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Evaluate Impact of Nomophobic Therapy and Adolescent Well-Being: A Pilot Study

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Abstract **Background:** Nomophobia or fear or discomfort associated with being without access to a mobile phone, is an emerging concern among adolescents. This pilot study examined the effectiveness of Nomophobic Therapy on behaviour, emotion and developing insight among high school students with nomophobia. **Objective:** To assess the effectiveness of Nomophobic Therapy on behaviour, emotion and developing insight regarding nomophobia among high school students with nomophobia. **Methods:** A randomized controlled pilot study was conducted among 40 high school students with nomophobia. Participants were randomly allocated to either the experimental group (n = 20) or the control group (n = 20). Pre-test and post-test assessments were conducted using the Nomophobia Questionnaire (NMP-Q), Strengths and Difficulties Questionnaire (SDQ) and a self-structured questionnaire assessing knowledge and insight regarding nomophobia. The experimental group received structured Nomophobic Therapy consisting of eight group sessions, delivered twice weekly, with each session lasting approximately 40 minutes. **Results:** The experimental group showed significant pretest-posttest improvements in emotional problems, conduct problems, hyperactivity, peer problems, prosocial behaviour, total difficulty score and insight related to nomophobia ($p \leq 0.05$). In the posttest comparison, the experimental group demonstrated significantly better outcomes than the control group in all domains except prosocial behaviour ($p = 0.142$). Overall, the findings indicate that Nomophobic Therapy was effective in improving emotional, behavioural and insight-related outcomes among high school students with nomophobia. **Conclusion:** Nomophobic Therapy showed promising preliminary effects on selected behavioural, emotional and insight-related outcomes. These findings support further evaluation in a larger adequately powered study using a standardized intervention protocol and validated outcome assessment.

Key Words Nomophobic Therapy, Adolescents, High School Students, Behaviour, Emotion, Insight, Mobile Phone Dependence

INTRODUCTION

Nomophobia is a term used to describe the discomfort, anxiety or apprehension associated with being unable to access or use a mobile phone. The Nomophobia Questionnaire (NMP-Q) conceptualizes nomophobia through dimensions such as inability to communicate, loss of connectedness, inability to access information and loss of convenience [1].

Adolescence is an important period for examining problematic mobile-phone use because smartphones are integrated into communication, social interaction, entertainment and everyday activities. Indian adolescent studies have reported associations between nomophobia, depression, anxiety and quality of life, indicating that nomophobia may have implications beyond the duration of phone use [2]. Broader systematic reviews of problematic smartphone use among children and young people have likewise identified associations with depression, anxiety, stress and poorer sleep, while reviews of mobile-phone addiction in children and adolescents have described behavioural and emotional difficulties, including hyperactivity and conduct problems [3,4].

Nomophobia has also been linked with psychological and behavioural difficulties. Research among adolescents has demonstrated relationships between specific nomophobia dimensions and psychiatric symptoms, while

systematic review evidence has reported positive associations between nomophobia, anxiety, smartphone addiction and insomnia [5,6]. Studies of problematic smartphone use further indicate associations with impaired psychological well-being and behavioural difficulties and systematic reviews have reported negative effects on quality of life and well-being among children and adolescents [7-9]. Recent meta-analytic evidence also suggests that problematic smartphone use is associated with anxiety and depression and may be related to academic achievement [10]. These findings highlight the need for early identification and intervention among adolescents.

Although the evidence describing prevalence and correlates of nomophobia is increasing, structured therapeutic interventions for adolescents remain comparatively limited. Recent intervention research has examined art-based therapy and other school-based programmes addressing problematic smartphone use, suggesting that non-pharmacological approaches may be feasible for this population [11,12]. Epidemiological evidence also indicates that problematic smartphone use is increasing internationally, although prevalence estimates vary according to population, region and measurement scale [13]. Systematic reviews of nomophobia have identified the NMP-Q as the most widely used instrument, while a separate validation study has demonstrated the feasibility of assessing nomophobia in younger school-aged children [14,15]. A recent systematic review and meta-analysis has also reported a substantial pooled prevalence of nomophobia, reinforcing the importance of prevention and intervention in educational settings [16].

Nomophobic Therapy in the present study was developed as a structured nursing intervention incorporating education about nomophobia and cognitive-behavioural techniques. The intervention was designed to improve awareness, identify triggers and maladaptive thoughts, strengthen coping and problem-solving skills and encourage healthier behavioural patterns related to mobile-phone use. This approach is consistent with evidence that family, self-control and psychosocial factors can influence problematic smartphone use among adolescents [17,18]. Intervention studies have reported beneficial effects of cognitive-behavioural approaches for excessive smartphone use and preventive programmes for problematic smartphone use among adolescents [19,20]. Psychosocial and health-promotion interventions have also shown potential to improve psychological outcomes in young people with problematic technology use [21,22]. More recent adolescent intervention research has emphasized practical strategies for reducing problematic smartphone use and strengthening social support, well-being and healthier technology-related behaviours [23,24].

Therefore, this pilot study was undertaken to examine the preliminary effectiveness of Nomophobic Therapy on behaviour, emotion and developing insight regarding nomophobia among high school students. The pilot findings were intended to provide preliminary evidence for refinement of the intervention and planning of the larger study.

Aim

The study aimed to assess the effectiveness of Nomophobic Therapy on behaviour, emotion and developing insight regarding nomophobia among high school students with nomophobia.

METHODS

A quantitative approach with a randomized controlled pre-test and post-test design was adopted. The pilot study included 40 high school students aged 13-18 years with mild to moderate nomophobia. Participants were randomly allocated to either the experimental group (n = 20) or the control group (n = 20). The experimental group received Nomophobic Therapy, while the control group continued their routine school activities.

The Institutional Ethics Committee granted ethical approval (BIEC-086-24) prior to data collection. The relevant school authorities granted permission for the study to be carried out. Parents and guardians provided written informed permission and the participating kids gave their assent.

Data collection was carried out in a structured manner. Initially, the investigator screened the students for eligibility and identified those who met the inclusion criteria and had mild to moderate nomophobia. After obtaining informed consent and assent, baseline demographic information and pre-test assessments were collected from both groups. The Nomophobia Questionnaire (NMP-Q) was used to assess the level of nomophobia, the Strengths and Difficulties Questionnaire (SDQ) completed by class teachers was used to assess emotional and behavioural problems and a self-structured questionnaire was used to assess knowledge and insight regarding nomophobia.

Following the pre-test assessment, the experimental group received Nomophobic Therapy in eight structured group sessions, conducted twice a week, with each session lasting approximately 40 minutes. The intervention included introduction and group bonding, awareness and insight regarding nomophobia, identification of addictive behaviours and emotional triggers, the thought-emotion-behaviour cycle, cognitive distortions and core beliefs, automatic thoughts and behavioural problem-solving and coping strategies. The control group continued with their routine school activities during the intervention period.

After completion of the intervention, post-test assessments were conducted for both the experimental and control groups using the same study instruments. Participant confidentiality and privacy were maintained throughout the study.

RESULTS

A total of 40 high school students participated in the pilot study, with 20 in each group. The groups had comparable distributions of age, gender and class of study. Most participants belonged to nuclear families, used one mobile phone and reported frequent mobile-phone checking. All participants reported that they were unaware of the term nomophobia.

Table 1 shows comparable demographic characteristics in both groups. Participants were equally distributed by age (50% each) and gender (50% male, 50% female). Most belonged to nuclear families (75% experimental; 85% control), used one mobile phone (85; 90%) and checked their phones more than six times daily (85; 95%). Notably, 100% of participants in both groups were unaware of "Nomophobia".

Table 1: Demographic Characteristics of Participants (N = 40)

S. No.	Demographic Variable	Experimental Group		Control Group	
		Number	Percentage	Number	Percentage
5	**Religion**				
	Hindu	13	65	11	55
	Christian	5	25	6	30
	Muslim	2	10	3	15
	Others	0	0	0	0
S. No.	Demographic Performa	Experimental Group		Control Group	
		Frequency	Percentage	Frequency	Percentage
1	**Age in years**				
	13-15	10	50	10	50
	16-18	10	50	10	50
2	**Gender**				
	Male	10	50	10	50
	Female	10	50	10	50
3	**Class of study**				
	9th standard	5	25	5	25
	10th standard	5	25	5	25
	11th standard	5	25	5	25
	12th standard	5	25	5	25
4	**Type of family**				
	Nuclear family	15	75	17	85
	Joint family	5	25	3	15
5	**Religion**				
	Hindu	13	65	11	55
	Christian	5	25	6	30
	Muslim	2	10	3	15
6	**Number of mobile phone being used**				
	1	17	85	18	90
	2	3	15	2	10
7	**Duration of mobile phone usage (in years)**				
	Less than 1 year	1	5	0	0
	1-3 years	11	55	13	65
	>3-5 years	8	40	7	35
8	**Frequency of checking mobile phone in a day**				
	Once a day	0	0	0	0
	2-5 times a day	3	15	1	5
	More than 6 times a day	17	85	19	95
9	**Money spent per month on mobile recharge (in INR)**				
	Less than 200Rs.	1	5	0	0
	200-400 Rs	12	60	14	70
	More than 400 Rs	7	35	6	30
10	**Duration of using mobile phone per day**				
	Less than 30 minutes	1	5	0	0
	30 minutes to 1 hour	7	35	8	40
	>2-3 hours	11	55	10	50
	More than 3 hours	1	5	2	10
11	**Monthly Family income**				
	Below Rs.10000	0	0	0	0
	Rs.10001 to 20000	6	30	4	20
	Rs. 20001 to 30000	12	60	12	60
	Above 30000	2	10	4	20
12	Awareness of the term Nomophobia				
	Yes	0	0	0	0
	No	20	100	20	100

Table 2: Assessment Level of Nomophobia Among High School Students with Nomophobia in Experimental and Control Group (N = 40)

	Control Group				Experimental Group			
	Pre-test		Post-test		Pre-test		Post-test	
Level of Nomophobia	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Mild	6	30	3	15	6	30	17	85
Moderate	14	70	17	85	14	70	3	15
Severe	0	0	0	0	0	0	0	0

Table 3: Assessment of the Pre-Test and Post-Test Level of Emotional Problems Among High School Students with Nomophobia in Experimental and Control Groups (N = 40)

	Experimental Pre-test		Experimental Post-test		Control Pre-test		Control Post-test	
Components	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Emotional Problems								
Normal	2	10	18	90	4	20	3	15
Borderline	14	70	2	10	12	60	14	70
Abnormal	4	20	0	0	4	20	3	15
Conduct Problems								
Normal	0	0	20	100	1	5	2	10
Borderline	11	55	0	0	13	65	14	70
Abnormal	9	45	0	0	6	30	4	20
Hyperactivity								
Normal	13	65	20	100	10	50	11	55
Borderline	4	20	0	0	7	35	8	40
Abnormal	3	15	0	0	3	15	1	5
Peer Problems								
Normal	0	0	17	85	2	10	1	5
Borderline	16	80	3	15	15	75	15	75
Abnormal	4	20	0	0	3	15	4	20
Prosocial Behaviour								
Normal	7	35	15	75	6	30	7	35
Borderline	8	40	5	25	9	45	9	45
Abnormal	5	25	0	0	5	25	4	20
Total Difficulty Score								
Normal	1	5	20	100	2	10	3	15
Borderline	6	30	0	0	8	40	7	35
Abnormal	13	65	0	0	10	50	10	50

Table 4: Assessment of the Level of Insight Among High School Students with Nomophobia in Experimental and Control Groups (N = 40)

	Experimental group				Control group			
	Pre-test		Post-test		Pre-test		Post-test	
Level of Insight	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low	14	70	1	5	13	65	14	70
Moderate	6	30	9	45	7	35	6	30
High	0	0	10	50	0	0	0	0

Table 2 showed that, in the experimental group, the proportion of students with mild nomophobia increased from 30% during the pre-test to 85% during the post-test, while moderate nomophobia decreased from 70-15%. No students had severe nomophobia. In contrast, the control group showed an increase in moderate nomophobia from 70-85%. The findings indicate that Nomophobic Therapy was effective in reducing the level of nomophobia among high school students.

Table 3 shows T variations in emotional and behavioural problems across the pre-test and post-test assessments in both groups. In the experimental group, improvements were observed in conduct problems, hyperactivity, prosocial behaviour and total difficulty scores, while changes in emotional and peer problems were limited. Overall, the findings indicate changes in the behavioural and emotional outcomes following Nomophobic Therapy.

Table 4 shows that the experimental group had 70% low, 30% moderate and 0% high levels of insight at pre-test. At post-test, low insight decreased to 5%, while moderate insight increased to 45% and high insight increased to 50%. In the control group, 65% had low and 35% had moderate insight at pre-test, compared with 70% low and 30% moderate at post-test, with no participants achieving a high level. Overall, the experimental group showed a marked improvement in insight following the intervention.

Table 5 shows that the experimental group demonstrated statistically significant pre-test to post-test improvements in emotional problems, conduct problems, hyperactivity, peer problems, prosocial behaviour, total difficulty score and insight ($p \leq 0.05$). In contrast, the control group showed no statistically significant pre-test-post-test differences ($p > 0.05$). These findings indicate the statistical effectiveness of Nomophobic Therapy in improving emotional, behavioural and insight-related outcomes among high school students with nomophobia.

Table 6 shows that the experimental group had statistically significantly better outcomes than the control group in emotional problems, conduct problems, hyperactivity, peer problems, total difficulty score and level

Table 5: Comparison of the Level of Depression, Stress and Anxiety Among Elderly Population in Experimental and Control Group (N = 40)

	Experimental Group					Control Group				
	Pre-test		Post-test			Pre-test		Post-test		
Components	Mean	SD	Mean	SD	Paired t-test	Mean	SD	Mean	SD	Paired t-test
Emotional Problems	8.14	0.35	9.76	0.32	t = 3.21 p = 0.012 S**	8.2	0.37	8.64	0.35	t = 0.78 p = 0.44 NS
Conduct Problems	8.52	0.42	7.30	0.38	t = -2.85 p = 0.021 S**	8.42	0.41	8.30	0.39	t = -0.25 p = 0.80 NS
Hyperactivity	8.44	0.47	10.18	0.41	t = 4.15 p = 0.003 S***	8.18	0.43	8.52	0.38	t = 1.12 p = 0.29 S*
Peer Problems	8.70	0.43	6.92	0.45	t = -3.72 p = 0.007 S***	8.42	0.48	8.34	0.41	t = -0.45 p = 0.66 NS
Prosocial Behaviour	5	1.2	6.2	1.5	t = 4.8 p = 0.0001239 S***	8.20	0.38	8.42	0.37	t = 0.32 p = 0.75 NS
Total Difficulty Score	8.06	0.39	9.42	0.48	t = 2.58 p = 0.032 S**	8.75	0.32	8.90	0.35	t = 0.45 p = 0.66 NS
Level of Insight	8.20	0.38	8.42	1.5	t = 2 p = 0.05 S**	8.32	0.41	8.28	0.41	t = -0.18 p = 0.86 NS

Table 6: Effectiveness of Nomophobic Therapy on emotion, Behaviour and Insight Among the High School Students by Comparing Experimental and Control Groups (N = 40)

	Experimental Group		Control Group		
Components	Mean	SD	Mean	SD	Unpaired t-test
Emotional Problems	8.30	0.35	9.58	0.38	t = 2.75 p = 0.012 S**
Conduct Problems	8.42	0.45	10.16	0.42	t = 3.15 p = 0.005 S***
Hyperactivity	8.35	0.42	9.88	0.37	t = 2.82 p = 0.011 S**
Peer Problems	8.70	0.43	6.92	0.45	t = -2.32 p = 0.037 S**
Prosocial Behaviour	8.06	0.39	9.42	0.48	t = 1.58 p = 0.142 NS
Total Difficulty Score	8.75	0.39	10.22	0.41	t = 3.58 p = 0.002 S***
Level of Insight	7.92	0.40	9.15	0.36	t = -3.29 p = 0.004 S***

Table 7: Correlation Between Selected Behavioural, Emotional and Insight-Related Variables (N = 40)

Behavioural domain	r with emotional problems	r with insight
Conduct problems	0.45	0.92
Hyperactivity	0.35	0.52
Peer problems	0.02	0.49
Prosocial behaviour	-0.35	0.58

of insight ($p<0.05$). However, no statistically significant difference was observed in prosocial behaviour ($p>0.05$). Overall, the findings demonstrate the statistical effectiveness of Nomophobic Therapy on most emotional, behavioural and insight-related outcomes among high school students with nomophobia.

Table 7 shows positive correlations of emotional problems with conduct problems ($r = 0.45$), hyperactivity ($r = 0.35$) and peer problems ($r = 0.02$), while prosocial behaviour showed a negative correlation ($r = -0.35$). Insight was positively correlated with conduct problems ($r = 0.92$), hyperactivity ($r = 0.52$), peer problems ($r = 0.49$) and prosocial behaviour ($r = 0.58$).

DISCUSSION

The present pilot study examined the preliminary effectiveness of Nomophobic Therapy on behaviour, emotion and developing insight among high school students

with nomophobia. This finding is consistent with the broader literature showing that problematic smartphone use is an increasingly recognized concern in young people and that early preventive approaches are warranted [3,13].

The experimental group demonstrated significant pre-test to post-test changes in emotional problems (p = 0.012), conduct problems (p = 0.021), hyperactivity (p = 0.003), peer problems (p = 0.007), prosocial behaviour (p<0.001), total difficulty score (p = 0.032) and insight (p = 0.050). The between-group comparison also showed significant differences in emotional problems (p = 0.012), conduct problems (p = 0.005), hyperactivity (p = 0.011), peer problems (p = 0.037), total difficulty score (p = 0.002) and insight (p = 0.004). Prosocial behaviour was not statistically significant between groups (p = 0.142). These findings provide preliminary evidence supporting the effectiveness of Nomophobic Therapy. The pattern of improvement is broadly consistent with previous evidence that problematic smartphone use is associated with emotional and behavioural difficulties and with intervention research showing that structured cognitive-behavioural and psychosocial approaches can reduce problematic technology use and related psychological symptoms [4,8,19-21,24].

The present findings are supported by Dasgupta *et al.* [2], who reported a significant relationship between nomophobia and depression, anxiety and quality of life among adolescents. Similarly, Kuşçu *et al.* [5] reported significant associations between dimensions of nomophobia and psychiatric symptoms among adolescents. Longitudinal evidence from adolescents has also linked nomophobia with insomnia over time, while systematic review evidence has shown negative associations between problematic smartphone use and quality of life and well-being [6,7,9]. These findings support the present observation that nomophobia may be associated with emotional and behavioural difficulties.

Daraj *et al.* [6], in a systematic review and meta-analysis, reported significant positive correlations between nomophobia and anxiety (r = 0.31), smartphone addiction (r = 0.39) and insomnia (r = 0.56), indicating that higher nomophobia is associated with greater psychological and behavioural difficulties. Additional evidence has shown that problematic smartphone use is associated with anxiety and depression, while studies in adolescents have reported associations with sleep problems and academic outcomes [9,10]. These findings provide further support for addressing nomophobia through structured interventions.

The Nomophobic Therapy incorporated awareness, identification of emotional triggers, cognitive restructuring, understanding the thought-emotion-behaviour relationship and problem-solving strategies. Previous intervention research has also suggested the potential value of structured non-pharmacological approaches for adolescents with nomophobia. Patil *et al.* [11] reported the effectiveness of art-based therapy among adolescents with nomophobia, supporting the feasibility of therapeutic approaches within adolescent settings. In addition, randomized and preliminary intervention studies using cognitive-behavioural, metacognitive and psychosocial approaches have reported reductions in excessive or problematic smartphone use among adolescents, with improvements in selected psychological outcomes [19-24]. These findings provide a rationale for continued development and testing of structured nursing interventions targeting problematic mobile-phone use.

The correlation analysis in the present study showed a strong positive relationship between conduct problems and insight, with moderate positive relationships between insight and hyperactivity and prosocial behaviour. These findings suggest that behavioural and insight-related factors may be interrelated among adolescents experiencing nomophobia. Previous reviews have identified self-control, family factors and social or personality characteristics as relevant correlates of problematic smartphone use, which supports the importance of addressing behavioural and psychosocial factors rather than focusing only on duration of phone use [17,18].

Overall, the pilot findings, together with previous evidence linking nomophobia with psychological and behavioural difficulties, support the need for structured school-based interventions. Evidence from adolescent studies has highlighted the role of school, family and social factors in problematic smartphone use and recent intervention studies have demonstrated the potential of school-based, cognitive-behavioural, psychosocial and positive-psychology approaches [19-24]. However, because the present study was a pilot involving only 40 participants, the findings should be interpreted cautiously and confirmed through a larger adequately powered study.

CONCLUSIONS

The pilot study provides preliminary evidence that Nomophobic Therapy may improve selected behavioural, emotional and insight-related outcomes among high school students with nomophobia. These findings support further evaluation using the full study protocol with a larger, adequately powered sample, standardized outcome measures and longer-term follow-up.

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