



Original Article

Effect of music on level of anxiety in patients undergoing colonoscopy without sedation

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Abstract

Background: Listening to music can be a noninvasive method for reducing the anxiety level without any adverse effects. The aim of this study was to explore whether music can reduce anxiety and to compare two different styles of music, informal classical music and light music, to ascertain the more effective style of music in reducing anxiety in patients undergoing colonoscopy without sedation.

Methods: This study enrolled 138 patients who underwent colonoscopy without sedation during a general health examination from February 2009 to January 2015. The patients were randomly assigned to a group that did not listen to music, a group that listened to music by David Tolley, or a group that listened to music by Kevin Kern. The State-Trait Anxiety Inventory was used to evaluate the status of anxiety.

Results: A trend test for mild anxiety was performed on the patients in the three groups, and a significant trend was noted ($p = 0.017$ for all patients; $p = 0.014$ for analysis by sex). Multivariate analysis for mild anxiety on the patients in each group was also performed in this study, and music by Kevin Kern was found to have the lowest odds ratio (Odds ratio = 0.34, $p = 0.045$).

Conclusion: Listening to music, especially music by Kevin Kern, reduced the level of anxiety in patients undergoing colonoscopy examination without sedation.

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Keywords: anxiety; colonoscopy; Kevin Kern; light music

1. Introduction

Colonoscopy is an endoscopic examination of the large bowel and the distal part of the small bowel that is used to diagnose pathological lesions, such as ulceration, polyps,

inflammation, and even cancer, via gross inspection or biopsy and as a therapeutic approach to remove suspected malignant lesions. In recent years, colonoscopy has been considered the gold standard for colon cancer screening and surveillance.¹

However, the colonoscopy procedure carries risks of perforation² and bleeding.³ Discomfort related to colonoscopy, such as abdominal pain and a sensation of fullness, is frequently experienced by patients during this procedure. Anxiety arising from this discomfort is inevitable for most patients, which may even prevent completion of the procedure in some cases. Under these circumstances, adequate patient physiological and

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psychological preparation is essential for a safe and successful examination and to maintain compliance during subsequent follow-up procedures. Colonoscopy under sedation is one alternative to ensure smooth performance of the procedure and is now widely applied in clinical practice.⁴ However, potential risks of cardiopulmonary complications exist, such as over-sedation, hypoxemia, hypoventilation,^{5–7} aspiration pneumonia, pulmonary embolism, and myocardial infarction,^{8,9} which patients and clinicians should be aware of prior to sedation. Therefore, although colonoscopy with sedation is performed to reduce anxiety and discomfort in patients during the examination, the risk of undergoing the procedure under sedation is not lower than that of colonoscopy without sedation.

The American Pain Society suggested that apart from medication, pain control can be achieved by alternative non-medication methods, which may result in improved efficacy in pain control. One nonmedication method for pain control is listening to music,¹⁰ which is a noninvasive method to reduce pain and anxiety without causing any adverse effects.¹¹ Currently, music is employed in many medical procedures and therapies, such as in the treatment of patients suffering from malignancy,¹² patients undergoing imaging-guided core-needle breast biopsy,¹³ burn injury patients,¹⁴ and women in labor,¹⁵ to reduce pain and anxiety. In a colonoscopy examination, music is viewed as an effective method for reducing procedure-related anxiety.^{16–18}

The aim of this study was to explore whether music can reduce procedure-related anxiety and also to compare two styles of music, informal classical music and light music, in order to ascertain the more effective music style for reducing anxiety in patients undergoing colonoscopy without sedation in Taiwan.

2. Methods

2.1. Patients

We enrolled patients who underwent a colonoscopy during a general health examination without sedation from February 2009 to January 2015 in the Health Management Center, Kaohsiung Medical University Chung-ho Memorial Hospital. Patients who suffered from medical conditions, such as myocardial infarction, pulmonary embolism, cerebral vascular infarction, unstable and severe cardiac disease, or severe gastroenteritis disease, were excluded from colonoscopy examination. In addition, the data for some patients were incomplete, and these patients were also excluded from this study. In total, 138 patients were enrolled in this study. The study was approved by the ethics committee and Institutional Review Board of Kaohsiung Medical University Chung-ho Memorial Hospital, and signed informed consent was obtained and agreed from all the patients who were enrolled in this study.

2.2. Body mass index, blood pressure, and past history

In this study, prior to colonoscopy examination, basic data of the patients, including height, weight, blood pressure, and

past history, were recorded. Body mass index [BMI, (kg/m²)] was calculated as weight/height². Blood pressure was measured in a sitting position, and the patients took no drugs during the fasting period. The cutoff values used in this study were systolic blood pressure and diastolic blood pressure of 120/80 mmHg, according to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure criteria.¹⁹ A BMI equal to or greater than 23 kg/m² was defined as overweight, according to the Steering Committee of the Regional Office for the Western Pacific Region of the World Health Organization.²⁰ Histories of hypertension, smoking, and drinking alcohol were also recorded. If patients had smoked or imbibed alcohol in the past 5 years, they were categorized as having a history of smoking or alcohol consumption.

2.3. Music and equipment

Patients were randomly classified into groups that did or did not listen to music during the colonoscopy examination. Those who were randomly classified into the group that listened to music were also randomly assigned to either a group that listened to “Canon in D” from the album “Pachelbel by The Sea” by David Tolley, which belongs to the genre of informal classical music, or a group that listened to “Blossom on the Wind” from the album “Embracing The Wind” by Kevin Kern, which belongs to the genre of light music. The music was played via an iPad with an amplifier at an adequate volume from the start of the colonoscopy examination and was stopped when the examination ended. No sedation was applied during the procedure. The music was played in the room where the procedure was performed in order to ensure that the outside noise was isolated. Finally, 81 patients were randomized into groups that listened to music, including 45 and 36 patients who listened to music by David Tolley and Kevin Kern, respectively, after exclusion of patients with incomplete data.

2.4. The State-Trait Anxiety Inventory

In this study, the State-Trait Anxiety Inventory (STAI) was used to evaluate the status of anxiety. Every patient completed the form following colonoscopy examination. The STAI Form Y is a brief, self-rating scale for the assessment of state and trait anxiety in adults. The concepts of state and trait anxiety were first introduced by Cattell and Scheier^{21–23} and have been further elaborated by Spielberger.^{24–27} Each STAI item is given a weighted score of 1 to 4 for each question (e.g., select item 1 scoring 1 for this question). For questions 1, 2, 5, 8, 10, 11, 15, 16, 19, 20, 21, 23, 24, 26, 27, 30, 33, 34, 36, and 39, the score was calculated as the reverse score (i.e., 5 minus the selected item score); scores of the other questions were simply the score of the selected item. The calculated scores for all questions were then summed up to give a total anxiety score. The lower the total score, the less anxious was the patient. A total final score of 41–80 represented mild anxiety, 81–120 represented moderate anxiety, and 121–160 represented severe anxiety.

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