

Impact of Screen Time on physical Activity Level and Body Composition among College Students

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Abstract

Introduction: The transition to early adulthood is a critical period for establishing long-term health behaviors. Increased time spent on phones, laptops, and other digital devices may contribute to a sedentary lifestyle, lower physical activity, and unfavorable weight gain. Therefore, this study aimed to investigate the relationship between screen time, physical activity levels, and body fat percentage among early adulthood students. **Methods:** A cross-sectional descriptive correlational study was conducted among 238 students (126 females and 112 males) aged 17–22 years from ICFAI University Tripura. Screen time was obtained from the previous week's mobile device records. Physical activity level was assessed using the Global Physical Activity Questionnaire (GPAQ), and body fat percentage was estimated using the Durnin and Womersley four-site skinfold method followed by the Siri equation. Descriptive statistics, independent samples t-test, and Pearson correlation analysis were used for data analysis. **Results:** The findings showed no significant sex difference in screen time, with females recording 305.68±89.65 minutes and males 295.35±88.44 minutes ($p=0.373$). Male students demonstrated significantly higher physical activity levels (516.39±101.23 MET-min/week) than female students (456.02±90.82 MET-min/week; $p<0.001$). Female students had significantly higher body fat percentage (27.25±3.71) than males (20.52±3.38; $p<0.001$). Correlation analysis revealed that screen time was negatively associated with physical activity ($r=-0.79$) and positively associated with body fat percentage. Physical activity level was negatively related to body fat percentage ($r=-0.34$). **Conclusion:** The study concludes that excessive screen time is an important lifestyle factor associated with reduced physical activity and less favorable body composition among college students. These findings highlight the need for health promotion initiatives during the transition to adulthood to encourage balanced technology use, regular physical activity, and healthier lifestyle behaviors.

Keywords: Screen Time, Physical Activity, Body Composition, College Students, Sedentary Behavior, GPAQ.

Resumen

Introducción: Este estudio destaca la importancia de la actividad física como estrategia preventiva frente al riesgo estimado de enfermedad cardiovascular (RECV%) en adultos colombianos de 30 a 55 años, con énfasis en el papel de las variables antropométricas. Con base en el modelo de Framingham (2008) y recomendaciones de la OMS (2017), se analizaron indicadores como índice de masa corporal (IMC), perímetro abdominal, relación cintura-cadera (RCC) y grasa visceral (GV), junto con parámetros hemodinámicos y pruebas de aptitud física. **Métodos:** Participaron 56 adultos en un estudio transversal. Se evaluaron frecuencia cardíaca (FC), presión arterial sistólica (PAS), variables antropométricas (IMC, RCC, GV, masa muscular, grasa corporal) y capacidades físicas (flexibilidad del tronco, fuerza de brazos y abdomen, resistencia aeróbica). El RECV% fue estimado mediante el modelo de Framingham (2008). Se aplicaron estadísticas descriptivas y correlaciones de Pearson y Spearman. **Resultados:** El 21,6 % presentó un alto RECV%. El 34 % tuvo FC >80 lpm y el 47,9 % PAS elevada. Se identificaron altos niveles de GC y %GC, y baja o moderada masa muscular. Más del 70 % obtuvo calificaciones bajas o regulares en al menos tres pruebas físicas. Se encontraron correlaciones significativas entre RECV% y edad ($r = 0,744$), GV ($r = 0,729$), PAS ($r = 0,674$) y RCC ($r = 0,547$). Flexibilidad, fuerza y resistencia aeróbica se asociaron inversamente con el riesgo. Los hallazgos refuerzan la utilidad de la cineantropometría en la detección del riesgo cardiovascular, destacando a la grasa visceral como predictor clave, especialmente en hombres y adultos físicamente inactivos. **Conclusión:** Existe una asociación significativa entre riesgo

cardiovascular, composición corporal y aptitud física. Se recomienda incorporar evaluaciones antropométricas en estrategias preventivas desde la educación física y la salud pública.

Palabras Clave: Tiempo de pantalla, Actividad Física, Composición Corporal, Estudiantes Universitarios, Comportamiento Sedentario, GPAQ

Introducción

The progression from late adolescence to early adulthood indicates a complete shift toward individualism. It further indicates various independence, lifestyle experimentation and health behavior modifications. Early adult transition period effects on college students typically manifest as changes in academic stress, social relationships, daily routines, changes in diet, disruption of sleep patterns and changes in level of physical activity (Ma et al., 2020). Furthermore, physical and psychological well-being can be affected. One of the most prominent of these lifestyle modifications is the changes to student life caused by the increase in modern technology, which primarily consists of smartphones, laptops, tablets, televisions, game systems and online educational platforms (C. Fountaine et al., 2008). These technologies can negatively impact behavior by overexposing students to the screens and causing them to be more sedentary and less physically active. Screen time can negatively impact students by stretching them and contributing to an unhealthy way to be sedentary. Due to the changes in life caused by screens and technology, students can be negatively impacted by stress, a change in sleep patterns, a change in unhealthy body composition, and the disruption of health (Wu et al., 2015). Physical activity can help students offset screens and technology by helping them regain and maintains their mental health, fitness level, and body composition.

Young adulthood is measured in multiple ways. When students transition from adolescence to young adulthood, many almost immediately stop spending time being physically active and instead focus on academics, such as studying or working on assignments, due to changes in the structure of their daily life. As a result, there is an evident disruption in students' physical health monitoring systems, and a change in the health of the population observed. Calestine et al. (2017) examined the work habits of college students found a relationship between these habits and their levels of physical activity and fitness suggesting daily work routines can dominantly determine physical behavior with movement directed by physical work habits (Calestine et al., 2017). Similarly, Bice et al. (2019) stated the use health of technology influenced the physical activity of college students, promoting or hindering an active lifestyle based on the way technology was utilized (Bice et al., 2019). Numerous studies have reported a relationship between screen time and physical activity with numerous associating high levels of screen exposure and activity levels with low levels of physical activity. Ge et al. (2020) reported that screen time were combined with levels of activity and perceived stress (Ge et al., 2020). Lavados-Romo et al. (2023) reported that the quality of life health and the level of physical activity of college students were screen time and significant level correlated (Lavados-Romo et al., 2023). Wu et al. (2015) argued that higher levels of screen time and low levels of physical activity correlated with a higher level of risk of mental problems and sleep quality (Wu et al., 2015). It was reported by Ma et al. (2020) that screen time and activity correlated with health status and quality of sleep of college freshmen (Ma et al., 2020). Not all the studies conducted have a relationship between activity and screen time, suggesting screen time is not a restrictive to activity. Fountaine et al. (2009) reported that screen time is not a prospective impediment to physical activity for college students (Fountaine et al., 2009). The studies of Fountaine et al. (2008) and Fountaine et al. (2011) also examined viewing, behavioral and movement activities and found some students, as demonstrated by the studies, were able to be quite active, even with long periods of watching (Fountaine et al., 2008, 2011). Ultimately, the studies concluded that the relationship possibly hinges on screen use, alternative activities, and time management.

Another component of health is body composition, particularly during young adulthood. Body composition, in contrast to body weight, gives insights on the ratios of fat mass, lean body mass, and tissue mass, to body water. Body composition in the normal range can improve metabolism, enhance performance, and decrease the risk of diseases. There are many things, such as inactivity, sitting too long, and sleep and eating patterns that can adversely affect body composition, leading to increased body fat and downward shifts in lean body mass. Zanovec et al. (2009) demonstrated that, at the college level, physical activity influenced percent body fat and composition; there was no relationship with the body mass index (Zanovec et al., 2009). Body composition is losing even more focus as the post-COVID-19 online and remote learning have demonstrated that models of more sedentary activities have been adopted. Prior research by Torres et al., (2023) on post COVID-19 lockdown demonstrated that citizens demonstrated the co-variance of physical activity with body composition and mental health (Torres et al., 2023). Interestingly, there are also research findings that show the importance of screen time and body

composition of male and female students in this research. This indicates that there are also it shows disparities in activity types, screen time and body composition patterns among students.

There is variation between male and female students' natural affinity towards different types of activity. Male students often participate in competitive activities such as sports or resistance training. On the other hand, female students demonstrate a preference for low-intensity activities such as group fitness classes. There are also biological differences in fat distribution, muscle, and metabolism. Thus, the analysis of sex differences would potentially explain behaviors related to health and allow tailored design of interventions. Previous literature indicates a lack of research analyzing the triad of physical activity, screen time, and body composition. It also indicates gaps in data that assess students in the early transitional period of adulthood and students in disparate socio-cultural contexts. Addressing the outlined gaps, this research seeks to assess screen time, physical activity and body composition in a sample of college students. It also seeks to address the imbalances in service-based interventions for participants across sex. The results of this research hope to provide guidance for the development of interventions that reduce reliance on digital technology, stimulate physical activity, and promote a more positive body image for college students.

Methodology

Research design: A comparative cross-sectional descriptive correlative research design has been adopted for examining screen time, physical activity and body composition of college students. The study also explores differences between male and female students among the parameters in the early adult transition stage.

Participants: The sample of the study was students of ICFAI University Tripura. The sample included 238 students with 112 males and 126 females, selected through the Convenient Sampling technique.

Inclusion and exclusion criteria: Participants were required to be 17 to 22 years old, mandatory University residents or nearby residential dwellers and needed to complete informed consent. Moreover, participants were required to engage in the questionnaire and disclose their screen time from the last week. Exclusion from the study included participation in any type of Physical Education courses, representing university, district or state in the last year in any type of competitive sports.

Data collection period: Data were collected from 15 January 2026 to 04 February 2026, approximately one month prior to the university midterm examination scheduled on 05 March 2026. This time frame was selected to reduce the possible effect of examination-related stress and irregular routine on physical activity and screen behavior.

Ethical considerations: The study received approval from the Departmental Research Committee of ICFAI University in Tripura. All the participants signed a consent form that explained the aim of the study, the participants' freedom to opt out of participating in part or the entire study, the confidentiality of the information, and the assurance that they can withdraw during the study without being punished.

Variables to be measured

Screen Time: Screen time was assessed through participants' mobile phone digital wellbeing or built-in screen time records. Students were asked to report their total screen time for the previous seven days. Average daily screen time was calculated and recorded in hours per day.

Physical Activity level: The Global Physical Activity Questionnaire (GPAQ) was developed by WHO, used to assess personal lifestyle among students. The GPAQ considers lifestyle among working and studying activities, transport and recreational activities. Standard GPAQ scoring procedures were followed to calculate total physical activity in Metabolic Equivalents (MET)-minutes per week.

Body fat percentage (%): Body fat percentages of the students were estimated using the Durnin and Womersley four-site skinfold method, followed by the William Siri equation. The bicep, tricep, subscapular and supraspinal skinfolds were measured as per the ISAK standards to get a body density. The sum of the skinfolds gives a body density estimate and is then transformed to a body fat percentage.

Data collection procedure: All the students were briefed about the purpose and procedure of the study. After filling the consent students submitted the report of their screen time and filled the GPAQ questionnaire. After completing these students were asked to measure their skinfolds by Level II anthropometrist recognised by ISAK.

Statistical analysis: Descriptive statistics (mean \pm standard deviation) was used to summarize the variables. Pearson's product-moment correlation coefficient was applied to determine the relationship among

screen time, physical activity level and body fat percentage. Independent samples t-test was used to compare male and female students on selected variables. Statistical analysis and graphical representation was performed using Jamovi (ver: 2.6.19) and Microsoft excel 2010 software. Statistical significance was accepted at the 0.05 level.

Results

The purpose of this study was to examine the relationship among screen time, physical activity level and body composition of students during the transitioning phase of early adulthood. The study also compares sex differences among the parameters.

Table 1 summarizes the participants' age and physical measurements. The age of the two groups was almost the same and no observable difference was found. However, average height and body mass of the males were higher than females due to natural sex differences.

Table 1. Descriptive characteristics of female and male college students

Parameters	Female (n=126)	Male (n=112)
Age (year)	19.33±1.02	19.34±0.98
Height (cm)	160.31±4.31	170.43±4.81
Body mass (kg)	57.01±6.21	68.69±7.76
BMI (kg/m ²)	22.22±2.59	23.71±3.04

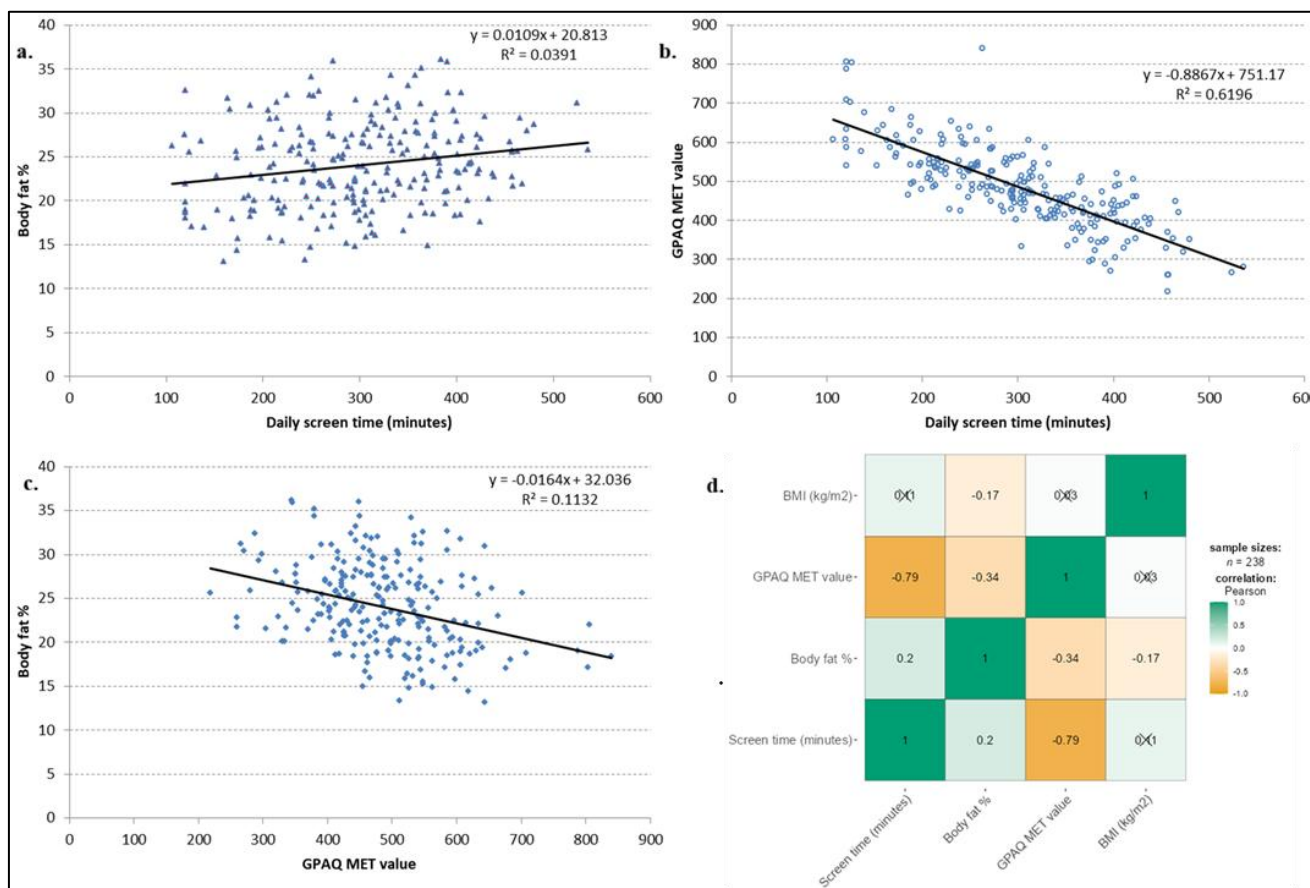


Figure 1. Relationship among daily screen time, physical activity level, body fat percentage and BMI among college students

Note: a.= correlation between body fat % and daily screen time; b.= correlation between GPAQ Met value and daily screen time; c.= correlation between body fat % and GPAQ Met value; d.= Pearson correlation coefficient matrix

Figure 1 illustrates relations among daily screen time, physical activity level, body fat percentage and BMI. Panel (a) shows that body fat percentage associated positively with daily screen time ($R^2 = 0.039$). Therefore, more screen time generally means higher body fat percentage. Panel (b) shows that screen time and GPAQ MET value were negatively associated with daily screen time ($R^2 = 0.62$) and indicates that higher daily screen time suggests lower physical activity level. Panel (c) shows that body fat percentage negatively associates with GPAQ MET value ($R^2 = 0.11$). Pearson correlation analysis confirmed that daily screen time positively associates with body fat percentage with a correlation ($r = 0.20$), indicating that students with higher body fat percentage engaged in screen time more. Screen time was found to negatively and strongly associate with GPAQ MET value ($r = 0.79$), indicating that higher screen time resulted in lower physical activity level. Physical activity level positively and strongly associates with body fat percentage ($r = 0.34$), meaning lower body fat percentage was found among more active students. The results showed that more screen time leads to lower physical activity level and higher body fat percentage among students.

Table 2 presents the comparison of screen time, body fat percentage and physical activity level between female and male college students. No significant difference was observed in screen time between females and males. Female students showed significantly higher body fat percentage than male students. In contrast, male students demonstrated significantly higher physical activity levels. The findings indicate that although screen time was similar across sexes, notable differences existed in body composition and physical activity level

Table 2. Comparison of screen time, body fat percentage, and physical activity level between female and male college students

Parameters	Female (n=126)	Male (n=112)	t-Statistic	p
Screen time (minutes)	305.68±89.65	295.35±88.44	0.89	0.373
Body fat %	27.25±3.71	20.52±3.38	14.56	<.001
GPAQ MET value (min/week)	456.02±90.82	516.39±101.23	-4.85	<.001

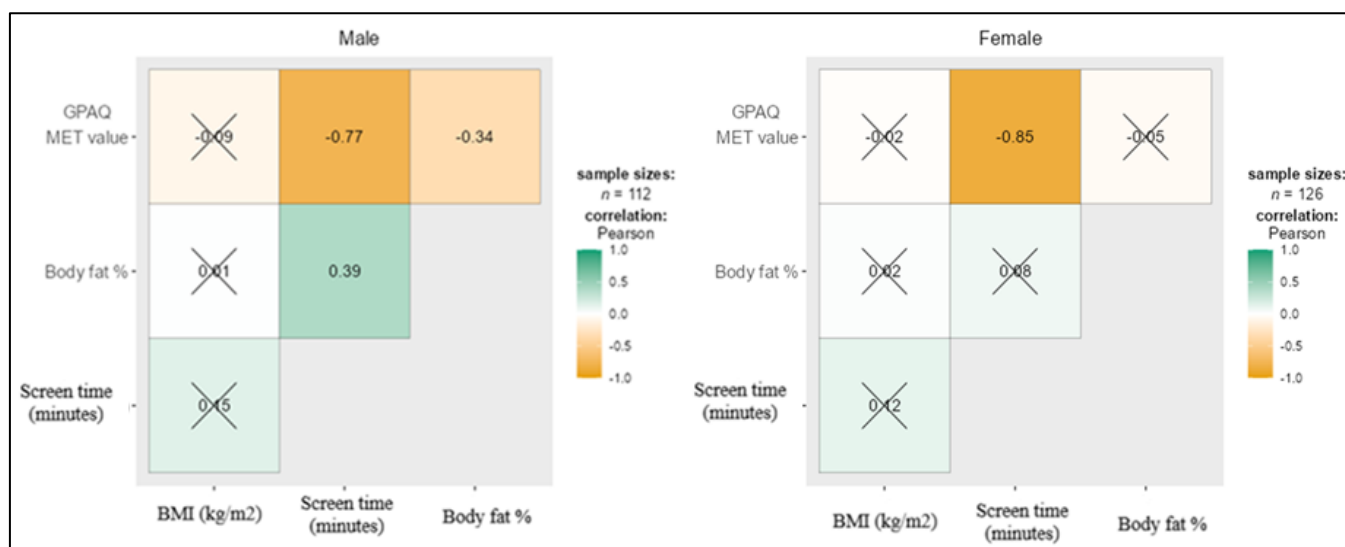


Figure 2. Sex-wise Pearson correlation matrix of screen time, body fat percentage, BMI and physical activity level among college students.

Figure 2 presents correlation coefficient matrices for male and female university students and demonstrates the relationships between screen time, body fat %, BMI and GPAQ MET value. In male students, screen time had strong negative correlation with GPAQ MET value ($r = -0.77$). Thus, more screen time meant less physical activity. Screen time was positively correlated to increased body fat ($r = 0.39$). The more screen time, the more body fat. Spend more time awake, less active, and body fat increases. GPAQ MET value and body fat had a negative relationship, suggesting active males had less body fat ($r = -0.34$). Strong relationships with BMI and the other variables were weak and insignificant. In female students, there was a strong negative correlation between increased screen time and GPAQ MET value ($r = -0.85$). More screen time meant less physical activity. Again, screen time and body fat relationships were weak. All relationships between GPAQ MET value and body fat with BMI and other variables were weak. The results suggest that among female university students, the relationship

between increased screen time and decreased physical activity was more pronounced, while among male university students, the relationship between increased screen time and body fat was more pronounced.

Discussion

This research aimed to analyze how screen time correlates with levels of physical activities and body compositions of university students in their early adult transition stages. The research also studied the discrepancies in male and female participants. The findings indicated that screen time in both genders were comparable, yet male students exhibited higher levels of physical activities and lower body fat percentages in comparison to female students. Additionally, higher screen time was correlated with lower physical activities and higher body fat percentages.

The health impacts of sedentary activities as part of digital behavior were clear and alarming for university students. The study also reported that the participants' average screen time was lengthy, with university students dedicating a significant part of their days to activities that require them to have a screen, including the use of smartphones, laptops and the internet for academia, communication, entertainment and social network activities. The findings showed that both genders exhibited similar behaviors when it came to the integration of digital technologies and were therefore comparable. According to findings of Bice et al., (2019) health technologies became part of students' lifestyle patterns, affecting their physical activities and daily behaviour (Bice et al., 2019). Also, the study participants were part of the sedentary screen behavior which was influenced by current lifestyle and time demands. Due to the higher amount of activity males tend to achieve, which may be attributed to active transport, active leisure or active recreation, males were more physically active than females. Furthermore, females were found to have a higher body fat percentage than males. There is a degree of body composition sexual dimorphism. Zanovec et al. (2009) found that physical inactivity was more closely related to body composition than body composition was to physical activity (Zanovec et al., 2009). Therefore, these studies support regular behavior as a mechanism to maintain a "healthier body profile."

The study reported a negative correlation between physical activity level and amount of time spent on screens. The more time spent on screens, the less physical activity was reported. Therefore, the more time spent on mobile devices and screens, the lower time spent exercising, playing sports, walking and doing anything else. Ge et al. (2020) found that physical activity, in combination with screen time, was a related situational factor (Ge et al., 2020). Additionally, Ma et al. (2020) found that higher exposure to screens coupled with a lower level of physical activity was related to a lower level of health (Ma et al., 2020). The current findings support the argument that a higher level of screen time was related to a higher level of inactivity. Additionally, a positive association was found between screen time and body fat percentage. Therefore, the more time spent on screens, the higher percentage of body fat.

The increase of device usage throughout the years may result in a more sedentary lifestyle, causing regular energy expenditure and regular sleep times to be disrupted. Also, Wu et.al (2015) stated that mental and sleep health, which are both affected by device usage, worsen due to high screen time (Wu et al., 2015). This shows that screen time not only decreases regular activities, but also the energy expended doing other less unhealthy activities. The negative correlation between regular activities and the body fat percentage also shows the importance of preserving movement. This is due to regular activities decreasing the amount of energy expended and improving metabolic efficiency which preserves the body. Thus, regular physical activities are vital for preserving the body composition health of college students.

The behavioral pattern was further examined by conducting sex-wise analysis. Among female students, the inverse relationship of physical activity and screen time appeared to be tighter compared to males. This indicates that the behavioral type of physically sedentary behavior may be dominant in females. This may be explained by low participation in organized sports, limited sport and leisure facilities in the community, preference for indoor activities and fewer social opportunities for outdoor recreation (Torres et al., 2023). Among male students, the association of screen time and body fat percentage was found to be stronger. This may mean some males may be employing behavior characterized as sedentary, entertaining screen time, and being physically inconsistent or engaged in poor dietary behavior. This research indicates that strategies to reduce screen time and increase physical activity may need to be different for females and males. It also found that body fat percentage was generally a more useful measure than some other body measurements when studying the relationship with screen time. This was further characterized by the measurement of body mass index as it encompassed lean body mass and fat mass. In contrast to the body fat measurement in percent, the measurement of body mass index was found to predict the actual physical body of the participant in a relationship to some situational leads.

These results are useful for universities and health practitioners to consider. Creating an environment that encourages participating in a sport is beneficial. This may also include providing accessible and confidence building opportunities for regular exercise for women, and may also require a focus on recreational activity for men, to help with a better balance of active vs. sedentary behavior. Strong consideration of the integration of positive digital wellness with active promotion of healthy behaviors on campus is also of benefit. While the results offer us a range of positive opportunities, consideration should also be given to the limitations of the research. The design of the research may not explain a relationship between isolated cause and an effect. The lack of focus on a preference of activity may explain different behaviors. The results are also limited as the research only collected data from one of the numerous universities in India. Regardless of the limitations, the results from the study are useful.

Conclusion

This study highlights that screen time is an important lifestyle factor associated with physical activity and body composition among college students during the early adult transition stage. The findings revealed that greater daily screen exposure was strongly associated with lower physical activity levels and was also linked to higher body fat percentage, indicating that prolonged use of digital devices may contribute to a more sedentary and less healthy lifestyle. Although screen time did not differ significantly between male and female students, clear sex-based differences were observed in health-related outcomes. Male students demonstrated higher physical activity levels and lower body fat percentage, whereas female students showed comparatively lower activity and higher body fat. The sex-wise analysis further suggested that the inverse relationship between screen time and physical activity was more pronounced among females, while the association between screen time and body fat was stronger among males. Overall, the results emphasize the need for targeted health promotion strategies in universities that encourage balanced technology use, regular physical activity, and healthier daily routines across academic, recreational, and social life contexts. Such interventions may help reduce sedentary behavior and improve body composition during a critical period of long-term health behavior development in young adults.

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Conflicts of Interest

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Informed Consent Statement

All the athletes included in the study provided written informed consent.

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