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Association of Television time with Psychiatric co-morbidity in school going children

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ABSTRACT

Background: This study exploresthe relationship between TV viewing habits affect psychiatric co-morbidities in children aged 8-12, including Attention Deficit Hyperactivity Disorder(ADHD), Oppositional Defiant Disorder(ODD), conduct disorder, depression, anxiety, and somatic symptoms. Given the increase in screen time, understanding its impact on mental health is critical.

Aim: The primary aim is to investigate the association between television screen time and psychiatric co-morbidities in school-going preadolescents.

Methods: The study included 300 students from a metropolitan city's English medium public schools. Data on sociodemographics, screen time, and behavioral issues were collected using semi structured performa, screen time questionnaire and the Child Behavior Checklist. The association of the variables which were quantitative and not normally distributed in nature were analysed using Kruskal Wallis test.

Results: The study of 300 students aged 8 to 12 found significant links between increased TV viewing and externalizing disorders: ADHD ($p < 0.0001$), Oppositional Defiant Disorder (ODD) ($p = 0.0003$), and Conduct Disorder ($p = 0.0001$). Higher TV time, especially on weekends ($p = 0.0004$) and overall daily viewing ($p < 0.0001$), correlated with these issues. TV viewing did not significantly relate to anxiety ($p = 0.854$) or somatic symptoms ($p = 0.983$), but weekend viewing was significantly associated with depressive symptoms ($p = 0.005$).

Conclusion: Findings suggest that excessive TV viewing in preadolescents is associated with more externalizing behaviors like ADHD and conduct disorders, while weekend viewing is linked to depressive symptoms. Monitoring screen time is crucial to address these risks, and further research is needed to explore these associations more comprehensively.

Keywords: ADHD, Anxiety, Conduct Disorder, Depressive Symptoms, ODD, Somatic Symptoms, Television Viewing, Screen Time

I. INTRODUCTION

Children and adolescents are significant consumers of television, with an increasing trend in screen time observed globally. From 2019 to 2021, a 17% rise in television viewing among this demographic was reported,[1] reflecting broader trends in screen-based behaviors. Earlier studies have shown that screen-based devices, including televisions, are frequently utilized by children and adolescents, with 48% of 5–15-year-olds having a television in their bedroom as of 2016.[2] This rise in screen time correlates with an increase in the prevalence of psychiatric problems among young people.[3]

However, the relationship between specific screen-based sedentary behaviors, such as television viewing and video gaming, and emotional disorder symptoms, including depression, panic, social phobia, and generalized anxiety, remains uncertain. This suggests that the link between screen time and emotional disorders may vary across different screen-based activities and emotional conditions.[4] A more detailed exploration of these associations is necessary to uncover the underlying mechanisms.

Research by Twenge et al.[5] has shown that children who engage extensively in screen media, such as television and video games, exhibit lower psychological well-being compared to their low-usage counterparts. High screen users are particularly prone to poor emotion regulation, including difficulties in staying calm, excessive arguing, and challenges in forming friendships. The COVID-19 pandemic further exacerbated these trends, as Thakur (Rai) N et al.[6] reported increased

digital media usage among children, with a growing preference for screen-based activities over outdoor play. This study highlighted significant screen time differences across age groups, with excessive television viewing adversely affecting both health and behavior in children.

While sedentary behaviors linked to excessive television viewing are associated with psychiatric disorders, the direction and specificity of these associations remain unclear. It is particularly uncertain whether certain types of screen-based behaviors are more closely related to specific psychiatric symptoms. Given the negative outcomes previously reported in connection with excessive television viewing, it is essential to investigate its impact on psychiatric comorbidities in pre-adolescents.

To our knowledge, no studies have specifically examined the relationship between excessive television viewing and psychiatric disorders in pre-adolescents in India. Therefore, this study aims to explore the association between excessive television viewing time and psychiatric comorbidities, such as depression, anxiety, ADHD, and other behavioral problems, in pre-adolescents aged 8-12 years.

Methodology

STUDY DESIGN:

It is a cross-sectional observational study, which includes 300 students of various English medium schools of metropolitan city. The research was conducted during the academic years 2022-2023after taking approval from the institutional ethics committee.

SAMPLE POPULATION AND CHARACTERISTICS:

A simple random sampling technique was employed to ensure a representative and reliable sample. The sample size was calculated using the formula $n= 4pq/D^2$, where "p" represents the prevalence of psychiatric disorders among school children (estimated at 23.33%), "q" is 1-p, and "D" is the margin of error. This calculation resulted in a sample size of 286, which was rounded up to 300 to account for potential dropouts and to ensure sufficient statistical power.

Inclusion criteria:

- Students aged 8 to 12 years, a critical developmental stage for the emergence of psychiatric conditions.
- Ability to cooperate and participate in the study.
- Exposure to visual multimedia devices for at least 6 months.
- Willingness of parents to provide informed consent and the student to give assent.

Exclusion criteria:

- Inability to complete the questionnaire with parental assistance.
- Lack of exposure to visual multimedia devices for at least 6 months.
- Inability to follow the language of the questionnaires, as these were only available in English.

Tools:

1. **Written Informed Consent/Assent Form**:

Written informed consent and assent were obtained from both parents and students, ensuring that all participants were fully aware of the study's purpose, procedures, and their rights, including the right to withdraw at any time.

2. **Self-Designed Sociodemographic Data Sheet**:

A semi-structured proforma was used to collect essential sociodemographic information, such as age, gender, and family background, relevant to the study's outcomes.

3. **Screen Time Questionnaire**:

An 18-item questionnaire, previously validated in related studies, assessed the usage of screen devices (e.g., television, smartphones, tablets) during weekdays and weekends. This tool classified students into different screen time categories, providing a comprehensive overview of their screen-based behaviors.

4. **Child Behavior Checklist (CBCL) for Ages 6 to 18 Years**:

The CBCL/6–18 is a 113-item parent report measure that assesses behavioral and emotional problems based on DSM-5 criteria. It includes subscales for anxiety, depression, somatic complaints, ADHD, ODD, and conduct disorder. The scale uses a 3-point Likert system, with T-scores derived from raw scores. A T-score of 65-70 indicates a borderline clinical range, while a T-score above 70 suggests a clinical range. The CBCL has demonstrated high reliability, with Cronbach's alpha values ranging from 0.78 to 0.94, making it a suitable tool for this population.

Statistical Analysis:

Categorical variables were represented as numbers and percentages, while quantitative data were presented as means ± SD and medians with interquartile ranges (IQR). The Shapiro-Wilk test was used to assess the normality of the data. For

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variables that were not normally distributed, the Kruskal-Wallis test was applied to assess associations. SPSS software version 25.0 (IBM, Chicago, USA) was used for the statistical analysis, with a significance level set at $p<0.05$.

II. RESULTS

The study analysed data from 300 students aged 8 to 12 years, all of whom had been exposed to television viewing for at least 6 months. The results of the analysis are presented below.

Table 1:- Socio-demographic characteristics distribution. (n=300)

Socio-demographic characteristics	Frequency	Percentage
Gender		
Female	146	48.67%
Male	154	51.33%
Religion		
Hindu	254	84.67%
Muslim	12	4.00%
Jain	29	9.67%
Christian	3	1.00%
Sikh	2	0.67%
Type of family		
Joint family	136	45.33%
Nuclear family	164	54.67%
Birth order		
1	214	71.33%
2	82	27.33%
3 & more	4	1.33%
Socio economic status		
Upper	19	6.33%
Upper middle	232	77.33%
Lower middle	49	16.33%
Number of siblings		
0	66	22.00%
1	159	53.00%
2 & more	75	25.00%
Age(years)		
Mean ± SD	10.11 ± 1.4	
Median(25th-75th percentile)	10(9-11)	
Range	8-12	

Sociodemographic Characteristics (Table 1):

The sample consisted of 154 males (51.33%) and 146 females (48.67%). The majority of participants were Hindu (84.67%), followed by Jain (9.67%), Muslim (4.00%), Christian (1.00%), and Sikh (0.67%). Most participants belonged to nuclear families (54.67%), while the remainder were from joint families (45.33%). Firstborn children comprised the majority of the sample (71.33%). The predominant socio-economic status was upper-middle class (77.33%), with fewer participants from lower-middle (16.33%) and upper classes (6.33%). The average age was 10.11 ± 1.4 years.

Table 2:- Parent's details distribution.(n=300)

Parent's details	Frequency	Percentage
Father's education		
Matriculate	16	5.33%
Graduate	183	61.00%
Post graduate & higher	101	33.67%
Father's occupation		

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Service	169	56.33%
Business	130	43.33%
Professional	1	0.33%
Mother's education		
Illiterate	2	0.67%
Matriculate	16	5.33%
Graduate	188	62.67%
Post graduate & higher	94	31.34%
Mother's occupation		
Service	110	36.67%
Business	28	9.33%
Professional	1	0.33%
Unemployed	161	53.67%

Parental Characteristics (Table 2):

Among the fathers, 61.00% had a graduate degree, and 33.67% had post-graduate or higher qualifications. Most were employed in service occupations (56.33%), with a smaller portion in business (43.33%). For mothers, 62.67% were graduates, and 31.34% had post-graduate or higher education. A majority of the mothers (53.67%) were unemployed, while 36.67% were employed in service roles.

Table 3:- Descriptive statistics of Television viewing (hours). (n=300)

Type of television viewing	Mean ± SD	Median(25th-75th percentile)	Range
Average television time on weekdays(hours)	1.31 ± 1.08	1(0.5-2)	0-10
Average television time on weeknights(hours)	1.01 ± 0.8	1(0.5-1.25)	0-6
Average television time on weekends(hours)	2.11 ± 1.37	2(1-3)	0-12
Average daily television time (avg of 7 days) (hours)	2.26 ± 1.46	2(1.286-3)	0-13.43

Television Viewing Patterns (Table 3):

On average, participants spent 1.31 ± 1.08 hours watching television on weekdays, 1.01 ± 0.8 hours on weeknights, and 2.11 ± 1.37 hours on weekends. The overall average daily television viewing time was 2.26 ± 1.46 hours.

Table 4:- Child behavior checklist distribution.(n=300)

Child behavior checklist	Depressive problems	Anxiety	Somatic problems	ADHD	ODD	Conduct problems
Normal range	248 (82.67%)	252 (84.00%)	253 (84.33%)	268 (89.33%)	272 (90.67%)	272 (90.67%)
Borderline clinical range	31 (10.33%)	22 (7.33%)	20 (6.67%)	20 (6.67%)	19 (6.33%)	21 (7.00%)
Clinical range	21 (7.00%)	26 (8.67%)	27 (9.00%)	12 (4.00%)	9 (3.00%)	7 (2.33%)
Mean ± SD (T-score)	57.15 ± 7.34	55.77 ± 7.72	57.24 ± 7.88	53.62 ± 6.2	53.62 ± 5.63	53.5 ± 5.94
Median(25th-75th percentile) (T-score)	56(51-61.5)	52(51-58)	57(50-61)	50(50-55)	51(50-55)	51(50-54)
Range	50-83	50-91	50-93	50-78	50-80	50-84

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Child Behavior Checklist (CBCL) Scores (Table 4):

The majority of children fell within the normal range across various behavioral issues, with 82.67% for depressive problems, 84.00% for anxiety, 84.33% for somatic problems, 89.33% for ADHD, and 90.67% for both ODD and conduct problems. Borderline clinical ranges were observed in smaller percentages, with 10.33% for depressive problems, 7.33% for anxiety, and 6.67% for somatic problems. Clinical range scores were relatively low, with 7.00% for depressive problems, 8.67% for anxiety, and 9.00% for somatic problems.

Table 5 :-Association of television viewing (hours) with depressive, anxiety and somatic problems.(n=300)

Television time (Hours)	Normal range(n=248)	Borderline clinical range(n=31)	Clinical range(n=21)	Total	P value
Association of Average television time on weekdays(hours) with depressive problems					
Mean ± SD	1.27 ± 0.98	1.64 ± 1.72	1.38 ± 1	1.31 ± 1.08	0.283
Median(25th-75th percentile)	1(0.5-2)	1.25(1-2)	1(1-2)	1(0.5-2)	
Range	0-6	0-10	0.25-5	0-10	
Association of Average television time on weeknights (hours) with depressive problems					
Mean ± SD	0.98 ± 0.78	1.23 ± 0.79	1.07 ± 1	1.01 ± 0.8	0.153
Median(25th-75th percentile)	1(0.5-1.062)	1(0.625-1.5)	1(0.5-1)	1(0.5-1.25)	
Range	0-6	0-4	0-5	0-6	
Association of Average television time on weekends (hours) with depressive problems					
Mean ± SD	2.05 ± 1.3	2.84 ± 1.93	1.75 ± 0.92	2.11 ± 1.37	0.005**
Median(25th-75th percentile)	2(1-3)	2(2-3)	2(1-2)	2(1-3)	
Range	0-6	0-12	0-4	0-12	
Association of Average daily television time(hours) with depressive problems					
Mean ± SD	2.19 ± 1.32	2.86 ± 2.2	2.25 ± 1.49	2.26 ± 1.46	0.068
Median(25th-75th percentile)	1.96(1.286-3)	2.36(1.732-3.161)	2(1.357-2.357)	2(1.286-3)	
Range	0-10.29	0.71-13.43	0.82-8	0-13.43	
Association of Average television time on weekdays(hours) with anxiety					
Mean ± SD	1.32 ± 1.15	1.32 ± 0.7	1.31 ± 0.63	1.31 ± 1.08	0.515
Median(25th-75th percentile)	1(0.5-2)	1(1-2)	1.25(0.625-2)	1(0.5-2)	
Range	0-10	0.33-3	0.5-2	0-10	
Association of Average television time on weeknights(hours) with anxiety					
Mean ± SD	1.03 ± 0.84	0.94 ± 0.51	0.85 ± 0.62	1.01 ± 0.8	0.674
Median(25th-75th percentile)	1(0.5-1.5)	1(0.5-1)	0.88(0.5-1)	1(0.5-1.25)	
Range	0-6	0-2	0-2	0-6	
Association of Average television time on weekend(hours) with anxiety					
Mean ± SD	2.15 ± 1.44	1.97 ± 0.91	1.87 ± 1.03	2.11 ± 1.37	0.694
Median(25th-75th percentile)	2(1-3)	2(2-2)	2(1-2.75)	2(1-3)	
Range	0-12	0-4	0.5-4	0-12	
Association of Average daily television time(hours) with anxiety					
Mean ± SD	2.29 ± 1.55	2.18 ± 0.79	2.07 ± 0.84	2.26 ± 1.46	0.854
Median(25th-75th percentile)	2(1.286-3)	2(1.661-2.571)	2.07(1.411-2.75)	2(1.286-3)	
Range	0-13.43	1.07-4	0.5-4	0-13.43	
Association of Average television time on weekdays(hours) with somatic problems					
Mean ± SD	1.33 ± 1.15	1.18 ± 0.62	1.27 ± 0.65	1.31 ± 1.08	0.872

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Median(25th-75th percentile)	1(0.5-2)	1(0.938-1.625)	1.5(0.75-2)	1(0.5-2)	
Range	0-10	0.25-2.5	0-2	0-10	
Association of Average television time on weeknights(hours) with somatic problems					
Mean ± SD	1.03 ± 0.84	0.99 ± 0.64	0.84 ± 0.51	1.01 ± 0.8	
Median(25th-75th percentile)	1(0.5-1.25)	1(0.5-1.5)	0.75(0.5-1)	1(0.5-1.25)	0.71
Range	0-6	0-2	0-2	0-6	
Association of Average television time on weekend(hours) with somatic problems					
Mean ± SD	2.16 ± 1.44	1.9 ± 0.93	1.86 ± 0.95	2.11 ± 1.37	
Median(25th-75th percentile)	2(1-3)	2(1.375-2)	2(1-2.375)	2(1-3)	0.8
Range	0-12	0-4	0-4	0-12	
Association of Average daily television time(hours) with somatic problems					
Mean ± SD	2.3 ± 1.55	2.09 ± 0.85	2.04 ± 0.72	2.26 ± 1.46	
Median(25th-75th percentile)	2(1.286-3)	2.11(1.571-2.482)	2.07(1.393-2.607)	2(1.286-3)	0.983
Range	0-13.43	0.71-3.43	0.82-3.36	0-13.43	

Kruskal Wallis test
* $p < 0.05$
** $p < 0.01$

Association of Television Viewing with Internalizing Problems (Table 5):

- **Depressive Problems**: No significant association was found between television viewing time on weekdays (p=0.283) or weeknights (p=0.153) and depressive problems. However, a significant association was observed on weekends, with those in the clinical range watching more television (2.75 hours) compared to those in the normal (2.05 hours) and borderline (2.84 hours) ranges (p=0.005**).
- **Anxiety**: There were no significant differences in television viewing time across anxiety ranges during weekdays (p=0.515), weeknights (p=0.674), weekends (p=0.694), or daily average (p=0.854).
- **Somatic Problems**: Similarly, no significant associations were observed between television viewing time and somatic problems during weekdays (p=0.872), weeknights (p=0.71), weekends (p=0.8), or daily average (p=0.983).

Table 6 :-Association of television viewing (hours) with ADHD, ODD and Conduct disorder.(n=300)

Television time (Hours)	**Normal range(n=248)**	**Borderline clinical range(n=31)**	**Clinical range(n=21)**	**Total**	**P value**
Association of Average television time on weekdays (hours) with ADHD					
Mean ± SD	1.21 ± 0.94	2.42 ± 1.98	1.75 ± 0.94	1.31 ± 1.08	
Median(25th-75th percentile)	1(0.5-2)	2(2-2.5)	2(1-2)	1(0.5-2)	<.0001**
Range	0-6	0-10	0-3.5	0-10	
Association of Average television time on weeknights (hours) with ADHD					
Mean ± SD	0.92 ± 0.76	1.8 ± 0.8	1.67 ± 0.75	1.01 ± 0.8	
Median(25th-75th percentile)	1(0.5-1)	1.75(1-2)	2(1-2)	1(0.5-1.25)	<.0001**
Range	0-6	1-4	0.5-3	0-6	
Association of Average television time on weekends (hours) with ADHD					
Mean ± SD	1.98 ± 1.2	3.32 ± 2.52	3.04 ± 1.21	2.11 ± 1.37	
Median(25th-75th percentile)	2(1-2.625)	3.25(1.375-4)	3.5(2.625-4)	2(1-3)	0.0004**
Range	0-6	0.5-12	1-4	0-12	

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Association of Average daily television time(hours) with ADHD					
Mean ± SD	2.09 ± 1.26	3.97 ± 2.48	3.31 ± 1.11	2.26 ± 1.46	<.0001**
Median(25th-75th percentile)	1.82(1.286-2.714)	3.64(2.929-4.089)	3(2.536-4)	2(1.286-3)	
Range	0-10.29	1.21-13.43	1.71-5.43	0-13.43	
Association of Average television time on weekdays(hours) with ODD					
Mean ± SD	1.25 ± 0.94	2.12 ± 2.1	1.72 ± 1.42	1.31 ± 1.08	0.028*
Median(25th-75th percentile)	1(0.5-2)	2(1-2.25)	2(0.5-2)	1(0.5-2)	
Range	0-6	0-10	0.5-5	0-10	
Association of Average television time on weeknights(hours) with ODD					
Mean ± SD	0.94 ± 0.72	1.66 ± 1.07	1.83 ± 1.48	1.01 ± 0.8	0.001**
Median(25th-75th percentile)	1(0.5-1)	2(1-2)	1(1-2.5)	1(0.5-1.25)	
Range	0-6	0-4	0.5-5	0-6	
Association of Average television time on weekend(hours) with ODD					
Mean ± SD	1.99 ± 1.2	3.34 ± 2.46	3.17 ± 1.7	2.11 ± 1.37	0.001**
Median(25th-75th percentile)	2(1-3)	4(2-4)	3(2-4)	2(1-3)	
Range	0-6	0.5-12	1-6	0-12	
Association of Average daily television time(hours) with ODD					
Mean ± SD	2.13 ± 1.23	3.66 ± 2.72	3.44 ± 2.08	2.26 ± 1.46	0.0003**
Median(25th-75th percentile)	1.93(1.286-2.732)	3.14(2.464-4.25)	2.64(2.071-4)	2(1.286-3)	
Range	0-10.29	0.38-13.43	1.36-8	0-13.43	
Association of Average television time on weekdays(hours) with conduct problems					
Mean ± SD	1.23 ± 0.95	2.21 ± 1.98	1.82 ± 0.94	1.31 ± 1.08	0.001**
Median(25th-75th percentile)	1(0.5-2)	2(1.5-2.5)	2(1-2.5)	1(0.5-2)	
Range	0-6	0.5-10	0.75-3	0-10	
Association of Average television time on weeknights(hours) with conduct problems					
Mean ± SD	0.95 ± 0.77	1.61 ± 0.96	1.36 ± 0.9	1.01 ± 0.8	0.001**
Median(25th-75th percentile)	1(0.5-1)	1.5(1-2)	1.5(0.75-2)	1(0.5-1.25)	
Range	0-6	0-4	0-2.5	0-6	
Association of Average television time on weekend(hours) with conduct problems					
Mean ± SD	2 ± 1.21	3.45 ± 2.41	2.32 ± 1.25	2.11 ± 1.37	0.002**
Median(25th-75th percentile)	2(1-3)	3(2-4)	2(1.5-3.125)	2(1-3)	
Range	0-6	0.5-12	1-4	0-12	
Association of Average daily television time(hours) with conduct problems					
Mean ± SD	2.13 ± 1.27	3.72 ± 2.55	2.93 ± 1.44	2.26 ± 1.46	0.0001**
Median(25th-75th percentile)	1.93(1.286-2.714)	3.43(2.357-3.857)	3.14(1.714-4.071)	2(1.286-3)	
Range	0-10.29	0.93-13.43	1.11-4.71	0-13.43	

Kruskal Wallis test
* $p < 0.05$
** $p < 0.01$

Association of Television Viewing with Externalizing Problems (Table 6):

- **ADHD**: Significant associations were found between increased television viewing time and ADHD across all time periods. On weekdays, those in the clinical range watched an average of 1.75 hours, significantly more than those in the normal range (1.21 hours, $p < 0.0001$**). Similar patterns were observed for weeknights (clinical: 1.67 hours, normal: 0.92 hours, p <

0.0001**) and weekends (clinical: 3.04 hours, normal: 1.98 hours, p = 0.0004**). Overall daily viewing time was also higher in the clinical range (3.31 hours, p < 0.0001**).

- **ODD**: Television viewing time was significantly associated with ODD across all time periods. On weekdays, clinical cases averaged 1.72 hours, more than the normal range (1.25 hours, p = 0.028*). Significant differences were also observed on weeknights (clinical: 1.83 hours, normal: 0.94 hours, p = 0.001**) and weekends (clinical: 3.17 hours, normal: 1.99 hours, p = 0.001**). Daily average television time was significantly higher for clinical ODD cases (3.44 hours, p = 0.0003**).
- **Conduct Disorder**: Significant associations were also observed between television viewing time and conduct disorder. On weekdays, clinical cases averaged 1.82 hours, compared to 1.23 hours in the normal range (p = 0.001**). Weeknight viewing times were similarly higher for those with conduct problems (clinical: 1.36 hours, normal: 0.95 hours, p = 0.001**), and weekend viewing was significantly higher for clinical cases (2.32 hours, p = 0.002**). Daily average viewing time was also associated with conduct disorder (clinical: 2.93 hours, p = 0.0001**).

III. SUMMARY OF RESULT:

The study found a significant association between increased television viewing time and higher levels of externalizing disorders such as ADHD, ODD, and conduct disorder. However, the association between television viewing and internalizing problems like depression, anxiety, and somatic symptoms was less pronounced, with only weekend viewing being significantly associated with depressive problems.

IV. DISCUSSION

The 2011 Census of India reported that there were approximately 207.9 million children aged 7 to 14 years. According to a meta-analysis, the prevalence of psychiatric disorders in this age group among Indian school-going children was found to be 23.33.[7]In today's media-rich environment, children and adolescents are heavily engaged with television-based digital media, which has become the predominant sedentary leisure activity for this age group.

Although screen media offers benefits such as information access and quick communication, its use is also associated with adverse effects on physical, psychological, and social health.[7,8]Given the documented negative outcomes associated with increased television time, it is crucial to examine how these behaviors correlate with psychiatric comorbidities in pre-adolescents. To address this gap, our study aimed to investigate the association between television screen time and psychiatric comorbidities, such as depression, anxiety, ADHD, and other behavioral problems, in children aged 8-12 years.

In our study, 51.33% of participants were boys and 48.67% were girls, with a mean age of 10.11 years. SE Anderson et al.[9]conducted a cross-sectional analysis of screen time and its association with sociodemographic characteristics such as gender and age, including 52.3% males and 47.7% females aged 9-11 years, with a mean age of 10.45 years, which is similar to our study. Another study exploring the association of screen time with depression in adolescents included 53% males and 47% females, with a mean age of 12.7 years, also reflecting a similar demographic to our study.[10]

The current study predominantly includes students from an upper-middle-class socioeconomic status (SES) (77.3%), with 6.33% from the upper class and 16.33% from the lower-middle class. In contrast, a previous similar study examining the relationship between SES and screen time in children and adolescents included 35.3% of participants from middle SES, 17.5% from low SES, and 47.2% from high SES.[11] Our study's sample was collected from public schools in Jaipur, which may account for the different SES distribution compared to previous studies.

Our study shows a higher literacy rate among parents, as the included students were only from English medium public schools. Additionally, 43% of the mothers of the included children in this study are employed or run their own businesses. In comparison, a previous study found that 53.5% of mothers were employed, and it indicated that children of working mothers had higher screen time than those with housewives. The previous study pointed out that the employment of mothers might pose challenges to their ability to regulate screen time for their children. The employment rate of mothers is higher in the mentioned study compared to our current study.[12]

We found that the average daily television time of 2.26 ± 1.46 hours in our sample exceeds the recommended screen time limits. A previous study reported a median duration of screen-based activities among adolescents to be 3.19 hours per day, identifying television watching as a major recreational activity.[13]However, in the current study, no significant difference was found in the patterns of television use between weekdays and

weekends. In contrast, previous studies in India suggested that children in urban settings spent more time on screen-based media during weekends or holidays (3.38 hours) compared to school days or weekdays (1.36 hours).[14]

A previous systematic review revealed a wide variation in depression prevalence among children and adolescents, ranging from 3% to 68%, largely due to methodological differences and reliance on screening questionnaires. In contrast, our study using the Child Behavior Checklist found a prevalence of 17.33% for depressive problems among school-going children.[15] The discrepancy may be influenced by the sample's demographic and socio-economic characteristics.

For anxiety, past studies in India reported a 3.67% prevalence among children aged 11 to 16,[16]while a U.S. survey (2016-2019) found an 8.6% prevalence in children aged 6-11.[17]Our study found 8.67% of children in the clinical range and 7.33% in the borderline clinical range for anxiety, which may reflect environmental stressors and increased mental health awareness in urban English medium schools.

Somatoform symptoms have shown a broad prevalence range from 5.1% to 81% in childhood and adolescence, with a pooled prevalence of 31%.[18] Our study identified 9% of participants with clinical somatic problems and 6.67% with borderline clinical problems.

Regarding ADHD, our study found 4% of students in the clinical range and 6.67% in the borderline clinical range, compared to a global prevalence of 3.4% and 8.7% in the U.S. survey (2016-2019). The lower prevalence in our urban sample may be influenced by demographic factors.For ODD and conduct disorder, our study found 3% and 2.33% of students in the clinical range, respectively, with 6.33% and 7% in the borderline clinical range. These figures align with previous global and U.S. prevalence rates. [16,19]

This study did find a significant association between average television viewing time on weekends and depressive symptoms. These findings align with a previous systematic review and meta-analysis, which also found significant correlations between increased screen time and internalizing problems in children and adolescents.[20,21]However, depressive and anxiety-related symptoms often go unnoticed in young children, as externalizing problems are more easily observed by parents and teachers. This might be a factor in the current study and many previous studies that report a weak correlation between screen time and internalizing problems such as depression and anxiety.

This study found a significant link between television watching and ADHD symptoms, both on weekdays and weekends. A meta-analysis of 45 studies supports this relationship, highlighting that increased screen time is associated with ADHD behaviors.The dopamine hypothesis suggests that screen use may trigger dopamine release, providing immediate rewards that individuals with ADHD find particularly appealing. The delay gratification theory proposes that those with ADHD struggle with impulse control and delaying rewards, which may be exacerbated by screen use.[22-25]

Furthermore, research by Nagata JM et al.[26] showed that exceeding the recommended screen time by one hour increases the likelihood of conduct disorder by 7% and oppositional defiant disorder by 5%. Our study similarly found significant associations between screen time and behavioral issues, including ODD and conduct disorder, affecting both television and other screen devices.

V. LIMITATIONS

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design prevents establishing causality between television viewing and psychiatric conditions. Longitudinal studies would be necessary to determine the directionality of these associations. Second, the reliance on self-reported data from children and their parents may introduce response biases, particularly in estimating screen time and reporting psychiatric symptoms. Third, the sample was drawn exclusively from English medium public schools in a metropolitan area, which may limit the generalizability of the findings to other socio-economic and geographic populations, especially those in rural or non-English-speaking regions. Additionally, the study did not account for potential confounding variables such as parental screen time, the quality of television content, or the overall family environment, which could have influenced the observed associations. Lastly, the exclusion of non-English speakers further narrows the applicability of the results, potentially overlooking the experiences of a broader, more diverse population.

VI. CONCLUSION

The study highlights significant associations between increased television viewing and externalizing behavioral problems such as ADHD, Oppositional Defiant Disorder (ODD), and Conduct Disorder among preadolescents. These

associations were most pronounced during weekends and in the overall daily television viewing time. In contrast, the relationship between television viewing and internalizing problems such as depression and anxiety was less significant, with only weekend viewing showing a significant link to depressive symptoms. These findings underscore the importance of monitoring and regulating screen time to mitigate potential adverse effects on children's mental health and behavioral development.

Given the limitations of the current study, including its cross-sectional nature and demographic focus, further research is needed in more diverse populations and through longitudinal studies. Such research should explore causal relationships and consider additional factors that may influence the association between screen time and psychiatric disorders. This study contributes to the growing evidence on the impact of screen time on children's mental health and supports the need for public health strategies aimed at reducing excessive screen exposure among children.

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