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Quasi-Experimental Study to Assess the Effectiveness of Nurse-Led Interventional Package on The Level of Knowledge Regarding the Impacts of Screen Addiction Among Adolescents Studying in Selected Schools of Punjab

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ABSTRACT

The rapid increase in digital technology usage has led to growing concerns about screen addiction, particularly among adolescents. This study was undertaken to assess the impact of screen addiction on the behavioural and psychosocial well-being of adolescents in selected schools. The present study aims to evaluate the effectiveness of the Nurse-Led Interventional package on the knowledge regarding the impacts of screen addiction. A quantitative research approach with a quasi-experimental design was used. A total sample of 400 adolescents was selected through multi-stage sampling. The sample was divided into the control and experimental groups. A pre-test was administered before implementing the nurse-led interventional package in both the control and experimental groups. The interventional package was delivered only to the experimental group. After 10 days of pre-test, a post-test was conducted in both the experimental and control groups. Data was collected using a socio-demographic profile, a screen addiction behaviour test, a structured knowledge questionnaire and a Likert attitude scale. The study was conducted at the eight selected schools of four districts of Punjab, namely Amritsar, Bathinda, Shaheed Bhagat Singh Nagar and Shri Fatehgarh Sahib. The sample comprised of adolescents aged between 13-18 years studying in selected schools.

Results showed that the mean Knowledge Score of adolescents within the experimental group in the pre-test was 20.20, and in the post-test was 22.63. The computed paired t value of 10.47 indicates that the mean post-test knowledge score was significantly higher than the pre-test knowledge score in the experimental group. This proves that the nurse-led interventional program had a great impact in enhancing the knowledge and attitude scores. The post-test scores of the experimental group showed improvement in screen-related behaviors, indicating the effectiveness of the intervention.

Keywords: Screen Addiction, Knowledge, Adolescents

INTRODUCTION

In today's digital age, screens have become an integral part of adolescents' daily lives, offering opportunities for learning, communication and entertainment. However, excessive and uncontrolled screen use has led to the growing concern known as screen addiction- a behavioural pattern characterised by compulsive and excessive use of screens, often at the expense of physical, emotional and social well-being. The adolescent population is particularly vulnerable due to their developmental stage, peer influences and limited self-regulatory capacity.

The idea of screen time has grown increasingly complicated in recent years due to the widespread availability of a large variety of electronic gadgets. The use of screens by young people has increased due to technological advancements, it has decreased their interaction with nature and negatively impacted their mental and general well-being. Studies have indicated adverse correlations between screen time and the advancement of cognitive and motor skills. Screen usage has also been connected to anxiety, sadness, obesity, and sleep issues.

We live in a world where technology is always advancing, and media technology has played a big role in this change. These advances have changed our lives by making it possible for us to work comfortably from home.

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The quick development of technology, which includes computers, laptops, cell phones, and the Internet, has a particular impact on youth and has made it necessary for communication. It is almost impossible to avoid its impact because it has ingrained itself so deeply into our daily lives.

Technology is dominating this century, with the Internet growing on a global scale. Over the past three decades, internet use has increased dramatically, particularly among youth. Screen addiction has been linked to various negative outcomes, including impaired academic performance, sleep disturbances, physical inactivity, poor interpersonal relationships, and mental health issues such as anxiety and depression.

Despite the negative consequences, adolescents often lack adequate awareness and understanding of the risks associated with prolonged screen exposure. Assessing their knowledge is a critical step toward designing effective educational and preventive strategies.

The study aims to assess the effectiveness of a nurse-led educational package on the level of knowledge among adolescents regarding the impacts of screen addiction.

The objectives of the study were:

To assess the pre-test knowledge scores regarding the impacts of screen addiction among adolescents in the control and experimental groups.

To implement and evaluate the effectiveness of the Nurse-Led Interventional Package regarding the impacts of screen addiction among adolescents in the experimental group.

To assess the post-test knowledge scores regarding the impacts of screen addiction among adolescents in the control and experimental groups.

MATERIALS AND METHODS

The research approach used for the present study was quantitative. Pre-test and post-test experimental design was considered. This design indicates that a pre-test was administered before administering the nurse-led interventional package.

Nurse-Led Interventional Package

A Nurse-Led Interventional Package on knowledge and attitude regarding the impacts of screen addiction among adolescents was developed after an extensive review of the literature. It consisted of three parts:

Part A: Digital Awareness Module

Objectives:

1. To educate and empower adolescents to develop healthy digital habits and maintain a balanced relationship with technology.
2. To understand the Importance of knowledge about Digital Awareness.
3. To understand how excessive screen time can contribute to anxiety, depression, and stress.
4. To recognise the physical impacts such as eye strain, poor posture, and sleep disturbances.
5. To realise the importance of offline interactions and face-to-face communication.

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6. To learn how to manage time effectively to ensure technology enhances academic productivity rather than hindering it.

Part B: Digital Detox Challenge: A practical guide for adolescents

Objectives:

1. To reduce screen time
2. To improve mental and physical health
3. To foster real-life social interactions
4. To enhance productivity and focus

Part C: Online Safety Module

Objectives:

To learn to safeguard personal information and maintain privacy online

To recognise potential risks associated with online activities

To learn to safeguard oneself from identity theft, cyberbullying, phishing, malware, and other forms of online fraud and abuse.

On Day 1, a Pre-test was conducted in both experimental and control groups. On Day 7, the Nurse-Led Interventional Package was administered to the experimental group, while no selected nursing intervention was administered to the control group by the researcher. On Day 21, a Post-test was conducted in both experimental and control groups. The study was conducted at selected schools in four districts of Punjab, namely Bathinda, Amritsar, Fatehgarh Sahib, and Shaheed Bhagat Singh Nagar. Four hundred adolescents were included in the study (two hundred in the control group and two hundred in the experimental group). The paper and pencil technique was used to collect data. Written consent was taken from the participants. They were assured of the confidentiality of their data.

Data Collection Tools

Data collection was done using a socio-demographic profile, which helped to collect information about the demographics of the clients. and a structured knowledge questionnaire to assess the knowledge regarding the impacts of screen addiction.

Section I: comprised of thirteen items seeking information about the demographic variables of adolescents such as their age, gender, educational standard, type of school, availability of devices, screen time in hours, educational status of mother and father, occupation of mother and father, type of family, area of residence and number of siblings.

Section II: A Structured Questionnaire consists of thirty-four items to assess the knowledge regarding the impacts of Screen Addiction. Items include the following content areas:

1. Introduction
2. Etiological Factors
3. Signs and Symptoms

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4. Impacts of Screen Addiction
5. Online Safety
6. Preventive Strategies

Scoring – All the items were of objective and multiple-choice type. Each item had a single correct response. Each correct answer carried a score of 'one', and the wrong answer was 'zero'. The total score ranges from 0 to 34.

Criterion Measure of Self-Structured Knowledge Questionnaire

Level of Knowledge	**Range of scores**
Excellent	28-34
Good	21-27
Average	14-20
Poor	0-13

The reliability of the knowledge questionnaire was calculated using Cronbach's Alpha, which yielded a value of 0.71, indicating acceptable reliability.

RESULTS

Table 1: The frequency and percentage distribution of demographic characteristics of selected adolescents in experimental and control groups

Sr. no.	**Variable**	**Experimental**		**Control**	
		N	**%**	**N**	**%**
1	**Age**				
	13-14	48	24	43	21.5
	15-16	96	48	79	39.5
	17-18	56	28	78	39
2	**Gender**				
	Male	97	48.5	97	48.5
	Female	103	51.5	103	51.5
	Transgender	0	0	0	0
3	**Year of Study**				
	7^{th} - 8^{th}	50	25	41	20.5
	9^{th} - 10^{th}	94	47	82	41

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	11^{th}-12^{th}	56 28	77 38.5
4	**Type of school**		
	Government	100 50	100 50
	Private	100 50	100 50
	Aided	0 0	0 0
5	**Availability of Device**		
	Personal	85 42.5	90 45
	Shared	115 57.5	110 55
6	**Daily Screen Time**		
	0-2 hours	17 8.5	25 12.5
	3-5 hours	53 26.5	53 26.5
	6-8 hours	87 43.5	77 38.5
	< 8 hours	42 21	45 22.5
7	**Education of father**		
	No formal Education	6 3	7 3.5
	Secondary Education	40 20	43 21.5
	Senior Secondary	90 45	66 33
	Graduate or Above	64 32	84 42
8	**Education of father**		
	No formal Education	8 4	11 5.5
	Secondary Education	42 21	54 27
	Senior Secondary	97 48.5	75 37.5
	Graduate or Above	53 26.5	60 30
9	**Father's Occupation**		
	Unemployed	11 5.5	20 10
	Labourer	48 24	49 24.5
	Job	94 47	80 40
	Businessman	57 28.5	51 25.5

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10	**Mother's Occupation**				
	Homemaker	54	27	44	22
	Labourer	44	22	49	24.5
	Job	63	31.5	64	32
	Businessman	39	19.5	43	21.5
11	**Type of Family**				
	Nuclear	87	43.5	85	42.5
	Joint	96	48	88	44
	Extended	17	8.5	27	13.5
12	**Area of Residence**				
	Rural	116	58	111	55.5
	Urban	84	42	89	44.5
13	**No. of Siblings**				
	Zero	58	29	37	18.5
	One or more	142	71	163	81.5

Table 1 depicts the frequency and percentage distribution of demographic characteristics of selected adolescents in experimental and control groups.

According to age, the majority of participants i.e. 48% (96) belong to the age group of 15-16 years in the experimental group, followed by 28% (56) belonging to the age group of 17-18 years and 24% to 13-14 years age group. Meanwhile, in the control group, 39.5% (79) of participants belonged to the 15-16 years age category, followed by 39% (78) participants belonging to the 17-18 years of age group, and least 21.5% (43) participants belonged to the 13-14 years age group.

Based on gender it was found that 51.5% (103) of adolescents in the experimental group were females followed by 48.5% (97) were males. In the control group, 51.5% (103) of adolescents were females and 48.5% (97) were males. No participants in the control and experimental group were transgender.

As per the year of study, the majority of participants i.e. 47% (94) in the experimental group belong to the 9^{th} to 10^{th} standard, followed by 28% (56) participants in the 11^{th}-12^{th} standard and 25% (50) in the 7^{th}-8^{th} standard. Meanwhile, in the control group, the majority 41% (82) of the participants were in the 9^{th}-10^{th} standard, 38.5% (77) participants were in the 11^{th}-12^{th} standard, and 20.5% (41) participants studied in the 7^{th}-8^{th} standard.

Based on the type of school, 50% (100) participants were in government schools, and 50% (100) participants studied in private schools in the experimental group. In the control group, 50% (100) were studied in private schools and 50% (100) participants read in government schools. No Participants study in aided schools in the control and experimental groups.

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57.5 % (115) use someone else's device in the experimental group followed by 42.5% (85) used personal device. In the control group, 55% (110) used someone else's device followed by 45 % (90) used a personal device.

As per Daily Screen time (in hours), in the experimental group, the majority of the participants i.e. 43.5% (87) have screen time of 6-8 hours, followed by 26.5% (53) have screen time of 3-5 hours, 21% (42) have screen time of more than 8 hours, and 8.5% (17) have screen time of 0-2 hours. In the control group, the majority of the participants 38.5% (77) have screen time of 6-8 hours, 26.5% (53) have screen time of 3-5 hours, 22.5% (45) have screen time of 3-5 hours, and 12.5% (25) have screen time of 0-2 hours.

Based on the educational status of the father, the majority i.e. 45% (90) of the fathers of the participants have senior secondary education, 32%(64) were graduates or above level education, have 20% (40) fathers have secondary education and 3% (6)have no formal education in the experimental group whereas, in the control group, the majority 42% (84) of the fathers of the participants have graduation or above the level of education, 33% (66) have senior secondary education, 21.5% (43) have secondary education and 3.5% (7) have no formal education.

Based on the educational status of the mother, the majority 48.5 % (97) of the mothers of the participants have senior secondary education, followed by 26.5%(53) who have graduated and above level education, 21% (42) have secondary education and 4%(8) have no formal education in the experimental group whereas, in the control group, the majority 37.5% (75) of the mothers of the participants have senior secondary education, 30% (60) have graduation and above education, 27% (54) have secondary education and the least 5.5% (11) have no formal education.

According to the occupation of the father, 47% (94) of the fathers have Private or Government Jobs, followed by 28,5% (57) were Businessmen, 24% (48) of fathers were laborers and least 5.5% (11) were unemployed in the experimental group. Meanwhile, in the control group, 10% (20) fathers were unemployed, 40% (80) had Private Jobs or Government Jobs, 24.5% (49) worked as Labourers and 25.5% (51) were Businessmen.

As per the occupation of the mother, 27% (54) of the mothers were homemakers, 31.5% (63) had Private Jobs or Government Jobs, 22% (44) worked as Labourers and 19.5% (39) were Businesswomen in the experimental group. Meanwhile, in the control group, 22% (44) of mothers were unemployed, 32% (64) had Private Jobs or Government Jobs, 24.5% (49) worked as Labourers and 21.5% (43) were Businesswomen.

The collected data showed that in the experimental group out of 200 adolescents, 43.5% (87) had nuclear families, 48% (96) were living in joint families, and 8.5% (17) lived in extended families whereas in the control group, 42.5% (85) had nuclear families, 44% (88) had joint families and 13.5% (27) lived in extended families.

Most of the adolescents in the experimental and control groups reside in the rural area i.e. 58% (116) and 55.5% (111) respectively whereas 42% (84) and 44.5% (89) of adolescents live in the urban area in the experimental and control groups respectively. Based on the number of siblings, 29% (58) of participants in the experimental group had 0 siblings, and 71% (142) had 1 or more siblings. Meanwhile, in the control group, 18.5% (37) had 0 siblings, and 81.5%(163) had 1 or more siblings.

Table 2 Frequency and Percentage distribution of Adolescents in the pre-test and post-test of control and experimental groups in terms of level of knowledge

N-400

Knowledge Level	**Experimental n-200**	**Control n-200**

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	Pre-test		**Post-test**		**Pre-test**		**Post-test**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Excellent	0	0	29	14.5	2	1	11	5.5
Good	62	31	92	46	63	31.5	70	35
Average	120	60	79	39.5	113	56.5	117	58.5
Poor	18	9	0	0	22	11	2	1

Maximum Score-34 Minimum Score-0

Table 2 depicts that 60% (120) of adolescents in the experimental group and 56.5% (113) adolescents under the control group had average pre-test knowledge level (14-20 score), followed by 31% (62) of adolescents in the experimental group and 31.5% (63) of adolescents in the control group had good pre-test knowledge score (21-27 score). Further data shows that only 9% (18) in experimental group and 11% (22) in control group had poor pre-test knowledge score (0-13 score) whereas it further shows that 0% (0) of subjects in the experimental group and 1% (2) in control group had excellent pre-test knowledge level (28-34).

In the post-test, after the implementation of the Nurse-Led Interventional Package in the experimental group, 14.5% (29) had excellent knowledge level, followed by 46% (92) had good knowledge level, 39.5% (79) had an average knowledge and 0% (0) had poor post-test knowledge level.

In the control group, the maximum i.e., 58.5% (117) had average post-test knowledge, followed by 35% (70) had good post-test knowledge, 5.5% (11) had excellent post-test knowledge, and the least 1% (2) had poor post-test knowledge level.

Table 3 Mean and standard deviation of knowledge score of adolescents under the control and experimental group during the pre-test and post-test

Group		**Mean**	**S.D.**	**Max.**	**Min.**
Control	**Pre-test**	**20.20**	**3.376**	**30**	**12**
	Post-test	**21.03**	**2.721**	**30**	**11**
Experimental	**Pre-test**	**20.19**	**3.235**	**27**	**12**
	Post-test	**22.63**	**3.359**	**31**	**15**

Max. Score- 34 Min. Score-0

The data presented in Table 3 indicate that the mean pre-test knowledge score (20.20) of the control group was slightly higher than the mean pre-test knowledge score (20.19) of adolescents in the experimental group.

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Meanwhile, the post-test mean Knowledge score (22.63) of adolescents in the experimental group was higher than the post-test mean knowledge score (21.03) of the control group.

It further depicts that the maximum post-test knowledge score attained by adolescents under the experimental group was 31, and the minimum pre-test knowledge score attained was 27.

Hence, it can be concluded that the knowledge score of the adolescents in the experimental group increased, proving the effectiveness of the nurse-led interventional program in increasing the knowledge.

To determine the significance of the difference between the knowledge scores of adolescents in the control and experimental group, the following hypotheses were stated.

H_1: The mean post-test knowledge scores of adolescents regarding the impacts of screen addiction in the control and the experimental groups will be statistically higher than those in the pre-test knowledge score, as measured by the knowledge questionnaire at the 0.05 significance level.

H_{01}- There will be no significant difference in the mean pre-test and post-test knowledge scores of adolescents regarding the impacts of screen addiction in the control and the experimental groups at the 0.05 level of significance.

Polit and Beck (2008) state that in a null hypothesis, there is no relationship between the variables.

The need for the hypothesis lies in the fact that, statistically, hypothesis testing is a process to reject a hypothesis. Through the statistical tests, the researcher seek to accomplish the rejection of the null hypothesis. Above null hypothesis H_{01} was stated to test the research hypothesis H_1.

To determine the significance of the difference in knowledge scores between adolescents in the experimental and control groups, an unpaired t-test was computed within each group, and a paired t-test was computed between the groups, with the findings presented in Table 4.

Table 4 Mean, Standard Deviation, and t value of scores obtained by adolescents on the knowledge questionnaire under the control and experimental groups

Group	**Pre-test**		**Post-test**		**Df**	**T test**
	Mean	**S.D.**	**Mean**	**S.D.**		
Experimental	**20.19**	**3.235**	**22.63**	**3.359**	**199**	**10.47**
Control	**20.20**	**3.376**	**20.99**	**2.717**	**199**	**3.61**
Df	**397**		**379**			
T test	**-0.03**		**5.37**			

Significant ($p<0.05$)

The data presented in Table 4 indicate that results were compared within the groups and between the two groups at both stages (pre-test and post-test).

The analysis of knowledge scores revealed a statistically significant improvement in the experimental group following the intervention. The post-test mean score of the experimental group ($M = 22.63$, $SD = 3.359$) was significantly higher than that of the control group ($M = 20.99$, $SD = 2.717$), with an independent t-test yielding a t-value of 5.37, degrees of freedom (df) = 379, and $p < 0.05$. This indicates a significant effect of the intervention on enhancing knowledge regarding screen addiction.

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At the baseline, the pre-test knowledge scores of the experimental group (M = 20.19, SD = 3.235) and control group (M = 20.20, SD = 3.376) were almost identical, and the difference was statistically non-significant (t = -0.03, df = 397, $p < 0.05$), confirming the initial homogeneity between the two groups in terms of knowledge.

Within-group comparisons also demonstrated meaningful findings. The experimental group showed a significant increase in knowledge from pre-test to post-test, with a t-value of 10.47 (df = 199, $p < 0.05$), confirming the positive impact of the intervention. The control group also exhibited a statistically significant improvement from pre-test to post-test with a t value of 3.61 (df = 199, $p < 0.05$), although the magnitude of change was much smaller compared to the experimental group.

Thus, it establishes a difference in the obtained mean post-knowledge score in the experimental group and the control group. Hence, the null hypothesis H_{01} was rejected, and the research hypothesis H_1 was accepted.

CONCLUSION

The above results confirm that the structured intervention was effective in improving the knowledge of adolescents in the experimental group regarding the impacts of screen addiction. The study concludes that screen addiction is a growing behavioural concern among adolescents, requiring urgent attention from parents, educators, nurses, and policymakers.

Implications

The study's findings have implications for Nursing practices, nursing administration, Nursing Education, and Nursing Research.

Implications for Nursing Practices

Knowledge of the impacts of screen addiction is essential for every nurse to prevent the potential consequences in patients. Nurses can further update their knowledge by attending workshops and seminars.

The study underscores the need for nurses to incorporate the screen usage assessment into routine health check-ups for adolescents.

Nurses can be equipped to provide early identification and intervention for screen addiction-related health problems such as sleep disturbances, vision issues, anxiety, and behavioral concerns.

Emphasis on individualized care planning based on the adolescent’s screen usage pattern can improve patient outcomes.

Nurses can play a key role in health promotion, guiding adolescents and their families toward healthier screen habits.

Implications for Community Health Nursing

The findings support the integration of screen addiction awareness programs in schools and community settings.

Community health nurses can collaborate with teachers and parents to educate adolescents about the adverse effects of excessive screen use.

School health services can be strengthened to include counselling and preventive interventions related to screen addiction.

Nurses can adopt a family-centered approach, involving parents in managing and monitoring screen time.

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Implications for Nursing Education

The research highlights the importance of incorporating digital health literacy and screen addiction topics into nursing curricula.

It encourages the development of training modules and case-based learning focused on adolescent mental health and screen-related issues.

Student nurses can be sensitized to modern behavioural challenges and equipped with skills to assess and counsel adolescents effectively.

Implications for Nursing Research

The study contributes to the limited body of research on behavioural and psychological impacts of screen addiction among adolescents in the Indian context.

It paves the way for further research into intervention strategies, long-term health impacts, and the role of family and peer influences.

The study can inspire the development of standardized assessment tools for use in clinical and community settings.

It supports evidence-based nursing practice by providing data that can be used to improve adolescent health strategies.

Implications for Nursing Administration

The findings can inform administrators in developing institutional policies and guidelines addressing screen addiction among adolescents.

They can help plan and implement staff development programs on digital wellness and behavioural health.

Administrators can use the insights to allocate resources effectively, such as establishing adolescent wellness clinics, counselling services, or digital detox programs in schools and communities.

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