

Original Article

Analysis of mobile phone dependence and physical activity level among school students

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Abstract

The rapid increase of cellphone usage among the youth has raised worries about possible impacts on both mental and physical well-being. Thus, the current examines the association of dependency on mobile dependence and physical activity (PA) levels among school students. The study employed a cross-sectional research design, gathering data through surveys from 330 samples studying in 11th and 12th standards in public schools. The PA level was examined by the International Physical Activity Questionnaire (IPAQ)- short version and the level of dependency on smartphones was analyzed by the Test for Mobile Phone Dependence (TMD) questionnaire. The results categorized the participants based on their observed PA levels, with percentages for low (28.19%), moderate (42.73%), and high (29.10%) PA. The results also indicated an association between PA levels and dependency of mobile, with high PA students demonstrating low dependency, moderate PA students displaying medium dependency, and low PA students exhibiting high dependency. In conclusion, mobile dependency alters the engagement in PA, as individuals increasingly prioritize screen time over active pursuits.

Keywords: mobile phone, school students, dependence, screen time, exercise

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Introduction

In the midst of the Covid-19 pandemic along with resultant lockdown measures, there was a notable surge in cell phone usage as people sought alternatives for entertainment because of the restrictions on physical activities (Tyagi et al., 2021; Srinivassin & Sasikala, 2022). Gyms, sports facilities, and educational institutions swiftly transitioned to online platforms to adapt to the new normal (Sahu, 2020). This heightened smartphone dependency, especially among students, resulted in addictive habits, characterized by prolonged engagement with social media, video content consumption, gaming, and messaging (Kuss & Griffiths, 2017).

This proliferation of smartphones has had a substantial impact on adolescents (Kandhi et al., 2019). Presently, over 60% of adolescents own a smartphone, and it's become a ubiquitous presence in their daily routines (George et al., 2020). The trade-off between physical activities and academic pursuits in favor of smartphone engagement potentially relates to adverse consequences on adolescents' academic and physical development (Domoff et al., 2019; Toh et al., 2019). Consequently, adolescence emerges as a significant risk group due to their frequent internet connectivity and technology dependency, leading to issues such

as weakened eyesight, hearing impairment, and decreased memory retention (Akulwar-Tajane et al., 2020).

Furthermore, an increase in phone usage is often accompanied by detrimental behaviors and can result in problems within personal relationships, work-related violations, as well as mental health issues including self-control problems, anxiety, depression, impulsive behavior, and reduced sleep quality (Billieux et al., 2015; Višnjić et al., 2018; He et al., 2020).

World Health Organization, state PA as “any bodily movement involving skeletal muscles that expends energy” (Posadzki et al., 2020). This encompasses movement during leisure, transportation, or work-related activities, both moderate and vigorous, which are known to promote overall health (Muntner et al., 2005). Reduced PA during adolescence is connected to reduced physical fitness, negatively affecting overall health of an individual (Kumar et al., 2015). It may contribute to the expansion of cardiovascular diseases, obesity, and osteoporosis in adulthood (Gaetano, 2016). Smartphone usage potentially exacerbates the decline in PA, further compromising physical fitness levels (Kim et al., 2015). Previous studies has focused on the usage of the internet, apps, and smartphones as solutions to combat sedentary behavior and their influence on academic score, but the interrelation between cell-phone use and sedentarism risk has received less attention. (Kim et al., 2015; Fennell et al., 2019).

Academic performance, assessed on a point scale, is closely connected to the physical fitness of adolescence. Generally, good health and low body fat in adolescence are connected with better academic performance in adulthood (Logi Kristjánsson et al., 2008; Jaswal & Jaswal, 2012). Additionally, prior research revealed that students engaged in physical activities or competitive sports tend to achieve higher academic results compared to sedentary peers (Pestana et al., 2018). Insted, spending over two hours daily in front of screens is linked with lower academic achievement among school-aged children (Ishii et al., 2020).

High schools may represent a crucial environment for assessing physical fitness and implementing measures to prevent future diseases, as they could become the primary location for adolescents to engage in physical activities. Therefore, the researcher aims to explore the impact of smartphone addiction on the PA levels of secondary school students.

Methodology

Study Design and Participants

The sample comprised of 330 higher secondary school students of two public schools in Haryana, India. The participant’s age was ranged between 16 to 18 years, and all participants own a smartphone. The questionnaire was filled in the mid of the academic year 2022–2023 in class time.

Analysis of PA Level

The research employed International Physical Activity Questionnaire (IPAQ)-short version to evaluate participants' PA. The questionnaire consisted of seven questions covering walking duration, vigorous and moderate physical activities, and sedentary behaviors. Participants were asked to record activities lasting at least 10 minutes within the last 7 days.

Weekly PA was evaluated by multiplying time by intensity, and the total weekly activity was shown in MET units. This involved the classification of daily (PA) time into different intensity levels, including walking duration, moderate PA duration, and vigorous PA duration. These separate time measurements could be summed up to evaluate the total duration of daily PA (IPAQ Total duration).

After getting IPAQ total duration, the volunteers were split into three levels of PA: Low, Moderate, and High. Individuals failing to meet the conditions for High and Moderate are placed in the Low category. To be classified as Moderate, individuals meet criteria for 3 or more days of vigorous-intensity activity, 5 or more days of moderate-intensity activity, or 5 or more days of walking, moderate-intensity, or vigorous-intensity activities achieving a minimum total physical activity of 600 MET-minutes/week. The High category demands either 1500 MET-minutes/week of vigorous-intensity activity on not more than 3 days or 3000 MET-minutes/week of a combination of walking, moderate-intensity, or vigorous-intensity activities on at least 7 days.

Analysis of Mobile Phone Dependence

Analysis of dependency on mobile was done by using a self-reported 22 questionnaire “test for mobile dependence” (TMD) (Toda et al., 2006). Each answer was counted on a Likert scale (0, 1, 2, 3, 4). Likert scores for each item were then added to give a final mobile phone dependence score ranging from 0 to 88. Higher scores denote a higher level of dependency. The starting 10 items are answered on scales ranging from 0 (never) to 4 (frequently). The last 12 items carry a scale starting from 0 (completely disagree) to 4 (completely agree) (Toda et al., 2006).

Statistical analysis

Descriptive statistics was used to analyze the data. All the values are expressed in mean and standard deviation. For statistical analysis SPSS (Statistical Package for Social Science) Version 25 was used.

Results and Discussion

The current research was aimed to examine the PA level and level of dependency mobile among school students. All participants completed the survey (n = 330, response rate 100%). The age of the participants was 17.22 ± 0.8 years. Fig 1 summarizes the PA level and mobile phone dependence. In current study, the mean PA levels of the participants were found to be 4490.98 ± 2599.76 MET-min/week.

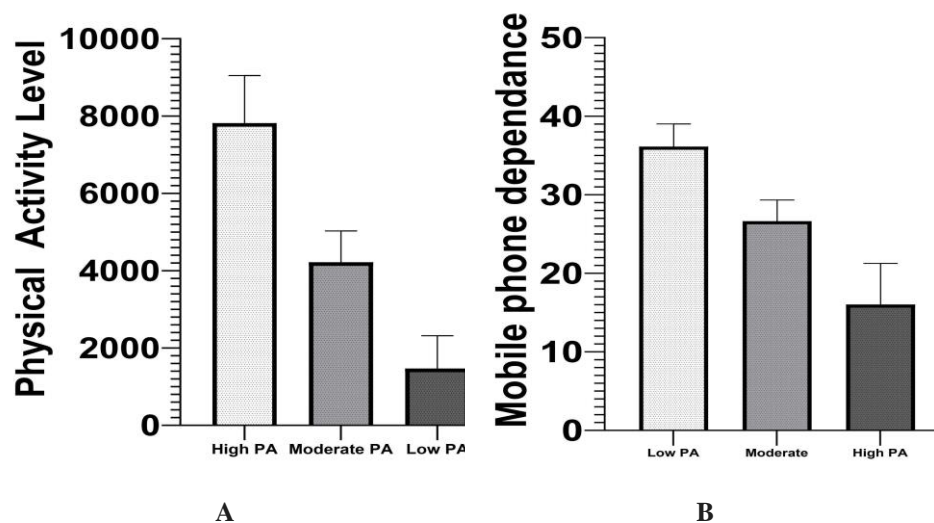


Fig 1. (A) Level of PA, (B) Level of Mobile phone Dependence

The standard deviation value denotes that the PA level does not provide a normal distribution for the participants. Results for categorical PA levels were observed as 28.19%, 42.73% and 29.10% for low, moderate, and high PA, respectively. People who engage in consistent PA experience positive outcomes in psychological, social, and physical well-being (Bahram & Shafizadeh, 2006; Pressman et al., 2009). The associated health advantages encompass a reduced risk of heart disease, cancer, type 2 diabetes, lower blood pressure, and a decreased susceptibility to conditions like osteoporosis and obesity.

Smartphones enhance productivity by offering a wide array of applications and tools that streamline daily tasks. According to the PEW Research Center, “67% of smart phone users have admitted to check their phone for calls or messages when their phone did not vibrate or ring” (Kodi et al., 2021). After the onset of covid-19 pandemic, learning virtually grows drastically causing a unique growth of e-learning and remote digital platform-based education (Gaol & Prasolova-Førland, 2023). Smartphones and internet play a crucial part in a student for the betterment for their studies. But the constant notifications, social media alerts, and the allure of entertainment on smartphones also lead to distraction and decreased concentration.

The findings of the current study revealed students possess different levels of PA and also, they differ in the dependency of smartphone. Smartphones are continually enhanced by extending their capabilities, leading to a higher risk of excessive usage and dependence (Leung & Liang, 2015; Rosaline & Johnson, 2020). Smartphone addiction is actually problematic for everyone particularly young people i.e., studying in schools, colleges and universities, preparing for competition (Dhiman, 2021).

The findings also revealed high PA level students have low dependence on smartphones and the student with a moderate level of PA possess medium dependency on the smartphone. But the students with low PA level were highly dependent on smartphones. The findings also supports the finding observed in a prior study done by Tong & Meng, revealed that consistent participation in PA may have higher levels of optimism and lower levels of smartphone addiction among students (Tong & Meng, 2023). The low level of PA among college students is significantly negatively related to smartphone addiction and loneliness (Yuan et al., 2022). In adolescents, involvement in physical exercise also effective in mitigating smartphone addiction by regulating the brain neurotrophic factor, endocrine system, and immune system (Tong & Meng, 2023).

Conclusion

In conclusion, the interrelation between PA and smartphone use is multifaceted, involving both dark and light aspects. Despite smartphones offer valuable resources for fitness and well-being, their extensive use may also result in sedentary behaviors and distraction during exercise. Maintaining a balance between leveraging the advantages of mobile technology for encouraging PA and mitigating potential drawbacks is crucial for promoting a healthy and active lifestyle in the school students. Mobile Dependence has been found to be an arising matter of public health. The identification of Smartphone Dependence as a growing public health concern underscores the necessity for early recognition, awareness campaigns, and the implementation of educational and treatment interventions. These efforts are essential to combat inappropriate phone use among the youth and prevent the escalation of a significant public health issue.

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