentary pursuits, including prolonged social media use, video streaming, gaming, and other screen-based leisure activities. Emerging evidence suggests that mentally passive SBs have stronger associations with psychological distress than mentally active SBs, such as reading or studying [47, 48, 50]. Therefore, the stronger associations observed for weekend SB suggest that the behavioural context of sedentary activities may be an important determinant of psychological well-being.

The findings also suggest that not all SB exerts the same psychological influence. Although total SB was associated with depression and anxiety, its association with stress was no longer statistically significant after adjustment. Similarly, weekday SB was associated only with depression. These findings support emerging evidence that different domains and timing of SB may have distinct health implications and should not be considered a single homogeneous behaviour [48]. Future studies should therefore distinguish between academic, occupational, transportation-related, and recreational sedentary activities when examining mental health outcomes.

Contrary to expectations, MVPA was not independently associated with depression, anxiety, or stress. Although physical activity is generally associated with better mental health [51, 52], the present findings suggest that SB may influence psychological distress independently of physical activity participation. Individuals may achieve moderate or high levels of MVPA while simultaneously accumulating prolonged periods of sedentary time [11, 17]. Consequently, the adverse psychological effects associated with excessive sitting may persist despite engagement in physical activity. These findings support the growing recognition that SB and physical activity are related but distinct behavioural constructs.

Similarly, sleep duration was not independently associated with depression, anxiety, or stress. This finding contrasts with previous studies that have linked insufficient sleep to poor mental health among university students [27, 28]. However, sleep duration alone may not adequately capture overall sleep health. Factors such as sleep quality, sleep efficiency, sleep timing, and sleep disturbances may be more strongly related to psychological well-being than sleep duration alone. Future research should therefore incorporate more comprehensive measures of sleep.

The findings of this study have important public health implications. University health promotion programmes often focus primarily on increasing physical activity. However, the present findings suggest that reducing SB, particularly during weekends, may represent an additional strategy for improving mental health among students. Interventions that encourage active leisure activities, recreational sports participation, reduced recreational screen time, and greater social engagement on weekends may contribute to reductions in depression, anxiety, and stress.

A major strength of this study is the relatively large sample size and the separate examination of weekday, weekend, and total SB. The inclusion of multiple psychological outcomes and adjustment for important behavioural and socio-demographic factors further strengthens the findings. Nevertheless, several limitations should be acknowledged. The cross-sectional design precludes causal inference and raises the possibility of reverse causation. Sedentary behaviour, sleep duration, physical activity, and psychological distress were assessed using self-report measures and may therefore be subject to recall bias. In addition, residual confounding from unmeasured factors such as dietary habits, substance use, social support, and academic performance cannot be excluded. Participants were recruited from a single university, which may limit the generalisability of the findings. Future longitudinal studies are needed to determine the directionality of the observed associations. Studies employing objective measures of SB and physical activity, such as accelerometry, would provide more robust evidence. Further research should also investigate specific sedentary domains, particularly recreational screen-based SBs, to better understand the mechanisms linking SB and psychological distress among university students.

Conclusion

This study revealed a high prevalence of psychological distress among Nigerian undergraduates, with approximately three-fifths of participants reporting at least mild depressive symptoms, three-quarters reporting at least mild anxiety symptoms, and over two-fifths

reporting at least mild stress symptoms. Sedentary behaviour was also common, particularly during weekends, when sedentary time was substantially higher than during weekdays. Sedentary behaviour was positively associated with depression, anxiety, and stress. After adjusting for sociodemographic and lifestyle factors, weekend SB emerged as the most consistent correlate of psychological distress, showing significant associations with depression, anxiety, and stress, whereas weekday SB was independently associated only with depression. These findings suggest that SB accumulated during weekends may be particularly important for students' mental health. Interventions aimed at reducing sedentary time, especially during weekends, may contribute to improved psychological well-being among undergraduates. Further longitudinal studies are needed to establish causal relationships.

Declarations

Ethics approval and consent to participate

This study was conducted in line with the Declaration of Helsinki (as revised in 2013). Ethical clearance was obtained from the Health Research Ethics Committee of Redeemer's University (Approval Number: RUN/REC/2026/212). Written informed consent was obtained from all participants.

Consent for publication

Not applicable

Availability of data and materials

The data generated in this study is available from the corresponding author on reasonable request

Competing interests

No competing interests

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Authors' contributions

ABA was involved in the design and conceptualisation of the study. ABA, IPA, DOF, NA, AO, MCA, AK, and CEM were involved in data collection, analysis, and interpretation. ABA wrote the initial draft of the manuscript. ABA, IPA, DOF, NA, AO, MCA, AK, and CEM contributed to the writing of the final draft of the manuscript. All authors read and approved the final manuscript.

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