RGUHS
Journal of Nursing Sciences

CASE REPORT

A Case Report on Examining the Effectiveness of a Self-Management Training Program for Adolescents at High Risk of Smartphone Addiction

Venkatesh Murthy J [1]*, Veena Gretta Tauro[2]

[1]Department of Paediatric Nursing, ESIC College of Nursing, Bangalore, Karnataka, India

[2]Department Paediatric Nursing, Masood College of Nursing, Mangalore, Karnataka, India

***Corresponding author:**

Dr. Venkatesh Murthy J, Assistant Professor, Department of Paediatric Nursing, ESIC College of Nursing, Bangalore, Karnataka, India. Email: jvmurthy19@gmail.com

Received date: December 18, 2023; **Accepted date:** July 19, 2024; **Published date:** July 31, 2024

Abstract

Smartphone usage is indispensably beneficial to everyone and a de facto means for convenience, mobility, connectivity, and socialization. Smartphones have rapidly penetrated people's daily lives and permanently changed their daily routines. However, excessive smartphone usage has been associated with physical and psychological health problems, including decreased academic performance in children and young adults. The overuse of smartphones is a form of technological addiction and has become a major global concern across societies. Cognitive behavioural therapy (CBT) is the most effective therapy, but it requires a professionally trained health worker. Therefore, the need to adopt a collaborative approach to prevent problematic smartphone use is brought into consideration. The adolescent mindset makes it difficult to focus. Hence, the researcher developed a new approach to control adolescents' drive and desire for smartphone overuse by using self-regulation techniques and training them to combat overuse of smartphones. The aim of the article was to identify the level of smartphone addiction among adolescents and its effective management with the help of Self-Management Training Program (SMTP) among adolescents.

Keywords: High risk for smartphone addiction, Physical health, Psychological health, Self-management training program (SMTP), Adolescents

Introduction

The twenty-first century is referred to as the 'information era'. The internet and wireless communication are amazing technologies that have completely changed the communication landscape.[1] While smartphones are valuable tools, they can also pose significant risks, particularly for adolescents and young adults. The availability of information on a smartphone can simplify life. But the convenience comes at a cost; the smartphones can be difficult to put down, and their technology purposely keeps its users engaged.[2]

A new public health problem emerged with the epidemic of 'smartphone addiction', especially among young adults in Asian countries.[3] The prevalence of smartphone addiction among the participants was 33.0% which was higher. Smartphone addiction was observed to be more prevalent among boys than girls.[4]

A fine line exists between healthy and compulsive smartphone use. Depending too heavily on a device can lead to smartphone dependence, smartphone overuse, or smartphone addiction. Smartphone addiction is a pleasure-seeking behaviour. Such an addicted individual exhibits few signs and symptoms in his daily life, viz., neglect or trouble completing duties at work, school, or home; spending long hours on phone; checking profiles repeatedly due to anxiety; working later to complete tasks; a weak or non-existent social life; fear of missing out; isolation from loved ones; lack of concentration; being angry or irritated if phone use is interrupted; reaching the phone at the moment when alone or bored; phantom vibrations; craving access to a smartphone; and difficulty in limiting smartphone use.[5]

Increased impairments in daily activities due to the overuse of smartphones among adolescents can negatively affect physical and mental health.[6] It has been associated with pain or discomfort in the neck, wrist, and back, and obesity associated with abnormal eating behaviours, change in the vision or sight, disturbed sleep, loneliness, anxiety, stress, depression, irritability, restlessness, low self-esteem, shyness, risk for suicidal tendencies, nomophobia, fear of missing out, decreased academic performance among schoolers, conflict of interpersonal relationships, family disharmony, and social maladjustment.[7]

Potential harm brought on by excessive and maladaptive smartphone use

For adolescents, a key area of functioning is their academic performance. Several studies reveal that smartphone addiction is regarded as an emotional regulation approach for mood enhancement that requires cognitive effort. Adolescence involves rapid physical growth, psychological development, and cognitive development.[8]

In this regard, understanding the level of knowledge on smartphone addiction among adolescents is important, which can help the researcher plan the intervention programs required to combat the problematic overuse of smartphones. Hence, the researcher developed a package of interventions called the 'Self-Management Training Program' (SMTP), which includes importing knowledge on smartphone addiction, its prevention and control, as well as strengthening the psychological wellbeing of an adolescent by incorporating the selected Sukshma vyayama (subtle yoga), pranayama, and yogasanas. The present study aimed to evaluate the effectiveness of SMTP on high-risk smartphone addiction among adolescents.

Case Presentation

This case report discusses the case of a 14-year-old adolescent boy studying 9th standard in a state syllabus curriculum at a private aided high school. He belonged to a nuclear family where both parents were graduates, and the father was the breadwinner of the family, with a family income of more than Rs. 40,000. During a face-to-face interaction regarding mobile usage, he revealed that he used his parents' smartphone for around 2-3 hours on weekdays and 3-4 hours on weekends and holidays. He had an unlimited internet package that was accessed via both Wi-Fi and mobile data. Due to the unlimited internet facility, he started using his mobile without any interruption. He was prescribed spectacles at the age of five years, and there was decline in his eye sight. He reported a habit of taking phone to bed and using it daily for 30-45 minutes before sleep.

He cultivated the habit of using his mobile phone while having food, especially for long hours (≥ 1 hour) during dinner. He never consumed adequate quantity of food. Gradually, he started using phone for longer hours each day, eventually finding it difficult to stop. Subsequently, the smartphone occupied his study time at home, but it did not disturb his concentration in school. He was an above-average performer in studies. He reported using smartphones frequently for internet browsing, occasionally for educational activities and viewing/reviewing social media networks, rarely for entertainment, phone calls, and text messages, and reported never using for playing mobile games.

The adolescent was screened for smartphone addiction using the Smartphone Addiction Scale Short Version (SPA-SV), which includes 10 statements on smartphone usage on a six-point scale ranging from minimum 1 (strongly disagree) to maximum 6 (strongly agree), which distinguishes the 'high-risk for smartphone addiction' group from the 'addiction' group. It categorizes the different ranges of scores for males and females and can be called "addicted" if the score is more than 31 in males and more than 33 in females.[9] If the score is between 22 to 31 and 22 to 33, it is referred to as "high risk for smartphone addiction" among males and females, respectively,[10] while the scores less than 22 can be referred to as "no addiction" in both the genders.[9,10]

On ethical consideration, the adolescent with a high risk for smartphone addiction was selected for the case study. This scale was used once for baseline data before the intervention and three times after the intervention on the 30th, 60th, and 90th days.

The researcher developed a self-administered questionnaire to assess the knowledge of smartphone addiction. It comprised a total of 26 questions on the general aspects of smartphone addiction, the impacts of smartphone addiction on physical and psychological health, and prevention and control measures for smartphone addiction. Each question had four alternative options, one of which was the correct answer. Each correct answer was awarded a score of '1' while the wrong answer was given a score of '0'. Based on the obtained score, it was categorized as 'excellent', 'good', 'average', and 'poor'. This scale was used once prior to the educational session for baseline data and twice after the educational session on the 15th and 90th days.

As part of the physical health assessment of adolescent, Body Mass Index (BMI) was calculated and subjectively assessed for digital eye strain, disability of arms, shoulders & hands, and sleep quality. As part of the psychological health assessment of adolescent, depression, anxiety, and stress were assessed using subjective questionnaires, which were carried out once for baseline data before the intervention and three times after the intervention on 30th, 60th, and 90th days, along with two follow-up or reinforcement sessions.

The adolescent's height (in centimetres) and weight (in kilograms) were measured to calculate the Body Mass Index (BMI). BMI less than 18.4 kg/m^2 was considered 'underweight', 18.5 to 24.9 kg/m^2 'normal', 25 to 29.9 kg/m^2 as 'overweight', 30-34.9 kg/m^2 as 'obese', 35-39.9 kg/m^2 as 'severely obese', and over 40 kg/m^2 as 'morbidly obese'.[11] This assessment was done once before the intervention and at the end of the 90th day after the intervention.

In continuation of the physical health assessment, the adolescent was assessed using the Computer Vision Syndrome Questionnaire (CVS-Q)/Digital Eye Strain (DES), which is characterized by a range of eye and vision-related symptoms, to assess the digital devices linked to potential problems. It required users to indicate the frequency and intensity of 16 symptoms experienced during mobile use to measure the frequency of occurrence (a scale of 0-3 points) as well as the intensity (a scale of 1-2 points) of each symptom. The total score of CVS-Q ranges from 0 to 32. If the total score is ≥ 6 points, it is considered positive for digital eye strain or computer vision syndrome.[11]

The QuickDASH (Disability of Arms, Shoulders, and Hands) scale consists of a self-reported questionnaire that contains 11 items measuring an individual's ability to complete tasks, absorb forces, and severity of symptoms that he experienced in last week (seven days) and presents with one or more disabilities of the arm, shoulder, and hand by rating his disability and interference with daily life on a 5-point Likert scale (1 being 'no difficulty', 5 being 'unable'). Higher scores indicate a greater level of disability and severity. The score ranges from 0 (no disability) to 100 (the most severe disability).[12]

As part of the physical health assessment, the sleep quality and pattern were assessed using the Pittsburgh Sleep Quality Index (PSQI). It differentiates "poor" from "good" sleep quality by measuring seven areas (components) using 18 questions pertaining to the last month. To score the questionnaire, each of the individual questions is assigned a score from 0-3. The item scores are used in computing the seven component scores, which are then added to produce a global score. The global score can range from 0 to 21. Any total score obtained that is greater than 5 is suggestive of a significant sleeping disorder or indicative of poor sleep quality.[13]

The psychological health assessment was assessed using 21 items from the Levibond and Levibond questionnaires on depression, anxiety, and stress scales (DASS) over the past week. Each of them contains seven items on a 4-point scale. There are established cut-off scores to categorize the individual scores into mild, moderate, severe, and extremely severe categories.[14]

As part of the pre-interventional assessment, the adolescent was found to be at 'high risk of smartphone addiction' with a score of 30 on SPA-SV. His knowledge of smartphone addiction was average. BMI was shown as 'underweight'. He had digital eye strain (scored 8, against a normal score range of 0-5) with subjective complaints of itching in the eyes, tearing, feeling heavy eyelids, sighting worsening, difficulty focusing near vision, headache experienced occasionally with moderate intensity, and redness of eyes often with moderate intensity for CVS-Q. The adolescent expressed

mild disability of arms, shoulders, and hands function on QuickDASH. The PSQI scale revealed that he had poor quality sleep (a score of 6, against the normal score of less than 5). He exhibited severe anxiety as part of the DASS psychological health assessment.

After the pre-assessment, the two sessions of educational programs were conducted on general aspects of smartphone addiction, its impact on physical and psychological health, and its control and preventive measures. The adolescent was taught and demonstrated the Self-Management Training Program (SMTP) for two weeks (on all working days) daily for a period of 40-45 minutes per session on the school campus, followed by the practice component of SMTP every day for 90 days at home. SMTP is a collaborative and non-pharmacological approach that has tangled with two educational sessions, followed by the demonstration and daily practice of selected Sukshma vyayama/joint exercises from head to foot and selected steps of pranayama, including vitalizing pranayama, sectional (vibhagiya) breathing, cooling (sheetali) pranayama, and resounding (bhramari) pranayama. Yogasanas were performed in standing and sitting postures. The adolescent was instructed to maintain a log sheet at home pertaining to daily practice of SMTP, duration of smartphone use, and general sleeping habits.

To evaluate the effectiveness of SMTP, the adolescent was re-assessed in a time-series design pattern on the 30th, 60th, and 90th days after the introduction of SMTP. At the end, there was a reduction in the smartphone addiction score from “high risk for smartphone addiction” to “no smartphone addiction." His knowledge of smartphone addiction scores was enhanced from average to excellent. There were no changes in his BMI score, but his appetite improved. The decrease in the digital eye strain (DES) score to below 5, which indicates “NO DES," was accompanied by a decrease in subjective symptoms of eye itching, tearing, sensitivity to light, headache, and redness of the eyes on CVS-Q. There was improvement in functional capacity of the arms, shoulder, and hands on the QuickDASH scale and improvement in quality and pattern of sleep on the PSQI scale. There was reduction in anxiety levels, which was indicated by the anxiety score (DASS). These improvements were observed only after the regular practice of SMTP.

Discussion

Smart phones have and will eventually become an integral part of one’s life, starting from late childhood to old age, as they offer a variety of applications not only for communication purposes, but also for information, education, and entertainment available at their fingertips.[15]

Warning signs of smartphone addiction are, increasing use of a smartphone for long hours, even while eating and at bedtime, persistent failure in attempts to keep the phone away, loss of sense of time, reduced work performance, withdrawal from cell phone results in anger, tension, irritability, and restlessness, weight changes due to altered pattern of eating, difficulty in paying attention, change in sleeping pattern, isolation from social activities.[16]

An expanding collection of research is emphasizing how crucial it is to address the impact of smartphone addiction on adolescents' physical, psychological, and social health. Sleep disturbances are more prevalent among high-mobile phone users due to an increase in sleep latency. The use of a mobile phone at bedtime significantly increases sleep latency and adversely affects sleep. Calls and text messages received during sleep hours may lead to persistent night awakenings. A smartphone screen emits blue light, which subsequently decreases the production of sleep hormone, melatonin, hence the pattern and quality of sleep is deranged.[17]

The relevant socio-demographic variables of adolescent and his characteristics of smartphone use, the adolescent’s level of smartphone addiction and his physical health, such as eye stains, functional ability of arms, shoulders, and hands, sleep quality, and body mass index, were assessed. His psychological health, including depression, anxiety, and stress, was assessed using standardized research tools. The study was conducted from the last week of June 2023 to the first week of October 2023.

If not identified and considered now, the intensity of smartphone addiction would emerge as a huge public health problem in India and around the globe.[15] While taking advantage of the educational benefits of smartphones, adolescents also use these devices in inappropriate ways, leading to disciplinary and educational problems.[18] The adolescent used his

smartphone primarily for social media, followed by entertainment, education, and web surfing. The median daily usage of smartphone was found to be four hours among adolescents.[15]

India being a 'Yoga Guru' (yogic teacher), has been motivated to inculcate the use of selected Sukshma Vyayama from head to foot and selected steps of pranayama and yogasanas, which help strengthen the physical health, firmness, steadiness, and lightness of body and improve the functional capacities of the joints and also develop mental faculties concentration, hence purifying the mind. This helped the adolescent to combat excessive use of smartphones in his daily life with confidence and determination. When asanas are done in a slow and steady manner, they generally stimulate the parasympathetic nervous system. Thus, there is a feeling of being refreshed and rejuvenated. While pranayama enhances mental focus, respiratory function, and stress reduction, yoga promotes flexibility, strength, balance, and cardiovascular health. Due to its multiple benefits, yoga has been gaining popularity among all age groups recently.[19]

As we are aware, nurses play an important role in helping adolescents and young adults combat drug and alcohol addictions and even behavioural addictions. Similarly, nurses can also play a vital role in non-substance addictions like smartphone addiction through education, counselling, cognitive behaviour therapy, collaboratively working with parents, counsellors, and therapists, and even the conduct of yoga sessions. This will help to promote a positive attitude towards the goal and break their smartphone usage. The implementation of this program is recommended for reducing dependence and promoting proper use of smartphone devices.

This SMTP was found to be effective in reducing the smartphone addiction level, decreasing the duration of phone usage to minimal (around 45 minutes/day), improving the quality of sleep, and reducing eye strain and anxiety. A similar study can be conducted on a large sample to determine the effectiveness of the interventions on a heterogeneous population.

As the smartphone is a multifunctional device, adolescents should be prevented from overusing, instead of dealing with their smartphone addiction at a later stage. The following measures are advised to follow in their daily usage of phones, which can help adolescents minimize the use of smartphones.

- Set a schedule for using the phone. Commit to reducing the time spent on phone activity.
- Instead of using a phone, engage in face-to-face communication.
- Create a "phone-free" zone at home and ask everyone not to carry a phone.
- Spend time with family members and friends; plan an outing.
- Actively involve in indoor or outdoor games instead of playing mobile games.
- Switching off the smartphone keeps the phone out of reach.
- Remove the unnecessary apps from smartphone.
- Avoid using e-books; instead use printed material for studies.
- Find healthier and more effective ways of managing stress and anxiety by practicing relaxation techniques.
- Don't carry the smartphone to the dining hall while having food or to the bedroom while sleeping. Turn off the notification alert.
- Encourage adolescents to participate in social and other interesting activities.
- Download the apps that control the use of smartphone activities.
- Take professional help for healthy use of smartphone.

Conflict of Interest

None

Ethical Consideration

Official permission was obtained from the competent authorities of the Educational Department (Commissioner of Public Instruction, Director, DDPI, and BEO) of the Government of Karnataka; institutional permission was obtained from the Head of the Institution. Written consent was obtained from the parent and assent from the subject.

Acknowledgment

We are grateful to the school's competent authority for giving permission to conduct the study and to the adolescent for his participation and sharing of his information during interaction and data collection. Sincere thanks to all the publishers and authors who have provided references for this study.

References

1. Ratan ZA, Parrish AM, Zaman SB, *et al.* Smartphone addiction and associated health outcomes in adult populations: A systematic review. Int J Environ Res Public Health 2021;18(22):12257.
2. Ertemel AV, Ari E. A marketing approach to a psychological problem: Problematic smartphone use on adolescents. Int J Environ Res Public Health 2020;17(7):2471.
3. Chiang JT, Chang FC, Lee KW, *et al.* Transitions in smartphone addiction proneness among children: the effect of gender and use patterns. PLoS One 2019;14(5):e0217235.
4. Gangadharan N, Borle AL, Basu S. Mobile phone addiction as an emerging behavioral form of addiction among adolescents in India. Cureus 2022;14(4):e23798.
5. Shoukat S. Cell phone addiction and psychological and physiological health in adolescents. EXCLI J 2019;18:47-50.
6. Domoff SE, Sutherland EQ, Yokum S, *et al.* Adolescents' addictive phone use: associations with eating behaviors and adiposity. Int J Environ Res Public Health 2020;17(8):2861.
7. Jeong YW, Han YR, Kim SK, *et al*. The frequency of impairments in everyday activities due to the overuse of the internet, gaming, or smartphone, and its relationship to health-related quality of life in Korea. BMC Public Health 2020;20(1):954.
8. Mahapatra S. Smartphone addiction and associated consequences: role of loneliness and self-regulation. Behaviour Information Technology 2019;38(8):833-844.
9. Kwon M, Kim DJ, Cho H, *et al.* The Smartphone Addiction Scale: Development and validation of a short version for adolescents. PLoS One 2013;8(12):e83558.
10. Nuttall FQ. Body Mass Index: Obesity, BMI, and health: A critical review. Nutr Today 2015;50(3): 117-128.
11. Seguí Mdel M, Cabrero-Garcia J, Crespo A, *et al.* A reliable and valid questionnaire was developed to measure computer vision syndrome at the workplace. J Clin Epidemiol 2015;68:662-673.
12. Gummesson C, Ward MM, Atroshi I. The Shortened Disabilities of the Arm, Shoulder and Hand Questionnaire (Quick DASH): Validity and reliability based on responses within the full-length DASH. BMC Musculoskelet Disord 2006;7:44.
13. Buysse DJ, Reynolds CF, Monk TH, *et al.* The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Psychiatry Res 1989;28(2):193-213.
14. Lovibond SH, Lovibond PF. Manual for the Depression Anxiety & Stress Scales. 2nd Ed. Sydney: Psychology Foundation; 1995.
15. Pandya CN, Christian DS, Patel MH. A cross-sectional study on smart-phone addiction among late adolescents and young adults (aged 15 to 24 years) of Ahmedabad city, Gujarat, India. J Evid Based Med Healthc 2021;8:491-496.
16. Panova T, Carbonell X. Is smartphone addiction really an addiction? J Behav Addict 2018;7(2): 252-259.
17. Sinha S, Dhooria S, Sasi A, *et al.* A study on the effect of mobile phone use on sleep. Indian J Med Res 2022;155(3-4):380-386.
18. Heravi MM, Khosravan S, Mohammadi A, *et al.* Effects of self-management training on smartphone dependence in low to moderate adolescent males' users. Behav Change 2023;40(1):67-75.
19. Pal R, Adhikari D, Heyat MBB, *et al.* Yoga meets intelligent internet of things: Recent challenges and future directions. Bioengineering (Basel) 2023; 10(4):459-459.