The International Journal of Indian Psychology
ISSN 2348-5396 (Online) | ISSN: 2349-3429 (Print)
Volume 14, Issue 3, July- September, 2026
DIP: 18.01.112.20261403, DOI: 10.25215/1403.112
https://www.ijip.in

Research Paper

The Effect of Music Therapy on Neuroticism, Sleep Quality, and Attention among Young Adults with High Screen Time

Vaishnavi Vasekar[1]*, Dr. Shradha Sakatkar[2]

ABSTRACT

High non-productive screen time has been identified as a major contributor to emotional instability, disturbed sleep, and impaired attention especially in young adults. Music therapy, specifically Raga based Hindustani classical music has proven to be a promising, cost-effective and non-pharmacological approach to address these issues. This study assessed whether a structured raga-based music therapy programme could meaningfully reduce neuroticism and improve sleep quality and attention in young adults with high non-productive screen time. A quasi-experimental pre-test–post-test control group design was used. There were a hundred young adults in study. These were further divided into 2 groups – experimental (n=50) and control (n=50), through purposive sampling. The experimental group attended the structured Hindustani raga based music therapy module (Bhupali, Desh, Kafi, Bageshree, Yaman) for five days per week for four weeks, delivered via Google Meet. Outcomes were measured by a range of tools such as NEO Five-Factor Inventory-Neuroticism subscale, Pittsburgh Sleep Quality Index (PSQI), and Attention Control Scale (ACS). The Wilcoxon Signed Ranks Test and Kruskal–Wallis test were used for within-group and between-group analyses, respectively. The experimental group showed meaningful improvements across all three outcomes, i.e. neuroticism ($Z = -6.183$, $p < .001$, $r = .874$), sleep quality ($Z = -6.263$, $p < .001$, $r = .886$), and attention ($Z = -6.198$, $p < .001$, $r = .877$), all reflecting significant and large effect sizes. The control group showed no meaningful changes in neuroticism or attention, however a minor sleep improvement observed in that group was attributed to assessment-induced behavioral change. An exploratory finding also indicated a significant reduction in social media use within the experimental group. Hindustani Raga-based music therapy appears to be an effective intervention for improving emotional stability, sleep quality and attention among young adults struggling with digital overuse. These findings carry direct relevance for psychologists, counselors, and educational wellness programmes.

Keywords: *Music Therapy, Hindustani Ragas, Neuroticism, Sleep Quality, Attention, Non-Productive Screen Time, Young Adults, Quasi-Experimental design*

[1]Department of Psychology, Modern College of Arts, Science and Commerce (Autonomous), Shivajinagar, Pune, Maharashtra, India
[2]Department of Psychology, Modern College of Arts, Science and Commerce (Autonomous), Shivajinagar, Pune, Maharashtra, India
*Corresponding Author

Received: April 22, 2026; Revision Received: August 18, 2026; Accepted: August 22, 2026

Over the past few decades, the way young adults engage with digital applications has shifted drastically. Even though these applications and various platforms serve productive needs, a large portion of screen time contributes to leisure activities such as doom scrolling, mobile gaming, video streaming, etc. This kind of passive digital consumption has turned into a habit at a hefty psychological cost. Numerous researches link high screen time with hampered attention, affected sleep quality and higher levels of emotional instability (Exelmans & Van den Bulck, 2016; Kuss & Griffiths, 2017; Twenge & Campbell, 2018).

Among the psychological variables chosen for the study, most liable to these effects is neuroticism, a core personality dimension marked by anxiety, mood instability, irritability, and a general tendency toward negative emotional experience (Costa & McCrae, 1992). High levels of neuroticism has been associated with maladaptive digital coping behaviors, creating a feedback loop in which emotional distress drives greater screen engagement, which in turn sustains or worsens emotional dysregulation. Sleep quality happens to be another area of alarming concern: the blue-light emitted by screens delays melatonin secretion, while the cognitively activating nature of interactive digital content makes it physiologically difficult for the brain to transition toward restful states (Exelmans & Van den Bulck, 2016). Sustained attention arguably the cognitive resource most central to learning and productivity, is similarly susceptible; the habit of doomscrolling and rapidly switching between digital stimuli reduces individuals' capacity for focused, sustained concentration (Shalash et al., 2024).

Despite of all these well-documented studies and researches, straightforward and accessible interventions that do not require specialized clinical infrastructure remain limited. Music therapy has come across as one promising solution. Broadly defined as the clinical and evidence-based use of music to accomplish individualized therapeutic goals (American Music Therapy Association [AMTA], 2013; Bruscia, 1998), music therapy has shown effects on neurochemical regulation, stress reduction, and cognitive functioning across diverse populations (Chanda & Levitin, 2013). Within the Indian context, the raga system of Hindustani classical music provides a particularly well-structured and culturally resonant therapeutic medium. Each raga carries a specific tonal and rhythmic architecture associated with distinct emotional states, offering a principled basis for designing sequenced therapeutic programmes (Mathur et al., 2015; Valla et al., 2015).

Prior studies have individually examined raga-based listening effects on sleep quality (Deshmukh et al., 2009; Kashyap & Sharma, 2022), attentional performance (Nagarajan et al., 2015), and stress responses (Thoma et al., 2013). What is notably missing, however, is researches that brings these findings together to target young adults whose psychological wellbeing is simultaneously hampered by high non-productive screen engagement. The present study was designed to address this specific gap, testing a four-week, structured Hindustani raga-based music therapy intervention on neuroticism, sleep quality, and attention in this population.

Objectives

- To assess the effect of music therapy on neuroticism, sleep quality, and attention among young adults with high non-productive screen time.

Hypotheses

Experimental Group

- **H1:** After receiving music therapy, there will be a significant reduction in neuroticism among young adults with high non-productive screen time.
- **H2:** After receiving music therapy, there will be a significant improvement in sleep quality among young adults with high non-productive screen time, after receiving music therapy
- **H3:** After receiving music therapy, there will be a significant improvement in attention among young adults with high non-productive screen time, after receiving music therapy

Control Group

- **H4:** In the absence of music therapy, there will be no significant change in neuroticism among young adults with high non-productive screen time.
- **H5:** In the absence of music therapy, there will be no significant change in sleep quality among young adults with high non-productive screen time.
- **H6:** In the absence of music therapy, there will be no significant change in attention among young adults with high non-productive screen time.

METHODOLOGY

Research Design

The study followed a quasi-experimental pre-test–post-test control group design. Participants were split into two groups; an experimental group that received structured music therapy and a control group that did not receive music therapy, through purposive sampling. Both groups were assessed at two time points: immediately before the intervention commenced (pre-test) and immediately after the four-week music therapy intervention (post-test). Because participants were not randomly assigned, this design carries inherent limitations with respect to internal validity, which are also discussed in the Limitations section.

Sample

100 young adults took part in this study (N = 100), and were split into two groups of 50 participants each. All participants fell within the age range of 18 to 30 (Experimental: M = 22.66, SD = 1.93; Control: M = 23.70, SD = 3.74) and recruited from college and community based sample in Pune, Maharashtra, India. Participants must have been between the ages of 18 and 30, admitted to at least 2 hours of non-productive screen use daily (i.e., social networking, streaming or gaming), be willing to commit to participation for the entire length of the study, not be diagnosed with any psychiatric or neurological condition, not be undergoing any psychological or pharmaceutical treatment for a sleep or emotional disorder, and not be ingesting high quantities of caffeine, use of yoga nidra or guided meditation regularly, or use of music as a technique for emotional self-regulation.

Measures

- **Neuroticism:** The NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992) Neuroticism subscale was used to measure tendency for anxiety proneness, reactivity, and instability. The 12 items of this subscale were rated on a five-point Likert scale where a higher score represented higher levels of neuroticism. The reliability of this subscale is well-established (Cronbach's .86).

- **Sleep Quality:** Subjective quality of sleep in the past month was measured by the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989) for overall sleep latency, duration, efficiency, and disturbances, as well as overall restful quality. Higher total scores were representative of poorer sleep quality, with scores above five considered problematic for clinical purposes. Psychometric properties have shown to be adequate (Cronbach's .83).
- **Attention:** To measure ability to intentionally select, sustain, and shift attention, the 20-item Attentional Control Scale (ACS; Derryberry & Reed, 2002) was utilized. This scale uses a four-point Likert scale where a higher score indicates greater attentional control. The measure has shown adequate reliability and validity in a student population.
- **Non-Productive Screen Time:** Participants were administered the Social Networking Addiction Scale (SNAS) to screen for the level of social media addiction. In addition to the questionnaire, a personal data sheet was used in which participants reported their daily hours spent in unproductive online behavior, providing a corroborating behavioral measure.

Intervention: Music Therapy Module

The music therapy intervention consisted of 20 x 30-minute, five days per week for 4 weeks, daily Hindustani raga based music sessions. The sessions consisted of a predetermined sequence of 5 Hindustani classical ragas selected based on an evidence based consideration of their affective and therapeutic properties, to be progressively guiding participants from a stable and attentive state to a deep state of relaxation within the span of the session. The sessions were delivered live over the Google Meet platform and required some basic brief initial guidance from the therapist on posture and breath in each session, and participants were encouraged to listen in a dark and quiet room, in a seated or recumbent position, with sustained focus on the music. A full description of the session is available in Table 1.

Table 1 Music Therapy Session Module: Raga Sequence and Therapeutic Purpose

Day	Duration	Raga	Therapeutic Purpose	Research Support
Day 1	30 min	Bhupali	Grounding, relaxation	Nagarajan et al. (2015); Chan et al. (2012)
Day 2	30 min	Desh	Stress reduction	Thoma et al. (2013); Kashyap & Sharma (2022)
Day 3	30 min	Kafi	Mental calmness	Mathur et al. (2015); Valla et al. (2015)
Day 4	30 min	Bageshree	Deep relaxation, sleep	Deshmukh et al. (2009); Jespersen et al. (2015)
Day 5	30 min	Yaman	Emotional stability	Chanda & Levitin (2013); Valla et al. (2015)

Note. Sessions conducted at moderate volume, five nights per week for four weeks, delivered via Google Meet.

Procedure

Upon obtaining institutional consent, participants that met the inclusion criteria were invited, and given detailed information regarding the study purpose and process. Informed written consent was acquired before data was collected. For the pre-test battery, all participants were asked to complete the NEO-FFI Neuroticism scale, the PSQI, ACS and SNAS. The

treatment group then proceeded through the music therapy program, while control participants were instructed to proceed with daily life. Both the treatment and control group completed the same post-test assessment battery after the fourth week. A few members of the control group were also asked to participate in an unstructured interview, following the identification of some peculiar patterns in the data.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics (Version 26). All variables at both time-points had descriptive statistics (Means, standard deviations, skewness and kurtosis) calculated. When inspecting the skewness and kurtosis of the values compared to their standard errors, data did not appear normally distributed in a number of the variables, confirming appropriate usage of non-parametric tests in this study. The data was then analyzed for changes from pre-test to post-test, within-groups, using the Wilcoxon Signed Ranks test for the control group and the experimental group respectively. The two groups were compared to each other at the two time-points using the Kruskal-Wallis test. In calculating effect sizes for the Wilcoxon, the formula r = Z / N was used with .10, .30 and .50 treated as small, medium and large effect size respectively (Cohen, 1988).

RESULTS

Descriptive Statistics

Table 2 displays means and standard deviations for all measures for each of the groups, and across both testing occasions. The most dramatic changes in the experimental group occurred on sleep quality where there was a decrease from a pre-test average that was in the clinically poor range (M = 12.58, SD=1.96) to a post-test mean that approached normal levels (M=6.84, SD=1.18); the other significant change in the experimental group was in attention, where the ACS score increased significantly from M=48.04, SD=7.07 to M=64.18, SD=5.47; neuroticism scores decrease from M=37.96 to M=28.54. Social media use also decreased significantly in the experimental group (from M=52.84 to M=38.94). With the exception of the sleep quality measure (where the control group's mean score only moved from M=10.26 to M=10.06), the scores in the control group changed negligibly. Skewness and Kurtosis exceeded normal values for some variables, notably Neuroticism scores for the experimental group at the pre-test, justifying the non-parametric approach employed here.

Table 2 Descriptive Statistics for All Variables by Group and Assessment Point

Variable	Group	N	Pre-test M	Pre-test SD	Post-test M	Post-test SD
Neuroticism	Experimental	50	37.96	6.07	28.54	5.31
	Control	50	28.00	4.15	27.86	4.33
Sleep Quality (PSQI)	Experimental	50	12.58	1.96	6.84	1.18
	Control	50	10.26	1.86	10.06	1.79
Attention (ACS)	Experimental	50	48.04	7.07	64.18	5.47
	Control	50	51.18	4.64	51.10	4.58
Social Media (SNAS)	Experimental	50	52.84	11.37	38.94	9.40
	Control	50	34.52	4.24	34.44	4.23

Note. Higher PSQI scores = poorer sleep quality. Higher ACS scores = better attention. Higher NEO-FFI Neuroticism scores = greater emotional instability.

Within-Group Comparisons: Wilcoxon Signed Ranks Test

The Wilcoxon Signed Ranks Test for the within-group comparisons is presented in Table 3. For the experimental group, each of the 50 participants displayed a decrease in neuroticism from the pre-test to the post-test (negative ranks = 50; positive ranks = 0), resulting in a significant Z-value ($Z = 6.183$, $p < .001$) and supporting H1. Sleep quality increased among the 50 participants ($Z = 6.263$, $p < .001$), and attentional scores improved across the 50 participants (positive ranks = 50; negative ranks = 0; $Z = 6.198$, $p < .001$); therefore H3 and H2 are supported, respectively. Participants also decreased their use of social media significantly across all 50 individuals ($Z = 6.180$, $p < .001$).

For the control group, neuroticism did not change significantly ($Z = 1.067$, $p = .286$); thus H4 is supported. Attentional scores also did not change significantly ($Z = .566$, $p = .572$), thereby supporting H6. Sleep quality, on the other hand, did improve among the control group ($Z = 3.162$, $p = .002$), thereby causing rejection of H5. Close inspection of the distribution of ranks indicated that only 10 of 50 individuals reported improved sleep, while the other 40 reported no change; follow-up interviews with 6 of the participants revealed that the pre-test questions about screen time seemed to induce genuine surprise and, in some cases, led participants to voluntarily change their behavior by turning off their phones for longer periods of the night. This effect, referred to as a response to a pre-test measurement (or assessment-induced effect) will be discussed in more detail in the Discussion section.

Table 3 Wilcoxon Signed Ranks Test Results for Within-Group Pre-Test to Post-Test Comparisons

Variable	Group	Neg. Ranks	Pos. Ranks	Ties	Total	Z	p
Neuroticism	Experimental	50	0	0	50	-6.183	< .001
	Control	25	18	7	50	-1.067	.286
Sleep Quality	Experimental	50	0	0	50	-6.263	< .001
	Control	10	0	40	50	-3.162	.002
Attention	Experimental	0	50	0	50	-6.198	< .001
	Control	27	23	0	50	-.566	.572
Social Media	Experimental	50	0	0	50	-6.180	< .001
	Control	27	23	0	50	-.566	.572

Note. Negative ranks for neuroticism and sleep quality indicate score reduction (improvement). Positive ranks for attention indicate score increase (improvement).

Between-Group Comparisons: Kruskal–Wallis Test

Table 4 displays the between-group Kruskal-Wallis results. There was a stark difference among groups, pre-test. With regard to each of the four variables - neuroticism ($H=49.719$, $p<.001$), sleep quality ($H=28.339$, $p<.001$), attention ($H=9.392$, $p=.002$) and social media use ($H=49.469$, $p<.001$) - groups were significantly non-equivalent. By design the experimental group's levels of neuroticism were higher and its levels of sleep quality and attention were lower than the control groups; in addition, social media use in the experimental group was also higher than the control group. This inherent non-equivalence is due to purposive, non-random sampling and must be recognized as a limitation.

By post-test, the non-equivalence disappeared with regard to neuroticism ($H=2.167$, $p=.141$); the higher scores in the experimental group lowered toward control group levels post-test. Opposite of the pre-test results, experimental participants had better sleep quality than controls ($H=58.133$, $p<.001$) and higher attention levels ($H=66.397$, $p<.001$).

Participants in the experimental group continued to have lower levels of social media use than the control group (H=12.431, p<.001) post-test.

Table 4 Kruskal–Wallis Test Results for Between-Group Comparisons at Pre-Test and Post-Test

Variable	Exp. Mean Rank	Ctrl. Mean Rank	Kruskal-Wallis H	df	p
Neuroticism Pre-test	70.94	30.06	49.719	1	< .001
Neuroticism Post-test	54.76	46.24	2.167	1	.141
Sleep Pre-test	65.79	35.21	28.339	1	< .001
Sleep Post-test	28.63	72.37	58.133	1	< .001
Attention Pre-test	41.63	59.37	9.392	1	.002
Attention Post-test	74.12	26.88	66.397	1	< .001
Social Media Pre-test	70.89	30.11	49.469	1	< .001
Social Media Post-test	60.72	40.28	12.431	1	< .001

Note. Mean ranks reflect relative standing within the combined sample of N = 100. Lower mean rank for sleep post-test (experimental) indicates better sleep. Higher mean rank for attention post-test (experimental) indicates better attention.

Exploratory Finding: Reduction in Social Media Use

One finding that was not a predetermined outcome, but an interesting finding none-the-less, concerns the participants use of social media. The experimental condition showed a significant and consistent decrease in SNAS scores throughout the intervention (Z = 6.180, p < .001, all 50 participants demonstrating a decrease). The control condition did not demonstrate a similar change (Z = .566, p = .572). Although this was not a hypothesis and therefore should be interpreted with caution, the effect across all 50 experimental participants is difficult to overlook as randomness. These mechanisms are explored in the Discussion.

Effect Size Analysis

Effect sizes for the Wilcoxon Signed Ranks Test were calculated using the formula r= Z / N (Cohen, 1988; Field, 2013). Using standard criteria, .10, .30 and .50 will be defined as a small, medium and large effect size. Table 5 displays this data.

Table 5 Effect Sizes (r) for Wilcoxon Signed Ranks Test Results

Variable	Group	Z	N	Effect Size (r)	Interpretation
Neuroticism	Experimental	-6.183	50	.874	Large
	Control	-1.067	50	.151	Small
Sleep Quality	Experimental	-6.263	50	.886	Large
	Control	-3.162	50	.447	Medium
Attention	Experimental	-6.198	50	.877	Large
	Control	-.566	50	.080	Small
Social Media Use	Experimental	-6.180	50	.874	Large
	Control	-.566	50	.080	Small

Note. Effect size r = Z / √N. Benchmarks: small = .10, medium = .30, large = .50 (Cohen, 1988).

Not only were the magnitude of effects large, but so was their uniformity. The control group values were all the way on the small side, indicating that no real intervention effect occurred in the control group: neuroticism was r = .151, attention was r = .080 and social media use was r = .080. Only the change in sleep quality in the control group was substantial: r = .447.

Although not quite large effects, it did not reach significance, and, as mentioned before, the change in sleep quality may be due to an artifact, i.e. Response shift after being interviewed. Most effects were very large in the experimental group: neuroticism was r = .874, sleep quality r = .886, attention r = .877 and social media use was r = .874. These values show that music therapy was not just statistically but practically significantly related to changes in all three outcomes.

These effect size values provide strong evidence that the statistical improvements obtained in the experimental group can be considered actual and practically relevant. Their similarity between different outcome variables strengthens this conclusion further as there seems to have been a uniform response among all outcomes.

DISCUSSION

Central to the aims of this study was to determine whether a structured, raga-based music therapy program would lead to clinically meaningful improvements in neuroticism, sleep, and attention in a high non-productive screen time young adult population. All three of the primary outcomes showed significant pre to post improvements with large effect sizes for the experimental group compared to little change for the control group. Together these findings suggest the promise of raga-based music therapy as a non-pharmacological intervention for a growing segment of digit-overexposed young adults.

The significant decrease in neuroticism in the experimental group-from mean 37.96 to 28.54 throughout the intervention with an effect size of r = .874-is in keeping with the neurobiological hypothesis outlined by Chanda and Levitin (2013), who have suggested the up-regulation of dopamine and cortisol pathways during music listening may contribute to improved emotional stability. The thoughtfully structured progressive nature of the raga arrangement-moving from Bhupali's grounding to Yaman's restful resolve-was designed to promote gradual emotional de-escalation. It is also probable that as the intervention progressed, participants began to exhibit a greater prevalence of parasympathetic over sympathetic nervous system activity. It is worth acknowledging, however, that neuroticism at pre-test was quite a bit higher in the experimental group than in the control group, and part of the change observed may simply be regression to the mean rather than an entirely intervention-related effect. This is impossible to exclude with the quasi-experimental design. Improvements in sleep quality were perhaps the most clinically striking. PSQI scores improved from mean 12.58 (which well exceeds the clinical cutoff of five) to mean 6.84 in the experimental group, with an effect size of r = .886. This outcome finding is very well aligned with the findings of the Jespersen et al. (2015) meta-analysis that relaxing music listening increases both subjective sleep quality and sleep latency and with a finding from Deshmukh et al. (2009) and Kashyap and Sharma (2022) that Indian listeners benefit particularly from pre-sleep listening of raga-based music. The inclusion of the Raga Bageshree in the central 10-minutes of each session is also likely to be related, as it is the dominant raga associated with restful sleep. That said, it is important to note that it is not possible to distinguish the effects of the raga-based program as a whole from the effects of the individually chosen ragas, as the entire program was implemented.

Attentional improvements with rising ACS scores from mean 48.04 to mean 64.18 (r = .877) are congruent with Nagarajan et al.'s (2015) study that demonstrated Raga Bhupali was able to induce states of calm alertness and increase digit span performance. This finding extends Nagarajan's previous research to a self-report measure of attention and a larger intervention

context. It is plausible that improvements in sleep quality were itself the primary mechanism behind improvements in attention and that it is through improved sleep that the raga-based intervention increased attention. That said, the precise mechanism of raga effects on attention are not completely clear from this study.

The unexpected significant improvement in sleep quality in the control group can be interpreted as supporting the null hypothesis that music therapy is more efficacious than nothing; however, there are more nuanced explanations. Only ten of the fifty participants in the control group showed sleep improvements. Moreover, in the post-test interviews with six control participants, a coherent explanation for the improved PSQI scores was generated: several participants noted that the post-test questionnaire questions that asked about nighttime screen use and pre-sleep latencies caused them to think about their nocturnal habits more closely, and that for several participants the questions were self-reflective enough that they immediately made voluntary changes to their evening behaviors. This well-documented psychological phenomenon is referred to as assessment reactivity. A further consequence of the control participants' better understanding of screen use factors related to sleep is that targeted psychoeducation about healthy evening behaviors may itself promote significant improvements in sleep quality among at-risk young adults.

The intriguing although purely exploratory decrease in experimental participants' use of social media (r=.874) is an exciting direction for future research. The decrease is unlikely due to a simple displacement effect where participants substituted their screen-time with music time because 30 minutes is too brief to explain this decrease. Instead, it is possible that the increase in capacity for self-regulation and decrease in need to seek mood repairs with screen use, combined with structural avoidance of screen use, led to the observed behavior change. Whether screen time reductions mediate improved attention, sleep, and neuroticism or vice versa could not be tested in this study and is an important question.

Limitations

Several methodological limitations need to be acknowledged while interpreting the results of this study. The most important issue is lack of randomization. Because participants were recruited through purposive sampling, there were baseline differences between the two groups: experimental participants entered the study with significantly higher neuroticism, lower sleep quality, lower attention scores, and more media consumption than control participants. While Kruskal-Wallis between-group comparisons at post-test do indicate that the experimental group has caught up to, or passed, the control group, these pre-existing differences indicate that some of the improvement seen might be attributable to regression to the mean, and not an effect of the treatment alone. Randomised controlled trials should be utilized in future studies.

Secondly, it is important to acknowledge the possibility of a Hawthorne effect influencing the results. Because the experimental group was receiving a structured intervention and was in contact with the researcher on a daily basis via the Google Meet sessions, it is possible that this attention and structure, rather than the music itself, was responsible for participants' motivation to improve, and exaggerated the results of music therapy. Active control using a structurally similar, but musically neutral, intervention would help isolate the effect of the raga music itself.

Thirdly, all measures were self-report. Although the NEO-FFI, PSQI, and ACS are all psychometrically validated, they are vulnerable to social desirability bias, demand characteristics, and limited introspective capacity. An experimental design including more objective outcome measures-polysomnography or actigraphy for sleep, and reaction-time or neuroimaging studies for attention-would increase the strength of the study results significantly.

Fourth, conducting the intervention online added potential sources of variation. Although participants were asked to listen in quiet, darkened surroundings, it was impossible to verify the audio quality, ambient noise, and distractions they were encountering. Conducting experiments in the laboratory setting would increase control of extraneous variables.

Fifth, because participants were drawn from a specific geographic location in Pune, Maharashtra, the findings cannot be generalised to populations, regions, or cultures outside of this context, even outside of India. Lastly, there were no post-intervention assessments; it is therefore unknown how long the improvement lasts after the conclusion of the programme. It would be beneficial to have post-test at 1 and 3 months in future research designs.

CONCLUSION

This research aimed to demonstrate that a systematic music therapy programme based on a raga can effect statistically significant and practically meaningful changes in young people's neuroticism, sleep quality, and ability to attend. It can. The experimental participant was able to make statistically significant and practically meaningful changes in all three dependent measures in just four weeks of structured listening to a raga, whilst remaining almost completely unchanged in neuroticism and attention from time one to time two. In the experimental participant effect sizes were large (r- .874 to - .886) and significant in all three instances, implying the changes were of substantial clinical as well as statistical relevance.

Such a finding is especially valuable at the current time where readily accessible, low cost, non-drug methods to manage the problems arising from extensive screen time are few. One such method that does not necessitate clinical set up, but only the provision of internet and that costs no more than the researcher's time and time, that relies on a tradition of music deeply engrained in culture provides a viable practical resource for the psychologist, counselors and the educational welfare services. In addition to this evidence of change for the planned psychological parameters it is interesting that one experimental participant reduced her usage of social media significantly – which suggests that there may also be a more global effect for lifestyle change.

It is important however to interpret the results cautiously on the basis of the fact that this was a quasi-experimental study. The results provide useful preliminary evidence which need to be tested through further studies that use randomized conditions with a proper active control, objective measure of outcome and long term follow-up studies; the tradition of Hindustani classical music seems particularly suitable with regard to the documented specificity of affect of particular ragas.

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Acknowledgment

To the participants who contributed their time and commitment to this study, to the research guide Dr. Shradha Sakatkar and to the Department of Psychology, Modern College of Arts, Science and Commerce (Autonomous), Pune, for institutional support and permission to conduct this research.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Vasekar, V. & Sakatkar, S. (2026). The Effect of Music Therapy on Neuroticism, Sleep Quality, and Attention among Young Adults with High Screen Time. *International Journal of Indian Psychology*, *14*(3), 1304-1315. DIP:18.01.112.20261403, DOI:10.25215/1403.112