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## Original Article

## Using Yoga Nidra Recordings for Pain Management in Patients Undergoing Colonoscopy

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## ABSTRACT

**Objective:** The objective of this study was to compare the effects produced by yoga nidra and relaxation music for pain management in patients undergoing colonoscopy. A quasiexperimental design was used. **Methods:** In total, 144 patients who were scheduled to undergo colonoscopy were assigned to three different treatment groups. Group 1 was a no treatment control group, group 2 was delivered relaxing music, and group 3 was delivered a yoga nidra recording. The primary outcome was pain score. Secondary treatment efficacy measures were an overall patient satisfaction score, a willingness to repeat the procedure score, and a perceived colonoscope insertion difficulty score. Secondary objective treatment effect measures were systolic and diastolic blood pressure and total procedure duration.

**Results:** The patients' perceptions of pain and the endoscopist's perceived colonoscope insertion difficulty were significantly reduced by both the music and the yoga nidra recording ( $p < .05$ ). Overall patient satisfaction was significantly improved by both the music and the yoga nidra recording ( $p < .05$ ). Patients' willingness to repeat the procedure and the total procedure duration were significantly improved and reduced, respectively, by the yoga nidra recording ( $p < .05$ ), but there were no significant differences compared to the music group. There were no statistically significant differences among the three groups in terms of blood pressure.

**Conclusions:** Both the yoga nidra recording and the relaxation music helped reduce the pain participants undergoing colonoscopy experienced. The yoga nidra recording was the most successful intervention among the three groups.

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**Conflict of Interest:** None declared.

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## Background

A colonoscopy is a medical procedure that provides a visual diagnosis and an opportunity to perform a biopsy or removal of lesions from the colon, but the insertion of the scope or stretching of the mesentery can be unpleasant and painful. Colonoscopy pain is generally considered procedure related and visceral. Although sedation for patients undergoing colonoscopy is the standard practice in Western countries, unsedated colonoscopies are still a routine practice in some European and Eastern countries (Aljebreen, Almadi, & Leung, 2014; Allen, Shaw, Jong, Behrens, & Skinner, 2015; Arai et al., 2016; Terruzzi, Paggi, Amato, & Radaelli, 2012), including China (Xu et al., 2016). Using sedation may delay recovery and postprocedure discharge, add to the cost of the procedure, and increase the risk of adverse events and cardiopulmonary complications (Aljebreen et al., 2014; Allen et al., 2015; Wernli, Brenner, Rutter, & Inadomi, 2016).

In China, most patients opt for no sedation during a colonoscopy at a lower cost, especially given that medical expenses are incurred

by patients themselves. Staff members at colonoscopy centers in China also favor no sedation to reduce recovery and postcolonoscopy discharge time and improve the efficiency of the endoscopy services. With the growing demand for colonoscopy procedures China's aging population poses, staff performing these procedures typically struggle to complete a number of onerous tasks. Unsedated, safe, and well-tolerated procedures could play an important role in reducing the burden and cost of this procedure.

Recently, medication-free interventions, such as hypnosis, acupuncture, music, audio distractions, patient education and guidance (Hsueh et al., 2015; Trevisani, Zelante, & Sartori, 2014), and insufflation of carbon dioxide (Homan, Mahkovic, Orel, & Mamula, 2016; Terruzzi et al., 2012; Xu et al., 2016), have been recommended to support high-quality endoscopic examinations, which patients undergoing colonoscopy have tolerated well. However, these interventions are not suitable for all procedures or situations (Paggi et al., 2012). Among these medication-free interventions during colonoscopy, music, which reduces the cost and time associated with sedation, may be the most practical of these options for colonoscopy (Onieva-Zafra, Castro-Sánchez, Matarán-Peñarrocha, & Moreno-Lorenzo, 2013; Özer, Karaman Özlü, Arslan, & Günes, 2013; Sin & Chow, 2015). However, music interventions involve the additional variables of type selection and personal preference. The studies published were very heterogeneous concerning the type of music used (classical, Turkish classical music, relaxing, easy listening, etc.), and findings were often conflicting (Trevisani et al., 2014). The pain was reported to be reduced in some studies but not in others (Trevisani et al., 2014). Moreover, overall patient satisfaction and willingness to repeat the procedure could be improved and perceived colonoscopy insertion difficulty, total procedure duration, and blood pressure could be reduced in some studies but not in others (Bechtold et al., 2009; Bradt, Dileo, Magill, & Teague, 2016; Costa et al., 2010). Consequently, more medication-free interventions are needed as an alternative/complementary therapy for pain management in patients undergoing colonoscopy.

Yoga nidra is a specific relaxation practice within yoga therapy and may be a safe and simple intervention (Kim, 2017). It has proved to be an effective and successful relaxation technique when used to manage pain related to various conditions (Singh & Singh, 2010). Yoga nidra means "a psychic sleep" and generates physical and mental relaxation (Kim, 2017). Various relaxation techniques have been successfully used to manage pain and include common features such as breath awareness, muscle awareness and relaxation, autosuggestion, and suitable imagery. These elements are also present in yoga nidra. Compared with other relaxation techniques, yoga nidra is easier to learn for most people and does not require systematic training (Singh & Singh, 2010). During a colonoscopy, it is difficult for a patient who is experiencing acute pain to practice relaxation techniques, especially if they have no previous experience doing so. Therefore, yoga nidra may be very useful for inducing psychological and physiological relaxation during a colonoscopy. Research has indicated that yoga nidra can be used to reconcile hormone imbalances (Rani et al., 2013); enhance well-being (Rani et al., 2011; Rani et al., 2016); decrease depression and anxiety (Eastman-Mueller, Wilson, Jung, Kimura, & Tarrant, 2013; Rani et al., 2016; Rani, Tiwari, Singh, Singh, & Srivastava, 2012); and alleviate pain (Kortering, Ockeloen, Hilbink, Benninga, & Deckers-Kocken, 2016; Posadzki, Ernst, Terry, & Lee, 2011; Shengelia, Parker, Ballin, George, & Reid, 2013; Smith, Levett, Collins, & Crowther, 2011). Nonetheless, there is little in the literature on the effects of yoga nidra for pain management in patients undergoing colonoscopy. Consequently, the effectiveness of yoga nidra on colonoscopy pain is unknown. Also, it is not clear whether yoga nidra recordings are better than relaxation music for pain management in colonoscopy.

A quasiexperimental study was used to evaluate the efficacy of yoga nidra recordings and the relaxation music on pain management in patients undergoing colonoscopy, including the rating of the pain, overall patient satisfaction, willingness to repeat the procedure, perceived difficulty during colonoscopy insertion, blood pressure, and duration of the procedure.

The main research hypotheses were as follows:

- (1) Patients who undergo colonoscopy and receive the yoga nidra intervention will have less pain during the colonoscopy than those receiving the music intervention or no intervention.
- (2) Patients who undergo colonoscopy and receive the yoga nidra intervention will report greater satisfaction with the colonoscopy procedure than those receiving the music intervention or no intervention.
- (3) Patients who undergo colonoscopy and receive the yoga nidra intervention will report more willingness to repeat the colonoscopy procedure in the future than those receiving the music intervention or no intervention.
- (4) Patients who undergo colonoscopy and receive the yoga nidra intervention will have a lower blood pressure before insertion of the colonoscope and after complete withdrawal of the colonoscope than those receiving the music intervention or no intervention.
- (5) The total colonoscopy procedure time will be lower for patients receiving the yoga nidra intervention than those receiving the music intervention or no intervention.
- (6) Perceived difficulty of colonoscopy insertion will be lower for patients receiving the yoga nidra intervention than those receiving the music intervention or no intervention.

## Methods

### Research Design

This study employed a quasiexperimental design. Consecutive patients were recruited on a voluntary basis and assigned to one of three groups according to their wishes when they made their colonoscopy appointments. Group 1 was a no treatment control group, group 2 was delivered relaxing music (Bechtold et al., 2009; Costa et al., 2010; Harikumar et al., 2006; Yinger & Gooding, 2015), and group 3 was delivered a yoga nidra recording. A research assistant who was blinded collected the postcolonoscopy data. All the colonoscopies were performed by one endoscopist who had more than 8 years of experience performing similar procedures, assisted by one experienced, qualified assistant.

### Sample and Setting

This research took place at an endoscopy center in a teaching hospital in central China. The sample was selected by convenience sampling. All patients who were scheduled to undergo a colonoscopy at the endoscopy center between July 2012 and January 2013 were offered an opportunity to participate in the study. The inclusion criteria were as follows: aged over 18 years, adequate vision and hearing, capable of completing questionnaires, and able to use the Numerical Rating Scale (NRS). The exclusion criteria were as follows: dementia, psychiatric illness, or mental deficiency; use of any anxiolytic medications in the 72 hours before the examination; and previous colon resection surgery.

Sample Size

Two hundred patients were eligible for recruitment, and 56 patients were excluded (Fig. 1). The sample size was estimated based on our pilot study, in which we measured pain experienced by subjects undergoing colonoscopy on the 0-10 NRS. The mean scores of the control group, the music group, and the yoga nidra group were 5.83, 4.83, and 3.83, respectively, and the standard deviations were 3.31, 2.04, and 1.94, respectively. To achieve statistical significance with an alpha error of .05, a power of 90%, and the assumption that there would be 15% attrition, it was calculated (by Power Analysis and Sample Size [PASS] software) that approximately 144 patients were needed in this study in total.

Interventions

The intervention strategy (the yoga nidra recording or the relaxation music) was implemented 10 minutes before scope insertion (at baseline) and lasted until the scope was completely

removed. The subjects received the following interventions: The yoga nidra group listened to a yoga nidra recording using headphones connected to a portable compact disc player. Yoga nidra is a meditative practice that consists of the practitioner focusing on body parts, breath awareness, and suggested imagery (Hoye & Reddy, 2016). The applied yoga nidra recording involved the subject being led through six stages, including preparation, rotation of consciousness, breath awareness, opposite feelings and sensations, visualization, and ending the practice (Singh & Singh, 2010). The customized recorded material was prepared by a certified yoga instructor skilled in yoga nidra. The yoga nidra recording was 37 minutes and 25 seconds in length and explained in detail how to breathe, hold, and relax completely. The music group listened to a series of music selections using headphones connected to a portable compact disc player. The relaxation music recording, with a tempo of 60 to 80 beats per minute (Allred, Byers, & Sole, 2010; Cole & LoBiondo-Wood, 2014), was composed of Mozart's Concerto Nos. 19, 21, 23, and 24 for piano (Dastgheib et al., 2014; Yinger & Gooding, 2015). The control group were told simply to attempt self-relaxation.

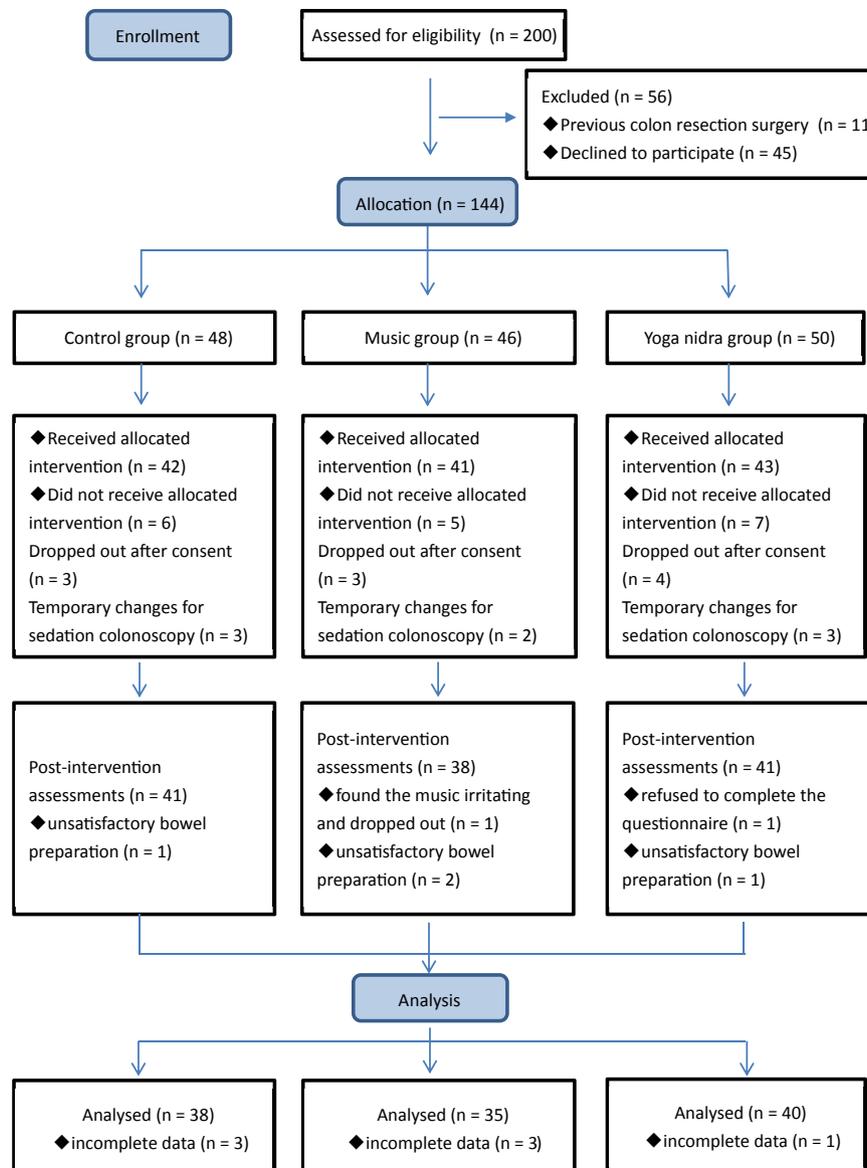


Fig. 1. Flowchart of the study.

### Data Collection and Measures

At the time of appointment scheduling, participants' demographics and clinical data were collected, including gender, age, educational level, indications for colonoscopy, history of previous colonoscopy, history of prior abdominal-pelvic surgery, baseline anxiety, and baseline pain. Baseline anxiety was measured before the intervention according to the Zung SAS (Zung Self-Rating Anxiety Scale; Zung, 1971), which explored the participants' emotional status during the week before the procedure using a 20-item questionnaire (Costa et al., 2010). Baseline pain was measured before the intervention according to the 0-10 NRS (0 = no pain, 10 = maximum pain; Bijur, Latimer, & Gallagher, 2003; Nelson, Adamek, & Kleiber, 2017).

### Outcome Measures

The primary outcome measure was the patients' perception of pain during the procedure, which patients rated on the 0-10 NRS (0 = no pain, 10 = maximum pain) at the end of the procedure (complete withdrawal of the colonoscope). Secondary treatment efficacy measures included overall patient satisfaction, rated on a 0-10 NRS (0 = not satisfied, 10 = very satisfied), based on patients' degree of satisfaction with the overall colonoscopy procedure; willingness to repeat the procedure in the future, rated on an NRS from 0 (never will) to 10 (happily will), based on patients' degree of willingness to have another colonoscopy procedure in the future based on the experience of the present colonoscopy; and perceived colonoscope insertion difficulty, based on degree of difficulty perceived by the endoscopist in performing the procedure and rated on an NRS from 0 (no difficulty) to 10 (maximum difficulty). Data sets were collected at the end of the procedure. Secondary objective treatment effect measures included systolic and diastolic blood pressure, which were recorded 10 minutes before inserting the colonoscope (at baseline) and after completing the procedure (complete withdrawal of the colonoscope), and total procedure duration, which was the time from introduction to complete withdrawal of the colonoscope.

### Data Analysis

Pearson's chi-square test or Fisher's exact test were used for categorical data. For continuous data, which were assumed to be normally distributed, a one-way analysis of variance (ANOVA; for three groups) test was used, as appropriate, to test the hypothesis of equality of means. If there were concerns about deviations from normality, the nonparametric Kruskal-Wallis test was used to test the hypothesis of equality of medians, and the Kruskal-Wallis test was used between each median. Parametric summary statistics are

presented as the mean (standard deviation). Nonparametric summary statistics were presented as the median (interquartile range). All statistical analyses were conducted using SAS 9.2, and results were considered statistically significant if  $p < .05$ .

### Ethics Statement

The study protocol was approved by the ethics committee of the School of Health Sciences, Wuhan University. Authorization for the study was granted by the research ethics committee of the hospital's endoscopy center, and written informed consent was obtained from every participant.

### Results

During the study period, 144 subjects were allocated to 3 groups. Thirty-one eligible subjects were excluded from the final analysis due to incomplete data collection (the nursing staff were too busy with clinical duties) or because they declined to participate for other reasons. Of the remaining 113 subjects included in the study, 38 were assigned to the control group, 35 to the music group, and 40 to the yoga nidra group. There were no procedure-related complications in any of the three groups (Fig. 1).

### Demographics and Clinical Characteristics

There were no significant differences among the three groups' demographic or clinical characteristics (Table 1). Therefore, the groups were considered equal in terms of gender, age, educational level, indications for examination, history of previous colonoscopy, history of previous abdominal-pelvic surgery, and anxiety score. Hence, all the baseline demographic and clinical characteristics of the included subjects were comparable.

### Primary Outcome: Pain Score

The median pain score was significantly reduced from 7 to 5 with music and the yoga nidra recording, but the scores were not significantly different between these two groups (Table 2 and Fig. 2).

### Secondary Treatment Efficacy Outcomes

Secondary treatment efficacy outcomes are summarized in Table 3. The median overall patient satisfaction score was significantly different among the three groups ( $p < .0001$ ; Table 3).

**Table 1**  
Demographics and Clinical Characteristics of the Included Subjects

Characteristics	Control (n = 48)	Music (n = 46)	Yoga Nidra (n = 50)	$\chi^2$ Value / F Value	p Value
Gender, M/F (%)	45.83/54.17	54.35/45.65	60.00/40.00	1.996	.369
Mean age (95% CI) in years	48.96 (45.70, 52.21)	47.07 (43.71, 50.42)	47.00 (43.17, 50.83)	.409	.665
Educational level (%)				.489	.783 <sup>a</sup>
Primary school or below	27.08	30.43	32.00		
Secondary school	22.92	26.09	24.00		
College or above	50.00	43.48	44.00		
Indications (%)				10.101	.258
Change in bowel habits	16.67	10.87	18.00		
Rectal bleeding	16.67	34.78	18.00		
Abdominal pain /constipation	16.67	17.39	24.00		
Surveillance	25.00	17.39	10.00		
Others	25.00	19.57	30.00		
Previous colonoscopy (%)	31.25	39.13	26.00	1.916	.384
Previous abdominal-pelvic surgery (%)	39.58	39.13	28.00	1.844	.398
Anxiety score (mean $\pm$ SD)	42.54 $\pm$ 4.84	44.06 $\pm$ 5.65	44.71 $\pm$ 4.27	2.479	.087

<sup>a</sup> Kruskal-Wallis test.

**Table 2**  
Pain Score

	Control (n = 38)	Music (n = 35)	Yoga Nidra (n = 40)	$\chi^2$ Value	p Value*
Pain score (before colonoscopy), (M/Q)	0/0	0/0	0/0	.697	.706
Pain score (after colonoscopy), (M/Q)	7.0 <sup>a</sup> /4.0	5.0 <sup>b</sup> /4.0	5.0 <sup>b</sup> /4.5	14.870	.001

Note. <sup>a</sup> and <sup>b</sup> represent significant differences between each other. If there is no significant difference between the two groups, it is marked with the same letter, for example, <sup>a</sup> and <sup>a</sup>; if there are differences between the two groups, it is marked with different letter, for example, <sup>a</sup> and <sup>b</sup>.

M = median; Q = quartile range.

\* Kruskal-Wallis test.

Overall patient satisfaction was significantly improved by both music and the yoga nidra recording, and it was higher in the yoga nidra group (10 [0]) than the music group (10 [1]) and the control group (7 [2]) (Table 3 and Fig. 3). The median willingness to repeat the procedure score was significantly improved in the yoga nidra group ( $p < .05$ ), but no significant improvement was found in the music group (Table 3). Patients' willingness to repeat the procedure was higher in the yoga nidra group (6 [5]) compared with the music group (5 [4]) (Table 3). Perceived colonoscope insertion difficulty by the endoscopist was significantly decreased in the music and the yoga nidra recording groups ( $p < .05$ ), but it was not significantly different between these two groups (Table 3).

*Secondary Objective Treatment Effect Outcomes*

Secondary objective treatment effect outcomes are summarized in Table 4. There were no significant differences among the three groups in terms of systolic and diastolic blood pressure (Table 4). A repeated measures ANOVA for the systolic and diastolic blood

**Table 3**  
Secondary Treatment Efficacy Outcomes

Outcomes	Control (n = 38)	Music (n = 35)	Yoga Nidra (n = 40)	$\chi^2$ Value	p Value*
Overall patient satisfaction score, (M/Q)	7 <sup>a</sup> /2	10 <sup>b</sup> /1	10 <sup>c</sup> /0	45.797	<.0001
Willingness to repeat the procedure score, (M/Q)	4 <sup>a</sup> /4	5 <sup>a</sup> /4	6 <sup>b</sup> /5	10.207	.006
Perceived colonoscope insertion difficulty score, (M/Q)	6 <sup>a</sup> /3	5 <sup>b</sup> /2	3 <sup>b</sup> /5	10.949	.004

Note. <sup>a</sup> and <sup>b</sup> represent significant differences between each other. If there is no significant difference between the two groups, it is marked with the same letter, for example, <sup>a</sup> and <sup>a</sup>; if there are differences between the two groups, it is marked with different letter, for example, <sup>a</sup> and <sup>b</sup>.

M = median; Q = quartile range.

\* Kruskal-Wallis test.

pressure indicated no significant differences between either measure among the three groups ( $p = .9070/p = .5373; p > .05$ ), no significant differences between either measure before or after the intervention ( $p = .4469/p = .1065; p > .05$ ), and no interaction between the time and treatment ( $p = .6259/p = .9326; p > .05$ ). The median total procedure duration score was significantly reduced in the yoga nidra group ( $p < .05$ ), but a significant difference was not found in the music group (Table 4). The total procedure duration was significantly shorter in the yoga nidra group (6 [7]) than in the music group (9 [6]; Table 4).

**Discussion**

The current study explored the effectiveness of a yoga nidra recording for pain management in patients undergoing colonoscopy. As hypothesized, the yoga nidra recording reduced colonoscopy pain and provided more positive psychological and physiologic effects than relaxation music.

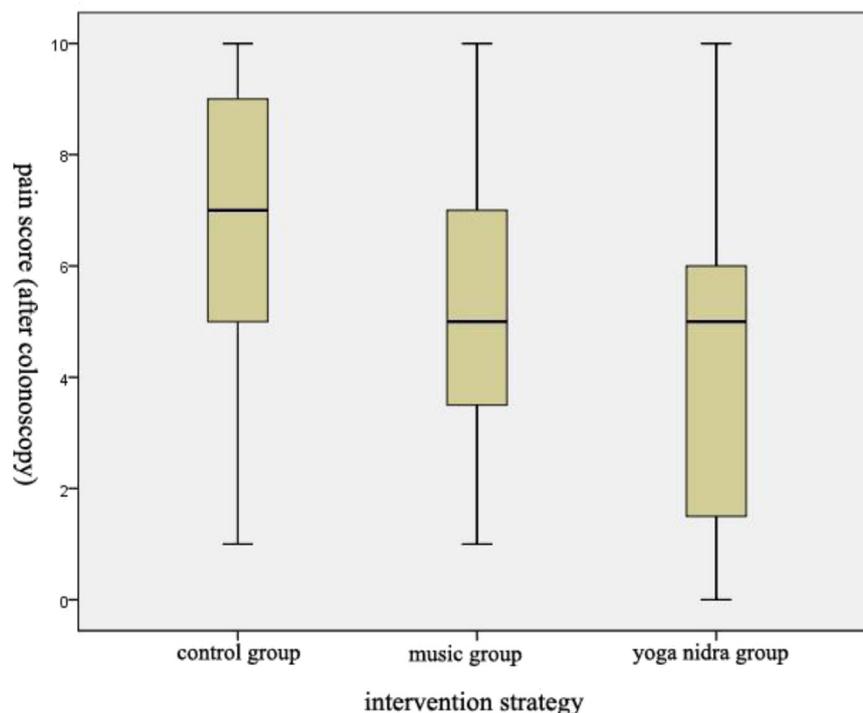


Fig. 2. Box plots of the pain score after colonoscopy rated on the 0-10 Numerical Rating Scale in the control group, music group, and yoga nidra group.

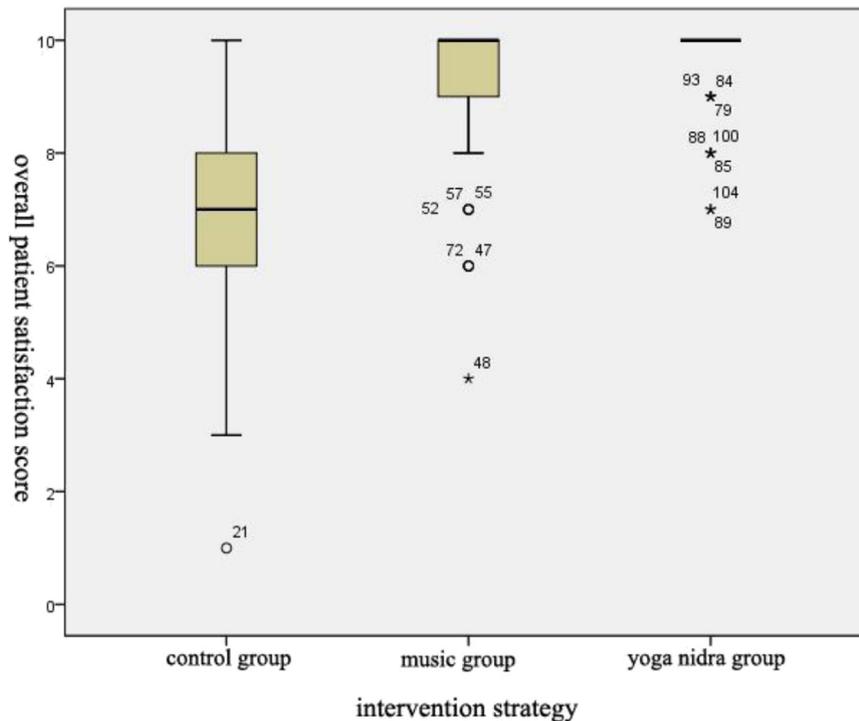


Fig. 3. Box plots of overall patient satisfaction scores rated on a 0–10 Numerical Rating Scale in the control group, music group, and yoga nidra group.

### Pain

The majority of prior studies have reported the benefits of relaxation music for pain management in patients undergoing colonoscopy (Costa et al., 2010; Owayolu et al., 2006). Conversely, other studies have indicated no significant difference in perceived pain during the procedure (Bechtold et al., 2009; Bechtold, Perez, Puli, & Marshall, 2006; Martindale, Mikocka-Walus, Walus, Keage, & Andrews, 2014). In this study, both the yoga nidra recording and music were found to reduce colonoscopy pain. As previously stated, colonoscopy pain is procedure-related pain and visceral occurring because of colonic smooth muscle spasms during a colonoscopy. Yoga nidra is a guided meditation that progressively releases tension in one's body and mind. The practice of yoga has been found to reduce tension and anxiety, which could relieve pain by relaxing smooth and skeletal muscles and glandular activities.

### Overall Patient Satisfaction, Willingness to Repeat the Procedure, and Perceived Colonoscope Insertion Difficulty

The beneficial effects of yoga nidra were confirmed by the treatment efficacy outcomes, which included overall patient

satisfaction, willingness to repeat the procedure, and perceived colonoscope insertion difficulty. The yoga nidra recording led to more positive effects than the music in terms of overall patient satisfaction and the patients' willingness to repeat the procedure. The majority of previous related studies have shown that music improved the satisfaction of patients undergoing colonoscopy (Bampton & Draper, 1997; Bechtold et al., 2006; Costa et al., 2010; Owayolu et al., 2006). The findings in the present study related to the music group were consistent with these earlier results. Moreover, the degree of overall patient satisfaction was significantly higher in the yoga nidra group compared with the music group. Costa et al. (2010) reported a higher mean score for patients' willingness to repeat the procedure when using a music intervention during colonoscopy. Other authors, however, have not reported such differences in terms of patient willingness to repeat the procedure (Bechtold et al., 2009; Harikumar et al., 2006). The findings for the music group in the current study were consistent with the latter. Nonetheless, the patients' willingness to repeat the procedure was significantly improved in the yoga nidra group.

There are several likely explanations for the current findings. First, they could be attributed to the mental relaxation yoga nidra induces (Anderson, Mammen, Paul, Pletch, & Pulia, 2017; Kim,

**Table 4**  
Secondary Objective Treatment Effect Outcomes

Outcomes	Control (n = 38)	Music (n = 35)	Yoga Nidra (n = 40)	$\chi^2$ Value	p Value
Systolic blood pressure					NS*
Before intervention (mean $\pm$ SD)	132.05 $\pm$ 16.93	131.59 $\pm$ 16.97	134.59 $\pm$ 19.67		
After intervention (mean $\pm$ SD)	133.55 $\pm$ 20.34	133.71 $\pm$ 14.91	133.87 $\pm$ 19.14		
Diastolic blood pressure					NS*
Before intervention (mean $\pm$ SD)	84.97 $\pm$ 10.96	87.12 $\pm$ 12.97	88.05 $\pm$ 11.71		
After intervention (mean $\pm$ SD)	86.82 $\pm$ 12.48	88.84 $\pm$ 12.99	89.10 $\pm$ 11.31		
Total procedure duration, min (M/Q)	11.000 <sup>a</sup> /5.000	9.000 <sup>a</sup> /6.000	6.000 <sup>b</sup> /7.000	8.409	.0150**

Note. <sup>a</sup> and <sup>b</sup> represent significant differences between each other. If there is no significant difference between the two groups, it is marked with the same letter, for example, <sup>a</sup> and <sup>a</sup>; if there are differences between the two groups, it is marked with different letter, for example, <sup>a</sup> and <sup>b</sup>.

NS = not significant; M = median; Q = quartile range.

\* Repeated measures ANOVA. \*\*Kruskal-Wallis test.

2017). As previous studies have shown, alpha electrocardiogram dominance has been found during the practice of yoga nidra, which is characterized by mental relaxation (Vallath, 2010). This mental state leads to the relaxation of consciousness toward a steady state and thus helps alleviate pain and discomfort. Second, most patients are sleep deprived when going in for a colonoscopy procedure due to the bowel preparation from the previous night in combination with hunger or low blood sugar caused by fasting, which together may aggravate patient lassitude. Therefore, the patients may have been more easily induced into a state of mental relaxation by the yoga nidra. Third, this meditation technique, which is based on increased self-awareness and decreases the fear of pain, was successfully used for the treatment of pain.

#### Total Procedure Duration and Blood Pressure

The beneficial effect of the yoga nidra recording was also confirmed by objective treatment effect outcomes, including the total procedure duration, which was not significantly affected in the music group. A previous meta-analysis of eight randomized controlled trials (Bechtold et al., 2009) did not show a significant effect of music on colonoscopy procedure duration. The present study's outcome was consistent with these findings. However, the total procedure duration was significantly improved in the yoga nidra group, which could be attributed to the physical relaxation induced by yoga nidra, which may have helped balance the autonomic nervous system and relax the spastic colon (Kavuri, Raghuram, Malamud, & Selvan, 2015; Kim, 2017). Additionally, in the present study, no significant differences were found among the three groups in terms of systolic blood pressure or diastolic blood pressure, which is also in accordance with the majority of previous related studies (Bechtold et al., 2009; Bradt et al., 2016; Hayes, Buffum, Lanier, Rodahl, & Sasso, 2003).

#### Limitations

One limitation in the current study was that neither the participating endoscopist nor the patients were blinded. Another limitation was that the patients were not randomized. Patients were assigned to groups based on their preference. Third, high attrition rate leads to smaller sample size, which reduces statistical conclusion validity. Setting up many elimination standards reduced generalizability. The last limitation was lack of fidelity checks.

#### Implications for Nursing Education, Clinical Practice, and Research

Compared with other medication-free interventions, there are a great deal of advantages of yoga nidra recordings. First, unlike in hypnosis, the patients using the yoga nidra recordings were awake throughout the procedure (Hoye & Reddy, 2016) and were able to suspend or continue the procedure at any time if the doctor had any questions or the patient appeared unwell. Second, during yoga nidra practice, the consciousness maintains a “blissful awareness,” and an intensive state of relaxation is achieved (Kim, 2017). As for a relaxation technique, yoga nidra was easier to learn for most people and did not require systematic training. The yoga nidra recordings intervened in the activity of consciousness rather than requiring physical movements. The patients were only required to follow the guide words in the recordings. Third, unlike the music, the yoga nidra intervention did not necessarily have to consider selection types or personal preferences.

#### Conclusion

In summary, both the yoga nidra recording and music were found to reduce patient pain during colonoscopy. The yoga nidra

recording was the highest rated and tolerated among the three groups. Therefore, these results provide evidence of the benefits of using yoga nidra as an alternative/complementary therapy for pain management in patients undergoing colonoscopy.

#### Supplementary Data

Supplementary data related to this article can be found online at <https://doi.org/10.1016/j.pmn.2018.04.005>.

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