

Improving Awareness of Video Game-Related Health Hazards Among School Children Through a Structured Teaching Programme

Suman Yadav¹; Sebi Das²

¹M.Sc. (N) Student, Pediatric Nursing, Vivekananda College of Nursing, King George's Medical University, Lucknow, India

²Professor, Vivekananda College of Nursing, King George's Medical University, Lucknow, India

Publication Date: 2026/07/16

Abstract:

Background:

Video games possess several features that make them highly appealing to individuals of all age groups, especially children and adolescents. The popularity and use of video games among children have increased considerably in recent years. Emerging evidence indicates that excessive engagement in video gaming may lead to various physical and psychological health problems. Therefore, it is essential to enhance children's awareness and understanding of the potential health hazards and adverse effects of video games on their overall well-being. The present study aims to assess the effectiveness of structured teaching program on knowledge regarding the health hazards of video games.

Material and Methods:

A Quasi-experimental one-group pre and post-test research design was adopted to study consecutively selected 70 school children at selected School, Lucknow, U.P.

Result:

In the pre-test, majority of School children i.e., 64.3% had inadequate and 35.7% had moderate knowledge and in the post-test, most of School children i.e., 74.3% had adequate and 25.2% had moderate knowledge. The pre-intervention mean knowledge score of the study population was 13.41 ± 3.38 after the structured teaching programme it was increased to 23.39 ± 3.21 ($P < 0.001$). No association found between the pre-test knowledge with their selected sociodemographic variables at $p < 0.05$ level of significance.

Conclusion:

This study suggests that structured teaching programme regarding the health hazards of video games can significantly enhance school children's knowledge. Measures should be taken to change the behaviour toward video games and prevent them from health problems.

Keywords: Effectiveness, Structured Teaching Program, Video Games, School Children.

How to Cite: Suman Yadav; Sebi Das (2026) Improving Awareness of Video Game-Related Health Hazards Among School Children Through a Structured Teaching Programme. *International Journal of Innovative Science and Research Technology*, 11(6), 3529-3540. <https://doi.org/10.38124/ijisrt/26jun1817>

I. INTRODUCTION

Today's children are the citizens of tomorrow, and they are the treasures of the nation. Healthy children are the most incredible resources and cause of prosperity for any country. Nothing is more important for all the parents than their children's health and future. Children are not mature enough to differentiate between good or bad for themselves, so this is the responsibility of parents, grandparents, uncle and

aunts, and teachers to teach and guide them in right direction.¹

Nowadays, in this era of globalization and information technology, smartphones are also available at every nook and corner of the village and town. The use of the internet is quintessential for comfortable survival. So, it becomes readily open and accessible to children for playing video

games.² We all are aware that excessive playing of video games leads to various adverse effects on health.³

Video games are the most favourite medium for entertainment for school children, especially gaining too much popularity among all ages. The excessive use of video games interferes with the daily life of the children.⁴ Children usually play video games for entertainment, excitement, challenge seeking, emotional coping, and escaping from reality to virtual reality to fulfil their unsatisfied needs or motivations.⁵

According to the 2017 survey by Web wise released by a telecom operator found that 134 million Indian children come online, and 62.4% of them spend up to 4 hours a day on the internet. The mobile phone is the preferred access device for children. Video games affect children's physical health and the emotional, behavioral, psychological health of children and society. So, there is a need to prevent children from the health hazards of video games by creating awareness.⁵

Various studies have found that children who play video games for over an hour or several hours a day have significantly detrimental effects and ailments in their bodies, such as lower back pain.^{6,7,8} In epileptic patients, internet gaming can provoke the occurrence of seizures.⁶ Health concerns associated with gaming behaviour are not limited to gaming disorder but also include other aspects of health such as insufficient physical activity, unhealthy diet, problems with eyesight or hearing, musculoskeletal problems, sleep deprivation, and associated health conditions such as aggressive and violent behaviour, irritation, focus issues, and other risks are cyberbullying, malware, privacy problem, webcam worries, etc.^{7,8,9}

Parents report that their children spend an excessive amount of time playing video games and, on the internet, affecting their study time and habits. Sometimes, they need to play compulsively while eating, and it isolates them from their family, friends, and social contacts.¹⁰ The children almost entirely focus on game achievements rather than other life events¹¹ such as their educational attainment and exhibit lack of imagination and mood swings when they are stopped or restricted from doing the activity.^{11,12,13}

The increasing prevalence of digital media has led to growing public concerns about potential detrimental effects, including the possibility that video gameplay may be "addicting." There is now a considerable body of research literature suggesting that some heavy users of video games indeed develop dysfunctional symptoms that can result in severe detrimental effects on physical, emotional, behavioural, cognitive, and social areas of life.¹⁴

World Health Organization drafted the 11th Revision of the International Classification of Disease (ICD-11), and The American Psychiatric Association, 2018 declared that Internet gaming disorder (IGD) added in DSM-5 as a potential diagnosis. "Persistent and recurrent use of the

Internet to engage in games, often with other players, leading to clinically significant impairment or distress"¹⁵

When people refer to "video game addiction," especially when it comes to children, they mean spending too much time playing video games – sometimes for more than 12 hours a day.¹⁵ Similarly, the WHO notes the inclusion of gaming disorder in ICD-11 to encourage more research into excessive gaming behaviour, including its prevention and treatment.¹⁶

➤ Objectives of the Study

- To assess the level of knowledge regarding health hazards of video games among school children.
- To evaluate the effectiveness of structured teaching programme on knowledge regarding health hazards of video games among school children.
- To find out the association between the pre-test knowledge score with their selected socio-demographic variables.

II. MATERIALS AND METHODS

A quantitative research approach was adopted for the present study to assess the effectiveness of the intervention among school children. The study employed a quasi-experimental one-group pre-test and post-test research design to evaluate the change in knowledge scores before and after the intervention.

The study was conducted at selected school, Lucknow, UP. The target population comprised school children studying in the 9th standard. The study sample consisted of school children aged between 12 and 16 years who fulfilled the inclusion criteria and were available during the period of data collection.

A non-probability consecutive sampling technique was used for selecting the participants. Eligible students were recruited consecutively until the required sample size was achieved. The pre-test was administered to assess the baseline knowledge of the participants, followed by the implementation of the intervention. Subsequently, a post-test was conducted to determine the effectiveness of the intervention by comparing the pre-test and post-test scores.

➤ Description of the Tools

A screening sheet was developed to identify eligible school children. A subject datasheet consisting of 20 items was prepared to collect the socio-demographic characteristics of the participants. The tool was developed based on an extensive review of literature and expert opinions.

A structured knowledge questionnaire was developed by the researcher to assess the knowledge of school children regarding the health hazards of video games. The questionnaire was prepared following an extensive literature review and expert consultation. It consisted of 30 multiple-choice questions covering various domains, including the

concept of video games, physical, emotional, psychological, social, and academic health hazards, as well as preventive measures. Each question had four alternatives with one correct answer. The questionnaire was used to assess the baseline and post-intervention knowledge levels of the participants.

➤ *Ethical Consideration*

Ethical clearance for the study was obtained from the Research Committee of Vivekananda College of Nursing, the Institutional Ethics Committee of VPIMS, Lucknow, and K.G.M.U., Lucknow (Reference No. IEC/VPIMS/21/009). Written permission was obtained from the principals of The City School and Lucknow Public School, Lucknow. The purpose of the study was explained to the authorities and participants, and informed consent was obtained prior to data collection. Confidentiality and anonymity of the participants were strictly maintained throughout the study.

III. RESULTS

➤ *Socio-demographic Characteristics of Participants*

A total of 70 school children from the 9th standard participated in the study. The mean age of the participants was 14.0 ± 0.66 years. Males constituted 57.1% of the sample, while females accounted for 42.9%. Most fathers were graduates (58.6%), followed by those with secondary education (20.0%) and master's degrees (20.0%). Similarly, the majority of mothers were graduates (55.7%), while 25.7% had secondary education. Only 4.5% of mothers had no formal education. Regarding socioeconomic status, 34.3% of participants reported a monthly family income of ₹20,001–40,000, followed by 32.9% with incomes between ₹40,001–60,000 and 28.6% with incomes above ₹60,000. Most participants resided in urban areas (94.3%), with only 5.7% from rural areas. The majority of students belonged to nuclear families (60.0%), while 40.0% belonged to joint families. In terms of siblings, 38.6% had two siblings, 37.1% had one sibling, 15.7% had three or more siblings, and 8.6% had no siblings. (Table 1)

➤ *Video Gaming Characteristics*

Among the participants, 91.4% reported playing video games. The majority (71.9%) engaged in both online and offline gaming, whereas 15.6% played only offline games and 12.5% played exclusively online games. Mobile phones were the most commonly used gaming devices (79.7%), followed by laptops (9.4%), iPads (6.2%), and personal computers (4.7%). More than half of the participants (57.1%) had been playing video games for 2–3 years. Before the COVID-19 pandemic, most participants (71.9%) spent less than one hour per day playing video games, while 25.0% spent 2–3 hours daily. During the COVID-19 period, 74.3% reported an increase in gaming time. Among those reporting increased gaming, 34.6% played frequently, while 23.1% spent more than six hours per day and another 23.1% spent 3–5 hours daily on video games. (Table 2)

➤ *Knowledge and Perceived Health Hazards of Video Gaming*

Most participants (94.3%) reported having prior knowledge regarding the health hazards associated with video gaming. Among those with pre-existing knowledge, the primary source of information was family, relatives, and friends (59.1%), followed by mass media (24.2%), teachers (9.1%), and awareness programs (7.6%). Regarding internet usage, the majority of students (70.0%) reported using unlimited monthly data plans, while smaller proportions used limited data packages. Sixty percent of participants perceived that excessive video gaming negatively affected their daily activities. Among these students, academic performance was the most commonly affected domain (47.6%), followed by family activities (21.4%), outdoor games (19.0%), and timely meal intake (12.0%). Furthermore, the vast majority of participants (92.9%) believed that video gaming has adverse effects on health, whereas only 7.1% did not perceive any negative health impact. (Table 3)

➤ *Pre-existing level of knowledge regarding Health hazards of video games among school children*

The findings revealed that the majority of school children had inadequate knowledge regarding the health hazards of video games before the intervention. Out of 70 participants, 45 (64.3%) demonstrated inadequate knowledge, while 25 (35.7%) had a moderate level of knowledge. None of the participants exhibited adequate knowledge regarding the health hazards of video games. These findings indicate a considerable deficiency in baseline knowledge among school children. (Table 4)

➤ *Comparison of the pre-test and post-test knowledge scores of school children*

Comparison of pre-test and post-test knowledge scores demonstrated a significant improvement in the knowledge of school children regarding the health hazards of video games following the structured teaching programme. Before the intervention, 64.3% of participants had inadequate knowledge and 35.7% had moderate knowledge, whereas after the intervention, 74.3% attained adequate knowledge and 25.7% had moderate knowledge, with no participant remaining in the inadequate category. The mean knowledge score increased significantly from 13.41 ± 3.38 in the pre-test to 23.39 ± 3.21 in the post-test, with a mean difference of 9.98. The paired t-test showed a highly significant difference between pre- and post-test scores ($t = 33.499$, $p < 0.001$), indicating that the structured teaching programme was effective in improving knowledge regarding the health hazards of video games among school children. (Table 5)

➤ *Association of Pre-test Knowledge Scores with Selected Variables*

Chi-square test/Fisher's exact test was used to determine the association between pre-test knowledge scores and selected demographic, socio-demographic, and video gaming-related variables. The analysis revealed no statistically significant association between pre-test knowledge scores and any of the selected variables, including gender ($p=0.249$), parental education (father:

$p=0.495$; mother: $p=0.443$), family income ($p=0.600$), area of residence ($p=1.000$), type of family ($p=0.309$), and number of siblings ($p=0.614$). Similarly, no significant association was observed between pre-test knowledge scores and video gaming-related variables such as gaming status ($p=1.000$), mode of gaming ($p=0.613$), source of gaming device ($p=0.777$), gaming media used ($p=0.200$), duration of smartphone use for gaming ($p=0.543$), time spent playing video games before COVID-19 ($p=0.478$), increased gaming during the COVID-19 period ($p=0.370$), and time spent gaming during COVID-19 ($p=0.064$). Furthermore, previous knowledge regarding health hazards of video games ($p=0.127$), source of information ($p=0.802$), monthly data consumption ($p=0.336$), activities affected by excessive gaming ($p=0.619$), and perception of the negative health effects of video gaming ($p=0.341$) also showed no significant association with pre-test knowledge scores. Overall, the findings indicate that baseline knowledge regarding the health hazards of video games was independent of the selected demographic and gaming-related characteristics of the school children ($p > 0.05$). (Table 6,7)

IV. DISCUSSION

➤ Section-I: Sample Characteristics

In the light of the referred literatures, the present study observations of the variables are discussed below. The school children were taken from 9th standard and their average age was 14 years.

In a similar way, studies done on Video and internet games by Wang CW et al. (2014)²¹ found that most students of grade 8 to 11 schools of Hong Kong and the researcher found that most playing video games belong to 9th standard and their average age was 14 years. Singh A, et al. (2020)²⁵ conducted a study among 8th to 10th-grade school children on online gaming addiction at Assam, found that the mean age was 14.6 years.

In the present study, boys (57.1%) outnumbered girls (42.9%). As per NITI Ayog 2013-15, India's gender ratio for every 1000 males, 900 females present, and Uttar Pradesh, the gender ratio is 1000/879. So, the difference in sex ratio may be the reason of the difference in the result. According to UNFPA State of World Population 2020, the sex ratio in India is 910 females per 1000 males, which is on the lower side of the index. This unequal sex ratio reflecting here also. Yarasani P et al. (2018)²⁰ conducted a study on online video game disorder among Medical Students at Andhra Pradesh and found that males were 53% and females were 47%.

In regard to education of fathers of school children, all fathers were educated from primary to master's degree level. According to education of mothers of school children, 95.5% were educated and only 4.3% mothers of School children had no formal education. According to the National Statistical office survey, in Urban areas of Uttar Pradesh the literacy rate among men is 86.8%, and women's is 74.9%. The present study was conducted in an Urban English

medium private school of Uttar Pradesh and so it is expected to get educated & aware parents as found in the current study. Similarly, study done by Wang CW et al. (2014)²¹ found that most of the parents of students were having education up to Secondary school, primary school and then college and above.

Regarding the family income, 66% of school children had family income per month were between Rs. 20,000 to 60,000 and more than 60,000 were 28.6% and less than 20,000 were 4.3%. Singh A, et al. (2020)²⁵ also found in their study that 82.2% of Students having online gaming addiction belongs to middle class family. Nowadays, aware parents give more stress on children's quality education irrespective of the high education expenses in private English medium schools.

With regard to residence majority of samples i.e., 94.3% were from urban area and 5.7% were from rural area. May be the expenses as well as distance of the school from the residence of students results a smaller number of students from rural area. Singh A, et al. (2020)²⁵ conducted a study on online gaming addiction among 8th to 10th grade school children found that 68.5% belong to urban areas and 31.5 belong to the rural area at Assam.

Most of the School children i.e., 60% were from nuclear family, 40% were from joint family and no one has found from extended family. The study conducted by Singh A, et al. (2020)²⁵ found that 72.6% samples were from nuclear family and 27.4% were from joint family. Navaneethan J, et al (2018)²⁶ found that majority (86%) of the respondents' hail from the nuclear family, whereas 12% of the respondents belong to joint families and the remaining 2% had single-parent families. Hence, the current observation regarding family type supports the recent trends of nuclear family.

A small family is need of the hour as India is the second most populated country in the world. In 1966, the Ministry of Health and Family Welfare was set up to manage the new population policy, called Small Family Norm that encouraged families to have only two children.⁶⁸ But in the study findings regarding number of children in the family found, majority i.e., 60% of the family having more than two children followed by 44% had 2 children and only 6.7% had one child. This finding is also supported by the reality that according to state wise population 2021, Uttar Pradesh population is 24 crores, highest among all states in India. This could be the reason behind the current study findings. The other states in India having less population than U.P. It is observed in the studies done by Prasad GD, et al. (2018)¹⁸ and Navaneethan J, et al. (2018)²⁶ in south India related to video games, and they found that 67.8%, 98% had less than two or two children in a family and 32.2%, 2% had more than two children in their family, respectively.

Majority of school children i.e., 91.4% play video games and only 8.6% they do not play video games. In a similar way, the study done by Apisitwasana N, et al.

(2018)²² conducted a survey of gaming addiction at Bangkok and found that 98.7% play video games and 1.3% do not play. In the present study, it is found that 71.9% of school children play both online/offline video games, followed by 15.6% and 12.5% play offline games and online games, respectively. Contrary to this current study finding, study done by Apisitwasana N, et al. (2018)²² and Wang CW, et al. (2014)²¹ in Bangkok and Hong Kong found that more than 50% children play online video games. Nowadays, technical gadgets especially smartphone reached every nook and corner of society. So, the easy accessibility of the gadgets leads to more children involved with video games. Although online video games are more exciting and appealing, they consume large amounts of data, making it more expensive. The difference in video gaming mode among children in different countries may be due to their socio-economic status differences between developed countries and developing countries like India.

All 70 i.e., 100% school children had the accessibility to technical gadgets needed to play video games, among them 37.5% play video games by using their personal device, followed by 34.4%, 15.6% and 12.5% used their mother, elder brother/sister, and father's devices, respectively. Moreover, 79.7% School children used mobile phone for playing Video games. In support of this finding, Apisitwasana N, et al. (2018)²² found that 90.7% have their own device at home and 9.3% do not have device at home. In regard to type of device, Dani R, et al. (2018)²³ found that 97% of students have mobile availability for playing games. Similarly, in another study done by Singh A, et al. (2020)⁵⁶, 91.0% participants use mobile phones followed by 7.1% using laptops/desktop and 2% using tablets to play video games. Yarasani P et al. (2018)²⁰ found that the majority i.e., 73.9% of students, used Mobile phones, followed by 12.2% computers, 8.7% used Tablets, and 5.2% used other gaming Consoles. As per India Smartphone Quarterly Market Data (2019Q4 – 2021Q1), the mobile smartphone sale is increased up to 23% to reach over 38 million users.³⁰

Most of the school children i.e., 74.9% had expressed that their daily time spending for video games increased during Covid-19 period than their previous video game duration per day. Before the Covid-19 period, most of them played video games less than an hour per day, but during the Covid-19 scenario, 80.8% of children played more than 2 hours per day. During the Covid-19 period, social distancing is prescribed as preventive measures. More people were confined to four walls and even children started virtual classes. So, this results in less time spending for outdoor games and socialization, which all led to stress among all. Because of before mentioned facts lead to become engrossed with the technical gadgets, net surfing and playing video games. In the same way, Shrestha MV, et al. (2020)¹⁹ reported that 69.2% of participants had increased their gaming behaviour due to the stress of the COVID-19 pandemic. Another study done by Balhara YPS, et al. (2020)¹⁷ showed that 50.8% of participants increased their gaming behaviour during the COVID-19 Scenario.

In respect to previous knowledge regarding Health hazards of video games, 94.3% of school children had prior existing knowledge according to them. The source of pre-existing knowledge regarding health hazards of video games i.e., 59.1% school children acquired knowledge from family, friends and relatives. The reason could be the first and most lesson of life, all learn from parents, guardians, family, and relatives.

Seventy percent uses an unlimited data package system per month for Internet connection. Online video games are more exciting and appealing. Moreover, when they are playing video games- the data consumption is more and expensive. Because the demand has increased, and all become virtual. Similar study supported by Apisitwasana N, et al. (2018)²² found that 89.1 % had Internet access at home.

Out of 70 (100%) School children, 42(60%) School children had expressed that playing video games affected their daily life activities and 28(40.0%) had said that playing video games had not influenced their usual daily routine. Forty-two (100%) children who expressed video games affected their daily activities, among them 20(47.6%) school children had expressed that playing excessive video games affected mostly their academic performance followed by 9(21.4%), 8(19%) and 5(12%) reported that video games affected their family activities, outdoor games, and timely meal intake, respectively. The majority of school children i.e., 92.9% had also agreed that video gaming has negative effects on health. This is supported by Yarasani P, et al. (2018)²⁰, they found that majority of students experienced severe disturbance in sleep, concentration on studies, family relations and physical problems like headache and visual disturbances. Other studies done by Hawi et al. (2018)²⁷, Rehbein et al. (2015)²⁸ and KO et al. (2014)²⁹ also support the current study findings. Here, this could be due to increased preoccupation of students with video gaming, cause less time available for study as well as lesser concentration during academic activities.

➤ *Section-II: Assessment of the Existing Level of Knowledge of School Children Regarding Health Hazards of Video Games.*

In this present study, most school children, i.e., 45(64.3%) had inadequate knowledge regarding Health hazard of video games, 25(35.7%) had moderate knowledge, and none had adequate knowledge.

The above findings of the study were supported by Dhani R, Dani P (2018)²³, they conducted a study on the effect of planned teaching program on knowledge regarding mobile games addiction among 70 students at Maharashtra. The result showed that in the pre-test 46%, 34% and 20% had poor, average, and good knowledge, whereas in the post-test 3%, 24% and 73% had poor, average, and good knowledge. The mean post-test knowledge score was higher than the mean pre-test knowledge score. Hence, planned teaching programme was effective in enhancing the knowledge of children.

This study and previous other studies have shown that most of the knowledge of the school children have received from their family, friends and relatives were from their superficial experience but not on the basis of in-depth and scientific base. That is why it is found that school children have not adequate knowledge regarding health hazards of video games.

➤ *Section-III: Effectiveness of Structured Teaching Programme on Knowledge Regarding Health Hazards of Video Games Among School Children.*

After giving a structured teaching programme, the knowledge level had been improved from inadequate 45(64.3%) knowledge and moderate 25(35.7%) knowledge to moderate 18(25.7%) and adequate 52(74.3%) knowledge. The pre-intervention mean knowledge score of the study population was 13.41 ± 3.38 , which was increased to 23.39 ± 3.21 after post-test. The mean difference knowledge score was 9.98. The calculated “t” value is 33.499 is more than the table value i.e., 3.323 was statistically highly significant at ($p < 0.001$) level, which supports the acceptance of the research hypothesis (H_1).

The above study findings were supported by Upadhyaya A, Joshi R. (2014)²⁴ who had conducted structured teaching programme on knowledge and attitude regarding computer vision syndrome among 180 students in selected schools of Ahmedabad. The finding showed that in pre-test majority 91.67% had inadequate knowledge, 8.33% had moderate and none of them had adequate knowledge, whereas in post-test majority 95% had adequate, 5% had moderate and none of them had inadequate knowledge. The mean post-test knowledge and attitude score was higher than the mean pre-test knowledge and attitude score at significant level ($p < 0.05$). Hence, STP was effective in enhancing the knowledge and attitude of children.

➤ *Section-IV: Association of Knowledge of School Children Regarding Health Hazards of Video Games with Their Selected Demographic Variables.*

With appropriate degrees of freedom, the analysed data reveals that there was no association between the pre-test knowledge scores with the demographic variables i.e., age, gender, education of parents, family income, area of residency, type of family, number of siblings, video games playing status before and during covid-19, duration (in years) and frequency (in hrs/day) of playing video games, previous knowledge and its source of information regarding health hazards of video games, monthly data consumption, activity affected due to excessive playing video games, video gaming have negative effect on health. So, it could be expressed as the increase knowledge regarding health hazards of video games was not influenced by the subjects' sociodemographic profiles but solely due to the structured teaching programme.

The present study included 9th standard school children with a mean age of 14 years, which is consistent with previous studies reporting similar age groups among video game users. Boys (57.1%) outnumbered girls (42.9%),

which may reflect the prevailing gender ratio and higher gaming involvement among males.

Most parents were educated, with the majority of fathers and mothers having at least primary to higher educational qualifications. The majority of participants belonged to middle-income families, lived in urban areas, and came from nuclear families. More than half of the families had more than two children.

Most participants (91.4%) played video games, with the majority engaging in both online and offline gaming. All participants had access to electronic devices, and mobile phones were the most commonly used devices for gaming. Similar findings have been reported in previous studies.

During the COVID-19 pandemic, the duration of gaming increased considerably, with most children spending more than two hours per day on video games. Increased screen time during lockdowns and limited outdoor activities may have contributed to this rise.

Most participants had prior knowledge regarding the health hazards of video games, mainly obtained from family members, friends, and relatives. The majority also had internet access with unlimited data packages.

About 60% of school children reported that video gaming negatively affected their daily activities, particularly academic performance, family activities, outdoor games, and meal timings. Furthermore, most participants agreed that excessive video gaming has adverse effects on physical, psychological, social, and academic health, which is consistent with findings from previous studies.

➤ *Section II: Existing Knowledge Regarding Health Hazards of Video Games*

The present study revealed that most school children (64.3%) had inadequate knowledge regarding the health hazards of video games, while 35.7% had moderate knowledge and none had adequate knowledge. Similar findings were reported by Dhani and Dani (2018), who observed poor knowledge among students before the implementation of a planned teaching programme. The inadequate knowledge observed in the present study may be attributed to the fact that most participants acquired information from family, friends, and relatives rather than from scientific or evidence-based sources.

➤ *Section III: Effectiveness of the Structured Teaching Programme*

The structured teaching programme significantly improved the knowledge of school children regarding the health hazards of video games. After the intervention, 74.3% of participants attained adequate knowledge, while only 25.7% had moderate knowledge. The mean knowledge score increased from 13.41 ± 3.38 in the pre-test to 23.39 ± 3.21 in the post-test, with a mean difference of 9.98. The obtained t-value (33.499) was statistically highly significant ($p < 0.001$), indicating the effectiveness of the structured teaching programme. Similar findings were reported by

Upadhyaya and Joshi (2014), who demonstrated significant improvement in students' knowledge following a structured teaching intervention.

➤ *Section IV: Association of Knowledge with Selected Demographic Variables*

The study found no significant association between pre-test knowledge scores and selected demographic variables such as age, gender, parental education, family income, area of residence, family type, number of siblings, gaming habits, duration and frequency of gaming, previous knowledge, source of information, internet usage, and perceived effects of video gaming. The findings suggest that the improvement in knowledge was independent of the participants' socio-demographic characteristics and was primarily due to the effectiveness of the structured teaching programme.

V. CONCLUSION

The study concluded that school children had inadequate knowledge regarding the health hazards of video games affecting their physical, psychological, mental, and social health. The structured teaching programme significantly improved the knowledge of school children regarding the health hazards of video games ($p < 0.001$). The findings demonstrate that the structured teaching programme was effective in enhancing knowledge among school children. Therefore, health education and awareness programmes on the health hazards of video games should be promoted among school children to prevent gaming addiction and its adverse effects.

LIMITATIONS

The study had certain limitations. It was conducted in a single setting, which limits the generalizability of the findings. The use of a convenience sampling technique may have introduced sampling bias.

RECOMMENDATIONS

Based on the study findings, future research may include longitudinal studies to assess the long-term health effects of video games, cross-sectional studies among different age groups and on knowledge, attitude, and practice domains, comparative studies between government and private educational institutions, prevalence studies on the ill effects of video gaming, and interventional studies evaluating the effectiveness of video-assisted teaching, information booklets, and preventive awareness programs for children, parents, and family members.

REFERENCES

[1]. National Research Council (US); Institute of Medicine (US). Children's Health, The Nation's Wealth: Assessing and Improving Child Health. Washington (DC): National Academies Press (US); 2004. 1, Introduction. Available from URL: <https://www.ncbi.nlm.nih.gov/books/NBK92210/>

[2]. Available from URL: <https://www.pewresearch.org/internet/2019/03/07/use-of-smartphones-and-social-media-is-common-across-most-emerging-economies/>

[3]. Bulletin of the world health organization, 2019 [online] Available from URL: <https://www.who.int/healthtopics/addictive-behaviours>

[4]. Hauge MR, Gentile DA. Video Game Addiction Among Adolescents: Associations with Academic Performance and Aggression. Paper presented at Society for Research in Child Development Conference, Tampa; April 2003.

[5]. Wan CS, Chiou WB. Why are adolescents addicted to online gaming? An interview study in Taiwan. *Cyberpsychol Behav* 2006; 9:762-6

[6]. Hakala PT, Saarni LA, Punamäki RL, Wallenius MA, Nygård CH, Rimpelä AH Musculoskeletal symptoms and computer use among Finnish adolescents--pain intensity and inconvenience to everyday life: a cross-sectional study". *BMC Musculoskeletal Disorder*. March 2012; 13(41) DOI:PMC 3348031. PMID 22439805

[7]. Gunzburg R, Balagué F, Nordin M, Szpalski M, Duyck D, Bull D, Mélot C. Low back pain in a population of school children. *EurSpineJ*. 1999. 8 (6):439-43. doi:10.1007/s005860050202. PMC 3611220. PMID 10664300

[8]. Available from URL: <https://www.health.harvard.edu/blog/the-health-effects-of-too-much-gaming-2020122221645>

[9]. Baranowski T, Abdelsamad D, Baranowski J, O'Connor TM, Thompson D, et al. (2012) Impact of an active video game on healthy children's physical activity. *Pediatrics* 129: 636–642. Available from URL: <https://goo.gl/hWrvio>

[10]. Ayenigbara IO (2018) Gaming Disorder and Effects of Gaming on Health: An Overview. *J Addict Med Ther Sci* 4(1): 001-003.

[11]. Willoughby T. A short-term longitudinal study of internet and computer game use by adolescent boys and girls: Prevalence, frequency of use, and psychosocial predictors. *Dev Psychol* 2008; 44:195-204

[12]. O'Keeffe GS, Clarke-Pearson K; Council on Communications and Media. The impact of social media on children, adolescents, and families. *Pediatrics* 2011; 127:800-4

[13]. Shek DT, Yu L. Internet addiction in Hong Kong adolescents: Profiles and psychosocial correlates. *Int J Disabil Human Dev* 2012; 11:133-42.

[14]. Lo SK, Wang CC, Fang W. Physical interpersonal relationships and social anxiety among online game players. *Cyber psychol Behav* 2005; 8:15-20.

[15]. Douglas A, Gentile, Kira Bailey, Daphne Bavelier, Jeanne Funk Brockmyer, Hilarie Cash, Sarah M. et al Official Journal of American academy of Paediatrics, Nov 2017, 140 (2) S81-S85; DOI: 10.1542/peds.2016-1758H

- [16]. World Health Organization (2018) Available from URL: <https://goo.gl/XvfDAw>
- [17]. Balhara YPS, Kattula D, Singh S, Chukkali S, Bhargava R. Impact of lockdown following COVID-19 on the gaming behaviour of college students. *Indian J Public Health*. 2020 Jun;64(Supplement): S172-S176.
- [18]. Prasad GD, Krupanidhi S, A Descriptive Study to Assess the Internet Gaming Addiction among Early Adolescents at Selected High Schools in Krishna District, Andhra Pradesh", *Int. J Sci. Res*. Sept 2020; 9(9):648 – 651. Available from URL: https://www.ijsr.net/search_index_results_paperid.php?id=SR20911152707
- [19]. Shrestha MV, Shrestha N, Sharma SC, Joshi SK. Gaming Disorder among Medical College Students during COVID-19 Pandemic Lockdown. *Kathmandu Univ Med J (KUMJ)*. 2020;18(70):48-52.
- [20]. Yarasani P, Shaik RS, Myla ARR. Prevalence of addiction to online video games: gaming disorder among medical students. *Int J Community Med Public Health*. Sep. 2018;5(10):4237-41.
- [21]. Wang CW, Chan CL, Mak KK, Ho SY, Wong PW, Ho RT. Prevalence and correlates of video and internet gaming addiction among Hong Kong adolescents: a pilot study. *ScientificWorldJournal*. 2014;2014:874648
- [22]. Apisitwasana N, Perngpam U, Cottler LB. Effectiveness of school- and family-based interventions to prevent gaming addiction among grades 4-5 students in Bangkok, Thailand. *Psychol Res Behav Manag*. Apr. 2018; 10(11):103-15.
- [23]. Dani R, Dani P. Effect of planned teaching program on knowledge regarding mobile game addiction among students in Sangli city, Maharashtra, *Int J. Acad. Res*. Mar.2018; 3(2): 1517-18.
- [24]. Upadhyaya A, Joshi R. An evaluation of knowledge and attitude amongst adolescents of Ahmedabad towards computer vision syndrome and effectiveness of structured teaching programme. *Int J Health Sci Res*. 2014;4(10):191-198.
- [25]. Singh A, Ali A, Choudhury M, Gujar NM. Online gaming and its association with emotional and behavioral problems among adolescents – A study from Northeast India. *Arch Ment Health*. 2020;21(2):71-76.
- [26]. Navaneetham J, Chandran J. Video game use among schoolchildren and its impact on the study habits. *Indian J Soc Psychiatry* 2018;34(3) :208-12
- [27]. Hawi NS, Samaha M, Griffiths MD. Internet gaming disorder in Lebanon: Relationships with age, sleep habits, and academic achievement. *J Behav Addict*. 2018; 7:70-8.
- [28]. Rehbein F, Kliem S, Baier D, Mößle T, Petry NM. Prevalence of Internet gaming disorder in German adolescents: Diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. *Addiction*. 2015;110:842–51.
- [29]. Ko CH. Internet gaming disorder. *Current Addiction Reports*. 2014; 1:177–85.
- [30]. Available from URL: India Smartphone Market Share: By Quarter - Counterpoint Research [Internet]. [cited 2021 Jun 26]. Available from: <https://www.counterpointresearch.com/india-smartphone-share/>

APPENIX

Table 1 Socio-demographic Profile of the School Children (Age, Gender, Education of Parents, Area of Residence, Family Income, Type of Family, Number of Siblings)

Variable		Mean	*SD
Age (in years)		14 years	±0.66

Variables		Frequency	Percentage
		f	%
Gender	Male	40	57.1%
	Female	30	42.9%
Education of Father	Primary	1	1.4%
	Secondary	14	20.0%
	Graduate	41	58.6%
	Master's degree	14	20.0%
	No formal education	0	0.00%
Education of Mother	Primary	5	7.1%
	Secondary	18	25.7%
	Graduate	39	55.7%
	Master's degree	5	7.1%
	No formal education	3	4.5%
Family Income per month (in Rupees)	< Rs. 20,000	3	4.3%
	Rs. 20,001-40,000	24	34.3%
	Rs. 40,001-60,000	23	32.9%
	> Rs. 60,000	20	28.6%
Area of Residence	Urban	66	94.3%
	Rural	4	5.7%
	Slum area	0	0.00%
Type of family	Nuclear	42	60%
	Joint	28	40%
	Extended	0	0.00%
Number of siblings	1	26	37.1%
	2	27	38.6%
	3 or more	11	15.7%
	No siblings	6	8.6%

*SD= Standard Deviation

Table 2 Socio-demographic Profile of the School Children (Video Games Playing Status Before and During Covid-19 Scenario and Duration [in Years] and Frequency [in Hrs/Day] of Playing Video Games)

N=70

Variables		Frequency	Percentage
		f	%
Play video games	Yes	64	91.4%
	No	6	8.6%
Mode of playing video games	Online	8	12.5%
	Offline	10	15.6%
	Both online/ offline	46	71.9%
Source of using gaming device for playing Video games	Self	24	37.5%
	Father	8	12.15%
	Mother	22	34.4%
	Elder brother/ sister	10	15.6%

Common media to play video games	Personal computer	3	4.7%
	Mobile	51	79.7%
	Laptop	6	9.4%
	i-pad	4	6.2%
Duration of using Smart phone for playing Video games in years	Less than 2 Years	5	7.1%
	2-3 Years	40	57.1%
	4-5 Years	7	10.0%
	More than 6 years	12	17.1%
Before Covid-19 Scenario, time spent in playing video games.	<1 hour	46	71.9%
	2-3 hours	16	25.0%
	>6 hours	2	3.1%
Playing video games increased or not during covid-19 period	Yes	52	74.3%
	No	18	25.7%
Time spent in playing video games during covid-19	<2 hours	10	19.2%
	3-5 hours	12	23.1%
	>6 hours	12	23.1%
	Frequent playing	18	34.6%

Table 3 Socio-demographic Profile of the School Children (Pre-Existing Knowledge and Its Source of Information Regarding Health Hazards of Video Games, Monthly Data Consumption, Most Affected Activity Due to Excessive Playing of Video Games, Video Gaming has Negative Effect on Health).

Variables	Frequency	Percentage	
	f	%	
Previous knowledge	Yes	66	94.3%
	No	4	5.7%
Source of information	Family/ relatives/ Friends	39	59.1%
	Teachers	6	9.1%
	Mass media	16	24.2%
	Awareness Programme	5	7.6%
Monthly data consumption	1-4 GB monthly	13	18.6%
	5-8 GB monthly	4	5.7%
	9-12 GB monthly	4	5.7%
	Unlimited data	49	70.0%
Most affected activity due to excessive playing of video games	Academic performance	20	28.6%
	Family activity and gatherings	9	12.9%
	Playing outdoor games with friends	8	11.4%
	Reduced taking proper meals	5	7.1%
	Not Affected	28	40.0%
Video gaming have negative effects on health	Agree	65	92.9%
	Disagree	5	7.1%

Table 4 Pre-existing level of knowledge regarding Health hazards of video games among school children

S. No	Level of Knowledge	Frequency	Percentage
1.	Inadequate (<50%)	45	64.3 %
2.	Moderate (50-73%)	25	35.7%
3.	Adequate (>73%)	00	00%

Table 5 Comparison of the pre-test and post-test knowledge scores of school children.

N=70

Health hazards of video games	Inadequate		Moderate		Adequate		Mean±SD	Mean Difference	t- value	p-value
	N	%	N	%	N	%				
Pre-intervention	45	64.3	25	35.7	0	0	13.41±3.38	9.98	33.499	*<0.001
Post-intervention	0	0	18	25.7	52	74.3	23.39±3.21			

Tabulated 't' value for one-tailed test= 3.232 and *p-value (p≤0.001)

Table 6 Association Between Pre-test Knowledge Scores with Their Selected Socio-demographic Variables (Gender, Education of Parents, Family Income, Area of Residence, Type of Family, Number of Siblings)

n=70

Variables		Pre-test				χ ² values	df	p-value
		INADEQUATE		MODERARTE				
		N	%	N	%			
Gender	Male	28	62.2%	12	48.0%	1.327	1	0.249 NS
	Female	17	37.8%	13	52.0%			
Education of Father	Primary	1	2.2%	0	.0%	2.390	3	0.495 NS
	Secondary	11	24.4%	3	12.0%			
	Graduate	24	53.3%	17	68.0%			
	Master’s degree	9	20.0%	5	20.0%			
	No formal education	0	.0%	0	.0%			
Education of Mother	Primary	4	8.9%	1	4.0%	3.736	4	0.443 NS
	Secondary	14	31.1%	4	16.0%			
	Graduate	23	51.1%	16	64.0%			
	Master’s degree	2	4.4%	3	12.0%			
	No formal education	2	4.4%	1	4.0%			
Family Income per month (in Rs.)	<Rs. 20,000	1	2.2%	2	8.0%	1.869	3	0.600 NS
	Rs.20,001-40,000	17	37.8%	7	28.0%			
	Rs.40,001-60,000	15	33.3%	8	32.0%			
	> Rs.60,001	12	26.7%	8	32.0%			
Area of Residence	Urban	42	93.3%	24	96.0%	NA	1	1.000 NS
	Rural	3	6.7%	1	4.0%			
	Slum	0	.0%	0	.0%			
Type of family	Nuclear	25	55.6%	17	68.0%	1.037	1	0.309 NS
	Joint	20	44.4%	8	32.0%			
	Extended	0	.0%	0	.0%			
Number of siblings	One	15	33.3%	11	44.0%	1.802	3	0.614 NS
	Two	19	42.2%	8	32.0%			
	Three or more	8	17.8%	3	12.0%			
	No sibling	3	6.7%	3	12.0%			

*NA= Not Applicable

*NS = Not Significant

Table 7 Association between Pre-test Knowledge Scores with Their Selected Demographic Variables (Previous Knowledge and Its Source of Information Regarding Health Hazards of Video Games as Well as Monthly Data Consumption, Most Affected Activity Due to Excessive Playing of Video Games, Video Gaming has Negative Effect on Health).

n=70

Variables		Pre-test				χ^2 values	Df	p-value
		INADEQUATE		MODERARTE				
		N	%	N	%			
Previous knowledge	Yes	44	97.8%	22	88.0%	NA	1	0.127 NS
	No	1	2.2%	3	12.0%			
Source of knowledge	Family/ relatives/ Friends	25	56.8%	14	63.6%	0.997	3	0.802 NS
	Teachers	5	11.4%	1	4.5%			
	Mass media	11	25.0%	5	22.7%			
	Awareness programs	3	6.8%	2	9.1%			
Monthly data consumption	1-4 GB monthly	9	20.0%	4	16.0%	3.383	3	0.336 NS
	5-8 GB monthly	2	4.4%	2	8.0%			
	9-12 GB monthly	1	2.2%	3	12.0%			
	Unlimited	33	73.3%	16	64.0%			
Most affected activity due to excessive playing of video games	Academic performance	14	31.1%	6	24.0%	2.644	4	0.619 NS
	Family activity and gatherings	6	13.3%	3	12.0%			
	Playing outdoor games with friends	6	13.3%	2	8.0%			
	Reduced taking proper meals	4	8.9%	1	4.0%			
	Not Affected	15	33.3%	13	52.0%			
Video gaming have negative effects on health	Agree	43	95.6%	22	88.0%	NA	1	0.341 NS
	Disagree	2	4.4%	3	12.0%			

*NA= Not Applicable

*NS=NotSignificant