



Cover Page



EFFECTIVENESS OF A MULTICOMPONENT COGNITIVE BEHAVIORAL THERAPY PROGRAM FOR INTERNET ADDICTION AMONG ADOLESCENTS: A STUDY FROM NORTHERN INDIA

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Abstract:

Background: Internet Addiction (IA) is an emerging behavioral concern among Indian adolescents, driven by increasing digital access and limited awareness of responsible internet use. Despite its growing prevalence, structured and culturally appropriate interventions remain scarce. This study evaluated the effectiveness of a multicomponent Cognitive Behavioral Therapy (CBT) program in reducing IA among adolescents in Northern India.

Methods: A single-group, pre–post intervention study was conducted between March and July 2023 at a psychological counseling center in Lucknow. Forty adolescents (aged 13–19 years) diagnosed with IA were recruited through purposive sampling. Participants received a structured 12-session CBT program delivered across three phases: psychoeducation, cognitive restructuring, and relapse prevention. The Hindi version of the Internet Addiction Scale (IAS) was administered before and after the intervention. Statistical analyses included paired t-tests, Cohen's d, and multiple linear regression.

Results: Significant reductions were observed in post-intervention IA scores ($p < .001$), with a large effect size (Cohen's $d = 2.67$ for total IA). Age significantly predicted improvement, with older adolescents demonstrating greater benefit ($p = .013$).

Conclusion: The culturally adapted multicomponent CBT program was effective in reducing IA severity among adolescents. Its age-sensitive design and contextual tailoring make it a promising candidate for integration into school- and community-based adolescent mental-health programs in India.

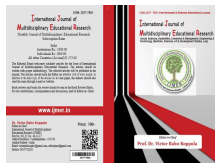
Key words: Adolescents, multicomponent Cognitive Behavior Therapy (CBT), Internet Addiction (IA).

1. Introduction

The increasing ubiquity of internet-enabled devices has led to a global surge in digital dependency, particularly among adolescents. While the internet offers educational, recreational, and social benefits, its excessive or poorly controlled use has given rise to a behavioral concern known as Internet Addiction (IA). (1) IA is characterized by compulsive internet use that leads to psychological, social, and academic impairments. (2–4)

A growing body of region-specific research reports variable but concerning levels of IA. A review of school-based studies across 14 Indian states revealed that the prevalence of moderate IA (Y-IAT 50–79) among adolescents ranges from 6% to 36%, while severe IA (Y-IAT ≥ 80), though less common, affects up to 10% in some regions. (5–11) Males and older adolescents consistently demonstrate higher risk. However, methodological inconsistencies, limited national surveillance, and a lack of culturally grounded intervention programs leave significant gaps in adolescent digital mental health services. Cognitive Behavioral Therapy (CBT) has emerged as a leading intervention for IA. (4,12) Young's CBT-IA model (13), as well as subsequent theoretical frameworks by Davis (14) and Caplan (15), emphasize the role of maladaptive cognitions, poor impulse control, and emotion regulation difficulties in maintaining IA behaviors. Recent studies highlight the potential of multicomponent CBT protocols, which combine psychoeducation, cognitive restructuring, behavioral substitution, mindfulness, and relapse prevention, to produce meaningful reductions in IA severity. (13,16,17)

While several Indian studies have examined the prevalence and correlates of Internet Addiction among adolescents, few have evaluated structured, culturally tailored CBT interventions using a replicable format. Moreover, the influence of demographic and psychosocial factors, such as age, socioeconomic status, and family structure, on treatment outcomes remains underexplored.



Cover Page



This study aimed to evaluate the effectiveness of a 12-session multicomponent CBT program in reducing Internet Addiction among adolescents aged 13–19 years. It also examined the influence of demographic factors on treatment response to better understand which subgroups may benefit most from such interventions. It was hypothesized that participation in the multicomponent CBT program would lead to a significant reduction in IA scores among adolescents.

2. Methodology

2.1 Study Design and Participants

This study employed a single-group, pre–post intervention design from March to July 2023 to evaluate the effectiveness of a structured, multicomponent CBT program for IA among adolescents. The study was conducted at a psychological counseling center in Lucknow, Northern India. Participants were referred following a diagnosis at other clinical centers. Adolescents aged 13 to 19 years were eligible if they met the diagnostic criteria for Internet Addiction, as determined by a clinical evaluation aligned with ICD-10 guidelines, and had regular internet use (≥ 2 hours/day). Individuals from diverse socio-economic backgrounds, family structures (nuclear or joint), and both urban and rural areas were included. Exclusion criteria comprised the presence of severe psychiatric conditions (e.g., psychosis), chronic medical illnesses or physical disabilities interfering with treatment adherence, and prior exposure to CBT or similar interventions for behavioral addictions within the past year.

A total of 40 participants were recruited through purposive sampling from school counselors, outpatient clinics, and community outreach programs. Written informed consent was obtained from parents or guardians, and assent was obtained from the adolescents.

2.2 Intervention Description

The CBT-IA program was delivered as a manualised, 12-session multicomponent intervention using a structured, session-wise treatment manual developed by the research team. The manual was culturally and contextually adapted to suit the developmental stage of adolescents and to reflect the sociocultural and socioeconomic realities of Indian families. The participants' digital habits, social context, and language preference were also taken into account. Each session followed a predefined format with specific goals, therapeutic techniques, in-session exercises, guided reflections, and homework assignments aligned with core CBT principles for behavioral addictions. The program was delivered individually, face-to-face, over 12 consecutive weeks by trained mental health professionals, ensuring treatment fidelity and replicability. Parent education sessions were held at baseline and midway to support environmental change.

Each session lasted approximately 45–60 minutes and followed a structured therapeutic framework comprising assessment, cognitive restructuring, behavioral activation, and skill-building exercises.

The intervention was delivered in three sequential phases, as detailed below (Table 1).

Fidelity to the intervention protocol was ensured through therapist supervision and the use of session checklists.

Table 1: Structure and Objectives of the 12-Session Multicomponent CBT-IA Program

Phase	Sessions	Objectives
Phase 1: Engagement and Psychoeducation	Sessions 1–4	<ul style="list-style-type: none"> - Building therapeutic alliance and motivational enhancement. - Psychoeducation on Internet Addiction (IA) and its biopsychosocial impacts. - Monitoring and mapping of online behavior patterns. - Identification of triggers and emotional states associated with IA.



Phase 2: Cognitive and Behavioral Restructuring	Sessions 5–9	<ul style="list-style-type: none"> - Cognitive restructuring of maladaptive beliefs (e.g., fear of missing out, online identity dependence). - Behavioral substitution techniques (introducing offline alternatives). - Impulse control training and digital detox planning. - Introduction of mindfulness practices and relaxation training. - Enhancing problem-solving and frustration tolerance.
Phase 3: Relapse Prevention and Lifestyle Integration	Sessions 10–12	<ul style="list-style-type: none"> - Reviewing progress and reinforcing adaptive patterns. - Developing individualized relapse prevention plans. - Encouraging offline goal setting and integration into school, social, and family life. - Strengthening support systems and self-monitoring strategies.

2.3 Outcome Measures

Internet Addiction severity was assessed using the Internet Addiction Scale (IAS) (Mrs. Daman Deep Kaur, Gulati, 2021, Hindi Version), a 20-item self-report tool measuring symptoms such as compulsive use, escapism, and neglect of duties. Higher scores indicated greater addiction severity.

A semi-structured questionnaire captured demographic and contextual variables, including age, sex, education, socioeconomic status (SES), domicile, religion, and type of family.

2.4 Procedure

After obtaining informed consent, baseline assessments were administered. The intervention was then delivered over 12 weeks. Post-intervention assessments were conducted at the end of the 12th week using the same standardized tools. (Fig. 1)

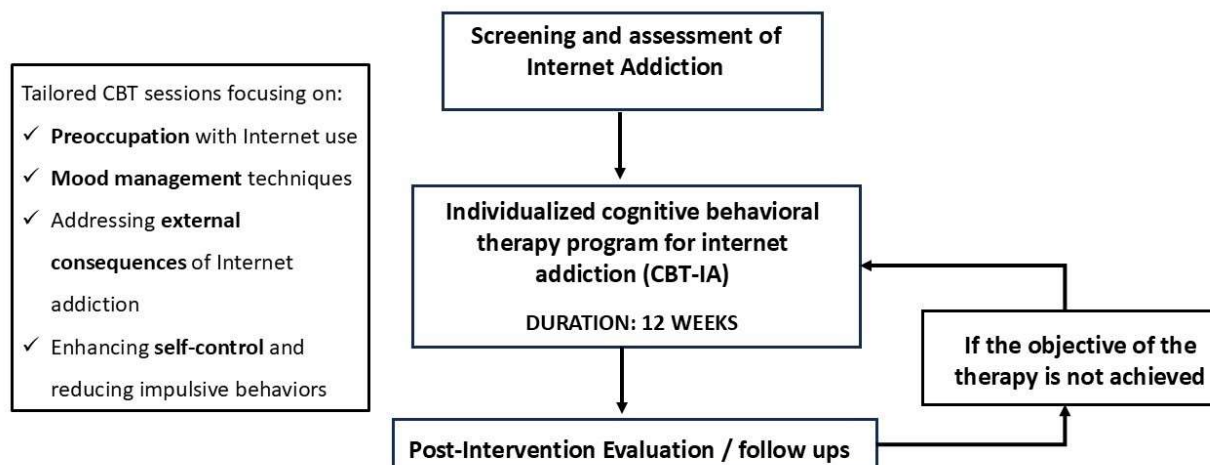


Fig 1: Intervention flow for the CBT-IA program, showing screening for Internet addiction, delivery of a 12-week individualized CBT intervention targeting core domains (preoccupation, mood management, external consequences, and self-control), and post-intervention follow-up, with continuation of therapy if treatment goals are not achieved.



2.5 Statistical Analysis

All statistical analyses were performed using standard software. Paired t-tests were used to compare pre- and post-intervention scores for IA. Effect sizes were calculated using Cohen's d. Pearson correlation coefficients were computed to explore associations between IA Change Score and demographic variables. Multiple linear regression was used to identify predictors of treatment response. A p-value of < .05 was considered statistically significant.

3. Results

3.1 Participant Characteristics

The final sample comprised 40 adolescents (55% female, mean age = 15.9 ± 1.6 years), predominantly from urban, upper-middle-class nuclear families. Most participants had completed higher secondary education. Full demographic details are presented in Table 2.

Table 2: Frequency and Percentage Distribution of Demographic Variables (N = 40)

Variable	Category	Percentage (n)
Gender	Female	55.0% (22)
	Male	45.0% (18)
Education	Primary	2.5% (1)
	Secondary	32.5% (13)
	Higher Secondary	40.0% (16)
	Graduation	25.0% (10)
Religion	Hinduism	90.0% (36)
	Sikhism	5.0% (2)
	Islam	5.0% (2)
Family Type	Nuclear	72.5% (29)
	Joint	27.5% (11)
Domicile	Urban	80.0% (32)
	Rural	20.0% (8)
Socioeconomic Status (SES)	Upper Middle	80.0% (32)
	Middle	2.5% (1)
	Lower Middle	17.5% (7)

3.2 Changes Following CBT-IA Intervention

All outcome variables followed normal distribution (Shapiro–Wilk test, $p > .05$). Mean total Internet Addiction score decreased significantly from 57.70 ± 17.50 at baseline to 22.93 ± 12.16 post-intervention ($p < .001$), with a mean reduction



of 34.77 ± 13.03 (Cohen's $d = 2.67$). Descriptive statistics and paired-sample t-test results for IA subscales are summarized in Table 3.

Table 3. Paired-sample t-test results and effect sizes (Cohen's d) for Internet Addiction subdomains before and after CBT-IA (N = 40)

Variable	SW-test p value	Mean Difference	SD	95% CI (Lower–Upper)	t (df)	p-value	Cohen's d
Preoccupation	0.43	7.60	6.59	5.49 – 9.71	7.29 (39)	< .001	1.15
Mood Management	0.98	8.40	5.43	6.66 – 10.14	9.79 (39)	< .001	1.55
External Consequences	0.41	9.90	4.71	8.40 – 11.40	13.31 (39)	< .001	2.10
Self-Control	0.20	8.80	4.40	7.39 – 10.21	12.65 (39)	< .001	2.00
Total IA Score	0.50	34.77	13.03	30.61 – 38.94	16.88 (39)	< .001	2.67

Paired-sample t-tests showed significant improvement across all IA subdomains (all $p < .001$). Effect sizes were large (Cohen's $d = 1.15$ – 2.67), indicating substantial treatment-related change. The magnitude of reduction across each subscale is illustrated in Figure 2.

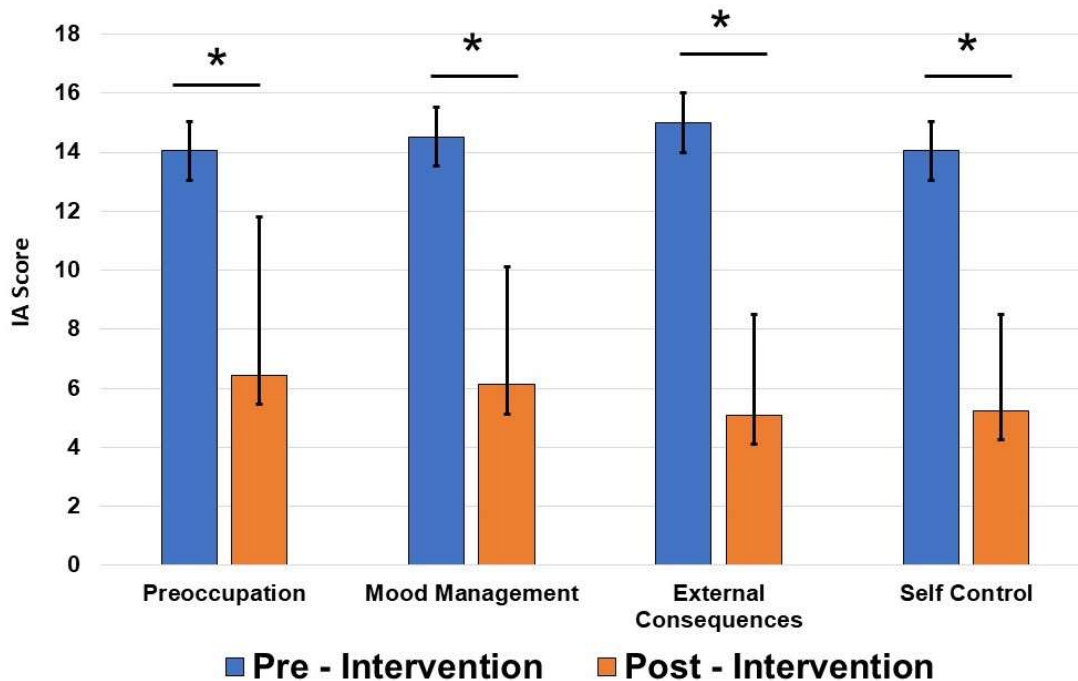


Fig. 2: Pre- and post-intervention mean scores across Internet Addiction subscales. Bar plots illustrate reductions in preoccupation, mood management, external consequences, self-control difficulties, and total IA scores following the 12-week CBT-IA intervention. Error bars represent standard deviations.



Figure 3 presents line plots of individual participants' Total IA scores, showing consistent reductions post-intervention.

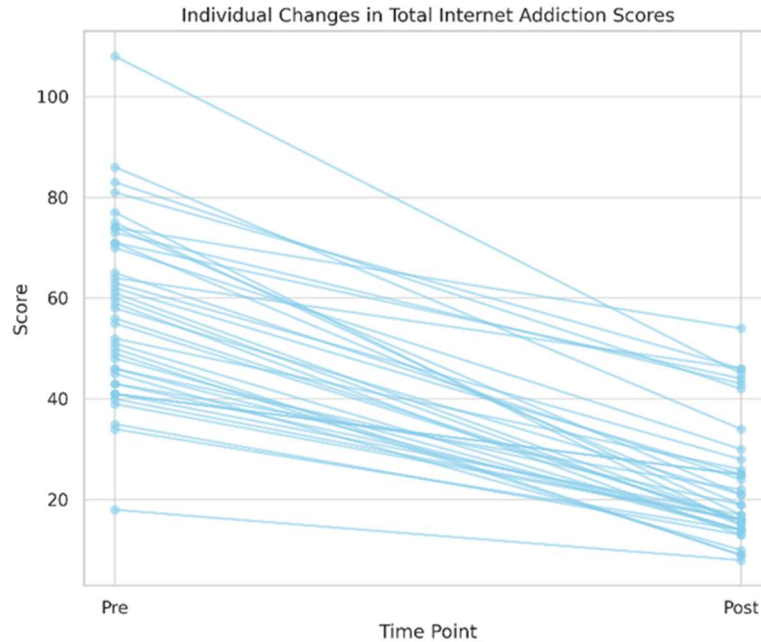


Fig. 3: Spaghetti plot illustrating individual changes in total Internet Addiction scores from baseline (pre-intervention) to post-intervention. The plot shows a reduction in scores for nearly all participants following the 12-week CBT-IA program, indicating an overall improvement in Internet addiction severity at the individual level.

3.3 Predictors of Treatment Response

Multiple linear regression was conducted to identify demographic predictors of change in IA scores. The model explained 30.4% of the variance ($R^2 = 0.304$), although it was not statistically significant overall ($F(9, 29) = 1.41, p = .231$). Among individual predictors, age emerged as a statistically significant predictor of IA improvement ($B = 6.53, p = .013$), indicating that older adolescents showed greater reductions in IA symptoms post-intervention. (Table 4)

Table 4. Multiple Linear Regression Predicting IA Change Score

Predictor Variable	Coefficient (B)	Std. Error	t-statistic	p-value	Lower 95% CI	Upper 95% CI
Intercept	-32.56	30.36	-1.07	.292	-94.65	29.52
Age	6.53	2.48	2.63	.013	1.45	11.61
Family Income	4.84×10^{-7}	2.66×10^{-7}	1.82	.079	-5.95E-8	1.03E-6
Education	-2.43	2.18	-1.12	.274	-6.88	2.02
Sex	-1.82	4.42	-0.41	.684	-10.86	7.22
Religion	3.44	4.84	0.71	.483	-6.46	13.34
Family Members	-1.10	1.67	-0.66	.517	-4.52	2.33
Type of Family	-0.11	5.30	-0.02	.984	-10.94	10.73
Domicile	-4.74	6.28	-0.75	.457	-17.59	8.11
SES	0.57	3.19	0.18	.860	-5.96	7.10



Cover Page



No significant associations were found with other demographic variables, including sex, education, domicile, family type, or socioeconomic status. A trend toward greater improvement in older adolescents (16–19 years) compared to younger adolescents (13–15 years) was observed ($p = .070$), but subgroup differences were not statistically significant and are not reported in detail.

4. Discussion

This study evaluated the effectiveness of a multicomponent CBT program in reducing IA among Indian adolescents aged 13 to 19 years. The results revealed significant improvements across all measured domains, namely preoccupation, mood management, external consequences, and self-control. These findings support the utility of structured, culturally adapted CBT interventions in addressing digital dependency and associated emotional difficulties in adolescents.

4.1 Effectiveness of Multicomponent CBT in the Indian Context

The observed reductions in IA severity symptoms are consistent with international research emphasizing CBT's efficacy in treating behavioral addictions. (18) However, this study is among the few to contextualize and evaluate a CBT-IA program specifically tailored to Indian adolescents. The intervention's strong effect sizes (Cohen's d ranging from 1.15 to 3.00) demonstrate the clinical relevance of addressing not just cognitive distortions but also underlying emotional dysregulation, poor impulse control, and lifestyle patterns that contribute to maladaptive internet use.

India presents a unique sociocultural backdrop where digital access is expanding rapidly, yet awareness and structured intervention frameworks for IA remain limited. Adolescents, particularly from urban and upper-middle-class backgrounds, as represented in this study, are increasingly exposed to unregulated internet use through smartphones and social media. (5,6,8–11) In this context, culturally sensitive therapy modules that incorporate familiar scenarios, language, and parental involvement are crucial to both engagement and retention. The integration of mindfulness, parental psychoeducation, and lifestyle reorientation within the CBT program likely contributed to the positive outcomes and high adherence observed in this study.

Key therapeutic mechanisms likely responsible for the observed changes include enhanced self-regulation, targeted cognitive restructuring, and lifestyle reorientation. The program's self-monitoring and impulse-control exercises strengthened adolescents' capacity to delay gratification and manage urges. Cognitive restructuring addressed maladaptive beliefs about online interactions and excessive concern over social belonging or missing online updates, thereby reducing the reinforcement value of internet use. Finally, lifestyle reorientation (structured offline activities, goal-setting, and parental involvement) replaced maladaptive online routines with adaptive alternatives, improving functional outcomes in school and family domains.

4.2 Age-Related Differences in Treatment Response

A key finding was the significant association between age and treatment response, with older adolescents demonstrating greater reductions in IA symptoms. This could be attributed to several factors. Older adolescents may have better-developed metacognitive capacities, such as self-awareness, abstract reasoning, and reflection, making them more receptive to cognitive restructuring and reflective therapeutic practices. Sauter et al. (2013) found that metacognitive ability continues to develop during adolescence and peaks in late adolescence, (19) and Friedberg & Gorman (2007) emphasized that these capacities are critical for engagement in CBT (20).

Additionally, older adolescents often face transitional life stages, such as board examinations or preparation for higher education, that heighten the salience of time management and self-regulation. (21) The CBT program's focus on goal-setting and relapse prevention may have resonated more with this age group, reinforcing adaptive offline behaviors. While younger adolescents also benefited from the intervention, future programs may need to incorporate developmentally appropriate tools such as gamification or parent-child joint sessions to enhance efficacy in this subgroup.

4.3 Relevance to Public Mental Health in India

Despite mounting evidence of Internet Addiction as a significant behavioral concern, affecting approximately 21.5% of adolescents at moderate to severe levels (22), and with nearly 11% meeting criteria for technology addiction in district



Cover Page



surveys (23), Indian interventions remain fragmented and often delayed. National guidelines from pediatric authorities and institutional initiatives like the new AIIMS Centre underscore the urgent need to integrate digital wellness strategies into school and community mental health programs. (24) This study demonstrates the feasibility and effectiveness of implementing a structured CBT-IA protocol within a resource-limited, non-metropolitan setting like Lucknow, suggesting its potential scalability across other Tier 2 and Tier 3 Indian cities.

Moreover, the use of a standardized Hindi-language Internet Addiction Scale and culturally attuned therapy content enhances the ecological validity and replicability of the intervention. The findings argue for the development of indigenous therapy manuals and training programs to equip school counselors, psychologists, and primary care providers with tools to identify and manage IA and associated emotional disorders. Given the structured manual and positive outcomes, this intervention could be feasibly implemented in school counseling and adolescent wellness programs with minimal adaptation. Training school counselors or community mental health workers to deliver the manualised 12-session program could expand access, with brief booster sessions and parent-education modules supporting sustainability.

4.4 Limitations and Future Directions

While the results are encouraging, several limitations must be noted. The single-group, pre-post design limits causal inference, as changes cannot be definitively attributed to the intervention in the absence of a control group. The sample size was relatively small ($N = 40$) and predominantly urban and upper-middle-class, limiting generalizability to rural and lower socioeconomic populations. Future studies should consider randomized controlled trials with larger and more diverse samples, including adolescents from marginalized communities where IA may coexist with other psychosocial stressors. Additionally, anxiety and depression, which are common co-occurrences with IA, were not measured. Longitudinal follow-up is also necessary to assess the durability of treatment gains and to identify patterns of relapse or sustained recovery.

5. Conclusion

This study adds to the growing evidence base supporting the use of multicomponent CBT in addressing Internet Addiction among adolescents. Its findings are particularly salient for the Indian context, where adolescent digital dependency is rising amidst limited mental health infrastructure. The significant age-related effects suggest that older adolescents may derive greater benefit from such interventions, highlighting the need for age-specific adaptations. Overall, this study calls for the inclusion of structured IA interventions within school mental health programs and community outreach initiatives to address the evolving digital health challenges of Indian youth.

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Data Availability Statement:

The data that support the findings of this study are not publicly available due to confidentiality agreements with participants and institutional ethical guidelines. However, de-identified datasets may be available from the corresponding author upon reasonable request and with appropriate ethical approval.

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Cover Page



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