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A Study of Addictive Behaviors, Physical, Psychological and Social Impact of Virtual Internet Usage in adolescents of Chandigarh, India

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ABSTRACT

Introduction

Social media plays a significant role in shaping the identities of today's adolescents. They curate their online personas, often presenting idealized versions of themselves to their peers. This can lead to both positive and negative effects on self-esteem and self-image. In contrast, older generations may have had fewer opportunities to construct such curated identities online. Therefore, it is a need of time to study and research about effects of virtual reality on community so that adverse effects can be prevented which is the main goal of public health research.

Objective The study was conducted to assess the prevalence of addictive behaviors, to examine the physical health consequences, to explore the psychological impact and to investigate the implications of virtual internet world on social behavior of adolescents.

Methods It is a cross-sectional observational community setting study conducted in adolescents of Chandigarh. It includes students from 6th to 10+2 ongoing school children. It includes representation from both government and private schools during year 2023.

Results As per study 57.3% of adolescents shows mild to severe internet addiction. Internet gaming addiction is severe in 4.6% and moderate in 6.3% adolescents. 2% adolescents show severe online shopping addiction and 37.1% shows video streaming addiction out of which 16.3% shows moderate to severe addictive behavior. Social media has high addictive behavior of 42.2% and severe addiction of social media at 7.1% is quite alarming. 12% of adolescents shows mild to severe stress, 26% adolescents have moderate to severe anxiety and 28% of adolescents shows mild to extremely severe depression out of which about 8% has severe depression. Eyes strain (37.3%) and shoulder or back pain (31.4%) are the most observed physical discomforts associated with internet usage in adolescents of Chandigarh. 19% adolescents are socially isolated and more than half of adolescents are active on almost all social parameters. Facebook/Instagram is significantly associated with Stress, Anxiety and Depression in adolescents. WhatsApp/Telegram is also significantly associated with Stress. all five addictions are highly significantly correlated with Stress, Anxiety and Depression. Social Score is mostly inversely correlated with addictions except online shopping addiction which is positively correlated. Significant correlation of Social Score is only with video streaming addiction which means if adolescents are socially active there is significant reduction in video watching. Virtual internet world is affecting adolescents physically, psychologically and socially and even addictive behaviors are also seen.

Key words: Virtual Internet World, Psychological impact, Adolescents

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Introduction: Internet is a source of development and opportunities for people, as it allows them to communicate, obtain information, and develop the ideas. Virtual reality is an interactive computer-generated experience that takes place in a simulated environment and includes primarily auditory and visual feedback. A cyberspace is a virtual reality network. It has been shown that internet gamers can experience isolation, leading to depression, anxiety, and difficulty dealing with the real world. In today's world everyone is involved in cyber world through mobiles and computers. However, despite all the advantages it implies, it also poses risks, especially for adolescent age group. Currently, adolescents live in a very different way from other generations, and have a complex and bidirectional relationship between what is occurring online and offline. Adolescents are shaping their reality by connecting their offline and online worlds, the latter frequently predominate (M Rouse, n.d.).

 One of the features of today's adolescents is intense use of internet via mobile phones which distinguishes them from previous generations. There is a clinical and social relevance of inappropriate internet use. The problematic use of the internet have a negative impact on health including changes in health habits (sleep, eating, physical activity, etc.) and their interference in the family, social, and academic life. There is scientific consensus around the fact that excessive internet use has negative results, especially during the sensitive developmental period of adolescence (Costa et al., 2018)

In recent years, the virtual internet world has become an integral part of the daily lives of adolescents worldwide, presenting both opportunities and challenges. Chandigarh, India, a rapidly developing city known for its modern infrastructure and vibrant youth culture, is no exception to this trend. As adolescents in Chandigarh increasingly immerse themselves in the virtual internet world, it becomes imperative to understand the multifaceted impact of this digital landscape on their well-being. The pervasive nature of the virtual internet world offers

unprecedented avenues for social interaction, entertainment, and information dissemination. However, concerns have been raised regarding the addictive potential of online activities, as well as their implications for physical health, psychological well-being, and social relationships among adolescents.

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Numerous studies have explored the effects of excessive internet use and specific online behaviors on adolescents' mental health and social functioning, the concept of internet addiction and its parallels with substance dependence, shedding light on the addictive nature of certain online activities (Griffiths, M. et al 2005). There is association between internet addiction and various psychological factors such as anxiety, depression, and low self-esteem (Kuss & Griffiths, 2012) and (Andreassen et al., 2016)

While there is a wealth of research on internet addiction and its correlates in global contexts, there is a paucity of studies focusing on the specific experiences of adolescents in India. Given the unique socio-cultural context of the region, it is essential to examine how the virtual internet world influences addictive behaviors and impacts physical, psychological, and social aspects of adolescent life in this setting. Therefore, it is a need of time to study and research about effects of virtual reality on community so that we can prevent adverse effects which are the main goal of public health research.

Objectives This observational study aims to address this gap by investigating the following objectives:

- To assess the prevalence of addictive behaviors related to the virtual internet world among adolescents in Chandigarh.
- To examine the physical health consequences, including sleep disturbances, eyestrain, headache and other complaints associated with excessive internet use.
- To explore the psychological impact of internet addiction on adolescents' mental health and well-being, including symptoms of anxiety, depression, and stress.
- To investigate the implications of virtual internet world on social behavior of adolescents

Methodology: Study was conducted on Adolescent (10-19 years old) in Chandigarh. City was divided into four quadrants according to the directions of the city map. From each quadrant, Government Schools, Private Schools and other educational institutions were randomly selected. Three Government and three private school were selected. A cross-sectional study was conducted involving 410 adolescents (aged 10-19 years) from Chandigarh. Self-designed Questionnaire was used for assessing the internet, social media, online shopping, internet gaming and video streaming related addictive behaviors. Self-designed questionnaire was also used for assessing physical and social well-being. DASS-21 Questionnaire was used for assessing psychological impact. Study is ethically approved from Ethical Committee of Panjab University. Permission from school education department and school authorities were taken. Consent of parents and children were taken. Study period is April 2023 –September 2023.

Statistical Analysis: The data collected was analyzed by using MS Excel and IBM SPSS Statistics software (Version 23.0). The Qualitative data was analyzed using graphs and tables and associations being tested by chi-square test. Correlations were computed for different quantitative variables.

Results Students of three Government and three private schools participated in the study. Students from 6th to 12th class were taken randomly. 410 students participated in the study.

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Table 1: Socio demographic profile of respondents

Indicator	Category	N (%)
Sex	Male	207(50.5%)
	Female	203(49.5%)
Age	10-13 years	138(33.7%)
	14-16 years	229(55.9%)
	17-18 years	43(10.5%)
Type of School	Government School	160(39%)
	Private School	250(61%)
Educational Status	Middle School	100(24.4%)
	High School	124(30.2%)
	Senior Secondary School	186(45.4%)
Religion	Hindu	334(81.5%)
	Sikhs	62(15.1%)
	Muslim	12(2.9%)
	Others	2(0.5%))
Residential Area	Urban	400(97.6%)
	Rural	10 (2.4%)
Monthly Income	Below 12000	66(16.1%)
	12000-24000	87(21.2%)
	24000-48000	78(19%)
	48000-96000	106(25.9%)
	Above 96000	73(17.8%)
Family Type	Nuclear Family	278 (67.8%)
	Joint Family	132(32.2%)
Residing at	Home with Parents	401(97.8%)
	Relatives House	6(1.5%)
	Hostel	1(0.2%)
	Alone	2(0.5%)

The results are presented below:

Table 1 shows socio demographic profile of respondents. The distribution of male and female was almost same. Major group of responses belongs to 14-16 yrs of age (55.9%) belonging to 8th,9th,10th and 10+1 classes. Private school students (61%) has more participation than government school students (39%). Major participation is from high school and senior secondary classes i.e. 9th to 10+2 classes. Hinduism was the religion of most of the participants (81.5%). As Chandigarh is the capital city of Haryana and Punjab, major chunk of respondents were urban (97.6%) living with their parents (97.8%). Nuclear Family setup (67.8%) is common in respondents as study area was a capital city of Chandigarh. Most of the respondents are from Lower and Middle Class economical

background. Regular internet users for work (study) were 94.4% out of 410 respondents.

Table 2 Average daily Internet time usage

Usage	0-1 hr	1-2 hr	2-5 hrs	5-10 hrs
Entertainment sites	160(39%)	250(61%)	0(0%)	0(0%)
Chat Rooms	273(66.6%)	137(33.4%)	0(0%)	0(0%)
WhatsApp/Telegram	206(50.2%)	204(49.8%)	0(0%)	0(0%)
Online Gambling	377(92%)	33(8%)	0(0%)	0(0%)
Online Gaming	232(56.6%)	178(43.4%)	0(0%)	0(0%)
Online Shopping	305(74.4%)	105(25.6%)	0(0%)	0(0%)
Adult Sites	379(92.4%)	31(7.6%)	0(0%)	0(0%)
Video streaming/YouTube	158(38.5%)	251(61.2%)	0(0%)	1(0.2%)
Social media like Facebook, Instagram	238(58%)	172(42%)	0(0%)	0(0%)
Online dating Sites like Tinder	387(94.4%)	23(5.6%)	0(0%)	0(0%)
Other	377(92%)	33(8%)	0(0%)	0(0%)

Table 2 shows that adolescents mainly use internet for browsing entertainment sites, WhatsApp/telegram chatting, online gaming browsing video streaming sites, YouTube, Facebook, Instagram like social media.

The Prevalence of various addictive behaviors including Internet Addition, Internet Gaming, Online shopping, Video Streaming and Social media addition have been shown in the form of Pie Diagram, given below:
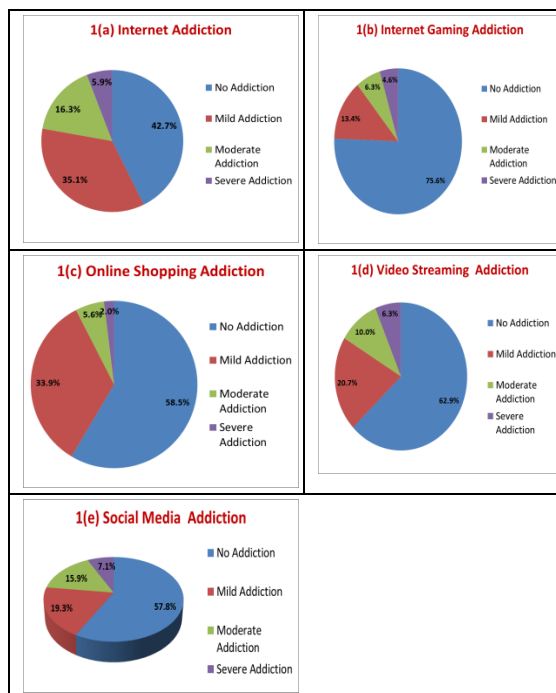
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Figure 1(a-e) Prevalence of various addictive behaviors

Fig 1(a) shows 57.3% of adolescents shows mild to severe internet addiction, most of them shows mild addiction that is 35.1%. Severe addiction is in 5.9% adolescents. Fig 1(b) shows internet gaming addiction among which 4.6% are severely addicted and 6.3% are moderately addicted. Figure 1(c) shows 2% adolescents show severe online shopping addiction although 39.5% shows mild or moderate addicted online shopping behaviour. Fig 1(d) shows 37.1% of video streaming addiction out of which 16.3% shows moderate to severe addictive behaviour. Figure 1(e) shows that social media has high addictive behaviour of 42.2% and severe addiction of social media at 7.1% is quite alarming.
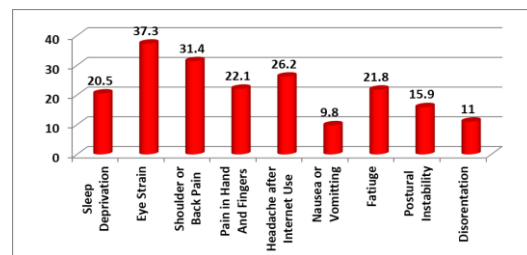

Figure 2 Prevalence of internet usage related physical ailments observed in adolescents

Figure 2 shows that Eyes strain and shoulder or back pain are the most observed physical discomforts associated with internet usage with prevalence of 37.3% and 31.4% in adolescents of Chandigarh.
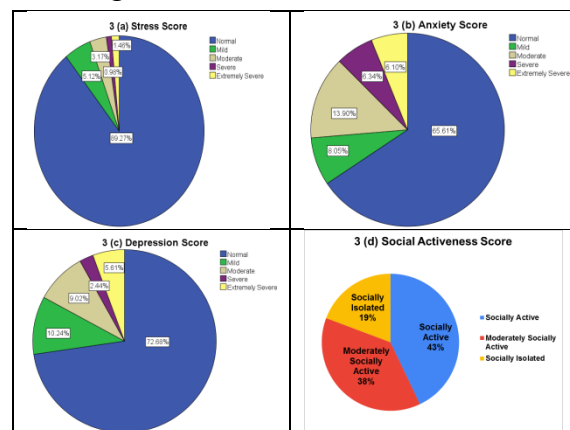

Figure 3 (a-d) Psychological and social impacts on adolescents

Figure 3 shows psychological impact on adolescents. Fig 3(a) shows about 12% of adolescents shows mild to extremely severe stress Fig 3(b) shows about 26% adolescents have moderate to severe anxiety. Figure 3(c) shows about 28% of adolescents shows mild to extremely severe depression out of which about 8% severe depression. Figure 3(d) shows 19% adolescents are socially isolated.
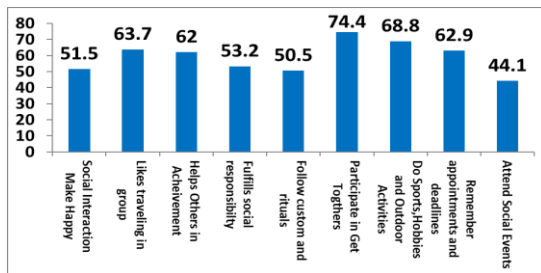
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Figure 4 Social behavior parameters in adolescents

Figure 4 shows more than half of adolescents are active on almost all social parameters and get along with peers while participating in activities.

Table 3 Association of internet activities with Stress, Anxiety and Depression using Chi-square test

	Depression Score	Anxiety Score	Stress Score
Social Media like Facebook, Instagram	11.996 (0.017*)	10.346(0.035*)	12.213(0.016*)
WhatsApp/ Telegram	8.250(0.083)	4.771(0.312)	10.645(0.031*)
Video Streaming/OTT /You Tube	7.701(0.463)	3.101(0.928)	5.408(0.713)
Entertainment Sites	7.785(0.100)	8.974(0.062)	3.188(0.527)
Internet Gaming	2.442(0.655)	3.986(0.408)	1.924(0.750)

*P Value < 0.05 is for Significant Association.

Table 3 shows that usage of social media like Facebook/Instagram is significantly associated with Stress, Anxiety and Depression in adolescents. WhatsApp/Telegram is also significantly associated with Stress.

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Table 4 Correlation of various internet related addictions with Stress, Anxiety, Depression and social interaction.

	Internet Addiction	Internet Gaming Addiction	Online Shopping Addiction	Video Streaming Addiction	Social Media Addiction
	Coefficient(Sig.)	Coefficient(Sig.)	Coefficient(Sig.)	Coefficient(Sig.)	Coefficient(Sig.)
Stress Score	0.421(0.0001)*	0.438(0.0001)*	0.279(0.0001)*	0.524(0.0001)*	0.323(0.0001)*
Anxiety Score	0.420(0.0001)*	0.408(0.0001)*	0.194(0.0001)*	0.520(0.0001)*	0.331(0.0001)*
Depression Score	0.420(0.0001)*	0.380(0.0001)*	0.181(0.0001)*	0.509(0.0001)*	0.321(0.0001)*
Social Score	-0.073(0.140)	-0.034(0.497)	0.011(0.825)	-0.099(0.046)#	-0.029(0.555)

*Correlation is significant at the 0.01 level (2-tailed).

#Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows that all five addictions are highly significantly correlated with Stress, Anxiety and Depression. Social Score is mostly inversely correlated with addictions except online shopping addiction which is positively correlated. Significant correlation of Social Score is only with video streaming addiction which means if adolescents are socially active there is significant reduction in video watching.

In summary the findings of this study shows that virtual internet world is affecting adolescents physically, psychologically and socially and even addictive behaviors are also seen. Major impact is from social media exposure which is associated with stress, anxiety and depression. It is recommended to watch usage of internet by adolescents so that they may be protected from its harmful impacts.

Discussion

This study contributes to knowledge of impact of virtual internet world occurring on adolescents. The use of online activities has increased significantly in the wake of the COVID-19 pandemic as regular activities such as shopping, classes, medical consultations, meetings have moved online during the pandemic. Online classes were the only way to continue education of students during pandemic due to which access to internet through computer and mobile reached to almost all the adolescents. Therefore a need was felt to observe the addictive behaviors, physical, psychological and social effects of virtual internet world on adolescent population as adolescent age is a crucial as the basis of future habits are usually formed during this age. This age group is important as it is a growth period physically, psychologically, sexually and career wise.

(Joseph et al., 2022) in systematic review reports the prevalence of internet addiction as 21.5(moderate) and 2.6%(severe) where as in our study internet addiction prevalence is 16.3% (moderate) and 5.9%(severe). In cross sectional study of (Joseph & Grover, 2020) in its cross-sectional study in state of Haryana (Chandigarh is capital city of Haryana) found the severe addiction 4.2% to 4.8% which was conducted before COVID

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pandemic in 2019.

(Undavalli et al., 2020) mentions the prevalence of Internet Gaming addiction in adolescents between 1.3% to 19.9% and males more affected than females when they conducted study in 2018. In this study, 4.6% are severely addicted and 6.3% are moderately addicted. Similar to Undavalli VK et al 2020 study, boys (34.3%) are more affected then girls (14.3%) in this study. (Teng et al 2021) in their longitudinal study reports a significant difference in online gaming disorder prevalence before the pandemic: 3.6% (55 boys and 9 girls) compared with during the pandemic: 5.0% (72 boys and 17 girls) (p=0.025).

Study of (Caner N et al, 2022) shows 24.4% of adolescents are social media addicts and (Ciacchini R et al 2023) shows 11% of the participants were addicted to social media. Social media addiction is 42.2% in this study with severe addiction in 7.1%.

(Grant JE et al, 2011) study found problem shopping in 3.5% of high school students of United States and (Uzarska, A et al, 2023) found prevalence in 3.5% Polish Under graduate students. Severe online shopping addiction is only in 2% of adolescents in this study.

(Paschke K et al, 2023) shows prevalence of Video streaming disorder as 8.75% in adolescents whereas in this study severe video streaming addiction is 6.3%.

Internet usage also leads to physical ailments like eye strain, headaches, back pain etc as (Zhou Mi et al, 2022) study reports internet addiction has a significant negative impact on physical and mental health of children by reducing their sleep and exercise time. (Singh BK et al, 2020) in their study of the students of 14 to 16 years found complaints

of headache (30.1%), neck pain (15.3%), wrist pain (21.9%), numbness in finger (19.8%), back pain (26.3%), and thumb pain (25.9%). In our study headache is in 26.2%, , Shoulder or back pain in 31.4%, pain in hands and fingers in 22.1 %, fatigue in 21.8% and sleep deprivation in 20.5 % of adolescents.

(Saikia AM et al, 2019) found there was a significant association between Internet addiction and depression, anxiety, and stress ($P < 0.0001$). Systematic review of (Keles B et al, 2019) found putative relationship between social media use and mental health problems in adolescents. Depression was the most commonly measured outcome. The prominent risk factors for depression, anxiety and psychological distress emerging from review were: time spent on social media, activities such as repeated checking for messages, personal investment, and addictive or problematic use. In our study depression, anxiety and stress was significantly associated with social media usage. Internet, internet gaming, social media, online shopping and video streaming addictions were found highly significantly correlated with stress, anxiety and depression.

In the study of (Elsayed W, 2021) conducted on school students from 1st grade to 12th grade (6-17 yrs) of United Arab Emirates, found children were highly affected socially as 92.73% were less interacting with their family members, 89.04% children tend to not attend social events, 86.04% children fell into many disputes and problems with their parents and siblings and 84.2% children became uninterested in performing their social roles.. In our study, social impact is comparatively less as study was conducted in 2023 after the pandemic ceased and

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normal social life style returned. (S, 2023) has also reported that excessive Internet use can result in strained friendships and family ties, a lack of interest in daily activities, and a disregard for domestic, academic, professional, and other duties that over time degrade life quality. In our study it is found that internet related addictions are negatively correlated with social score, means social activeness reduces addictions.

All factors were considered on same population which is the strength of this study. Most of the respondents were from urban area and living with parents and family which may be considered as limitations in generalization of this study. As after the pandemic the lifestyle and psychology of society has been changed leading to more invasion of internet virtual world in human life the future studies may be focused for strategies and interventions required to reduce the effect of threat of internet virtual world in this era of artificial intelligence.

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