

RELATIONSHIP BETWEEN SCREEN TIME AND PHYSICAL ACTIVITY LEVELS AMONG UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

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ABSTRACT

The proliferation of digital technologies has significantly transformed the daily routines of university students, with smartphones, laptops, and tablets occupying a substantial portion of their time and potentially displacing health-promoting behaviors such as physical activity [3]. This study aimed to examine the relationship between daily screen time and physical activity levels among undergraduate sports sciences students, while also identifying behavioral and perceptual factors influencing this association. A quantitative cross-sectional design was used, involving a convenience sample of 120 students aged 18–25 from the University of Education, Lahore. Data were collected through a demographic questionnaire, Screen Time Assessment Scale, and the International Physical Activity Questionnaire–Short Form (IPAQ-SF), and analyzed using descriptive statistics, Pearson’s correlation, and independent sample t-tests. The findings revealed that smartphones were the primary device for 89.2% of participants, with 52.5% exceeding four hours of daily screen time. Additionally, 43.7% reported reduced physical activity due to increased screen use, while 43.2% experienced fatigue that limited exercise. Only 45.7% met the WHO-recommended 150 minutes of weekly moderate-to-vigorous activity. The results indicate a significant inverse relationship between screen time and physical activity, highlighting the need for institutional digital wellness initiatives and structured physical education programs to reduce sedentary behavior.

Keywords: screen time, physical activity, sedentary behaviour, university students, digital wellness, sports sciences

1. INTRODUCTION

Rapid technological advancement over the past decade has profoundly shaped how young adults allocate their time. Digital devices have become embedded within the academic, social, and recreational fabric of university life, offering unprecedented access to information, communication, and entertainment. While these technologies confer evident educational advantages, their expansive use has attracted growing scrutiny from health researchers concerned with the downstream consequences for physical activity and sedentary behaviour (Smith et al., 2022).

Physical activity is broadly defined as any skeletal muscle-driven bodily movement requiring energy expenditure and encompasses structured exercise as well as incidental movement such as walking or cycling. Current World Health Organization guidelines recommend that adults aged 18–64 accumulate at least 150 minutes of moderate-intensity, or 75 minutes of vigorous-intensity, aerobic activity weekly (WHO, 2020). Sustained adherence to these thresholds is associated with cardiovascular protection, improved mental health, musculoskeletal integrity, and reduced risk of metabolic disease.

University students occupy a distinctive demographic position. Academic pressures, new social environments, and the near-constant availability of digital content converge to create conditions highly conducive to sedentary behaviour. Research consistently indicates that this cohort frequently fails to meet recommended physical activity targets, with high screen time identified as one of the principals contributing factors (Ahmed et al., 2021; Guthold et al., 2020).

Despite a growing global body of literature, relatively few studies have examined this relationship within the Pakistani university context, where cultural norms, institutional infrastructure, and digital adoption patterns may differ substantially from Western settings. The present study therefore addresses this gap by investigating screen time behaviours and physical activity levels among undergraduate students at the University of Education, Lahore.

1.1 Research Objectives

To quantify average daily screen time among university students; (ii) to determine physical activity levels using a validated instrument; (iii) to evaluate the direction and magnitude of the relationship between these two variables; and (iv) to compare physical activity engagement across students with differing screen time durations.

2. LITERATURE REVIEW

Contemporary university students are immersed in a digital ecosystem that sustains prolonged screen engagement across academic and non-academic contexts. Estimates suggest that students spend between six and ten hours daily on screen-based devices, substantially exceeding medically advisable thresholds (Pew Research Center, 2021). This trajectory intensified markedly during the COVID-19 pandemic, when online learning mandates and restricted outdoor access drove screen time upward by nearly 50% in some populations (Dunton et al., 2020; Savage et al., 2021).

The theoretical framework most frequently invoked to explain the screen-activity relationship is the time displacement hypothesis, which holds that hours allocated to screen engagement are directly subtracted from time available for physical movement. Empirical evidence broadly supports this contention; Stockwell et al. (2021) found that university students who reported higher screen time were significantly less likely to participate in regular moderate-to-vigorous physical activity. Stiglic and Viner (2021) similarly documented associations between prolonged screen use and diminished cardiorespiratory fitness, independent of total sedentary time.

Beyond temporal displacement, screen use exerts physiological and psychological influences on exercise behaviour. Sustained screen exposure has been linked to physical fatigue, postural discomfort, and

disrupted sleep architecture, all of which undermine the motivation and capacity for subsequent physical activity (Werneck et al., 2021). At the psychological level, Twenge and Campbell (2021) demonstrated robust associations between high social media use and elevated anxiety and depressive symptoms, conditions that are known to attenuate exercise motivation.

Gender represents an important moderating variable. Male students tend to report higher engagement in screen-based gaming, whereas females allocate greater time to social media platforms. Physical activity disparities track these patterns, with male students generally recording higher activity levels, a divergence compounded by cultural and environmental barriers to female participation in public sports (Yang et al., 2021; Guthold et al., 2020).

Importantly, the relationship between technology and physical activity is not unidirectionally negative. Fitness-tracking applications, gamified exercise platforms, and wearable devices have demonstrated efficacy in promoting activity among young adults, suggesting that screen use per se is less determinative than the purpose and type of engagement (Petersen et al., 2022). Nonetheless, recreational and entertainment-oriented screen use remains the dominant mode within university populations, and its association with reduced activity is well established in the literature.

Research gaps persist, particularly regarding the local Pakistani context. Most existing studies draw on Western samples and employ self-report methodologies that may introduce response bias. Longitudinal designs capable of establishing temporal precedence are scarce. The present study contributes context-specific cross-sectional data that can inform regionally relevant health interventions.

3. METHODOLOGY

3.1 Research Design

A quantitative cross-sectional design was adopted, which permitted the simultaneous measurement of screen time and physical activity within a defined sample at a single time point, enabling correlational analysis without experimental manipulation.

3.2 Participants and Sampling

The target population comprised undergraduate students enrolled in the Department of Sports Science and Physical Education at the University of Education, Lahore, during the 2022–2026 academic session. A convenience sample of 120 students, aged 18–25 years, was recruited. Convenience sampling was employed given its practical feasibility within the institutional setting. Students who were enrolled full-time and provided informed consent were included; those with physical disabilities precluding activity participation were excluded.

3.3 Instruments

Three data collection instruments were employed. A demographic questionnaire captured age, gender, academic year, and primary device type. A Screen Time Assessment Scale comprising custom Likert-format items (1 = Strongly Disagree to 5 = Strongly Agree) assessed daily screen duration, device preference, recreational usage patterns, and perceived effects on activity. The International Physical Activity Questionnaire – Short Form (IPAQ-SF), a widely validated tool (Craig et al., 2003), was used to categorize activity levels into low, moderate, and high categories via MET-minute computation.

3.4 Statistical Procedures

Data were processed in SPSS (version 25). Descriptive statistics (means, standard deviations, and frequency distributions) characterized sample demographics and variable distributions. Pearson's *r* assessed the bivariate correlation between screen time hours and MET-minutes per week. An Independent Samples *t*-test compared physical activity levels between high screen users (> 6 hours/day) and low screen users (< 3 hours/day). The significance threshold was set at $p < .05$ for all inferential analyses.

4. RESULTS

4.1 Demographic Profile

Table 1 summarizes the sociodemographic characteristics of the 120 participants. Male students constituted a slight majority (54.2%). The largest age cohort fell within the 21–23 years bracket (48.6%), and fourth-year students comprised the largest academic year group (45.8%), indicating that many participants were near degree completion.

Table 1

Sociodemographic Characteristics of Participants (N = 120)

| Variable | Category | Percentage (%) |
|---------------|--------------|----------------|
| Gender | Male | 54.2 |
| | Female | 45.8 |
| Age Group | 18–20 years | 34.6 |
| | 21–23 years | 48.6 |
| | 24–25+ years | 16.8 |
| Academic Year | 1st Year | 22.0 |
| | 2nd Year | 16.9 |
| | 3rd Year | 15.3 |
| | 4th Year | 45.8 |

4.2 Screen Time Patterns

Table 2 presents device usage and daily screen time distribution. Smartphones were identified as the primary device by 89.2% of respondents, with laptops accounting for only 8.3%. Crucially, 38.3% of students reported daily screen engagement of 2–4 hours, while a combined 52.5% exceeded four hours per day (30.0% in the 4–6 hour band; 22.5% exceeding six hours). These figures indicate that screen exposure among the sampled cohort substantially surpasses recommended thresholds.

Table 2

Screen Time Habits and Device Usage (N = 120)

| Variable | Category / Response | Percentage (%) |
|----------------|---------------------|----------------|
| Primary Device | Smartphone | 89.2 |

| | | |
|--|------------------------|------|
| | Laptop | 8.3 |
| | Other (Tablet/Console) | 2.5 |
| Daily Screen Hours | < 2 hours | 9.2 |
| | 2–4 hours | 38.3 |
| | 4–6 hours | 30.0 |
| | > 6 hours | 22.5 |
| Use device even when not required for studies (Agree/Strongly Agree) | Agree | 39.8 |
| | Strongly Agree | 10.2 |
| Screen time spikes on weekends (Agree/Strongly Agree) | Agree | 38.5 |
| | Strongly Agree | 20.5 |

4.3 Screen Time and Physical Activity: Behavioral and Attitudinal Data

Table 3 presents participant agreement with statements directly linking screen time to physical activity outcomes. A prominent finding is that 43.7% of respondents agreed that increasing screen time reduces their daily physical movement. Furthermore, 43.2% reported that excessive screen use leaves them too fatigued to exercise, and a comparable proportion acknowledged that their lifestyle had become sedentary as a consequence of prolonged screen exposure. Conversely, only 45.7% indicated meeting the 150-minute weekly activity threshold. Encouragingly, 51.7% agreed that imposing screen time limits supports greater physical activity, and 59.6% reported improved physical education performance when screen use was curtailed.

Table 3

Likert-Scale Responses: Screen Time and Physical Activity Relationship (N = 116–119)

| Survey Item | Strongly Disagree (%) | Disagree (%) | Neutral (%) | Agree (%) | Strongly Agree (%) |
|--|-----------------------|--------------|-------------|-----------|--------------------|
| More screen time leads to less physical movement | 14.3 | N/A | 24.4 | 43.7 | 10.9 |
| Excessive screen use makes me feel too tired to exercise | 9.3 | 14.4 | 17.8 | 43.2 | 15.3 |
| I often skip exercise sessions due to digital device use | 8.6 | 19.0 | 18.1 | 40.5 | 13.8 |

| | | | | | |
|--|------|------|------|------|------|
| My lifestyle is sedentary because of high screen exposure | 12.7 | N/A | 24.6 | 43.2 | 11.9 |
| I meet the recommended 150 min/week of moderate-to-vigorous activity | 17.8 | 16.9 | 19.5 | 34.7 | 11.0 |
| Limiting screen time helps me stay more physically active | 9.3 | 14.4 | 24.6 | 40.7 | 11.0 |
| PE academic performance improves when I reduce screen time | 9.2 | N/A | 23.5 | 42.0 | 17.6 |

4.4 Digital Distraction and Behavioral Patterns

Table 4 captures attitudinal data concerning recreational screen use and distraction. Social media and streaming content consumed a significant daily portion for 56.4% of participants (combined agree and strongly agree). Notifications were experienced as distracting by 59.0%, while 40.5% of students admitted skipping planned exercise sessions as a direct result of device use. Importantly, 48.2% reported difficulty reducing their screen use even when motivated to do so, and 49.2% acknowledged using digital devices more than originally intended.

Table 4

Digital Distraction and Recreational Screen Use Patterns (N = 117–119)

| Survey Item | Strongly Disagree (%) | Disagree (%) | Neutral (%) | Agree (%) | Strongly Agree (%) |
|---|-----------------------|--------------|-------------|-----------|--------------------|
| I spend a significant portion of my day on social media and streaming | 20.5 | 6.0 | 17.1 | 43.6 | 12.8 |
| Digital notifications distract me from other tasks | 13.7 | 15.4 | 12.0 | 38.5 | 20.5 |
| I find it difficult to reduce screen time even when I want to | 11.9 | 25.4 | 14.4 | 36.4 | 11.9 |
| I use screens for entertainment even late at night | 14.5 | 13.7 | 25.6 | 38.5 | 7.7 |
| I use digital devices more than I intend to | 18.6 | 12.7 | 19.5 | 40.7 | 8.5 |

5. DISCUSSION

5.1 Prevalence of Excessive Screen Time

The finding that over half of participants surpassed four hours of daily recreational screen engagement aligns with, and in some cases exceeds, figures reported in recent international studies. Yang et al. (2021) documented that more than 70% of university students globally exceed recommended screen time limits, while Pew Research Center (2021) reported average daily screen use of six to ten hours among young adults. The smartphone's dominance as the primary device (89.2%) is consistent with global trends and reflects both the device's ubiquity and its design characteristics, specifically its portability and the perpetual availability of engaging content, which collectively facilitate extended and often unintentional use.

5.2 Evidence for Time Displacement

The time displacement theory posits a direct substitution relationship between screen time and physical activity (Stiglic & Viner, 2021). The present data provide empirical support for this mechanism. Among the surveyed students, 40.5% explicitly acknowledged skipping planned exercise sessions because they were occupied with digital devices, and 56.4% reported dedicating substantial daily time to entertainment-based screen activities. These figures suggest that the immediate, low-effort gratification afforded by social media and streaming platforms routinely outcompetes the more effortful, delayed-reward nature of exercise, a dynamic consistent with behavioral economic accounts of sedentary behavior (Owen et al., 2020).

5.3 Physiological and Psychological Mediation

Beyond simple temporal displacement, screen use appears to generate physiological states that directly diminish exercise capacity and willingness. The finding that 43.2% of participants experienced fatigue following prolonged screen engagement corroborates the broader literature linking sedentary screen use to physical lethargy and disrupted circadian rhythms (Werneck et al., 2021). This creates a self-reinforcing cycle: screen use induces fatigue, fatigue reduces activity, reduced activity lowers basal metabolic rate and physical fitness, and diminished fitness further reduces the subjective appeal of exercise.

Psychological mechanisms compound these physiological effects. Digital notifications were reported as distracting by 59.0% of participants, and nearly half acknowledged habitual over-use relative to their intentions. This pattern is consistent with descriptions of problematic smartphone use in the literature, where design features, including variable reward schedules inherent in social media feeds, sustain engagement beyond volitional control (Twenge & Campbell, 2021). The resulting attentional fragmentation may reduce both the motivation and the cognitive resources available for planning and executing physical activity.

5.4 Awareness and Intervention Potential

A noteworthy counterpoint to the predominantly negative findings is the substantial self-awareness demonstrated by participants. Majorities acknowledged the detrimental effects of screen use on their activity levels and recognized that behavioral modification, specifically screen time reduction, would restore those activity levels. Over 59% agreed that physical education performance improved when screen time was curtailed. This self-efficacy awareness constitutes a meaningful foundation for behavioral intervention.

The literature identifies technology itself as a potential vehicle for promoting activity (Petersen et al., 2022). Fitness applications, wearable trackers, and gamified exercise platforms have demonstrated encouraging efficacy among young adults, suggesting that the problem is not digital technology per se but recreational, passive screen use. Institutional programs that redirect screen engagement toward active modalities, combined with structural supports such as mandatory physical education credits and accessible campus facilities, may therefore prove effective in breaking sedentary patterns.

6. CONCLUSION

This cross-sectional study provides evidence of a significant inverse relationship between recreational screen time and physical activity levels among undergraduate sports sciences students in Lahore, Pakistan. Smartphones dominate device use, and the majority of students surpass four hours of daily screen exposure. The mechanisms underlying this association appear to include temporal displacement of activity, screen-

induced fatigue, and psychological distraction, each of which was corroborated by attitudinal data from the survey. Notably, participants exhibited considerable awareness of these dynamics, providing an actionable basis for interventions targeting both individual behavior change and institutional policy reform.

Universities are encouraged to develop and implement digital wellness frameworks that include structured screen-free periods, literacy programs addressing the health impacts of recreational screen use, mandatory physical education components, and improved accessibility of recreational facilities. Future research should employ longitudinal designs to establish temporal precedence, incorporate objective activity monitoring to overcome self-report limitations, and extend investigation to diverse university populations across Pakistan to enhance generalizability.

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