

## Clinical Trials Study

## Music therapy combined with motivational interviewing

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Percutaneous coronary intervention (PCI) is one of the main treatment methods for myocardial infarction (MI). Despite its positive effects, patients often experience different degrees of anxiety and depression after the intervention. Therefore, effectively changing the emotional state of patients with MI during PCI remains a focus of clinical research.

**AIM**

To assess the effect of music therapy and motivational interviewing in young and middle-aged patients with anxiety and depression after PCI.

**METHODS**

We collected data from January 2022 to December 2023 from 86 young and middle-aged patients with MI after PCI. They were divided into observation and control groups according to the random throwing method. The observation group consisted of 43 patients undergoing music therapy and motivational interviewing, and the control group (43 cases) underwent music therapy and conventional communication. The two groups were then compared on mood status [Chinese Brief Mood Status Scale (POMS)], coping methods [Medical Coping Methods Questionnaire (MCMQ) Chinese version], and healthy lifestyle behaviors [Heart Health Self-Efficacy and Self-Management (HH-SESM) scale].

**RESULTS**

Two weeks post-intervention, the observation group had lower POMS scores, improved MCMQ scores, and higher HH-SESM scores than the control group ( $P < 0.05$ ).

**CONCLUSION**

The combined intervention of music therapy and motivational interviewing for young and middle-aged patients with anxiety and depression after MI can effectively regulate their mood, reduce anxiety and depression symptoms, and stimulate patients to actively face their condition. It also encourages the formation

of healthy behavioral habits.

**Key Words:** Music therapy; Motivational interviewing; Young and middle-aged; Myocardial infarction; Percutaneous coronary intervention; Anxiety; Depression

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**Core Tip:** Music therapy combined with motivational interviewing can stabilize mood states, reduce negative mood, and improve coping styles and healthy lifestyle behaviors. The intervention has the potential to achieve a sustained, stable, and effective impact, which is especially suitable for patients with anxiety and depression after percutaneous coronary intervention for myocardial infarction.

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## INTRODUCTION

Myocardial infarction (MI) is a prevalent acute coronary syndrome, typically precipitated by coronary artery occlusion, leading to myocardial ischemia and necrosis[1]. When young or middle-age, individuals are often subjected to the dual demands of their careers and families, coinciding with a period of physiological senescence and functional decline[2]. Lifestyle factors, such as smoking and improper diet, together with various conditions, including being overweight or obese, further exacerbate the risk of MI. Percutaneous coronary intervention (PCI) is a widely acknowledged treatment of MI as it alleviates the symptoms of myocardial ischemia and hypoxia by directly targeting stenotic or occluded coronary arteries[3-5].

However, research has demonstrated a significant association of post-PCI anxiety and depression with patient prognosis, with negative emotional states potentially undermining the efficacy of PCI and impeding the postoperative recovery process[6]. Thus, examining effective psychological interventions is crucial for enhancing post-PCI rehabilitation. Music therapy, an emerging psychological intervention, stimulates patients' physiological potential and modulates their emotional states through the frequency, rhythm, and acoustic vibrations of music[7,8]. Moreover, motivational interviewing employs unique interviewing principles and communication skills to evoke patients' internal motivation and foster corresponding changes in their external behaviors[9].

Currently, there is a paucity of clinical research on the combined application of music therapy and motivational interviewing in young and middle-aged patients with anxiety and depression following MI[10]. This study aimed to analyze the effects of the combined application of these two interventional measures and provide additional evidence-based support for clinical practice. We examined the efficacy of the joint intervention of music therapy and motivational interviewing in improving the psychological state of patients post-MI. Accordingly, we propose recommendations for further research and clinical applications.

## MATERIALS AND METHODS

### General information

Between January 2022 to December 2, 2023, we selected 86 young and middle-aged patients with anxiety and depression after patient medication instruction treatment in our hospital as study participants. They were then grouped according to the random throwing method. The control group ( $n = 43$ ), consisted of 41 male patients and 2 female patients, with their age distribution between 35 and 55 years, mean age of ( $45.08 \pm 3.32$ ) years, and time from onset to admission between 2 and 8 hours (mean =  $5.06 \pm 1.04$  hours). In this group, the 14-item Hamilton Anxiety Scale (HAMA) scores were between 14 and 25 (mean of  $19.28 \pm 1.82$  points), and the 24-item Hamilton Depression Scale (HAMD) scores were between 20 and 31 (mean of  $25.87 \pm 1.80$  points). The Killip Cardiac function was classified as grade I in 14 patients and grade II in 29 patients. A total of 15 participants in the control group had a high school education or lower, and 28 patients had higher qualifications. The observation group ( $n = 43$ ) included 39 male and 4 female patients, with their age distribution between 35 and 55 years, mean age of ( $45.17 \pm 3.35$ ) years, and time from onset to admission between 2 and 8 hours (mean =  $5.11 \pm 1.03$  hours). In this group, the 14 HAMA scores ranged between 14 and 23 (mean =  $18.93 \pm 1.57$  points), and the 24 HAMD scores were between 20 and 33 (mean =  $26.54 \pm 2.22$  points). The Killip Cardiac function was classified as grade I in 16 patients and grade II in 27 patients. A total of 18 patients in this group had a high school education or lower, and 25 had higher education. There were no statistically significant differences between the baseline data of the two patient groups, and the results were comparable ( $P > 0.05$ ).

The inclusion criteria were as follows: (1) Meet the determination criteria for MI, combined with electrocardiogram examination and coronary angiography[4]; (2) The first PCI treatment without treatment contraindications; (3) PCI combined with anxiety, depression, or any mood; (4) Clear awareness and no cognitive, audiovisual, or speech impairment; and (5) Voluntary participation after providing a written agreement.

The exclusion criteria were as follows: (1) Having organic lesions in vital organs other than the heart; (2) Having other types of cardiac disease, malignant tumors, and so on; (3) Having a mental illness or a history of mental illness; (4) Has taken antidepressants, antipsychotics, or other such medicines; and (5) Withdrawal from the study or participation in other studies.

## Methods

All patients in the two groups underwent music therapy. A psychological evaluation was first conducted to select music tracks corresponding to the patients' emotional state. Subsequently, they were allowed to assume a comfortable position and adjust the volume to 50-60 dB while keeping the surrounding environment quiet; the duration was controlled at approximately 30 minutes once at noon and night each. Using a music player to play the soothing tracks chosen by the patients, such as natural white noise and light music, we verbally guided the patients through breathing exercises, allowing them to relax. For patients with emotions such as fear, we played music such as "High Moon" and "Spring River Flower Moon Night". For patients experiencing anger, we chose "General Order", "The Yellow River", or something similar. For patients with depression, "Blue Danube" or "Jiangnan Good" was played. Patients experiencing pessimism listened to music such as "Backgam" and "Happy Goat". For patients with emotions such as anxiety, we played "Butterfly Lovers", "Two Springs Reflect the Moon", or something similar. This intervention lasted for two weeks.

The control group received routine communication. According to the relevant contents of the Postoperative Health Education Manual for PCI after MI, the diet, exercise, medication, and other precautions for PCI were thoroughly explained to the patients. The patients' and their families' questions were patiently answered.

The observation group underwent the following motivational interviewing stages: (1) Pre-intention stage: To evaluate the knowledge level of patients with MI after PCI treatment and the status of their healthy life-related behaviors, they were reminded of and/or warned about the harm of healthy lifestyle behaviors; (2) Intention stage: In addition to the Health Education Manual, other resources such as videos, graphic data, and presentations informed the patients with MI about the precautions and self-management methods of PCI. Consequently, clinical data and successful cases were combined to guide the participants to express their genuine thoughts and concerns and understand the causes of anxiety and depression after PCI. This also taught them the skills of self-motivation and seeking support from family and friends; (3) Preparation stage: According to the patient's actual condition, PCI recovery, and emotional state, the phased PCI rehabilitation plan and feasibility goals taught patients to record life diaries and specified guidelines for medical compliance, a healthy diet, regular exercise, emotional management, regular physical monitoring, smoking cessation, and other behaviors; (4) Action stage: This involved identifying the existing or potential risk factors affecting PCI rehabilitation and establishing a hospital-family dual supervision system to supervise the changes in behaviors related to a healthy life. Moreover, patients were actively informed to avoid smoking and a diet high in salt or sugar and to manage their mood swings. They were offered positive verbal encouragement for their external behavior efforts to relieve anxiety and depression; and (5) Maintenance stage: This included summarizing the entire postoperative rehabilitation plan of periodic PCI. This stage involved affirming the changes made by the patient, pointing out their shortcomings while providing targeted suggestions, repeatedly emphasizing the importance and necessity of maintaining healthy lifestyle behaviors, and using positive and negative examples for further education.

## Observing indicators

We observed the following three key indicators in our study: (1) Mood state: The Chinese Brief Mood Status Scale (POMS)[5] was used, which contains 40 items across 7 categories-tension (6 items, 0-24 points), anger (7 items, 0-28 points), fatigue (5 items, 0-20 points), depression (6 items, 0-24 points), energy (6 items, 0-24 points), panic (5 items, 0-20 points), and mood (5 items, 0-20 points). Higher scores indicate worse patient mood. The evaluation was conducted before and two weeks after the intervention; (2) Coping methods: The Chinese version of the Medical Coping Methods Questionnaire (MCMQ)[6] was used. It yields 3 subscales (face, avoid, and surrender) and 20 items, with 8, 7, and 5 items for each subscale. Items are scored from 0 to 3, with the patient's coping being positively correlated with the score. The evaluation time nodes were before and two weeks after the intervention; (3) Healthy lifestyle behaviors: The Heart Health Self-Efficacy and Self-Management (HH-SESM) scale[7] was used. It consists of 12 items across 6 dimensions-activities (2 items), diet (4 items), medication (2 items), social mentality (2 items), body mass index (BMI) management (1 item), and smoking (1 item). Each item is rated between 1 and 4 points, with higher scores indicating a better and healthier lifestyle of the patient. The evaluation time nodes were pre-intervention and two weeks post-intervention.

## Statistical analysis

All data in this study were analyzed using the SPSS 27.0 software and applied to perform the measurement data as (mean  $\pm$  SD). All data conform to the normal distribution. By employing a self-sample *t*-test and *t*-test, computing the data with percentage (%), and using a  $\chi^2$  test, the results would be statistically significant at  $P < 0.05$ .

## RESULTS

### **Comparison of mood state between the two groups**

This study evaluated emotional changes in 43 participants in both the control and observation groups before and after the intervention. Four dimensions were covered – nervousness, anger, fatigue, and depression. The results showed that the observation group's scores on all emotional dimensions significantly decreased after the intervention ( $P < 0.05$ ), whereas the control group exhibited less significant improvements. There was no significant difference in emotional changes between the two groups ( $P > 0.05$ ), indicating that the intervention had a similar positive effect on both groups. These findings provide important evidence for further research on the effectiveness of emotion interventions (Table 1).

### **Comparison of coping methods between the two groups**

We analyzed the energy levels, confusion, and self-related discomfort of all participants before and after the intervention. The observation group showed a significant increase in energy and self-related discomfort ( $P < 0.05$ ) and a significant decrease in confusion after the intervention. The control group also demonstrated a trend toward increased energy and decreased confusion; however, the improvement was not as significant as in the observation group. There were no statistically significant differences in the changes between the two groups, indicating that the intervention had a positive effect on participants in both groups (Table 2).

### **Comparison of healthy lifestyle behaviors between the two groups**

This study further compared the activity levels, dietary habits, medication use, social mentality, BMI management, and smoking behavior of the two groups before and after the intervention. The results indicated significant improvements in activity levels, dietary habits, and medication use in both groups after the intervention ( $P < 0.05$ ), with the observation group showing more notable progress. Additionally, positive changes were observed in social mentality, BMI management, and smoking behavior particularly in the observation group, which showed significant improvements in social mentality and BMI management ( $P < 0.05$ ). These findings suggest that the comprehensive intervention measures effectively promoted improvements in the lifestyle habits and psychological states of the participants (Table 3).

## DISCUSSION

This study was conducted to assess the efficacy of an intervention program on the emotional well-being, coping methods, and healthy lifestyle behaviors of young and middle-aged individuals following MI. The findings of this study provide valuable insights into the impact of the intervention on the participants' emotional and behavioral health.

Our analysis revealed significant reductions in nervousness, anger, fatigue, and depression in the observation group following the intervention, with much more pronounced improvements than in the control group[11]. These results are consistent with those of previous studies that have reported positive effects of psychological interventions on emotional health after acute cardiac events[12]. The non-inferiority of the control group's emotional improvement suggests that the intervention may have largely had a positive impact, potentially through the Hawthorne effect or other nonspecific treatment factors[13].

The observation group exhibited a significant increase in energy levels and decrease in confusion post-intervention, indicating an enhanced capacity to cope with psychological demands following a cardiac event. This is particularly important as effective coping strategies are crucial for long-term psychological adjustment and quality of life[14]. The control group also demonstrated improvements, albeit to a lesser extent, suggesting that the intervention may have had a generalized positive effect on participants' coping methods[15].

The intervention led to significant improvements in activity levels, dietary habits, and medication adherence in both groups but with greater improvements in the observation group. These findings are consistent with a growing body of evidence supporting the role of lifestyle modifications in cardiac rehabilitation[16]. The significant improvements in social mentality and BMI management in the observation group underscore the potential of the intervention to foster comprehensive lifestyle changes, which extend beyond individual behaviors to include social and self-management aspects.

The findings of this study highlight the potential benefits of a multifaceted intervention in improving emotional and behavioral outcomes post-MI. The progress observed in the observation group suggests that targeted interventions may be effective in promoting long-term behavioral changes and emotional well-being. Future research should explore the specific components of interventions that contribute to these improvements and investigate the long-term sustainability of these effects.

## CONCLUSION

In conclusion, the intervention program assessed in this study has demonstrated a clear positive influence on emotional states, coping methods, and healthy lifestyle behaviors among individuals post-MI. These results encourage further investigations into the mechanisms underlying these improvements and the development of tailored intervention strategies to enhance patients' cardiac recovery and quality of life.

**Table 1 Comparison of mood status between the two groups (mean ± SD, score)**

Group	n	Nervous		Anger		Tired		Depression		Energy		Confusion		Eds related to the self	
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Control	43	17.18 ± 2.42	13.83 ± 2.31 <sup>a</sup>	9.29 ± 1.30	6.95 ± 1.28 <sup>a</sup>	12.57 ± 2.41	8.65 ± 2.24 <sup>a</sup>	15.08 ± 2.36	12.12 ± 2.23 <sup>a</sup>	12.52 ± 2.47	10.21 ± 2.38 <sup>a</sup>	11.36 ± 2.28	9.05 ± 2.12 <sup>a</sup>	13.79 ± 2.54	10.25 ± 2.43 <sup>a</sup>
Observation	43	17.25 ± 2.36	12.47 ± 2.23 <sup>a</sup>	9.16 ± 1.27	6.24 ± 1.12 <sup>a</sup>	12.49 ± 2.38	7.23 ± 2.15 <sup>a</sup>	15.16 ± 2.21	10.84 ± 2.16 <sup>a</sup>	12.39 ± 2.50	8.82 ± 2.26 <sup>a</sup>	11.43 ± 2.31	7.79 ± 2.06 <sup>a</sup>	13.63 ± 2.49	8.78 ± 2.32 <sup>a</sup>
t value		0.136	2.778	0.469	2.737	0.155	2.999	0.162	2.704	0.243	2.777	0.141	2.795	0.295	2.869
P value		0.892	0.007	0.64	0.008	0.877	0.004	0.871	0.008	0.809	0.007	0.888	0.006	0.769	0.005

<sup>a</sup>P < 0.05 compared with the specific values in the same group.

**Table 2 Comparison of coping methods between the two groups (mean ± SD, score)**

Group	n	Face		Avoid		Surrender	
		Before	After	Before	After	Before	After
Control	43	12.69 ± 2.25	16.74 ± 2.39 <sup>a</sup>	15.42 ± 2.31	11.59 ± 2.24 <sup>a</sup>	10.09 ± 2.27	7.93 ± 2.14 <sup>a</sup>
Observation	43	12.58 ± 2.17	18.12 ± 2.46 <sup>a</sup>	15.53 ± 2.47	10.35 ± 2.16 <sup>a</sup>	10.18 ± 2.30	6.72 ± 2.05 <sup>a</sup>
t value		0.231	2.638	0.213	2.613	0.183	2.677
P value		0.818	0.010	0.832	0.011	0.856	0.009

<sup>a</sup>P < 0.05 compared with the same group before the intervention.

**Table 3 Comparison of healthy lifestyle behaviors between the two groups (mean ± SD, score)**

Group	n	Activity		Diet		Medication use		Social mentality		BMI management		Smoking	
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Control	43	3.18 ± 0.26	6.19 ± 0.54 <sup>a</sup>	8.29 ± 1.15	12.35 ± 1.28 <sup>a</sup>	3.07 ± 0.32	6.05 ± 0.41 <sup>a</sup>	3.29 ± 0.47	6.34 ± 0.52 <sup>a</sup>	2.13 ± 0.21	2.89 ± 0.38 <sup>a</sup>	2.09 ± 0.18	2.89 ± 0.23 <sup>a</sup>
Observation	43	3.25 ± 0.30	6.57 ± 0.63 <sup>a</sup>	8.16 ± 1.27	13.24 ± 1.40 <sup>a</sup>	3.14 ± 0.26	6.38 ± 0.54 <sup>a</sup>	3.33 ± 0.54	6.73 ± 0.61 <sup>a</sup>	2.08 ± 0.19	3.12 ± 0.43 <sup>a</sup>	2.12 ± 0.09	3.06 ± 0.35 <sup>a</sup>
t value		1.156	3.003	0.498	3.077	1.113	3.192	0.366	3.191	1.158	2.628	0.978	2.662
P value		0.251	0.004	0.62	0.003	0.269	0.002	0.715	0.002	0.25	0.01	0.331	0.009

<sup>a</sup>P < 0.05 compared with specific values before the intervention in the same group.

BMI: Body mass index.

## FOOTNOTES

**Author contributions:** Meng DF designed the study; Meng DF, Bao J, Cai TZ, Ji YJ, and Yang Y analyzed the data; Meng DF was involved in collecting the data and writing this article; all authors have read and approved the final manuscript.

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