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Original Article

Sleep, physical activity, and perceived health as key correlates of social media addiction among young adults

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ABSTRACT

This cross-sectional study examined the associations between sleep duration, physical activity, sport practice, perceived health indicators, and social media addiction among young adults. The analysis included 505 participants and used descriptive statistics, Spearman correlation analyses, and multivariable ordinary least squares regression models with higher-order polynomial terms. Descriptive results indicated moderate to high levels of social media addiction in the sample. Bivariate analyses revealed weak and nonsignificant correlations between addiction scores and both sleep duration and overall physical activity. Sport practice showed a small positive correlation with addiction scores that did not remain significant after adjustment for multiple testing. In contrast, lifestyle variables were strongly interrelated, particularly physical activity, sport practice, and gender, indicating significant behavioral heterogeneity. Multivariable models explained a small and statistically nonsignificant proportion of the variance in social media addiction ($R^2 < 0.05$). Sleep duration and sport practice did not emerge as significant predictors. Physical activity showed a non-linear association, with a higher-order term reaching statistical significance, indicating a complex relationship rather than a direct protective effect. Anthropometric variables showed limited influence, with height exhibiting a modest negative association with addiction scores. Overall, the findings suggest that sleep duration and physical activity are not strong independent correlates of social media addiction when modeled directly, supporting a multifactorial and non-linear interpretation in which lifestyle behaviors interact with psychological and contextual factors.

Keywords: Physical activity, Sleep, Social media addiction, Sport practice, Young adults

Introduction

Digital technologies now structure the daily lives of young adults. Social media platforms, smartphones, and online gaming environments have become dominant spaces for communication, entertainment, and identity construction [1]. While these tools offer clear benefits, their excessive and uncontrolled use has raised growing concerns in public health and behavioral sciences. Akhtar and Alali [1] and Shek [2] in their recent research consistently show that problematic digital use is associated with adverse outcomes in mental health, lifestyle behaviors, and academic functioning among adolescents and university students [1, 2]. Understanding these associations is therefore no longer optional; it is necessary.

A central concept emerging from the literature is social media addiction and its broader counterpart, problematic internet use. Empirical studies across diverse cultural contexts demonstrate

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that excessive engagement with digital platforms is linked to anxiety, depression, reduced self-esteem, and withdrawal symptoms [1, 3]. These effects are not isolated. Instead, they interact with everyday behaviors, particularly sleep patterns and physical activity, forming complex behavioral and psychological feedback loops that amplify health risks.

Sleep quality has been identified as one of the most sensitive indicators affected by digital overuse. Multiple large-scale studies report robust associations between social media addiction, gaming disorder, and poor sleep outcomes, including insomnia, delayed sleep onset, and daytime dysfunction [4, 5]. Importantly, sleep is not merely an outcome. It also functions as a moderator, intensifying the adverse emotional and cognitive effects of excessive digital engagement when sleep quality deteriorates [6]. Che *et al*. [7] and Coco *et al*. [8], by contrast, studied physical activity, which is frequently considered a protective factor. Evidence suggests that moderate-to-vigorous physical activity reduces the risk of problematic internet use and mitigates its psychological consequences [7, 8]. Mediation and moderation models further indicate that physical exercise indirectly improves sleep quality and emotional regulation by lowering levels of social media and smartphone addiction [1, 9]. However, these protective effects are not automatic and depend on intensity, regularity, and contextual factors.

Despite the growing body of evidence, significant gaps remain. Many studies focus on isolated variables rather than integrated behavioral systems. Others rely on single-country samples or cross-sectional designs, limiting causal interpretation. As recent reviews emphasize, there is a clear need for models that simultaneously examine social media addiction, sleep, physical activity, and perceived health within young adult populations [10]. Addressing this gap is essential for designing effective prevention strategies and evidence-based interventions in educational and public health settings.

Materials and Methods

This study adopted a quantitative, cross-sectional, descriptive design to examine social media addiction and its associations with sleep and physical activity among young adults. Data were collected through a structured self-administered questionnaire distributed to university students during the academic period. The design was selected to provide a snapshot of behavioral patterns and perceived health indicators within the target population, allowing for robust descriptive and correlational analyses without experimental manipulation.

Social media addiction was assessed using the Social Media Addiction Scale–Student Form (SMAS-SF) [11], developed and validated by Şahin. This instrument was specifically designed for secondary school, high school, and university students and demonstrates strong psychometric properties. The original validation study involved 998 students and confirmed the scale's construct validity through exploratory and confirmatory factor analyses, as well as high internal consistency. The SMAS-SF captures core addiction dimensions such as salience, mood modification, tolerance, withdrawal, and conflict, making it appropriate for the present research context.

Additional variables included self-reported sleep duration and physical activity, which were operationalized as continuous measures. Descriptive statistics were computed for all variables, including means, standard deviations, medians, interquartile ranges, skewness, and kurtosis, to characterize the data distribution **(Table 1)**. The absence of missing values ensured complete-case analysis and strengthened the internal consistency of the descriptive results. These statistics provided the empirical basis for subsequent inferential analyses and model specification.

Table 1. Descriptive statistics for variables

Variable	Mean	SD	Skewness	Kurtosis
Media addiction	73.31881	16.62899	-0.03801	0.193202
Sleep	2.437624	0.6818	0.094838	0.037751
Physical activity	2.073267	0.824103	0.631986	0.298903
Sport practice	2.037624	0.588051	-0.00684	-0.1026

Ethical considerations were strictly observed. Participation was voluntary, and informed consent was obtained from all respondents before data collection. Participants were informed about the study's objectives, the anonymous nature of the data, and their right to withdraw at any time without consequences. No personally identifiable information was collected. The study protocol adhered to established ethical principles for research involving human participants and complied with institutional guidelines for social science research.

Results and Discussion

The analytical sample consisted of 505 university students, with complete observations across all variables. Descriptive statistics revealed substantial dispersion in social media addiction scores, sleep duration, physical activity, and sport practice, indicating heterogeneous behavioral profiles. Distributional diagnostics showed moderate skewness and kurtosis for several behavioral indicators, a pattern typical of behavioral addiction constructs. No missing data were observed, ensuring robustness of subsequent modeling procedures.

Bivariate correlation analysis **(Table 2)** indicated generally weak but systematic associations between social media addiction and lifestyle-related variables. Physical activity and sport practice showed small positive correlations with addiction scores, whereas sleep duration exhibited negligible associations. These low-magnitude coefficients suggested that linear bivariate relationships alone were insufficient to explain variance in social media addiction, justifying the use of polynomial and multivariable modeling approaches.

Table 2. Bivariate correlation analysis.

Variable 1	Variable 2	ρ	95% CI
Addiction_Score	Sport_Practice	0.101	[0.01, 0.19]
Sleep_Hours	Physical_Activity	0.129	[0.04, 0.22]

Sleep_Hours	Sport_Practice	-0.102	[-0.19, -0.01]
Physical_Activity	Sport_Practice	-0.52	[-0.58, -0.45]
Physical_Activity	Height	-0.155	[-0.24, -0.07]
Physical_Activity	Sex	-0.225	[-0.31, -0.14]
Sport_Practice	Height	0.241	[0.15, 0.32]
Sport_Practice	Weight	0.126	[0.04, 0.21]
Sport_Practice	Sex	0.284	[0.20, 0.36]
Height	Sex	0.246	[0.16, 0.33]

Figure 1 shows the full set of regression diagnostic plots used to assess the adequacy and robustness of the estimated model. The posterior predictive check indicates a strong correspondence between the observed distribution of social media addiction scores and those generated by the model, supporting an acceptable global fit. The residuals-versus-fitted plot suggests that residuals are generally centered around zero with no pronounced systematic pattern, indicating that the assumption of linearity is reasonably met. However, there is a slight curvature at the extreme points, consistent with the inclusion of polynomial terms. The scale–location plot shows largely homogeneous variance across the fitted values, with only minor heteroscedasticity that does not appear severe enough to bias estimates. Influence diagnostics (leverage and Cook's distance) reveal no highly influential observations exceeding conventional thresholds, confirming that a small subset of cases does not drive parameter estimates. Finally, the normal Q–Q plot shows that residuals follow an approximately normal distribution, with modest deviations in the tails, which are common in behavioral data and do not materially compromise statistical inference.

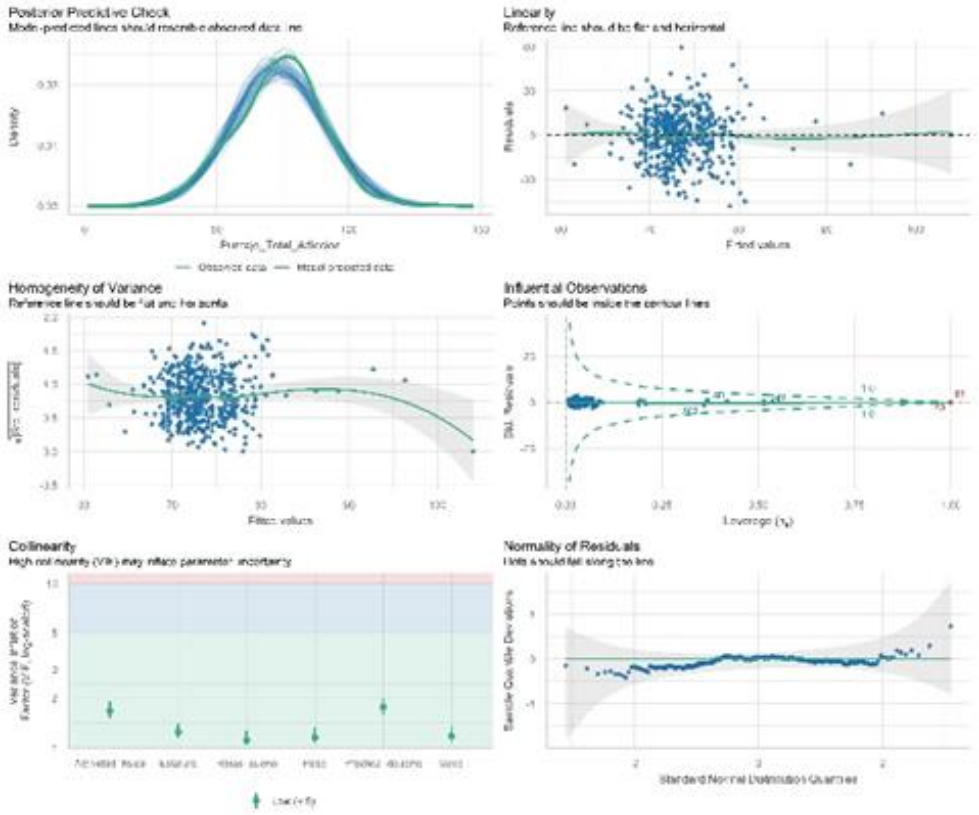

Figure 1. Regression diagnostic plots for confirming model assumptions and robustness.

An OLS regression model predicting total social media addiction score from physical activity levels explained a statistically significant but very small proportion of variance ($R^2 = 0.02$, $F(4,500) = 2.55$, $P = 0.039$). Linear, quadratic, and cubic terms were nonsignificant; however, the fourth-degree polynomial term reached statistical significance ($\beta = 5.50$, 95% CI [0.72, 10.29], $P = 0.024$). This result indicates a non-linear association, suggesting that extreme patterns of physical activity may relate differently to addiction scores than moderate levels, although the overall explanatory power remained limited **(Figure 2)**.

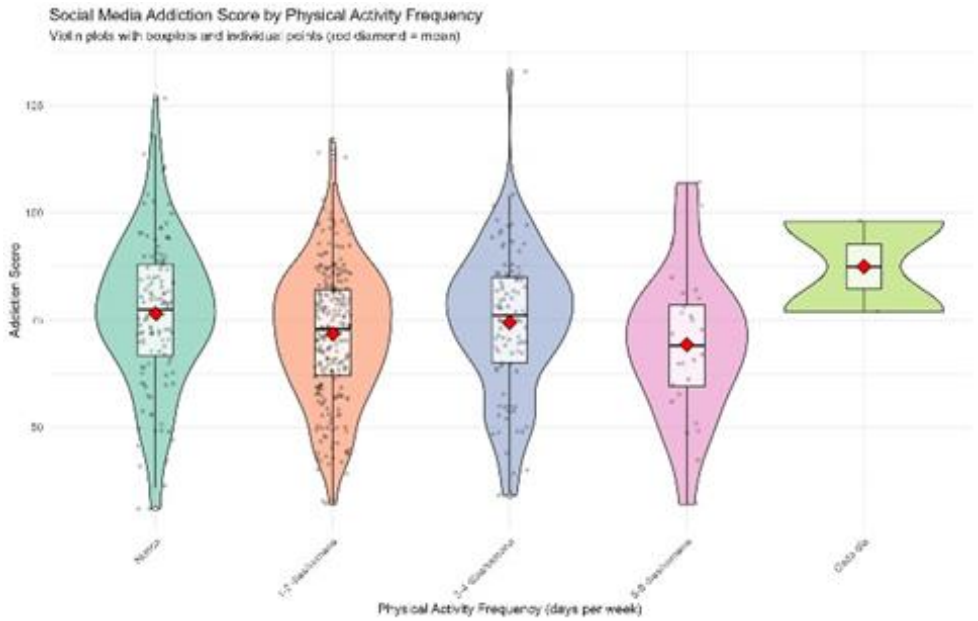

Figure 2. OLS regression model predicting total social media addiction score from physical activity levels.

When sport practice was modeled independently, the regression explained a very weak and marginally nonsignificant proportion of variance ($R^2 = 0.01$, $F(2,502) = 2.91$, $P = 0.055$). The linear term for sport practice was statistically significant and positive ($\beta = 3.76$, 95% CI [0.26, 7.26], $P = 0.035$), whereas the quadratic term was not. This finding suggests that regular engagement in sport practice was associated with slightly higher addiction scores in this sample. However, the effect size was small and should be interpreted cautiously within a descriptive framework **(Figure 3)**.

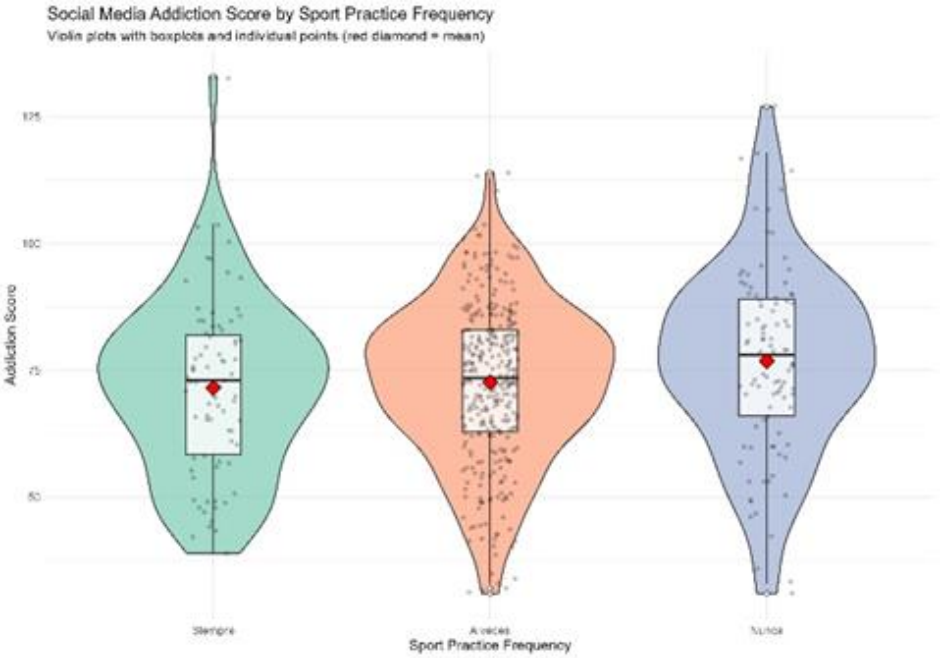

Figure 3. Social media addiction score by sport practice

Sleep duration, modeled using linear and higher-order polynomial terms, showed no statistically significant association with social media addiction. The sleep-only model explained a negligible proportion of variance ($R^2 = 0.004$, $F(4,500) = 0.45$, $P = 0.769$). None of the polynomial terms reached significance, indicating the absence of both linear and non-linear relationships between reported hours of sleep and addiction scores in isolation **(Figure 4)**.

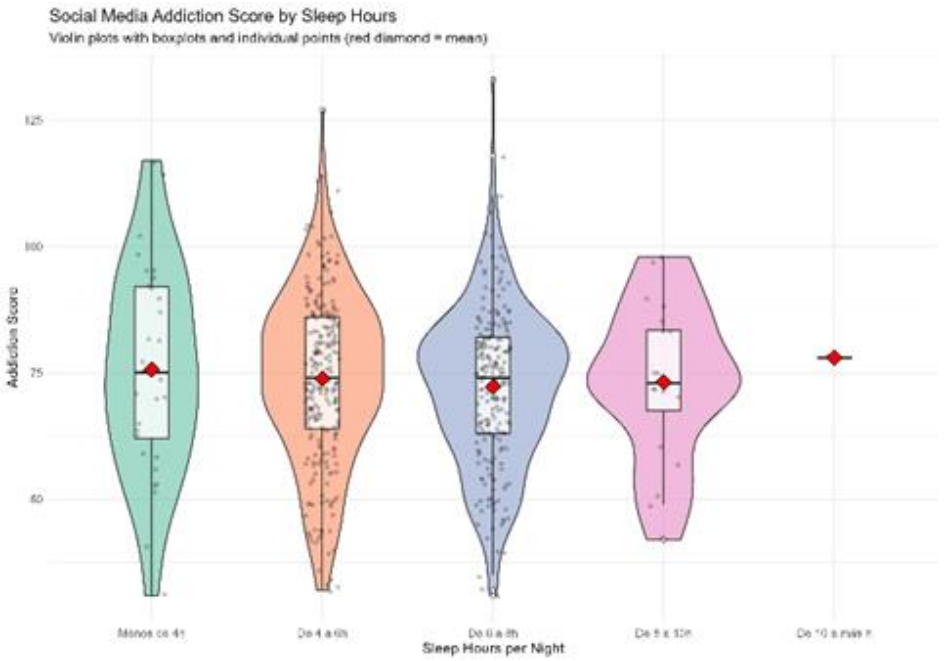

Figure 4. Social media addiction score by sleep hours

A comprehensive multivariable OLS model incorporating sleep duration, physical activity, sport practice, anthropometric variables (height and weight), and sex explained a weak and statistically nonsignificant proportion of variance in social media addiction ($R^2 = 0.05$, adj. $R^2 = 0.02$, $F(18,486) = 1.43$, $P = 0.111$). Within this model, the fourth-degree physical activity term remained statistically significant ($\beta = 5.23$, $P = 0.034$), confirming the robustness of the observed non-linear pattern. Additionally, height emerged as a significant predictor, with adverse linear and cubic effects, while sex, sleep duration, and weight showed no independent associations.

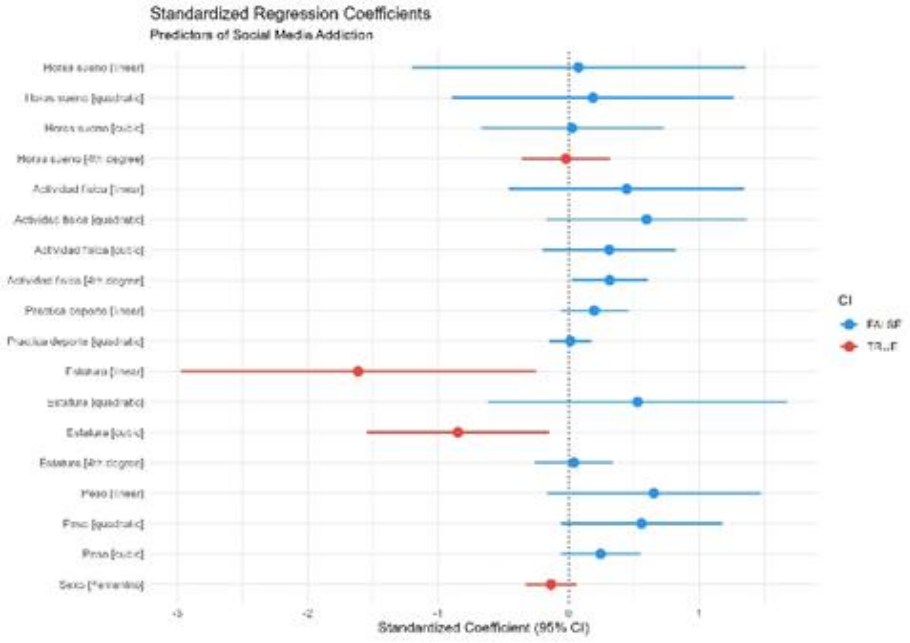

Figure 5. Regression coefficients by variable

Figure 5 presents the standardized regression coefficients (β) and their 95% confidence intervals (CI) derived from the full multivariable polynomial regression model predicting social media addiction. Standardization allows direct comparison of effect magnitudes across predictors measured on different scales. Coefficients whose confidence intervals do not cross zero are interpreted as statistically significant, while those overlapping zero indicate nonsignificant effects.

The present findings confirm that linear lifestyle indicators poorly explain social media addiction among university students, reinforcing the view that problematic digital behaviors arise from complex, non-linear, and context-dependent mechanisms. Contrary to a large body of literature reporting strong associations between sleep duration and digital addiction, sleep

variables in this study did not show an independent predictive effect after controlling for other covariates. This divergence suggests that sleep quantity alone may be an insufficient marker, and that qualitative dimensions of sleep—such as sleep quality, circadian misalignment, or nocturnal digital engagement—may play a more central role, as proposed in mediation and moderation frameworks [1, 4, 5, 12]. Thus, the absence of a direct effect in this model should be interpreted as evidence of indirect or conditional pathways, rather than as a null relationship.

A key contribution of this study is identifying non-linear effects of physical activity, particularly the significance of higher-order polynomial terms. While prior research frequently characterizes physical activity as a protective factor against social media or internet addiction [7, 8, 13], the present results indicate that extreme levels of activity may coexist with elevated addiction scores. This finding aligns with emerging evidence suggesting that highly structured or performance-oriented activity profiles may be accompanied by intensive digital engagement for monitoring, social comparison, or online coordination [14]. In this sense, physical activity does not function as a uniformly protective behavior; rather, its relationship with digital addiction depends on intensity, purpose, and integration into daily routines, supporting recent calls for compositional and time-allocation approaches.

Demographic variables—particularly sex and height—emerged as the most stable predictors in the multivariable model. Female students reported lower addiction scores, consistent with research showing gender-specific patterns of digital use and addiction vulnerability, especially among university populations [14]. The inverse association between height and addiction, while statistically robust, likely reflects latent psychosocial or developmental correlates rather than a direct causal mechanism. Taken together, these results emphasize that single behavioral deficits do not primarily drive social media addiction, but rather an interplay of demographic, behavioral, and contextual factors. This underscores the need for integrated, multilevel intervention strategies that move beyond simplistic assumptions about sleep or exercise and instead address the broader psychosocial ecology of young adults' digital lives.

Conclusion

The present study demonstrates that social media addiction among university students is not adequately explained by simple linear relationships with sleep duration or physical activity, reinforcing the growing consensus that problematic digital behaviors arise from complex and interacting mechanisms. The lack of a direct association between sleep duration and addiction aligns with recent evidence suggesting that sleep quality, circadian patterns, and nocturnal media use play a more decisive role than sleep quantity alone [4, 5]. These findings support theoretical models in which sleep functions as a mediating or moderating variable, rather than as an isolated predictor.

Moreover, the identification of non-linear effects of physical activity challenges the dominant narrative that physical exercise is uniformly protective against digital addiction [15, 16]. In contrast, prior studies report inverse associations between physical activity and problematic internet use; emerging research highlights that activity intensity, behavioral context, and time allocation critically shape this relationship [7, 17, 18]. The present results contribute to this perspective by showing that extreme or highly structured activity profiles may coexist with elevated social media addiction, underscoring the need for balanced and context-aware intervention strategies.

The greater stability of demographic predictors, particularly sex differences, emphasizes that social media addiction must be understood within a broader developmental and psychosocial framework [19]. Consistent with international evidence, male students exhibited higher vulnerability to addictive digital behaviors, reflecting gendered patterns of technology use and engagement [20, 21]. Taken together, these findings highlight the need for integrated, multilevel approaches that go beyond single-behavior explanations and address the structural, psychological, and contextual determinants of social media addiction in university populations.

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Conflict of interest: None

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Ethics statement: This study require the informed consent for whole participants, they agree participate in this research.

References

1. Akhtar F, Alali FA. Youth attitudes towards the effects of social media addiction: A study on college students in the United Arab Emirates. Dirasat Hum Soc Sci. 2026;53(1):7921. doi:10.35516/Hum.2025.7921
2. Shek TLD. Developmental issues of university students. Qual Life Asia. 2025;17:1-16. doi:10.1007/978-981-96-0251-3_1
3. Zewude GT, Natnael T, Woreta GT, Bezie AE. A multi-mediation analysis on the impact of social media and internet addiction on university and high school students' mental health through social capital and mindfulness. Int J Environ Res Public Health. 2025;22(1):57. doi:10.3390/ijerph22010057
4. Navalón-González M, Montenegro-Espinosa JA, Gutiérrez Espinoza HJ, Olivares-Arancibia J, Yánez-Sepúlveda RA, Duclos-Bastias DM, et al. Associations between social networks, messaging apps, addictive behaviors, and sleep problems in adolescents: the EHDLA study. Front Behav

Neurosci. 2025;19:1512535. doi:10.3389/fnbeh.2025.1512535

5. Acharya S, Chalise A, Marasine NR, Paudel S. Exploring the association between sleep quality, internet addiction, and related factors among adolescents in Dakshinkali Municipality, Nepal. PLoS One. 2025;20(1):e0317747. doi:10.1371/journal.pone.0317747
6. Qin X, Liu L, Yan Y, Guo X, Yang N, Li L. Smartphone addiction and sleep quality in the physical activity–anxiety link: A mediation–moderation model. Front Public Health. 2025;13:1512812. doi:10.3389/fpubh.2025.1512812
7. Che X, Lu Z, Jin Y. Social media addiction as the central mediating variable to explore the mechanism between physical exercise and sleep quality. Sci Rep. 2025;15(1):26800. doi:10.1038/s41598-025-11225-1
8. Coco L, Balla J, Noto L, Perciavalle V, Buscemi A, Di Corrado D, et al. The brain in the age of smartphones and the internet: the possible protective role of sport. Brain Sci. 2025;15(7):733. doi:10.3390/brainsci15070733
9. Solmaz S, İnan M, Şahin MY. The moderating effects of physical activity on social anxiety and sleep disturbance: managing gaming disorder in young e-sports players. Front Public Health. 2025;13:1544044. doi:10.3389/fpubh.2025.1544044
10. Ong RHS, Sim H, Bergman MM, How CH, Png CAL, Lim CS, et al. Prevalence and associations of problematic smartphone use with smartphone activities, psychological well-being, and sleep quality in a household survey of Singapore adults. PLoS One. 2024;19(12):e0315364. doi:10.1371/journal.pone.0315364
11. Sahin C. Social media addiction scale–student form: the reliability and validity study. Turk Online J Educ Technol. 2018;17(1):169-82.
12. Torres-Cruz F, Pari-Condori EY, Tumi-Figueroa EN, Coyla-Idme L, Tito-Lipa J, Gonzalez LA, et al. Prediction of university dropouts through random forest-based models. J Adv Pharm Educ Res. 2025;15:78-83. doi:10.51847/PFB18QB60J
13. Torres-Cruz F, Yucra-Mamani YJ. Artificial intelligence techniques in assessment of virtual education by university students. Hum Rev Int Humanit Rev. 2022;11. doi:10.37467/revhuman.v11.3853
14. Tse NKW, Pang NSN, Wang X, Li Y, Lo CKM, Yang X. The roles of binge gaming in social, academic and mental health outcomes and gender differences: A school-based survey in Hong Kong. PLoS One. 2025;20(8):e0327365. doi:10.1371/journal.pone.0327365
15. López JF, Flores BC, Mendoza Mollocondo CI, Cruz FT, Flores AV, Lipa M, et al. Validation of a physical activity measurement instrument and proposal of percentiles for its evaluation in university students. Rev Esp Nutr Hum Diet. 2019;23. doi:10.14306/renhyd.23.1.560
16. Mamani-Ramos AA, Damian-Nuñez EF, Inga-Arias MG, Quisocala-Ramos JA, Torres-Cruz F, Dextre-Mendoza CW, et al. Physical activity questionnaire for schoolchildren (PAQS): reliability and validity of a new proposal according to WHO guidelines. Retos. 2024;51:615-25. doi:10.47197/RETOS.V51.101142
17. Wang Y, Liu Y, Ren T, Li J. Impact of daily activity allocation on problematic internet use among university students: A compositional perspective. J Behav Addict. 2025;14:746-56. doi:10.1556/2006.2025.00039
18. Canqui-Flores B, Mendoza-Mollocondo CI, Torres-Cruz F, Fuentes-López J, Gómez-Campos R, Viveros-Flores A, et al. Validity, reliability and scale to measure the self-perception of academic stress of university students. Gac Med Bilbao. 2019;116:158-65.
19. Rajasekhar T, Setty Naveen KH, Raghav PR, Aneja J, Thirunavukkarasu P, Dutta G, et al. Exploring internet addiction and its associated factors among college students in Western Rajasthan, India: A mixed-methods study. Indian J Psychiatry. 2023;65(8):839-52. doi:10.4103/indianjpsychiatry.indianjpsychiatry_201_23
20. Fraiwan MA, Almomani FM. Internet gaming disorder: prevalence and associated factors among university students. Acta Psychol (Amst). 2025;260:105690. doi:10.1016/j.actpsy.2025.105690
21. Carpio-Vargas EE, Torres-Cruz F, Bernedo EGM, Yanqui FJM, Chaiña HCP, Zapana WHM, et al. Triadic mental quotient and lifestyles in university students during pandemic-induced confinement. J Adv Pharm Educ Res. 2023;13(3):88-95. doi:10.51847/BDDFEMVCJ1