

Effects of Music on Pain, Anxiety and Vital Signs of Children during Colonoscopy

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Abstract: This study aimed to investigate the effect of music on pain, anxiety and vital signs in children undergoing colonoscopy. This was a randomized clinical study. It was carried out on 100 children (7 to 14 years old) requiring colonoscopy. Children were randomly allocated to a control or music group. The music group was played relaxing music (by Clayderman) during the procedure. Spiegelberger and pain questionnaires were administered immediately after the colonoscopy. Pulse rate, blood pressure and percent blood oxygen saturation were recorded for each subject. The control group was treated in an identical manner, but was not played music during the procedure. Data were analyzed using SPSS software. Satisfaction, anxiety, pain, and blood pressure were significantly different between the groups ($P < 0.05$), but oxygen saturation and heart rate did not differ significantly ($P > 0.05$). Music can reduce anxiety and pain during colonoscopy.

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1. Introduction

Colonoscopy is an effective method for detecting colonic polyps in the prevention of colon cancer, and is also widely used for the detection of colonic damage and inflammation in children. However colonoscopy is associated with pain, discomfort and other side effects (1). Several techniques have been used, or proposed to relieve pain and anxiety during the procedure: these include, tranquilizers, nitric oxide, carbon dioxide, hypnosis and music therapy (2).

Music therapy was used in ancient Egypt to treat infertility. It has been used in Iran to treat several conditions (3). Music appears to reduce pain and anxiety by providing a distracting focus. In addition, music lowers blood pressure, respiration and heart rate associated with relaxation, and altered adrenaline levels (4). Listening to music also causes a release of endorphins, neurotransmitters which also reduce levels of anxiety. Furthermore, endorphins affect several physiological responses; reducing respiratory rate, blood pressure and heart rate (5).

Studies have reported positive effects of music therapy on anxiety and fear (6). However its effects on anxiety and pain during colonoscopy in children have not been reported previously. In this

study we have investigated effects of music on pain, anxiety and vital signs in pediatric patients undergoing colonoscopy.

2. Material and Methods

This study was approved by Ethical Committee of Tehran University of Medical Sciences and it was performed on 100 children (7-14 years old) who were candidates for colonoscopy at the Childrens' Medical Center, Tehran. Patients were randomly allocated using a random number table into a group receiving music therapy (the music group) comprising 33 boys and 18 girls, and a control group of 30 males and 20 females. Inclusion criteria were children of either gender, who were 7-14 years old, and who were suspected of having colonic disease or polyps, or bleeding of unknown origin. Exclusion criteria included deafness, or hearing impairment, or unwillingness to listen to music during the procedure. Parental consent was obtained for each child before entry into the study, which was approved by the Ethics Committee of the Tehran University of Medical Sciences, Tehran, Iran.

For the music group, classical music by Clyderman' was played during the colonoscopy. After the procedure a Spielberger Anxiety

Questionnaire and visual pain scale (VAS) was completed by each subject (7). Vital signs were measured and recorded. An observer blinded to group, measured blood pressure and pulse rate by a standard mercury sphygmomanometer. The control group was not played music. Again subjects were 7-14 years old and were helped to complete the questionnaire by their parents. The Spiegelberger State - Trait Anxiety questionnaire contains a total of 40 questions (20 questions that trait anxiety and 20 questions state anxiety. Subjects responded using a five point Likert scale. Validity and reliability of the method was examined by a pilot study and calculated with Alpha Cronbach ($\alpha=0.81$).

A blinded observer recorded the children's pain according to 10 parts criterion VAS standard. (0= no pain/1, 2= very little pain/3, 4= little pain/5, 6= moderate pain/7, 8=severe pain/9, 10=very severe pain). Data were analyzed using SPSS version 15. T-test and wilcoxon rank-sum test were used. P values less than 0.05 were considered significant.

3. Results

Table 1. Demographic characteristics, value of pain, anxiety in children 7-14 years old under colonoscopy

	Control group (n=50)	Music group (n=50)	P-value
Mean age (y)	8.08±2.95	7.13±2.24	0.37
Gender (% males)	60.78	66.00	0.77
Pain score	5.10±1.35	3.80±1.96	0.001
Value of anxiety score	44.90±8.33	36.30±6.20	0.03

Table 2. Mean value of vital sign children 4-12 years old under colonoscopy

Groups	Mean value of vital sign children 4-12 years old under colonoscopy		
	Oxygen saturation (%)	Pulse rate (min)	Mean systolic blood pressure (mm Hg)
Control group	91.66±1.99	129.06±19.17	90.76±8.69
Music group	93.80±1.92	109.96±15.17	91.80±8.92

4. Discussions

Listening to music was found to reduce the anxiety and pain associated with colonoscopy in children. These findings are consistent with the results of Ovayolu et al (2006). This latter study aimed to investigate the effects of Turkish classical music on 60 patients in the age range 20-70 years during colonoscopy. The Spiegel-berger questionnaire and visual analogue pain scale was used for values of anxiety and pain. Validity and reliability of the questionnaire was acceptance by Oner study in 1977. The result of another study in 2008 showed that music reduces stress in children 4-7 years old with cancer in the United States (9). Gold et al reported a positive effect of music on the symptoms and quality of life for children 11-4 years with mental illness. They report that music can enhance the quality of life of these children (10)

The mean age of children in the control group was 8.08 ± 2.95 years and 7.13 ± 2.24 years for the music group ($P > 0.05$). Within the control group 31 subjects were male (60.78%) and 33 individuals in the music group were male (66%); data analysis showed no significant difference between the groups for gender distribution ($P > 0.05$) (Table 1). The results showed that the average level of anxiety in the control group was 36.30 ± 6.20 and in music group was 44.90 ± 8.33 and were statistically significant. Also, in the control group the average pain score was 5.10 ± 1.35 and in the music group 3.80 ± 1.96 . The comparison showed a significant difference in perceived pain between the two groups ($P < 0.05$) (Table 1). In the control group, the average heart rate was 129.06 ± 19.17 beats per minute, oxygen saturation was $91.66\% \pm 1.99$ and mean value of blood pressure was 90.76 ± 8.69 mm Hg. In the music group, the average heart rate was 109.96 ± 15.17 beats per minute; oxygen saturation was $93.80\% \pm 1.92$ and means value of blood pressure 91.80 ± 8.92 mmHg, respectively (Table 2).

Research results of another study indicated that music is effective in the management of pain and anxiety in children, and most children tend to continue playing music in the course of their treatment (11). On the other hand, studies by Aitken and colleagues showed that music had no effect on reducing children's fears in a dental treatment (12). It may be because of the type of music played and the age of the patients investigated. The results of present study showed that music reduces pulse rate but not blood pressure; this is similar to the study of Rohi et al (13) and oxygen saturation. Iconomido and colleagues also showed that music therapy can reduce pain, blood pressure, respiratory rate after surgery. In this study pain was measured and recorded using visual analog scale pain (14). Lai also showed that music has no effect on heart rate and arterial blood pressure (15). In contrast, Breble and colleagues

reported in 2007 that music can reduce anxiety, heart rate and blood cortisol levels. This difference appears to be due to different types of music and selection of patients and their environment condition (16). The simplicity, low cost and effectiveness of music compared with pharmacological treatments may be a way of reducing anxiety and impacts on vital signs during colonoscopy in children.

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