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The Effect of Music Therapy on Anxiety and Physiological Indicators in Patients Undergoing Colonoscopy: A Meta-analysis

Beibei Wang, Tongtong Zhou, Xiaoqin Sha, Fei Zhao*

Northwest Minzu University, Lanzhou 730030, Gansu, China

Author to whom correspondence should be addressed.

Abstract: *Purpose*: To evaluate the effect of music therapy on anxiety, physiological indicators and successful colon intubation rate in patients undergoing colonoscopy. *Methods*: Randomized controlled trials (RCTs) on music therapy during colonoscopy published up to December 2025 were retrieved from 8 databases. Study quality was assessed using the Cochrane risk-of-bias tool (ROB 2.0), and meta-analysis was performed with R software. *Results*: 25 RCTs involving 4,525 patients were included. Music therapy significantly reduced anxiety (SMD = -0.61; 95% CI [-0.84, -0.38]; $p < 0.0001$), systolic blood pressure (MD = -8.63; $p = 0.015$), diastolic blood pressure (MD = -0.92; $p = 0.034$), mean arterial pressure (MD = -7.77; $p = 0.005$) and heart rate (MD = -11.65; $p < 0.0001$), and improved intubation success rate (RR = 1.04; $p = 0.002$). No significant effect on respiratory rate was observed. Results were robust, but study quality was generally low. *Conclusion*s: Music therapy is safe and effective for alleviating anxiety and improving physiological indicators in colonoscopy patients, warranting clinical promotion. More high-quality RCTs are needed.

Keywords: Music therapy; Colonoscopy; Randomized controlled trial; Meta-analysis; Anxiety

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1. Introduction

Colonoscopy is an intuitive and clear endoscopic examination method with a high diagnostic rate for lower gastrointestinal diseases. It can be used to confirm the diagnosis of hematochezia, abdominal pain, diarrhea and unexplained anemia, as well as to perform endoscopic procedures such as polypectomy, hemostasis and stricture dilation [1]. As the gold standard for colorectal cancer screening and detection, it is widely used in clinical practice [2]. However, as an invasive procedure, colonoscopy can cause abdominal pain and distension during the examination. The resulting anxiety and strong physiological and psychological stress responses often lead to examination failure and affect disease diagnosis [3].

Although music therapy has been applied to patients undergoing colonoscopy in existing studies, its

effects on pain and anxiety remain controversial. For example, Demirci et al. showed that music therapy significantly reduced anxiety scores and systolic blood pressure in patients during colonoscopy, while Sun et al. reported opposite results [4,5]. Therefore, this study aimed to systematically evaluate the effect of music therapy on anxiety, hemodynamic parameters (systolic blood pressure, diastolic blood pressure, mean arterial pressure, heart rate) and respiratory rate in patients during colonoscopy, so as to provide the latest evidence-based basis for clinical practice.

2. Method

2.1. Search strategy

Computerised searches were conducted in PubMed, Embase, The Cochrane Library, Web of Science, CNKI, Wanfang, VIP and CBM databases from their inception to December 2025. The Chinese search terms included: “colonoscopy”, “colonoscopic examination”, “colonoscopic surgery”, “sigmoidoscopy”, “colonoscopic biopsy”, “colonoscopic diagnosis”, “colonoscopic treatment”, “music therapy”, “music treatment”, “music intervention”, “music”, “random*”, “randomised controlled trial”. The English search terms included: “Colonoscopy”, “Colonoscopies”, “Colonoscopic Surgical Procedure”, “Sigmoidoscopy”, “Colon capsule endoscopy”, “Ileocolonoscopy”, “Music Therapy”, “Music intervention”, “Music Listening”, “Receptive music therapy”, “random*”. Subject headings combined with keywords and Boolean operators were used for searching, with no language restrictions. Supplementary searches were performed by tracking references and searching Baidu Academic.

2.2. Inclusion and exclusion criteria

2.2.1. Inclusion criteria

(1) Study type
Randomized controlled trials;

(2) Study subjects
Adult patients diagnosed by doctors requiring colonoscopy, with no hearing impairment, no mental illness, conscious and capable of signing informed consent;

(3) Intervention measures
The experimental group received music intervention in addition to routine nursing, including any form of music therapy (e.g., MP3 and headphone playback, background music), with no restrictions on music type, intervention duration or playback method. The control group only received routine nursing without any music intervention or other additional adjuvant treatment;

(4) Outcome indicators
Including anxiety, hemodynamic parameters (systolic blood pressure, diastolic blood pressure, mean arterial pressure, heart rate), success rate of colon intubation, etc.

2.2.2. Exclusion criteria

(1) Duplicate publications;
(2) Reviews, conference abstracts, systematic reviews/meta-analyses;
(3) Studies combining music therapy with other intervention measures;
(4) Studies unable to provide valid data;

(5) Studies with unavailable full text.

2.3. Study selection and data extraction

Two researchers independently screened literature and extracted data according to the inclusion and exclusion criteria. Discrepancies during the screening process were resolved through consultation with a third researcher. The extracted data mainly included the following aspects:

(1) General information

Title, author, publication year;

(2) Study characteristics

Age of study subjects, music type, playback time and method, etc.;

(3) Outcome indicators

Mainly anxiety, blood pressure, heart rate, respiratory rate, success rate of colon intubation, etc.

If a single study contained multiple independent experimental groups meeting the inclusion criteria (e.g., different types of music intervention, different control settings), data were extracted separately and marked with author + year + lowercase letter suffix to ensure the independence of each effect size during statistical pooling.

2.4. Quality assessment

The Cochrane Risk of Bias 2.0 (ROB 2.0) tool recommended by the Cochrane Handbook for Systematic Reviews of Interventions was used to assess the quality of included RCTs. The assessment covered five domains: bias arising from the randomization process, bias due to deviations from intended interventions, bias due to missing outcome data, bias in measurement of the outcome, and bias in selection of the reported result. The risk of bias for each domain was classified as “low risk”, “some concerns” or “high risk”. Two researchers independently performed the assessment, and discrepancies were resolved through third-party consultation. Risk of bias summary and graph were plotted.

2.5. Data synthesis and analysis

R software was used to analyze the extracted data. For continuous outcome indicators (anxiety, respiratory rate, heart rate, blood pressure, etc.), data were presented as mean ± standard deviation. If the same measurement tool was used for an outcome indicator, mean difference (MD) was used as the pooled effect size; if different measurement tools were used, standardized mean difference (SMD) was used, both with 95% confidence intervals (CI). The effect size for anxiety was the change value before and after music therapy intervention, calculated as: Anxiety change value = post-intervention anxiety scale score − pre-intervention anxiety scale score. A positive value indicated increased anxiety level after intervention, while a negative value indicated decreased anxiety level after intervention. The effect sizes for blood pressure (systolic, diastolic, mean arterial), heart rate and respiratory rate were all change values before and after music therapy intervention, calculated as: Change value = Post-intervention value − Pre-intervention value. A positive value indicated an increase in the outcome indicator after intervention, while a negative value indicated a decrease.

For dichotomous outcome indicators (success rate of colon intubation), risk ratio (RR) was used as the effect size, also with 95% CI. Heterogeneity was assessed using I^2 statistic. Significant heterogeneity was considered when $I^2 > 50\%$ with $p < 0.10$, in which case a random-effects model was applied. Otherwise,

a fixed-effects model was used. Subgroup analysis and sensitivity analysis were conducted to explore the sources of heterogeneity and the robustness of heterogeneous results. The statistical significance level was set at $p < 0.05$.

3. Results

3.1. Study selection

A total of 315 articles were initially retrieved. After removing duplicates, further screening by reading titles, abstracts and full texts, 25 articles were finally included, including 10 Chinese articles and 15 English articles [3–27]. The literature screening process and results are shown in **Figure 1**.

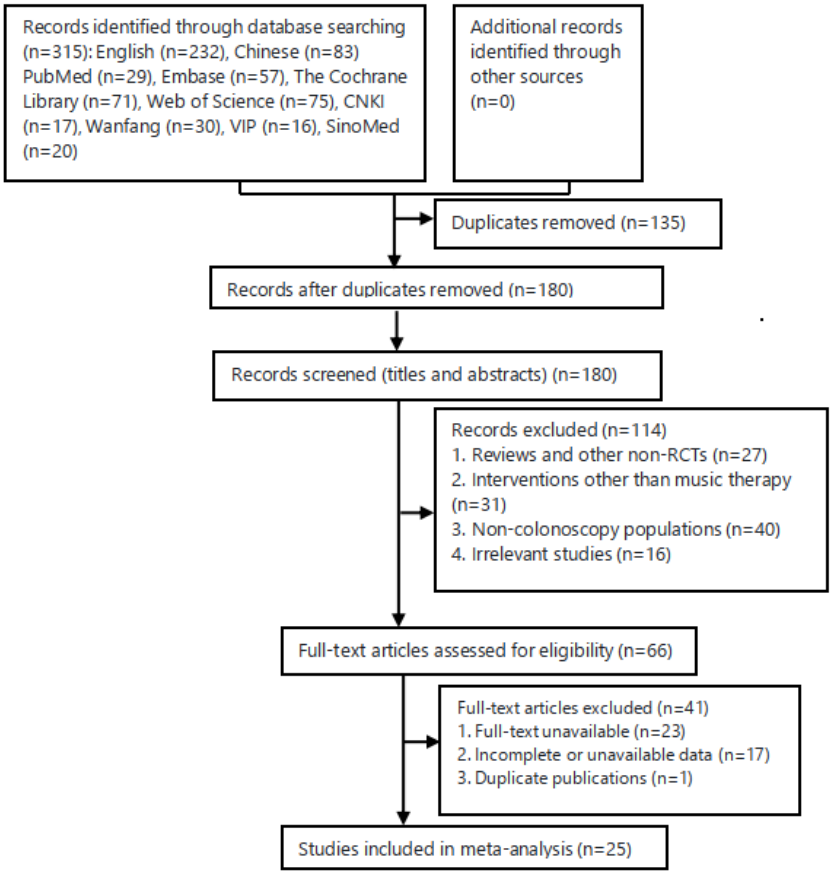


Figure 1. PRISMA flow diagram of literature screening.

Note: CNKI = China National Knowledge Infrastructure; CBM = Chinese Biomedical Literature Database; VIP = Chinese Scientific Journal Database.

3.2. Quality of the studies

All 25 included RCTs mentioned "random" grouping. Among them, 5 studies used random number method and were rated as "low risk"; 1 study used block random sampling, 1 used random sampling grouping, 1 used lottery random grouping, and 9 only mentioned "random" without specifying the method, rated as "some concerns"; 4 studies grouped by examination date, 1 by examination number, and 1 by patient preference, rated as "high risk". Four studies (16%) implemented allocation concealment, and 6 studies

(24%) implemented blinding. No incomplete data or selective outcome reporting was found. The risk of bias summary and graph are shown in **Figure 2**.

Figure 2. Risk of bias summary (A) and risk of bias graph (B).

3.3. Study characteristics

The basic information of the 25 included studies is shown in **Tables 1** and **2**.

Table 1. Basic characteristics of included studies

Included study	Country	Multicentre	Registered	Sample size		Age (years)	
				Music group	Control group	Music group	Control group
Martindale 2014 [6]	Australia	No	Yes	17	17	——	——
Nagata 2014 [7]	Japan	No	Yes	56	56	51.6	52.9
Ko 2019 [8]	China	No	Not mentioned	40	40	57.68 ± 11.07	57.68 ± 11.92
Sun 2022 [5]	China	No	Not mentioned	112	104	44.71 ± 13.32	44.98 ± 12.09
Hirani 2024 [9]	Pakistan	No	Not mentioned	55	55	49.15 ± 15.55	50.89 ± 16.80
Costa 2010 [10]	Italy	No	Not mentioned	56	53	50.0 ± 14.2	52.7 ± 15.3
Bashiri 2018a [11]	Turkey	No	Not mentioned	33	25	28–65	28–69

Included study	Country	Multicentre	Registered	Sample size		Age (years)	
				Music group	Control group	Music group	Control group
Bashiri 2018b [11]	Turkey	No	Not mentioned	41	55	24–65	28–60
Selda 2023 [12]	Turkey	No	Not mentioned	30	30	57.66 ± 13.43	59.26 ± 13.74
Li 2018a [13]	China	No	Not mentioned	40	38	——	——
Li 2018b [13]	China	No	Not mentioned	35	38	——	——
Çelebi 2019 [14]	Turkey	No	Not mentioned	56	56	54.34 ± 14.20	54.04 ± 13.77
Demirci 2025 [4]	Turkey	No	Not mentioned	46	46	49.17 ± 10.83	53.54 ± 13.11
Brix 2022 [15]	Denmark	No	Not mentioned	169	168	56 ± 13.9	59 ± 13.2
Andrada 2003 [16]	Spain	No	Not mentioned	63	55	46 ± 14.22	49 ± 13.88
Hayes 2003 [17]	USA	No	Not mentioned	100	98	61	61
Silva 2016 [18]	Sri Lanka	No	Yes	66	67	54.4 ± 12.5	56.5 ± 13.8
Zhou 2014 [19]	China	No	Not mentioned	50	50	19–55	
Deng 2007 [3]	China	No	Not mentioned	133	133	43.40 ± 34.60	45.02 ± 30.98
Wang 2010 [20]	China	No	Not mentioned	594	556	19–87	17–84
Zhang 2022 [21]	China	No	Not mentioned	68	78	49. 82 ± 11. 202	58. 57 ± 13. 189
Wang 2010 [22]	China	No	Not mentioned	32	32	43.54 ± 11.32	44.21 ± 10.14
Luo 2016 [23]	China	No	Not mentioned	100	100	21–69	
Wang 2009 [24]	China	No	Not mentioned	62	70	l8–66	22–67
Luo 2010 [25]	China	No	Not mentioned	93	85	18–65	18–67
Huang 2010 [26]	China	No	Not mentioned	40	40	——	——
Li 2008a [27]	China	No	Not mentioned	60	60	——	——
Li 2008b [27]	China	No	Not mentioned	60	60	——	——

Table 2. Basic intervention protocols of included studies

Included study	Intervention measure		Music type	Method	Intervention time point	Duration
	Music group	Control group				
Martindale 2014 [6]	Music therapy	Routine nursing	Classical music	MP3 + headphones	10 minutes before examination	10 minutes before + entire examination
Nagata 2014 [7]	Music therapy	Routine nursing	Soothing background music	Speaker	After entering examination room	Entire examination
Ko 2019 [8]	Music therapy	Routine nursing	Other	MP3 + headphones	20 minutes before examination	20 minutes before + entire examination
Sun 2022 [5]	Music therapy	Routine nursing	Light music	Headphones	After entering examination room	Entire examination
Hirani 2024 [9]	Music therapy	Routine nursing	Light music	Headphones	Before examination (waiting area)	Before + entire examination
Costa 2010 [10]	Music therapy	Routine nursing	Self-selected music	Headphones	3 minutes before examination	3 minutes before + entire examination
Bashiri 2018a [11]	Music therapy	Routine nursing	Self-selected music	Headphones	After entering examination room	Entire examination
Bashiri 2018b [11]	Music therapy	Routine nursing	Self-selected music	Headphones	After entering examination room	Entire examination

Selda 2023 [12]	Music therapy	Routine nursing	Classical music	MP3 + headphones	10 minutes before examination	10 minutes before + entire examination
Li 2018a [13]	Music therapy	Routine nursing	Other	Headphones	10 minutes before examination	10 minutes before + entire examination
Li 2018b [13]	Music therapy	Routine nursing	Classical music	MP3 + headphones	10 minutes before examination	10 minutes before + entire examination
Çelebi 2019 [14]	Music therapy	Routine nursing	Classical music	MP3 + headphones	After entering examination room	Entire examination
Demirci 2025 [4]	Music therapy	Routine nursing	Other	MP3 + headphones	After entering examination room	Entire examination
Brix 2022 [15]	Music therapy	Routine nursing	Light music	Headphones	30 minutes before examination	30 minutes before + entire examination
Andrada 2003 [16]	Music therapy	Routine nursing	Classical music	Headphones	Before examination	Before + entire examination
Hayes 2003 [17]	Music therapy	Routine nursing	Self-selected music	Not mentioned	15 minutes before examination	15 minutes before + entire examination
Silva 2016 [18]	Music therapy	Routine nursing	Self-selected music	Headphones	After entering examination room	Entire examination
Zhou 2014 [19]	Music therapy	Routine nursing	Self-selected music	Not mentioned	Not mentioned	Not mentioned
Deng 2007 [3]	Music therapy	Routine nursing	Self-selected music	MP3	15 minutes before examination	15 minutes before + entire examination
Wang 2010 [20]	Music therapy	Routine nursing	Soothing background music	Not mentioned	Not mentioned	Not mentioned
Zhang 2022 [21]	Music therapy	Routine nursing	Self-selected music	Headphones	5 minutes before examination	5 minutes before + entire examination
Wang 2010 [22]	Music therapy	Routine nursing	Self-selected music	Not mentioned	20 minutes before examination	20 minutes before examination
Luo 2016 [23]	Music therapy	Routine nursing	Self-selected music	Not mentioned	Not mentioned	Not mentioned
Wang 2009 [24]	Music therapy	Routine nursing	Soothing background music	Speaker	After entering examination room	Entire examination
Luo 2010 [25]	Music therapy	Routine nursing	Self-selected music	Headphones	20 minutes before examination	20 minutes before + entire examination
Huang 2010 [26]	Music therapy	Routine nursing	Light music	Not mentioned	Not mentioned	Not mentioned
Li 2008a [27]	Music therapy	Routine nursing	Self-selected music	Headphones	Not mentioned	Not mentioned
Li 2008b [27]	Music therapy	Routine nursing	Self-selected music	Speaker	Not mentioned	Not mentioned

3.4. Quantitative syntheses

3.4.1. Anxiety

Ten groups of data from 9 RCTs involving 1,130 patients reported the effect of music intervention on anxiety levels in patients undergoing colonoscopy [4–6,11,12,14,16,17,21]. The overall heterogeneity test showed $I^2 = 73.9\%$, so a random-effect model was used for meta-analysis. The pooled results showed that compared with the control group, music intervention significantly improved patients' anxiety (SMD = -0.61; 95% CI [-0.84, -0.38]; $p < 0.0001$), with a statistically significant difference between the two groups (**Figure 3**)

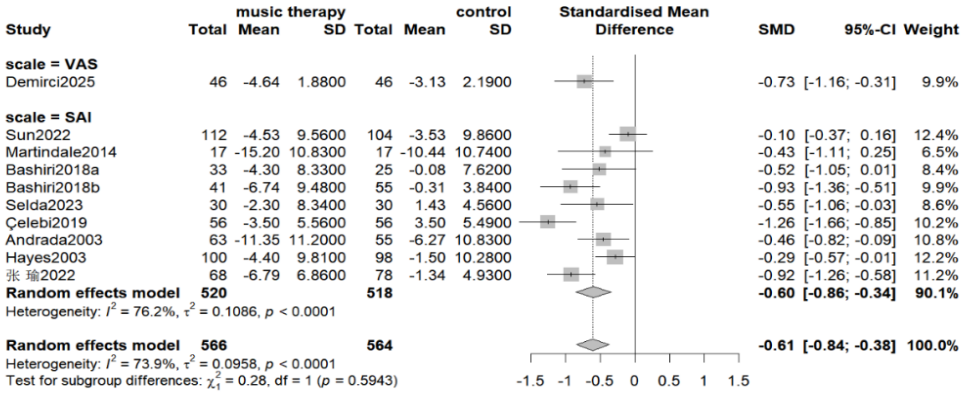


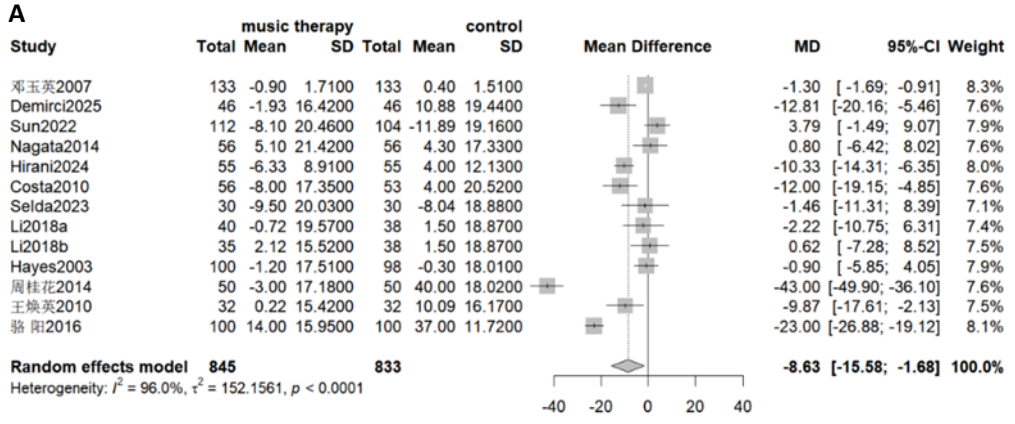
Figure 3. Meta-analysis of anxiety in patients after music therapy intervention.

3.4.2. Blood pressure

Thirteen groups of data from 12 RCTs involving 1,678 patients reported the effect of music intervention on systolic blood pressure [3–5,7,9,10,12,13,17,19,22,23]. The heterogeneity test showed I^2 = 96.0%, so a random-effect model was used. The pooled results showed that music intervention significantly reduced systolic blood pressure compared with the control group (MD = -8.63; 95% CI [-15.58, -1.68]; p = 0.015), with a statistically significant difference.

Thirteen groups of data from 12 RCTs involving 1,592 patients reported the effect on diastolic blood pressure [3–5,7,8,10,12-14,17,22,24]. The heterogeneity test showed I^2 = 48.4%, so a fixed-effect model was used. The pooled results showed that music intervention significantly reduced diastolic blood pressure (MD = -0.92; 95% CI [-1.77, -0.07]; p = 0.034), with a statistically significant difference.

Five groups of data from 4 RCTs involving 628 patients reported the effect on mean arterial pressure [5,11,25,26]. Bashiri 2018a was excluded from the pooled analysis because the standard deviation of the control group was 0 and the effect size could not be calculated. The overall heterogeneity test showed I^2 = 94.2%, so a random-effect model was used. The pooled results showed that music intervention significantly reduced mean arterial pressure (MD = -7.77; 95% CI [-13.24, -2.29]; p = 0.005), with a statistically significant difference (**Figure 4**).



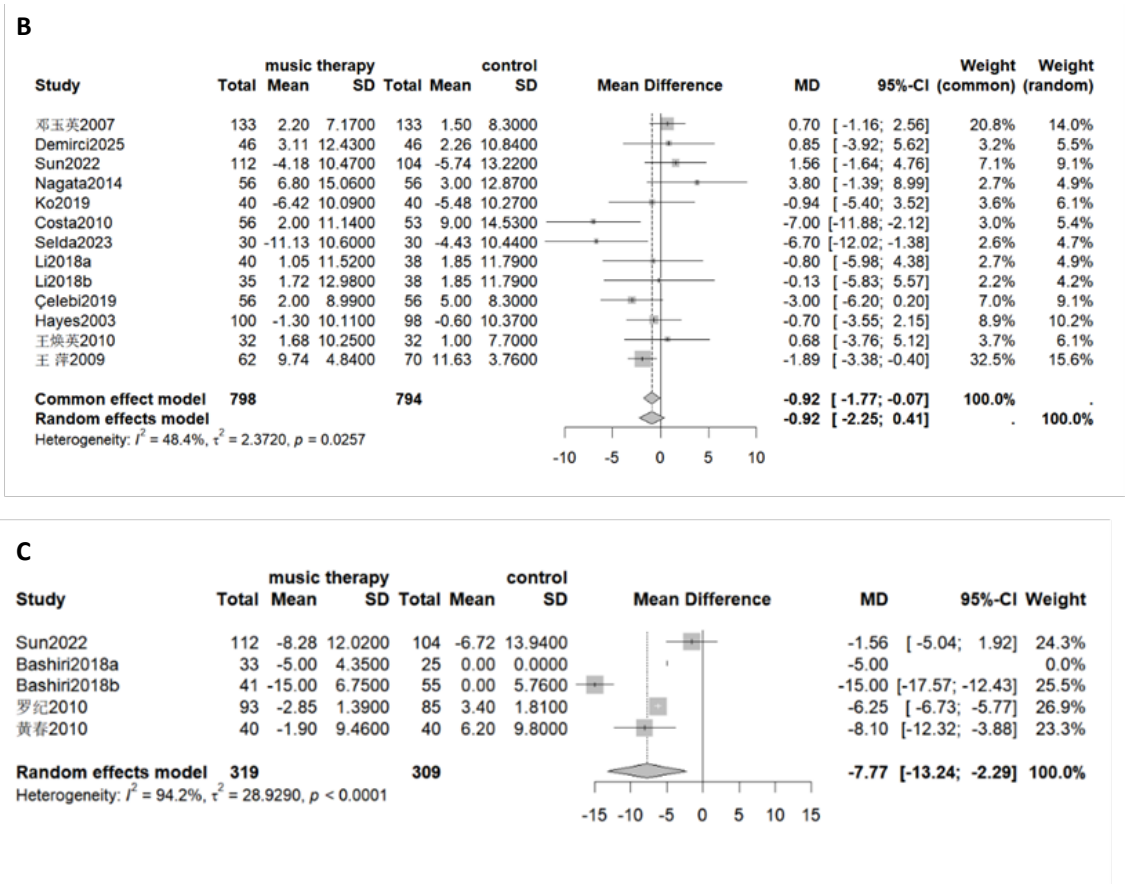


Figure 4. Meta-analysis of blood pressure in patients after music therapy intervention: (A) Systolic blood pressure; (B) Diastolic blood pressure; (C) Mean arterial pressure.

3.4.3. Heart rate

Seventeen groups of data from 15 RCTs involving 2,182 patients reported the effect of music intervention on the change difference of heart rate before and after intervention. The overall heterogeneity test showed I^2 = 91.9%, so a random-effect model was used [3–5,7,9,11,12,14,17,19,22,23,25–27]. The pooled results showed that music intervention significantly reduced overall heart rate compared with the control group (MD = -11.65; 95% CI [-15.72, -7.58]; p < 0.0001), with a statistically significant difference.

Subgroup analysis results: ① Subgroup with unspecified music listening method: Pooled MD=-15.66 (95% CI [-26.34, -4.98]; p = 0.004), statistically significant; ② In-ear listening subgroup: Pooled MD = -10.27 (95% CI [-14.49, -6.05]; p < 0.0001), statistically significant; ③ Non-in-ear listening subgroup: Pooled MD = -9.11 (95% CI [-18.96, 0.74]; p = 0.070), not statistically significant. Overlapping CIs between subgroups indicated no significant difference in the effect of different music listening methods on heart rate. High heterogeneity existed within all subgroups (unspecified group I^2 = 96.3%, in-ear group I^2 = 88.5%, non-in-ear group I^2 = 85%), suggesting large differences in intervention protocols and study populations within subgroups (**Figure 5**).

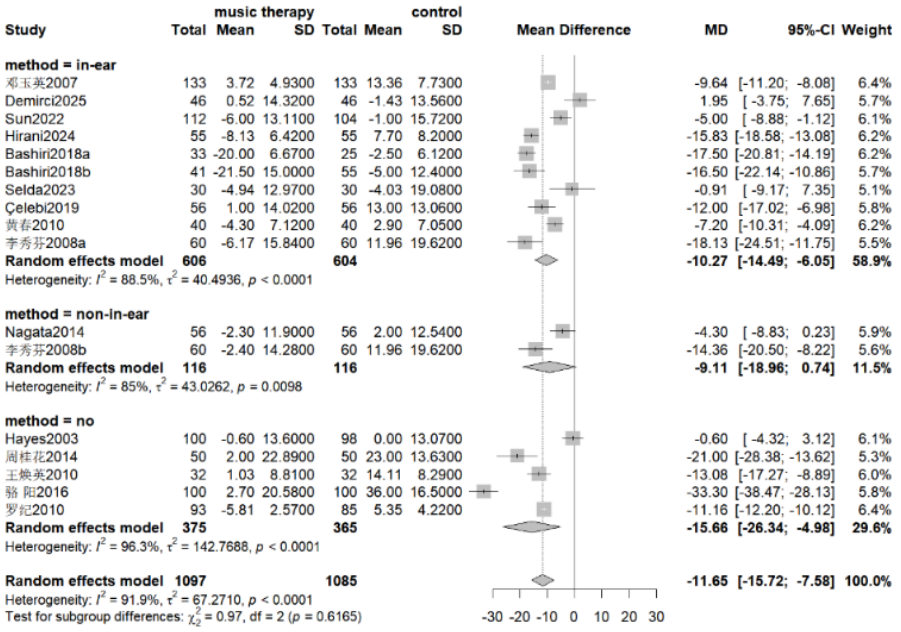


Figure 5. Meta-analysis of heart rate change difference in patients after music therapy intervention.

3.4.4. Respiratory rate and colon intubation success rate

Three RCTs involving 354 patients reported the effect of music intervention on respiratory rate. The heterogeneity test showed I^2 = 96.6%, so a random-effect model was used [14,22,25]. The pooled results showed no statistically significant difference in respiratory rate between the music intervention group and the control group (MD = -1.18; 95% CI [-2.38, 0.02]; p = 0.055).

Five RCTs involving 1,798 patients reported the effect on colon intubation success rate [12,15,16,18,20]. The heterogeneity test showed I^2 = 29.9%, so a fixed-effect model was used. The pooled results showed that music intervention significantly improved the success rate of colon intubation compared with the control group (RR = 1.04; 95% CI [1.01, 1.07]; p = 0.002), with a statistically significant difference (**Figure 6**).

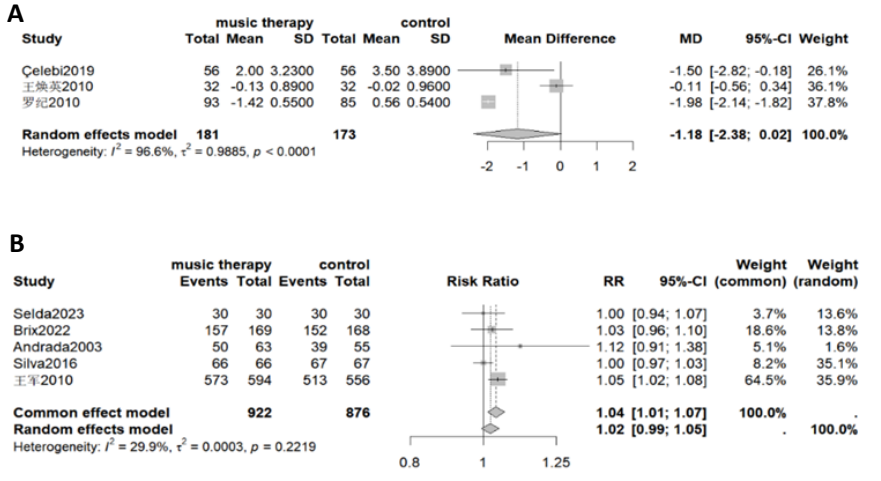


Figure 6. Meta-analysis of (A) respiratory rate and (B) colon intubation success rate in patients after music therapy intervention.

3.5. Sensitivity analysis

Sensitivity analysis was performed for the four indicators of anxiety, systolic blood pressure, diastolic blood pressure and heart rate by sequentially excluding each included study. The results showed that the direction of pooled effect sizes, statistical significance and inter-study heterogeneity levels did not change substantially. No reversal of effect results or significant changes in statistical significance were observed. The meta-analysis conclusions for anxiety, systolic blood pressure, diastolic blood pressure and heart rate were robust and reliable, with little influence from single studies (**Figure 7** and **8**).

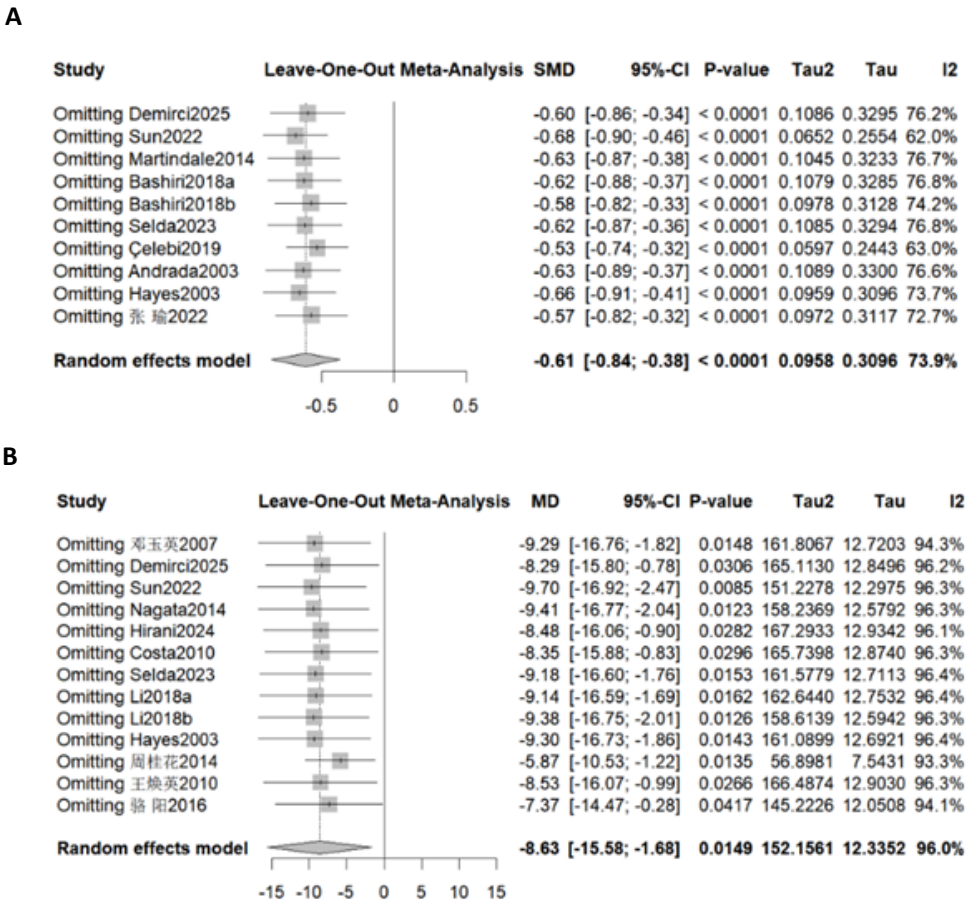


Figure 7. Sensitivity analysis: (A) Anxiety; (B) Systolic blood pressure.

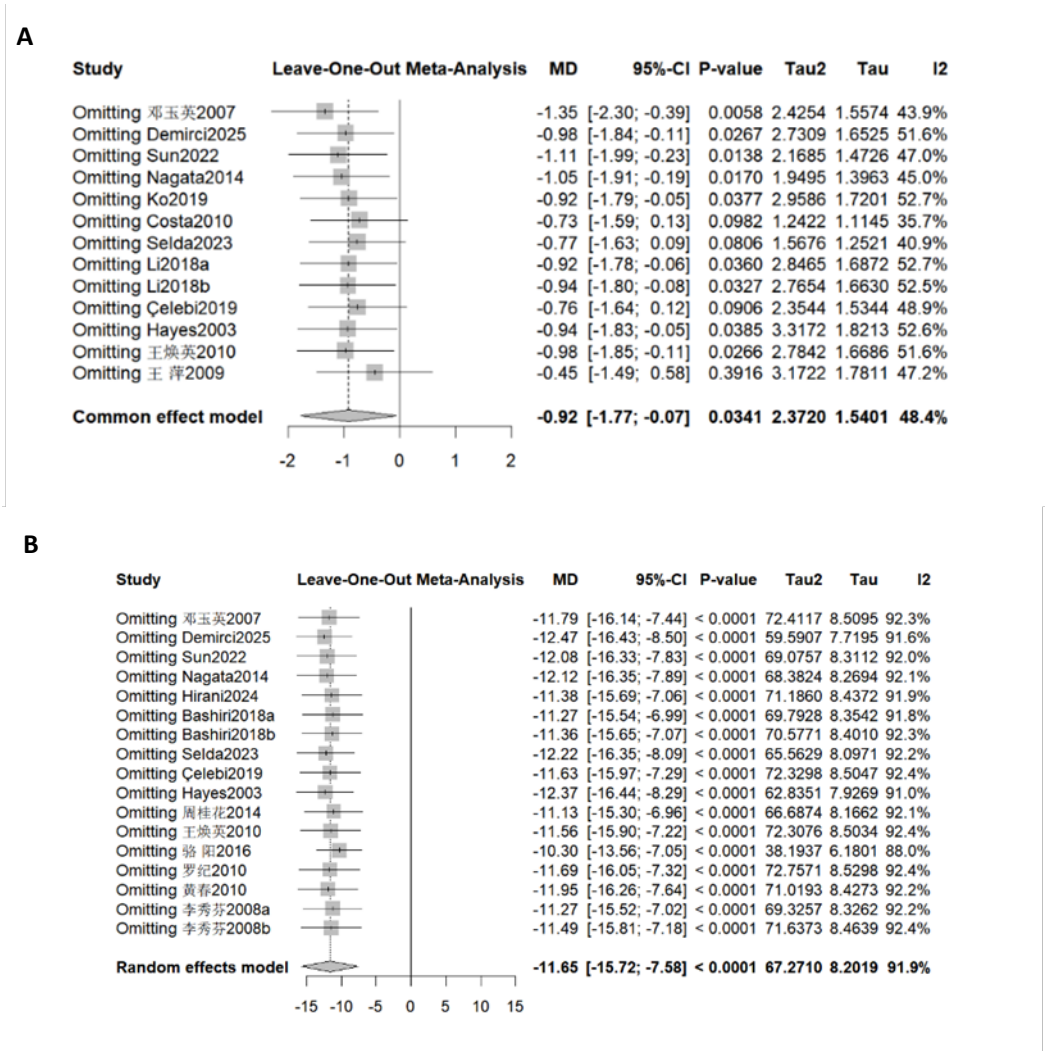


Figure 8. Sensitivity analysis: (A) Diastolic blood pressure; (B) Heart rate change difference.

4. Discussion

4.1. Summary and interpretation of results

This meta-analysis evaluated the intervention effect of music therapy during colonoscopy. The results showed that music therapy could alleviate patients' anxiety during the examination. Existing studies suggest that music can induce psychophysiological responses through the right hemisphere via the limbic system, coordinate muscle tension and movement, and produce anti-anxiety effects [14]. It has also been confirmed that music can stimulate the pituitary gland to secrete more endorphins, thereby relieving pain and reducing anxiety levels [28]. At the psychological and behavioral level, music reduces negative experiences by diverting attention and inducing positive imagination. The acoustic vibration information of music through coordination, rhythm and melody can divert patients' attention, help them forget worries, increase a sense of security and comfort, and reduce anxiety and fear [26]. Even 15 minutes of self-selected music can significantly reduce anxiety before gastrointestinal examinations [17].

From a physiological perspective, anxiety is mainly a defensive biological process mediated by the sympathetic nervous system. Sympathetic nervous system excitation leads to vasoconstriction (increased

blood pressure) and tachycardia. Music therapy can help patients adapt physiologically to the colonoscopy procedure, reduce sympathetic nervous system excitation and anxiety, thereby lowering blood pressure and heart rate [29].

In terms of regulating physiological indicators, the meta-analysis results showed that music therapy could reduce blood pressure (systolic, diastolic and mean arterial) and heart rate. Studies have found that light music can inhibit efferent impulses from the cerebral cortex, reduce visceral sympathetic nerve excitation, and prevent intestinal spasm and sudden increases in blood pressure and heart rate [26]. When the music rhythm is lower than the heart rate (average 72 beats per minute), slow and regularly paused, and at a moderate volume, it can achieve a relaxation effect by slowing and deepening breathing, lowering blood pressure and relaxing muscles [6]. In addition, endoscopic procedures can induce a typical endocrine metabolic stress response [30]. Music can promote the secretion of enkephalins and reduce catecholamine levels, regulating endocrine function and thereby lowering heart rate and blood pressure [19]. Meanwhile, music can reduce sympathetic nervous system activity and increase parasympathetic nervous system activity to attenuate this response [31]. It can also affect the release of brain neurotransmitters such as acetylcholine and norepinephrine, leading to decreased blood pressure and slowed respiratory and heart rates [20].

The meta-analysis results also showed that music therapy could improve the success rate of colon intubation. Studies have shown that piano light music can reduce patients' anxiety, improve satisfaction with colonoscopy, pain management and service satisfaction, and reduce the difficulty of colonoscopy operation [5].

No statistically significant improvement in respiratory rate was observed in this meta-analysis, although Çelebi 2019 and Luo 2010 reported that music therapy could reduce respiratory rate changes during examination [14,25]. This discrepancy may be due to individual differences in sample sizes, music types, intervention durations and geographical regions among included studies. The effectiveness of music in reducing respiratory rate during examination requires further in-depth investigation in future studies to identify the specific reasons for the differences.

Both Demirci and Sun confirmed that music therapy significantly reduced anxiety levels in patients undergoing colonoscopy, but no significant changes were observed in vital signs in either study [4,5]. These results are not contradictory but complementary: Demirci used binaural beats (theta waves), while Sun used piano light music, and both reached consistent conclusions on anxiety improvement [4,5]. The differences may stem from variations in music type, intervention timing and patient baseline characteristics, which require further verification through standardized intervention studies in the future.

4.2. Limitations

There are various restrictions on this study. Firstly, the quality of included studies was generally low, with most not describing random allocation and allocation concealment methods in detail, and poor implementation of blinding. Secondly, some studies had small sample sizes, and insufficient statistical power may affect the stability of results. Thirdly, lack of standardized intervention protocols (no uniform standards for music type, intervention duration, equipment type and intervention mode), which may be a source of high heterogeneity in some outcome indicators. Fourthly, individual factors such as patient age, music preference and cultural background were not fully considered as moderators of intervention effect. Lastly, inconsistent outcome indicator monitoring, including differences in measurement time points and tools for physiological indicators, increased heterogeneity in pooled analysis. Existing evidence supports music therapy as an

effective adjuvant intervention during the peri-colonoscopy period, but its clinical application still lacks standardized protocols, and the quality of included studies is limited. More high-quality, standardized large-sample RCTs are needed in the future to verify its effect and clarify the optimal intervention mode, so as to provide more comprehensive evidence-based support for optimizing peri-colonoscopy nursing.

5. Conclusion

As the gold standard for the diagnosis and screening of colorectal diseases, the invasive nature of colonoscopy often leads to patient refusal. Music therapy has the advantages of being safe, non-invasive, cost-effective and easy to implement. It requires no special equipment and can be routinely promoted in hospitals at all levels, especially primary endoscopy centers, as an important supplement to routine nursing to reduce cardiovascular stress responses during the peri-examination period.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Al-Shamali M, Kalaoui M, Hasan F, et al., 2001, Colonoscopy: Evaluating Indications and Diagnostic Yield. Ann Saudi Med, 21(5–6): 304–307.

[2] Hoffman A, Teubner D, Kiesslich R, 2014, Competition in Colon Cancer Screening? What Is the Role of Colonoscopy? Visceral Medicine, 30(1): 18–25.

[3] Deng Y, Chen X, Li X, et al., 2007, Study on Individualised Music Intervention to Relieve Pain in Patients Undergoing Colonoscopy. Nursing Practice and Research, 4(13): 3–6.

[4] Demirci S, Sezer S, Pirincci S, 2025, Effect of Binaural Beats on Pain, Anxiety, and Procedure Tolerance in Patients Undergoing Colonoscopy Without Sedation: A Randomised Controlled Trial. European Research Journal, 11(2): 270–278.

[5] Sun D, You Y, He X, et al., 2022, Effects of Light Music Played by Piano Intervention on Satisfaction, Anxiety, and Pain in Patients Undergoing Colonoscopy: A Randomised Controlled Trial. Medicine, 101(52): e32339.

[6] Martindale F, Mikocka-Walus A, Walus B, et al., 2014, The Effects of a Designer Music Intervention on Patients' Anxiety, Pain, and Experience of Colonoscopy: A Short Report on a Pilot Study. Gastroenterology Nursing, 37(5): 338–342.

[7] Nagata K, Iida N, Kanazawa H, et al., 2014, Effect of Listening to Music and Essential Oil Inhalation on Patients Undergoing Screening CT Colonography: A Randomised Controlled Trial. European Journal of Radiology, 83(12): 2172–2176.

[8] Ko S, Leung D, Wong E, 2019, Effects of Easy Listening Music Intervention on Satisfaction, Anxiety, and Pain in Patients Undergoing Colonoscopy: A Pilot Randomised Controlled Trial. Clinical Interventions in Aging, 14: 977–986.

[9] Hirani A, Ismail F, Abdulaziz F, et al., 2024, The Effects of Music Therapy on Patients Undergoing Colonoscopy in a Tertiary Care Hospital at Karachi, Pakistan: A Comparative Study. Journal of Pain & Palliative Care Pharmacotherapy, 38(3): 233–243.

[10] Costa A, Montalbano L, Orlando A, et al., 2010, Music for Colonoscopy: A Single-Blind Randomised Controlled Trial. Digestive and Liver Disease, 42(12): 871–876.

[11] Bashiri M, Akçali D, Coşkun D, et al., 2018, Evaluation of Pain and Patient Satisfaction by Music Therapy in Patients with Endoscopy/Colonoscopy. Turkish Journal of Gastroenterology, 29(5): 574–579.

[12] Cakir S, Evirgen S, 2023, Three Distraction Methods for Pain Reduction During Colonoscopy: A Randomised Controlled Trial Evaluating the Effects on Pain and Anxiety. Journal of Perianesthesia Nursing, 38(5): e1–e7.

[13] Li L, Shu W, Li Z, et al., 2019, Using Yoga Nidra Recordings for Pain Management in Patients Undergoing Colonoscopy. Pain Management Nursing, 20(1): 39–46.

[14] Çelebi D, Yılmaz E, Şahin S, et al., 2020, The Effect of Music Therapy During Colonoscopy on Pain, Anxiety and Patient Comfort: A Randomised Controlled Trial. Complementary Therapies in Clinical Practice, 38: 101084.

[15] Brix L, Pedersen A, 2022, Effect of Music Intervention in Colonoscopy-Naïve Adults: A Randomised Controlled Trial. British Journal of Nursing, 31(10): 526–532.

[16] López-Cepero Andrada J, Amaya Vidal A, Castro Aguilar-Tablada T, et al., 2004, Anxiety During the Performance of Colonoscopies: Modification Using Music Therapy. European Journal of Gastroenterology & Hepatology, 16(12): 1381–1386.

[17] Hayes A, Buffum M, Lanier E, et al., 2003, A Music Intervention to Reduce Anxiety Prior to Gastrointestinal Procedures. Gastroenterology Nursing, 26(4): 145–149.

[18] De Silva A, Niriella M, Nandamuni Y, et al., 2016, Effect of Audio and Visual Distraction on Patients Undergoing Colonoscopy: A Randomised Controlled Study. Endoscopy International Open, 4(11): E1211–E1214.

[19] Zhou G, Luo Y, 2014, Application of Background Music in Electronic Colonoscopy in Primary Hospitals. Guide of China Medicine, 12(29): 176–177.

[20] Wang J, Yue Q, Yuan J, et al., 2010, The Role of Background Music in Colonoscopy. Journal of Hunan University of Chinese Medicine, 30(2): 30–31 + 36.

[21] Zhang Y, Yang F, Zhao J, et al., 2022, Effects of Attention Distraction Methods on Pain and Anxiety in Patients Undergoing Colonoscopy. Jilin Medical Journal, 43(8): 2065–2070.

[22] Wang H, 2010, Effect of Music Therapy on Preoperative Anxiety and Vital Signs in Patients Undergoing Colonoscopy. Modern Medicine & Health, 26(1): 68–69.

[23] Luo Y, 2016, Effect of Background Music Intervention on Patients Undergoing Colonoscopy. Medical Information, 29(15): 375.

[24] Wang P, Cai X, Xu J, et al., 2009, Application of Background Music in Ordinary Colonoscopy. China Journal of Endoscopy, 15(6): 630–632 + 635.

[25] Luo J, Man L, 2010, Effect of Music Therapy Intervention on Patients Undergoing Colonoscopy. Chinese Journal of Modern Nursing, 16(6): 670–671.

[26] Huang C, Lü L, Tan Y, et al., 2010, Nursing Application of Light Music in Colonoscopy. Medical Innovation of China, 7(33): 92–93.

[27] Li X, Yang L, Yin Y, 2008, Study on the Effect of Relaxing Music on Pain in Patients Undergoing Colonoscopy. Chinese Journal of Practical Nursing, 24(8C): 15–17.

[28] Ko C, Chen Y, Wu K, et al., 2017, Effect of Music on Level of Anxiety in Patients Undergoing Colonoscopy Without Sedation. Journal of the Chinese Medical Association, 80: 154–160.

[29] Smolen D, Topp R, Singer L, 2002, The Effect of Self-Selected Music During Colonoscopy on Anxiety, Heart Rate, and Blood Pressure. Applied Nursing Research, 16(2): 126–136.

[30] Tonnesen H, Puggaard L, Braagaard J, et al., 1999, Stress Response to Endoscopy. Scandinavian Journal of Gastroenterology, 34(6): 629–631.

[31] Zhang Y, Basnet D, Zhao Y, et al., 2025, One-Hour Music Intervention to Improve the Quality of Recovery in Female Patients Undergoing Elective Surgery After General Anaesthesia: A Single-Centre Randomised Clinical Study. Journal of Clinical Anaesthesia, 106: 111955.