

Classical Music Meditation Content and Quality of Life: Sequential Mediation of Poor Sleep Quality and Chronic Fatigue

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<https://doi.org/10.5392/IJoC.2026.22.2.068>

Manuscript Received 29 September 2025; Received 17 June 2026; Accepted 19 June 2026

Abstract: This study investigated the relationship between participation in classical music meditation and adults' quality of life (QoL), specifically examining whether poor sleep quality and chronic fatigue sequentially mediated this association. One hundred twenty adults who had experienced sleep or fatigue problems within the past six months participated in a six-week program, attending one 40-minute session per week. Sleep quality, chronic fatigue, and QoL were measured using the Pittsburgh Sleep Quality Index (PSQI), Fatigue Severity Scale (FSS), and WHOQOL-BREF, respectively. The reliability coefficients for these measures ranged from Cronbach's $\alpha = 0.81$ to 0.91 . Data were analyzed using SPSS 25.0 and PROCESS macro v.4.2 (Model 6) to test the sequential mediation model. Results indicated that participation in classical music meditation was significantly associated with a higher quality of life, mediated through improved sleep quality and reduced chronic fatigue. Specifically, the sequential pathway—classical music meditation participation $\rightarrow$ better sleep quality $\rightarrow$ lower chronic fatigue $\rightarrow$ higher quality of life—was supported. These findings suggest that music-based meditation can function as an integrative healing intervention, extending beyond a purely artistic experience. This has practical implications for education, counseling, and health promotion.

Keywords: Classical Music Meditation; Sleep Quality; Chronic Fatigue; Quality of Life; Sequential Mediation

1. Introduction

In modern society, poor sleep quality and chronic fatigue among adults have emerged as a significant public health issue, imposing not only personal discomfort but also substantial national, social, and economic costs [1]. According to the World Health Organization (WHO, 2020), approximately 30–40% of adults worldwide experience chronic sleep problems, which contribute to reduced productivity, impaired job performance, and increased healthcare expenditures [2]. Korean studies have report that poor sleep quality is associated with poorer physical and mental health as well as reduced quality of life (QoL) [3].

Poor sleep quality and chronic fatigue adversely affect mental health, daily functioning, and quality of life (QoL) [3, 4]. Therefore, the development of effective intervention programs addressing these issues is crucial, not only at the individual level but also from a societal perspective. Recently, music-based meditation content has garnered attention as a non-pharmacological intervention, offering multiple benefits such as emotional stabilization, physical recovery, and improved sleep quality [5, 6].

In this study, “music-based meditation” refers broadly to meditation practices that incorporate musical stimuli, whereas “classical music meditation” refers more specifically to a structured program using selected classical pieces as attentional and emotional anchors during meditation. Classical music differs from general music interventions in that many classical works are characterized by relatively stable tempo, predictable melodic development, harmonic coherence, and structured phrasing. These features may facilitate relaxation, sustained attention, and emotional regulation by providing a stable auditory environment. In contrast to passive music listening, classical music meditation requires intentional attention to breathing, bodily sensations, emotional awareness, and reflective observation while listening to music. Therefore, the intervention used in this study should be understood not as simple music appreciation, but as a structured meditative practice

supported by classical music. Furthermore, conventional music interventions primarily aim to induce relaxation, mood enhancement, or symptom relief through listening experiences.

In contrast, meditation-based approaches emphasize sustained attention, nonjudgmental awareness, self-observation, and regulation of internal experiences. Therefore, classical music meditation integrates both components by combining the affective and sensory benefits of music with the attentional and reflective processes of meditation, creating a structured mind-body intervention rather than a simple music-listening activity. This integrated process may facilitate autonomic nervous system regulation and reduce physiological arousal, thereby supporting improvements in sleep quality and fatigue recovery.

Classical music meditation, in particular, integrates musical and meditative elements to provide sensory and emotional stability, representing an art-based therapeutic approach. Its potential applications have been discussed in various domains, including education, counseling, and health promotion [6, 7]. Music meditation has been shown to contribute to psychological and physiological recovery, self-regulation, and emotional control beyond mere artistic experience [7, 8].

For example, Dickson and Schubert (2020) reported that music interventions positively influence sleep quality [5], while Chen et al. (2021) found that music therapy improved sleep and alleviated fatigue in older adults [6]. Furthermore, Hu et al. (2023) demonstrated that music interventions targeting sleep enhanced both sleep indicators and mental health outcomes among university students [7]. Music interventions have also shown effects on fatigue and overall QoL. Valero-Cantero et al. (2023) reported that family caregivers of cancer patients who listened to self-selected music experienced significant improvements in overall QoL [8]. These findings suggest that music meditation can contribute meaningfully to life quality enhancement beyond simple artistic experience.

However, several limitations exist in prior research. First, most studies have focused on specific populations (e.g., older adults, patients, university students), with relatively few examining medium-term, integrative effects in the general adult population [1, 2]. Second, previous research has mainly addressed fragmented relationships between music meditation and specific psychological outcomes (e.g., anxiety reduction, sleep improvement), with limited investigation into the structural pathways linking poor sleep, chronic fatigue, and QoL [1], [3]. Third, there is a paucity of empirical studies implementing content-based classical music meditation programs in domestic settings and systematically evaluating their effectiveness [6, 7].

In response, this study investigated the associations among participation in a six-week classical music meditation program, in domestic settings and systematically evaluating their associations with psychological and health-related outcomes. Specifically, the study aimed to: (1) examine the association between participation in classical music meditation and adults' QoL, (2) investigate the sequential mediating roles of poor sleep quality and chronic fatigue in this relationship, and (3) discuss practical implications of content-based meditation programs in education, counseling, and health promotion. This study empirically examines music-based meditation as integrative healing content that may be associated with the sequential pathway of sleep → fatigue → QoL, extending beyond the management of single symptoms.

2. Theoretical Background and Literature Review

2.1 Sleep Quality and Quality of Life

Sleep quality is closely associated with both physical and emotional health, as well as overall quality of life (QoL). Sleep disturbances can lead to chronic fatigue, stress, and emotional instability, ultimately reducing QoL [9, 10]. Redeker and Stein (2008) reported that sleep disorders may contribute to decreased physical functioning and increased rehospitalization rates among patients with heart failure [9]. Additionally, recent research has suggested that poor sleep health is associated with adverse physical and psychological outcomes, highlighting the importance of sleep quality for overall well-being [10]. Consequently, improving sleep quality is considered a critical health indicator, with implications for both individual well-being and societal cost reduction.

2.2 Music Meditation and Sleep/Fatigue

Music meditation has been reported as an effective non-pharmacological intervention for improving sleep quality and alleviating fatigue [11, 12]. For instance, Burrai et al. (2020) found that daily 30-minute classical music listening sessions for three months significantly improved sleep quality, QoL, anxiety, depression, and cognitive function in patients with heart failure [11]. Similarly, Petrovsky (2021) conducted a systematic review of adults aged 50 and above and concluded that music interventions positively influence sleep quality and reduce

fatigue [12]. These studies suggest that music meditation is associated with physiological recovery and psychological stability.

2.3 Educational and Counseling Applications of Classical Music Meditation

Recent research indicates that music meditation can enhance emotional regulation, reduce stress, and improve cognitive functioning, demonstrating its potential for integration into educational and counseling programs [6, 7], [13]. Ramirez et al. (2025) implemented short-term music-based meditation sessions and measured pre- and post-intervention outcomes.

The study found that the combined music and meditation content increased psychological well-being, suggesting that music-based meditation can contribute to mental health improvement even over a short period [13]. Accordingly, classical music meditation possesses the potential to serve as an integrative healing content applicable to education, counseling, and health promotion programs beyond mere artistic experience.

2.4 Academic and Practical Contributions of the Study

This study addresses limitations in prior music therapy and meditation research by employing a sequential mediation model to analyze structural pathways and provide empirical evidence regarding the associations among sleep quality, fatigue, and quality of life [6, 7], [13].

Furthermore, it offers practical guidance for the development of counseling, educational, and health promotion programs. By combining content development with empirical research, this study contributes to the growing literature on music-based meditation, psychological well-being, and health promotion [6, 7], [13].

3. Methodology

3.1 Research Model

This study aimed to examine the association between participation in classical music meditation content and adults' quality of life (QoL), and to investigate whether poor sleep quality and chronic fatigue sequentially mediated this relationship. A sequential mediation model was constructed, comprising the independent variable, two mediators, and the dependent variable. The model was analyzed using SPSS 25.0 and PROCESS macro v.4.2 (Model 6) [1].

The research model is illustrated in Figure 1. Control variables included gender, age, educational level, and health status to account for potential confounding effects. This model allowed for testing the direct association between classical music meditation participation and QoL, as well as the indirect associations through the sequential pathways of sleep quality and fatigue.

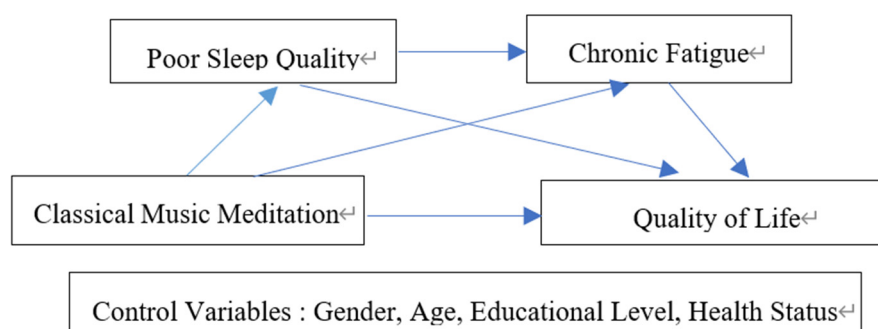


Figure 1. Research Model

3.2 Participants and Data Collection

The participants comprised 120 adults aged 20 years or older who had experienced sleep disturbances or fatigue within the past six months. Data collection was conducted over a six-week period from May to June 2025. Participants attended one 40-minute session per week of classical music meditation content and completed questionnaires throughout the six-week intervention period. All participants were fully informed about the study objectives and procedures, and provided written informed consent prior to participation. The 6-

week program Table 1 was designed to progressively support psychological stability, emotional regulation, fatigue recovery, and improvement in quality of life (QoL). Each session integrated meditation exercises with classical music to facilitate physical and emotional changes in a systematic manner.

Table 1. Six-Week Classical Music Meditation Program

Week	Session	Theme	Musical Piece	Activities
1	Mind and Breath Stabilization	J.S. Bach, <i>Air on the G String</i> , BWV 1068	Breathing meditation with music listening, relaxation of body and mind	40
2	Concentration Enhancement	L. van Beethoven, <i>Moonlight Sonata</i> , Op.27-2	Visualization meditation with music listening, concentration training	40
3	Stress Reduction	F. Chopin, <i>Nocturne Op.9-2</i>	Progressive muscle relaxation with music listening, emotional stabilization	40
4	Emotional Regulation	W.A. Mozart, <i>Piano Sonata No.16</i> , K.545	Emotion awareness meditation with music listening, emotional regulation exercises	40
5	Fatigue Recovery	C. Debussy, <i>Clair de Lune</i>	Body scan meditation with music listening, fatigue recovery	40
6	Integrated Meditation	P.I. Tchaikovsky, <i>Swan Lake Suite</i> , Op.20	Comprehensive meditation practice, integration of music and meditation, sharing personal experiences	40

During the first session, participants engaged in breathing meditation while listening to Bach's Air on the G String, promoting psychological stability and preparing for focused attention. The second session employed Beethoven's Moonlight Sonata combined with visualization meditation to enhance concentration. The third session focused on stress reduction through progressive muscle relaxation paired with Chopin's Nocturne Op.9-2. In the fourth session, Mozart's Piano Sonata No.16 was used in emotion awareness meditation to improve emotional regulation skills. The fifth session combined Debussy's Clair de Lune with body scan meditation to facilitate fatigue recovery. Finally, the sixth session applied Tchaikovsky's Swan Lake Suite in a comprehensive meditation practice, integrating previous sessions' experiences and encouraging participants to share personal reflections to maximize learning outcomes. The program was designed to progressively address psychological stability, emotional regulation, and fatigue recovery, which are theoretically associated with quality of life. Each session lasted 40 minutes, balancing practical feasibility and sustained intervention effects.

3.3 Variables and Measurements

3.3.1 Independent Variable: Participation in Classical Music Meditation

The independent variable was defined as the degree of participation in classical music meditation content. Specifically, it was measured by attendance in the six-week program, with one 40-minute session per week. Participation was objectively recorded through the researcher's observation logs and attendance confirmation forms. Higher participation rates were considered indicative of greater exposure to the intervention and increased likelihood of experiencing its effects. As participation was recorded quantitatively, internal consistency (Cronbach's α) was not applicable.

3.3.2 Mediator 1: Poor Sleep Quality

Poor sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). The PSQI consists of 19 items across seven subdomains, including sleep latency, duration, efficiency, disturbances, use of sleep medication, and daytime dysfunction, rated on a 4-point Likert scale. Higher scores indicate worse sleep quality. In this study, internal consistency was Cronbach's $\alpha = 0.81$. The PSQI is widely recognized as a standard instrument for evaluating sleep quality in both clinical and research settings, ensuring the reliability and validity of the measurement.

3.3.3 Mediator 2: Chronic Fatigue

Chronic fatigue was assessed using the Fatigue Severity Scale (FSS), which comprises nine items rated on a 7-point Likert scale. Higher scores indicate more severe fatigue. In the current study, internal consistency was Cronbach's $\alpha = 0.88$. The FSS is widely used to quantitatively assess subjective fatigue across various adult populations.

3.3.4 Dependent Variable: Quality of Life

Quality of Life (QoL) was evaluated using the WHOQOL-BREF, a 26-item instrument encompassing four domains: physical health, psychological state, social relationships, and environment. Items are rated on a 5-point Likert scale, with higher scores indicating better QoL. Internal consistency in this study was Cronbach's $\alpha = 0.91$. The WHOQOL-BREF is internationally standardized and allows for comprehensive assessment of health and overall well-being.

3.3.5 Control Variables

The analysis controlled for gender, age, educational level, and health status, which are key demographic factors potentially associated with QoL, sleep, and fatigue. These variables were included as covariates to enhance the accuracy of the sequential mediation analysis.

3.4 Data Analysis

Data were analyzed using SPSS 25.0 and PROCESS macro v.4.2 (Model 6) [1]. Descriptive statistics, including mean, standard deviation, skewness, and kurtosis, were calculated to examine participants' general characteristics and the distribution of variables. Pearson correlation analysis was conducted to evaluate the basic relationships among the independent variable, mediators, and dependent variable. The core analysis involved testing the sequential mediation effect, examining whether participation in classical music meditation was associated with QoL through the sequential pathways of poor sleep quality and chronic fatigue. Bootstrapping with 5,000 resamples was applied, and the statistical significance of indirect effects was evaluated at a 95% confidence interval. This approach enables structural evaluation of the mediating pathways, going beyond the simple assessment of direct relationships between the independent and dependent variables. The analytical procedure was consistent with the research design, allowing systematic examination of how classical music meditation content is associated with QoL through sleep quality and fatigue.

4. Results

4.1 Descriptive Statistics

4.1.1 Demographic Characteristics

The demographic characteristics of the 120 participants are presented in Table 2.

Table 2. Demographic Characteristics of Participants ($n = 120$)

Variable	Category	Frequency (n)	Valid Percentage (%)
Gender	Male	54	45.0
	Female	66	55.0
Education	Undergraduate (enrolled/graduated)	78	65.0
	Graduate (enrolled/graduated)	42	35.0
Age	20–29	36	30.0
	30–39	32	26.7
	40–49	28	23.3
Health Status	Good or above	96	80.0
	Fair or below	24	20.0

Among the participants, 66 (55.0%) were female and 54 (45.0%) were male, indicating a slightly higher proportion of women. The age distribution showed that 20–29 years accounted for 36 participants (30.0%) and 30–39 years for 32 participants (26.7%), such that the 20–39 age group represented 56.7% of the sample. Regarding educational attainment, most participants (78, 65.0%) had completed or were enrolled in undergraduate studies, whereas 42 participants (35.0%) had graduate-level education. In terms of self-reported health status, 96 participants (80.0%) indicated “good or above,” suggesting that most participants were generally healthy.

These results indicate that the study sample comprised adults with diverse age ranges and educational levels, while overall health status was relatively good. Therefore, participants’ health condition is unlikely to significantly confound the subsequent analyses involving sleep quality, chronic fatigue, and quality of life.

4.1.2 Descriptive Statistics of Key Variables

The descriptive statistics of the key study variables for the 120 participants are presented in Table 3.

Table 3. Descriptive Statistics of Key Variables ($n = 120$)

Variable	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Participation in Classical Music Meditation	3.75	0.42	-0.12	0.05
Poor Sleep Quality	2.87	0.65	0.21	-0.12
Chronic Fatigue	3.21	0.71	0.18	0.05
Quality of Life	3.64	0.58	-0.25	0.22

The independent variable, participation in classical music meditation, had a mean of 3.75 ($SD = 0.42$), indicating that participants generally engaged actively in the program. Poor sleep quality, the first mediator, showed a mean of 2.87 ($SD = 0.65$), which is moderately low, with skewness of 0.21 and kurtosis of -0.12, suggesting approximate normality. Chronic fatigue, the second mediator, had a mean of 3.21 ($SD = 0.71$), indicating that participants experienced moderate-to-high levels of fatigue, with skewness of 0.18 and kurtosis of 0.05, reflecting acceptable normal distribution. The dependent variable, quality of life (QoL), had a mean of 3.64 ($SD = 0.58$), indicating an overall moderate-to-high level, with skewness of -0.25 and kurtosis of 0.22, approximating normality.

The internal consistency of the measurement instruments was sufficient, with Cronbach’s $\alpha = 0.81$ for poor sleep quality, 0.88 for chronic fatigue, and 0.91 for QoL, confirming the reliability of the data. Overall, the distribution of the variables was suitable for subsequent analyses, and the relatively high level of participation in the intervention facilitated examination of the associations among variables in the sequential mediation analysis.

4.1.3 Correlations Among Key Variables

The correlations among the key study variables for the 120 participants are presented in Table 4.

Table 4. Correlations Among Key Variables ($n = 120$)

Variable	1	2	3	4
1. Participation in Classical Music Meditation	1			
2. Poor Sleep Quality	-0.42**	1		
3. Chronic Fatigue	-0.38**	0.56**	1	
4. Quality of Life	0.45**	-0.61**	-0.57**	1

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 4 presents the correlations among the key study variables. Participation in classical music meditation was significantly and negatively correlated with poor sleep quality ($r = -0.42$, $p < .01$) and chronic fatigue ($r =$

-0.38, $p < .01$). It was also positively correlated with quality of life ($r = 0.45$, $p < .01$). Poor sleep quality showed a significant positive correlation with chronic fatigue ($r = 0.56$, $p < .01$) and significant negative correlations with quality of life ($r = -0.61$, $p < .01$). Chronic fatigue was also negatively correlated with quality of life ($r = -0.57$, $p < .01$). These results suggest that participation in classical music meditation is associated with better sleep quality, lower fatigue, and higher quality of life.

4.2 Sequential Mediation Pathway of Sleep Quality and Chronic Fatigue on the Relationship Between Participation in Classical Music Meditation and Quality of Life

4.2.1 Step 1: Association of Participation in Classical Music Meditation with Poor Sleep Quality

Table 5. Step 1: Association of Participation in Classical Music Meditation with Poor Sleep Quality ($n = 120$)

Path	β	SE	t	F	R^2
Participation in Classical Music Meditation → Poor Sleep Quality	-0.42	0.08	-5.25**	27.56**	0.18

* $p < .05$, ** $p < .01$, *** $p < .001$

As shown in Table 5, participation in classical music meditation was significantly and negatively associated with poor sleep quality ($\beta = -0.42$, $t = -5.25$, $p < .01$). The model accounted for 18% of the variance ($F = 27.56$, $R^2 = 0.18$), indicating that higher participation in classical music meditation was associated with better sleep quality.

4.2.2 Step 2: Association of Participation in Classical Music Meditation with Chronic Fatigue

Table 6. Step 2: Association of Participation in Classical Music Meditation with Chronic Fatigue ($n = 120$)

Path	β	SE	t	F	R^2
Participation in Classical Music Meditation → Chronic Fatigue	-0.38	0.09	-4.22**	22.32**	0.15

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 6 demonstrates that participation in classical music meditation was significantly and negatively associated with chronic fatigue ($\beta = -0.38$, $t = -4.22$, $p < .01$). The explanatory power of the model was 15% ($F = 22.32$, $R^2 = 0.15$). This finding indicates that individuals who engaged more actively in classical music meditation reported lower levels of fatigue.

4.2.3 Step 3: Association of Poor Sleep Quality with Chronic Fatigue

Table 7. Step 3: Association of Poor Sleep Quality with Chronic Fatigue ($n = 120$)

Path	β	SE	t	F	R^2
Poor Sleep Quality → Chronic Fatigue	0.56	0.07	8.00**	64.00**	0.31

* $p < .05$, ** $p < .01$, *** $p < .001$

The results in Table 7 show that poor sleep quality was significantly and positively associated with chronic fatigue ($\beta = 0.56$, $t = 8.00$, $p < .01$). The model explained 31% of the variance ($F = 64.00$, $R^2 = 0.31$). This confirms that poorer sleep quality is closely associated with increased fatigue among adults.

4.2.4 Step 4: Associations of Independent and Mediating Variables with Quality of Life

Table 8. Step 4: Associations of Independent and Mediating Variables with Quality of Life ($n = 120$)

Path	β	SE	t	F	R^2
Poor Sleep Quality → Quality of Life	-0.34	0.08	-4.25**	22.81**	0.34
Chronic Fatigue → Quality of Life	-0.57	0.09	-6.33**	40.07**	0.34
Participation in Classical Music Meditation → Quality of Life	0.20	0.07	2.86**	8.18**	0.34

* $p < .05$, ** $p < .01$, *** $p < .001$

As presented in Table 8, poor sleep quality ($\beta = -0.34$, $t = -4.25$, $p < .01$) and chronic fatigue ($\beta = -0.57$, $t = -6.33$, $p < .01$) were both significantly and negatively associated with quality of life. In contrast, participation in classical music meditation was significantly and positively associated with quality of life ($\beta = 0.20$, $t = 2.86$, $p < .01$). The overall model explained 34% of the variance ($R^2 = 0.34$). These findings suggest that classical music meditation participation may be directly and indirectly associated with higher quality of life through better sleep quality and lower chronic fatigue.

4.2.5 Step 5: Bootstrap Test of the Sequential Mediation Effect

Table 9. Step 5: Bootstrap Test of the Sequential Mediation Effect ($n = 120$)

Pathway	Effect	SE (Boot)	95% CI
Participation in Classical Music Meditation → Poor Sleep Quality → Quality of Life	0.14	0.05	[0.06, 0.26]
Participation in Classical Music Meditation → Chronic Fatigue → Quality of Life	0.16	0.06	[0.07, 0.30]
Participation in Classical Music Meditation → Poor Sleep Quality → Chronic Fatigue → Quality of Life	0.09	0.04	[0.04, 0.18]

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 9 reports the bootstrap analysis results for the sequential mediation effects. The indirect path of participation in classical music meditation through poor sleep quality to quality of life was significant (Effect = 0.14, Boot LLCI = 0.06, Boot ULCI = 0.26). Similarly, the indirect path through chronic fatigue alone was significant (Effect = 0.16, Boot LLCI = 0.07, Boot ULCI = 0.30). Most importantly, the sequential pathway—participation in classical music meditation → poor sleep quality → chronic fatigue → quality of life—was also significant (Effect = 0.09, Boot LLCI = 0.04, Boot ULCI = 0.18).

These results suggest that classical music meditation participation is associated with quality of life both directly and indirectly through a sequential mediation mechanism whereby better sleep quality is associated with lower fatigue, which in turn is associated with higher quality of life.

5. Conclusion

This study investigated the association between participation in classical music meditation (CMM) content and adults' quality of life (QoL), focusing on the sequential mediating roles of poor sleep quality and chronic fatigue. The findings provide both theoretical contributions and practical implications for content-based interventions in education, counseling, and health promotion.

First, participation in CMM was significantly associated with better sleep quality, lower chronic fatigue, and higher QoL. These findings suggest that CMM extends beyond a purely artistic or aesthetic activity, serving as an integrative therapeutic content that contributes to psychological stabilization and physical recovery [5-7]. This highlights the potential of CMM as a structured module within educational curricula, adult learning centers, and counseling programs to promote both short-term well-being and long-term resilience.

Second, sequential mediation analysis demonstrated that the pathway linking CMM participation to QoL through poor sleep quality and chronic fatigue was statistically significant. Specifically, higher CMM participation was associated with better sleep quality, which was related to lower fatigue and, subsequently, higher QoL. This sequential pathway—better sleep quality → lower fatigue → higher QoL—provides empirical evidence for a structured, integrative mechanism that distinguishes this study from prior research focusing on specific populations (e.g., older adults, patients) or isolated psychological and physiological outcomes [1-3], [6]. A possible psychophysiological explanation for these findings is that classical music meditation may promote autonomic nervous system regulation and emotional stabilization. Previous studies have suggested that music-based interventions can reduce physiological arousal, decrease stress-related activation, and facilitate relaxation responses associated with improved sleep quality [6, 7]. In addition, mindfulness-oriented attention during music listening may reduce cognitive and emotional overactivation, thereby decreasing perceived fatigue and supporting psychological recovery [13]. These mechanisms may help explain why better sleep quality was associated with lower chronic fatigue and subsequently with higher quality of life in the present study.

Third, the six-week program with weekly 40-minute CMM sessions may provide a feasible non-pharmacological content model associated with emotional stabilization, sleep-related outcomes, fatigue-related outcomes, and QoL. These results align with previous findings on music-based mindfulness interventions [7, 8], offering robust evidence for the efficacy of CMM as a non-pharmacological, low-cost strategy applicable to diverse populations.

6. Practical Implications

Based on these findings, several implications can be drawn:

1. Educational and Counseling Applications

Integrating CMM content into schools, universities, and community-based counseling programs can provide systematic modules for enhancing psychological stability and physical health. As demonstrated in this study, music-based meditation offers both short-term experiential value and long-term benefits for well-being [5, 6].

2. Health Promotion and Preventive Strategies

Poor sleep and chronic fatigue are strongly associated with health risks and broader social and economic costs [1, 2]. CMM content provides a scalable, accessible, and non-invasive approach to health promotion. Sustained participation, as evidenced by the six-week program in this study, may serve as a practical intervention to prevent fatigue-related disorders and enhance overall QoL [7, 8].

3. Research Development

While this study focused on a general adult population, future studies should expand to diverse age groups, occupational backgrounds, and cultural contexts to strengthen external validity. Additionally, investigating outcomes such as emotional regulation, stress response, and cognitive performance will broaden the scope of program development and academic contribution [3], [6-8].

4. Integrative Therapeutic Content Innovation

This research demonstrates the value of combining music, meditation, education, counseling, and health promotion into a unified content model. Future development should incorporate personalized music selection, varied meditation techniques, and digital delivery platforms to increase accessibility and scalability in modern contexts [5], [7].

In conclusion, this study provides robust empirical evidence that CMM is associated with higher QoL through sequential associations involving sleep quality and fatigue, rather than through a single direct pathway. The findings underscore its dual academic and practical contributions, supporting the development of integrative therapeutic programs aimed at psychological stabilization, physical recovery, and emotional regulation for the general adult population.

7. Limitations and Future Research

This study has several limitations that should be considered when interpreting the findings.

First, the study did not clearly include a randomized controlled trial (RCT) group or a distinct control group, and therefore causal interpretations should be made with caution. Consequently, it remains difficult to completely distinguish the therapeutic effects of the program from potential placebo effects.

Second, this study relied on self-report questionnaires, including the PSQI, FSS, and WHOQOL-BREF. Therefore, objective sleep indicators such as actigraphy, polysomnography, or physiological measures were not

included. Future studies should incorporate objective sleep and physiological indicators to strengthen the validity of the findings.

Third, due to the non-experimental, longitudinal nature of the data, the possibility of reverse causality cannot be entirely discounted; for instance, participants with inherently more severe baseline sleep disturbances or chronic fatigue may have experienced lower attendance or session compliance, thereby potentially structuring the observed associations. Future studies should employ repeated-measures designs to examine temporal trajectories more rigorously.

Finally, future research should employ randomized controlled designs with larger and more diverse samples to verify the generalizability and causal mechanisms of classical music meditation content.

Conflicts of Interest: The authors declare no conflict of interest.

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