

Preoperative Music to Decrease Anxiety in Patients Undergoing Gastrointestinal

Procedures

by

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A DNP Project Manuscript
Submitted in Partial Fulfillment of the Requirements for the
Doctor of Nursing Practice Degree

University of Maryland School of Nursing
November 2021

Abstract

Problem & Purpose: Anxiety is an emotional state characterized by feelings of nervousness and worry that affect 85% of patients undergoing surgery and general anesthesia. Anxious patients have reported more postoperative pain, which leads to an increase in the use of analgesics, risk of infection, duration of hospitalization, and delayed wound healing. The anesthesia providers at the practice site anecdotally estimated that 80% of patients scheduled for gastrointestinal (GI) procedures are anxious. The purpose of this quality improvement (QI) project was to implement the preoperative use of music to reduce anxiety in adult patients undergoing GI procedures.

Methods: This QI project was implemented from September 7th to December 31st of 2021. Approximately 15 registered nurses (RNs) and 43 certified nurse anesthetists (CRNAs) and anesthesiologists were included in this project. The providers were educated on the benefits of preoperative music to reduce anxiety and offered music to patients that met the inclusion criteria (age > 18, patients' consent, etc.) Provider compliance was collected weekly and reasons for noncompliance were assessed and addressed. **Results:** In the first seven weeks of data collection, 18.5% of patients admitted to the GI suite were offered music. After including student registered nurse anesthetists in the project, the average percentage of patients offered music increased from 18.5% to 41.5% for the last four weeks of the project. **Conclusions:** Listening to music is effective for reducing the anxiety of preoperative patients; most especially, in patients scheduled for endoscopies and colonoscopies in which anxiolytics are typically not offered. The project demonstrated that patients are enthusiastic about being offered music and are willing to implement the intervention. This project also highlighted providers' compliance with offering music to patients in the GI suite to reduce anxiety.

Anxiety is an emotional state characterized by feelings of nervousness and worry that affect 85% of patients undergoing surgery and general anesthesia (McClurkin & Smith, 2016). High preoperative anxiety causes an increase in patient serum cortisol level, blood pressure (BP), and heart rate (HR). Studies have also shown that anxious patients report more postoperative pain, which leads to an increase in the use of analgesics, risk of infection, duration of hospitalization, and delayed wound healing (Uğraş et al., 2018).

In same-day surgery, where preoperative nursing care is limited and waiting times for surgery are uncomfortably long and subject to change, traditional pharmacological anxiolysis may fail to reduce preoperative anxiety (Ni et al., 2011). Gastrointestinal (GI) procedures also limit the depth of anesthesia that can be given because patients are expected to be discharged shortly after the procedure. The anesthesia providers at the practice site anecdotally estimated that 80% of patients scheduled for GI procedures are anxious. Yet, there is no policy dedicated to reducing patient anxiety in the GI preoperative holding area at the site

Finding multimodal approaches to ease anxiety from unfamiliar unit surroundings and perceived risks of morbidity (e.g. disfigurement and long-term sequelae) is necessary to reduce preoperative anxiety and subsequent physiological complications (Ni et al., 2011). Scientific studies have shown the value of music therapy on the body, mind, or health of individuals (Sharma et al., 2017). Compared to the conventional use of pharmacological drugs to reduce preoperative anxiety, listening to music is safer, easy to administer, and more cost-effective (Tan et al., 2020). The purpose of this QI project was to implement the preoperative use of music to reduce anxiety in adult patients undergoing GI procedures.

Literature Review

An evidence review was completed to assess various interventions to reduce preoperative anxiety for patients scheduled for GI procedures, such as endoscopies, colonoscopies, or both at an acute care institution. This analysis examined the quality of evidence for the use of music for preoperative anxiety in patients undergoing surgery. All the studies included in this analysis made use of randomized control trials to assess their interventions. Two studies received a quality rating of A, and two studies received a B, for strength and quality of evidence. A detailed description of the evidence reviews and synthesis is provided in Tables 1 and 2 respectively.

Ertuğ et al. (2017) included 159 participants in two intervention groups and a control group. The first intervention group of patients listened to nature sounds, the second performed relaxation exercises, and the control patients were only exposed to silence in their rooms. Visual analog scale (VAS) scores immediately after and 30 minutes after the intervention were significantly lower in the nature sounds and relaxation exercises groups than in the control. The study found that nature sounds and relaxation exercises effectively reduce preoperative anxiety in patients awaiting surgery.

Mohammadi et al. (2014) evaluated (n=60) non-vocal classical music played together with nature sounds (e.g., sea, rain, and water) through headphones connected to an MP3 player for 20 minutes. A significant difference in state anxiety before and after listening to music was observed ($p < 0.01$). The study concluded that music serves as an effective non-invasive therapeutic intervention to reduce preoperative state anxiety and physiological parameters in patients undergoing general surgery.

Ni et al. (2011) evaluated music by headphones for 20 minutes before surgery (n=86). The researchers found there was a statistically significant reduction in preoperative anxiety levels and

physiological indicators of anxiety in patients scheduled to undergo elective day surgery by providing music.

Lastly, Sharma et al. (2017) conducted a study using 199 participants. The intervention was divided into two groups; one group was made to listen to prerecorded Vedic chants for 10 minutes and another group listened to Indian Classical instrumental music for 10 minutes. The control group was placed in the same room as the intervention groups for 10 minutes but with no music. The study concluded that endoscopy patients who listened to Vedic chants and/or instrumental music before their procedures showed reduced anxiety scores and improved physiological parameters.

Theoretical Framework

The Theory of Unpleasant Symptoms (TOUS) is a middle-range theory that was developed to guide research and practice across multiple clinical populations (Lenz et al.,1997). TOUS was proposed as a means for incorporating existing information about a variety of symptoms. The TOUS addresses three major components: the symptoms the individual experiences, influencing factors that give rise to those symptoms, and the result of those symptoms.

This theory can easily be applied to preoperative anxiety, how it affects patients, and the long-lasting effects preoperative anxiety can have on a patient's postoperative well-being such as increased pain. For this project, the symptoms experienced refer to patients' increased anxiety in the preoperative setting. The influencing factors that give rise to this symptom include the patient's perception of the procedure and anesthesia; the duration of time patients spend in the preoperative holding area without a support system; the limited depth of anesthesia that can be given to patients being discharged on the same day etc. Lastly, the final component of TOUS, the

result of increased anxiety, has been proven to include negative physiological manifestations such as an increase in patient serum cortisol level, blood pressure, and heart rate (Uğraş et al., 2018). Figure 1 provides a visual representation of the TOUS framework.

Methods

This QI project was implemented over 14 weeks from September through December 2021 in the preoperative area of an acute care hospital for patients undergoing GI procedures. Approximately 15 RNs and 43 CRNAs and anesthesiologists rotated through the GI suite and were included in this project. Refer to Appendix A for the current process flow map and Appendix B for the process being implemented.

The practice change involved educating providers on the benefits of music to reduce anxiety and how to implement music in the preoperative GI setting. This was achieved by providing an in-service to all providers caring for GI patients. Approximately 780 patients were admitted through the duration of the project. Patient inclusion criteria for the project included adults aged 18 and above, and the American Society of Anesthesiologists (ASA) classification 1-4 scheduled for short duration GI procedures. Exclusion criteria included pediatric patients, pregnant women, patients with an ASA of 5 or 6, patients that were hearing impaired, and patients that refused music therapy.

Education regarding the project was provided to all providers caring for patients in the preoperative area of the GI suite. Two MP3 players and disposable headsets were also made available and a demonstration on proper use and safe handling was provided to each staff member involved. Anesthesia providers and nurses were educated on the importance of reducing anxiety. The intervention was assessed using an outcome tool (Appendix C) to keep track of the number of patients receiving music.

Measures to protect patient confidentiality included the absence of patient identifiers on the random observation tool. Each patient was assigned a random number to protect patient information. Providers' confidentiality during staff education was maintained by deidentifying the providers on the training tool. To maintain privacy, all completed data collection tools were stored in a locked box.

One-to-one staff interviews with every provider included in the project were done to ensure each provider was educated and teaching objectives were met. Nursing staff education was completed in one grand education session during the morning huddle and a subsequent education brochure was sent to every staff nurse. Lastly, weekly data collection assessing the percentage of patients offered a music player and the number of patients refusing the intervention was recorded on an outcome tool (Appendix D).

Interviews involving various stakeholders to address barriers, failures, and unexpected problems were conducted after the project was implemented. The assistant nurse manager for the GI suite addressed the inability of the nurses to take part in offering music to patients due to their demanding workflow. It was recommended that the nurses be excluded from the project and the anesthesia providers should be solely responsible for offering music to patients. The clinical site representative for the project recommended that the Student Registered Nurse Anesthetists (SRNAs) should be included in the project to help offer music to patients. The SRNAs were trained at the beginning of week eight on the goals of the project and how to offer music to patients in the GI suite to reduce anxiety. Offering music to patients became the anesthesia providers' and SRNAs' responsibility and the nurses were no longer expected to assist with offering music to patients.

Results

Eleven observation tools were collected weekly over the 14-week period of the project implementation. Approximately 780 patients admitted to the GI suite for either an endoscopy, colonoscopy, or both met the eligibility criteria to receive music to reduce anxiety. Following provider education and project implementation, there was an increase in the use of music to reduce patient anxiety. In the first seven weeks of data collection, 18.5% of patients admitted to the GI suite were offered music

Including SRNAs in the 8th week led to a significant increase in the percentage of patients that were offered music from 18.5% to 41.5%. See Figures 2 and 3. As new SRNAs would rotate through the GI suite, education was provided, and occasional virtual reminders were sent to the anesthesia providers and SRNAs via email. These maneuvers ensured that the percentage of patients offered music was maintained in the 40s after the 8th week. The results show that the proposed goal of 100% of patients rotating through the GI suite being offered music was not met; but there was an overall increase from baseline.

Discussion

Providers were effectively educated on the use and benefits of preoperative music to reduce anxiety. This led to the implementation of music to reduce anxiety in patients undergoing a GI procedure. Key findings included the need to involve the nurses and SRNAs earlier in the planning phase of the process. A study done by Spagnuolo et al. (2020) implemented the use of nurse trainees to explore whether music can reduce anxiety and pain in patients who underwent diagnostic endoscopic examinations in conscious and deep sedation. The study demonstrated the need to use available resources such as the nurse trainees considering the fast workflow of the endoscopic center. The result from this project also demonstrates that patients were enthusiastic to engage in the project with an average of 61% of patients accepting the intervention once it was offered to them (see Figure 3).

Limitations to this project were identified throughout the 14 weeks. The workflow and high surgical turnover of the GI suite were not taken into consideration during the planning for the implementation of the project. The nurses should have been included from the planning phase considering their input initially on how best to include offering music to patients in an already tedious workflow.

Another limitation identified was the resistance to change from providers. Despite providing adequate education on the benefits of music to reduce anxiety and its subsequent effects, some anesthesia providers were still hesitant to include it in their practice. Including the SRNAs in the project led to a significant improvement in the number of patients being offered music and helped overcome the anesthesia providers' resistance.

Conclusion

Listening to music is effective for reducing the anxiety of preoperative patients; most especially, in patients scheduled for endoscopies and colonoscopies in which anxiolytics are typically not offered. The project demonstrated that patients are enthusiastic about being offered music and are willing to implement the intervention to reduce their anxiety. This project also highlighted various strategies that were implemented to improve providers' compliance with offering music to patients in the GI suite to reduce anxiety.

To ensure sustainability, incorporating the use of music to reduce anxiety into the institution's policies based on the evidence provided by this project would be beneficial and was suggested to the hospital's administration. This will ensure that education on the intervention will be provided during the new hire process for anesthesia providers and the onboarding of SRNAs. Also, change champions that facilitated the implementation of the intervention through the project were encouraged to continue the process of offering patients music to reduce anxiety. This will encourage their coworkers to continue to

do the same. Implications and suggestions for future QI projects emphasizes the use of a multidisciplinary approach involving the SRNAs and nurses early on from the planning phase.

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Table 1

Evidence review table: Preoperative Anxiety

Ertuğ, N., Ulusoylu, Ö, Bal, A., & Özgür, H. (2017). Comparison of the effectiveness of two different interventions to reduce preoperative anxiety: A randomized controlled study. <i>Nursing & Health Sciences</i> , 19(2), 250-256. doi:10.1111/nhs.12339					Level II
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
The purpose of this study was to determine and compare the effectiveness of nature sounds and relaxation exercises for reducing preoperative anxiety.	A repeated measure randomized controlled trial design was used. The study involved two intervention groups (nature sounds and relaxation exercises) and a control.	<p>Sampling Technique: A total of 159 patients who were about to undergo planned surgery with general anesthesia were randomly divided into three groups: nature sounds (n = 53), relaxation exercises (n = 53), and a control (n = 53).</p> <p># Eligible: Participants who met the following criteria: 18 years of age or older, able to communicate in Turkish, with no hearing or cognitive impairment.</p> <p># Accepted: 159 participants</p> <p># Control: 53 participants</p> <p># Intervention: Divided into 2 groups: nature sounds (53) and relaxation groups (53).</p> <p>Power analysis: A pilot study with 131 patients determined that a sample size of 159 patients would be necessary using power analysis with $\alpha = 0.05$ and $\beta = 0.20$.</p>	<p>Control: The control patients were only exposed to silence in their rooms.</p> <p>Intervention: The first intervention group of patients listened to nature sounds, the second performed relaxation exercises.</p> <p>Intervention fidelity: Permuted-block randomization with sealed envelopes was used to randomly assign the patients to the three groups while ensuring a balanced distribution. To avoid bias, these envelopes were prepared by a person who was not involved in the study.</p>	<p>DV: Anxiety scores within a group were compared.</p> <p>Measurement tool (reliability), time, procedure: Patients' state of anxiety was measured using the Turkish version of the State Anxiety Inventory (SAI). It contains 20 items and uses a four-point Likert scale. Patients were requested to choose one of the four options for each of the 20 items. High scores indicate high anxiety levels. In addition to the SAI, the Visual Analog Scale (VAS) was used to determine the patients' anxiety levels. The VAS consists of a 10 cm line where one end indicates the absence of anxiety and the other indicates severe anxiety.</p>	<p>Statistical Procedures(s) and Results: Base VAS scores in the nature sounds, relaxation exercises, and control groups were 5.75 ± 2.18, 5.61 ± 2.18, and 5.20 ± 2.51, respectively. There was not statistically significant difference in the VAS ($F = 0.822$, $P = 0.441$) or SAI ($F = 2.813$, $P = 0.063$) scores ($F = 2.813$, $P = 0.063$) between the groups. VAS scores immediately after and 30 min after the intervention were lower in the nature sounds and relaxation exercises groups than in the control (3.10 ± 1.68, 3.28 ± 1.80, and 5.44 ± 2.66, respectively; $F = 4.611$, $P = 0.011$). Post hoc analysis also revealed that the control group had higher VAS scores ($P < 0.016$). No statistically significant difference between the nature sounds and relaxation groups was observed ($P =$</p>

		Group Homogeneity: A chi-square test was used to evaluate the homogeneity of the patients in the groups.			0.894). The hypothesis was therefore accepted.
Mohammadi, A., Mirbagher Ajorpaz, N., Torabi, M., Mirsane, A., & Moradi, F. (2014). Effects of music listening on preoperative state anxiety and physiological parameters in patients undergoing general surgery: A randomized quasi-experimental trial. <i>Central European Journal of Nursing and Midwifery</i> , 5(4), 156-160. doi:10.15452/cejnm.2014.05.0011					Level II
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
The study aimed to evaluate the effects of music on preoperative state anxiety and physiological parameters including heart rate, respiratory rate and mean systolic, and diastolic BP in 60 patients undergoing general surgery.	A randomized quasi-experimental trial was performed on patients undergoing general surgery.	Sampling Technique: A simple random sampling method was used. # Eligible: 60 participants # Accepted: 60 participants # Control: 30 participants # Intervention: 30 participants Power analysis: The sample size was calculated using the sample size formula, with a 95% confidence interval and 80% power. Group Homogeneity: Patients undergoing surgery on even and odd days were allocated to the trial and control groups, respectively.	Control: No music Intervention: Those in the trial group listened to non-vocal classical music played together with nature sounds (e.g., sea, rain, and water) through headphones connected to an MP3 player for 20 minutes. Intervention fidelity: Patients undergoing surgery on even and odd days were allocated to the trial and control groups, respectively.	DV: Anxiety scores within a group were compared. Measurement tool (reliability), time, procedure: State anxiety was measured by the State-Trait Anxiety Inventory (STAI) questionnaire and physiological parameters including respiratory rate, heart rate and BP were measured in the two groups by pulse CO-oximeter (Masimo RAD-57C, Finland), and recorded in the medical charts by nurses. The STAI measures two types of anxiety; state anxiety, or anxiety about an event (anxiety absent and anxiety present), and trait anxiety, or anxiety level (anxiety absent and anxiety present) as a personal characteristic. Higher scores are positively correlated with higher levels of anxiety	Statistical Procedures(s) and Results: The results were finally analyzed by SPSS software version 16 using chi-square and independent t-tests with a significance level of 0.95. A significant difference in state anxiety before and after listening to music was observed ($p < 0.01$). After listening to music, state anxiety shifted from 39.1 ± 4.21 to 31.11 ± 3.10 .
Ni, C., Tsai, W., Lee, L., Kao, C., & Chen, Y. (2011). Minimising preoperative anxiety with music for day surgery patients - A randomised clinical trial. <i>Journal of Clinical Nursing</i> , 21(5-6), 620-625. doi:10.1111/j.1365-2702.2010.03466.x					Level II

Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
The objective of this study was to evaluate the effects of a musical intervention on preoperative anxiety and vital signs in patients undergoing outpatient (day) surgery.	A randomized, controlled study was performed.	Sampling Technique: Random sampling of patients scheduled for outpatient surgery. # Eligible: 183 patients # Accepted: 174 patients # Control: 86 patients # Intervention: 86 patients Group Homogeneity: After preoperative registration, a registered nurse took vital signs and administered the STAI, following standardized instructions. A computer-generated list then randomized the patients to receive either musical intervention or control.	Control: No music Intervention: Music delivered by headphones for 20 minutes before surgery. Intervention fidelity: Permuted block randomization was used to assign participants to either.	DV: The primary outcome was a decrease in anxiety level. Measurement tool (reliability), time, procedure: Anxiety was measured with a STAI questionnaire. Vital signs (BP and HR) were also measured before and after a musical intervention. The Chinese STAI was used in this study, and it had been previously validated and exhibited high internal consistency (.90–0.4)	Statistical Procedures(s) and Results: Categorical variables were analyzed using Chi-square analysis/Fisher’s exact test. Paired t-tests in both groups were employed to analyze the results of differences in improvement after intervention. Independent two-sample t-tests were used. Significant decreases in STAI scores from baseline were observed in both groups (both $p < 0.001$). Also, there was a statistically significant difference between the music and control groups ($p < 0.001$). The STAI score decreased by 5.83 and 1.72 in the music and control groups, respectively. Decreases in heart rate, systolic and diastolic blood pressures from baseline were observed in both groups.
Sharma, N., Padam, A., Sastri, O. S., Mahajan, S., & Sharma, R. (2017). Effect of listening to Vedic chants and Indian classical instrumental music on patients Undergoing upper gastrointestinal endoscopy: A randomized control trial. <i>Indian Journal of Psychiatry</i> , 59(2), 214. doi:10.4103/psychiatry.indianjpsychiatry_314_16					Level II
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results

<p>The aim was to analyze the effect of listening to Vedic chants and Indian classical instrumental music on anxiety levels and blood pressure, heart rate, and oxygen saturation in patients undergoing upper GI endoscopy.</p>	<p>A prospective, randomized controlled trial was conducted.</p>	<p>Sampling Technique: Randomized sampling # Eligible: 199 # Accepted: 199 # Control: 66 patients # Intervention: Vedic music group (67 patients) and Instrumental music group (66 patients) Power analysis: alpha was set at 0.05 and power at 0.80, then a sample size of 65 was required for each of the three groups (total n = 195) to detect a medium effect size. Group Homogeneity: The patients who were willing to participate in the study were randomized into three groups by computer-generated numbers.</p>	<p>Control: The patients remained for 10 minutes in the same environment as the intervention groups. Intervention: The intervention was divided into two groups. Group I consisted of 67 patients that were made to listen prerecorded Vedic chants for 10 minutes and group II included 66 patients that listened to Indian Classical instrumental music for 10 minutes.</p>	<p>DV: Preoperative anxiety level and biophysiological parameters between the three groups. Measurement tool (reliability), time, procedure: Participants were asked to complete the STAI pro forma, which is a self-reporting standardized scale comprising two parts, state and trait, used for measuring anxiety level. Biophysiological parameters were recorded in all the patients. BP was measured by the calibrated SSMED sphygmomanometer by tying the BP cuff on the right arm in the sitting position. HR and oxygen saturation are measured by the calibrated SSMED pulse oximeter from the left index finger.</p>	<p>Statistical Procedures(s) and Results: The data analysis and interpretation were done using descriptive statistics such as mean and standard deviation (SD) and inferential statistics such as paired' test, independent t-test, and "Chi-square" test. A significant reduction in anxiety state scores was observed in the patients in Group I (from 40.4 ± 8.9 to 38.5 ± 10.7; P < 0.05) and Group II (from 41.8 ± 9.9 to 38.0 ± 8.6; P < 0.001) while Group III controls showed no significant change in the anxiety scores. A significant decrease in systolic BP (P < 0.001), diastolic BP (P < 0.05), and SpO2 (P < 0.05) was also observed in Group II.</p>
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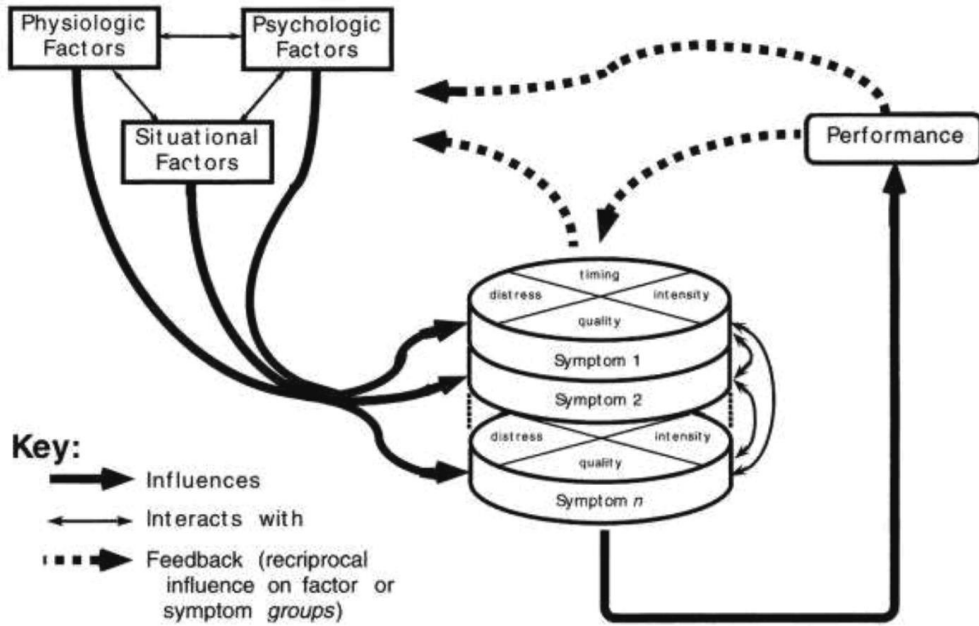
Table 2

Synthesis table: Preoperative anxiety

Evidence-Based Practice Question (PICO): Does listening to music in the preoperative setting have an impact on preoperative anxiety in patients scheduled for GI procedures.			
Level of Evidence	# of Studies	Summary of Findings	Overall Quality
II	4	<p>Ertuğ, Ulusoylu, Bal, & Özgür (2017). Nature sounds and relaxation exercises were found to effectively reduce preoperative anxiety in the intervention groups compared with the control in this study.</p> <p>Mohammadi, Mirbagher Ajorpaz, Torabi, Mirsane, & Moradi (2014) The study indicated that music can be used as a non-invasive therapeutic intervention to reduce preoperative state anxiety and physiological parameters in patients undergoing general surgery.</p> <p>Ni, Tsai, Lee, Kao, & Chen (2011) The result of the study indicate that patients scheduled to undergo elective day surgery may benefit from musical intervention in terms of reduced preoperative anxiety levels and physiological indicators of anxiety.</p> <p>Sharma, Padam, Sastri, Mahajan, & Sharma (2017) The study concluded that endoscopy patients who listen to Vedic chants and/or instrumental music before the procedures shows reduced anxiety scores and improved physiological parameters</p>	<p>B, a power analysis was done for sample size, but blinding of the investigators or patients was not possible because of the nature of the study. Limitations were clearly stated and addressed.</p> <p>A, well-designed study with measures.</p> <p>B, a power analysis was not done to assess adequate sample size for the study. The individuals who collected post-intervention data were aware of who was in each group and this may have biased the results. Limitations were clearly addressed.</p> <p>A, well-designed study with measures.</p>

Figure 1

Framework diagram: *The Theory of Unpleasant Symptoms*



The Middle-Range Theory of Unpleasant Symptoms 2

Figure 2

Run chart showing weekly progress

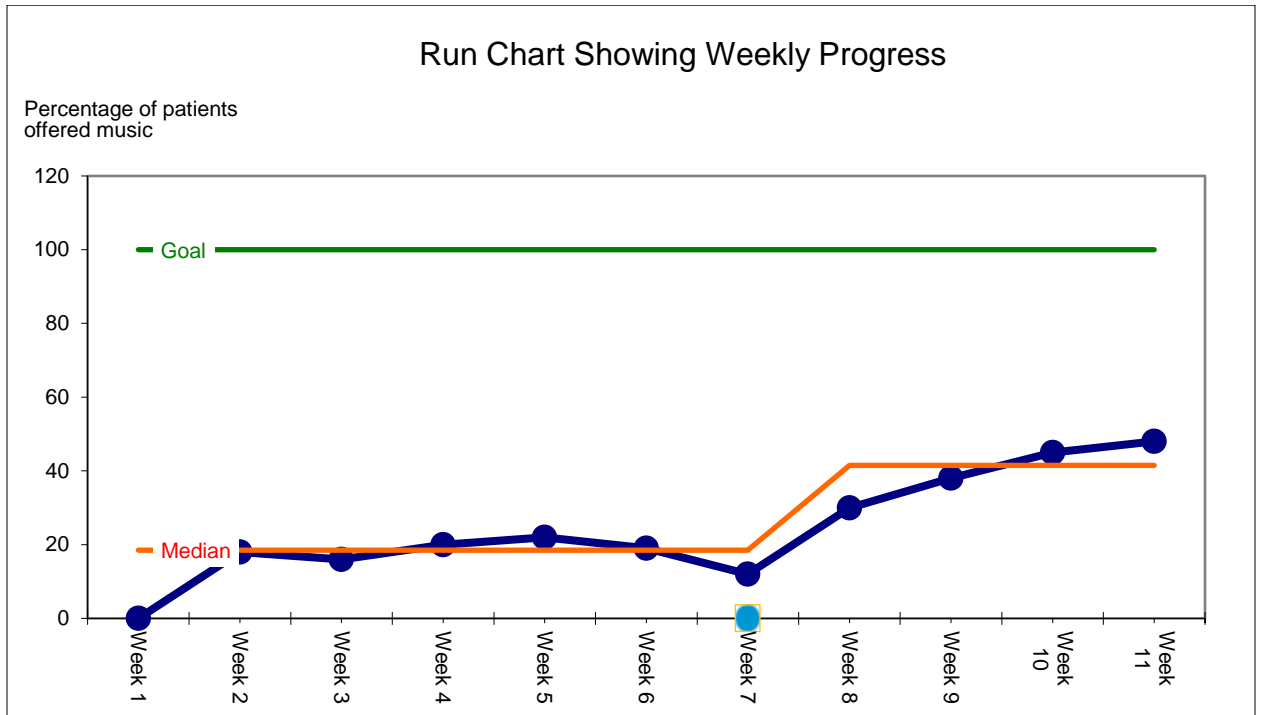
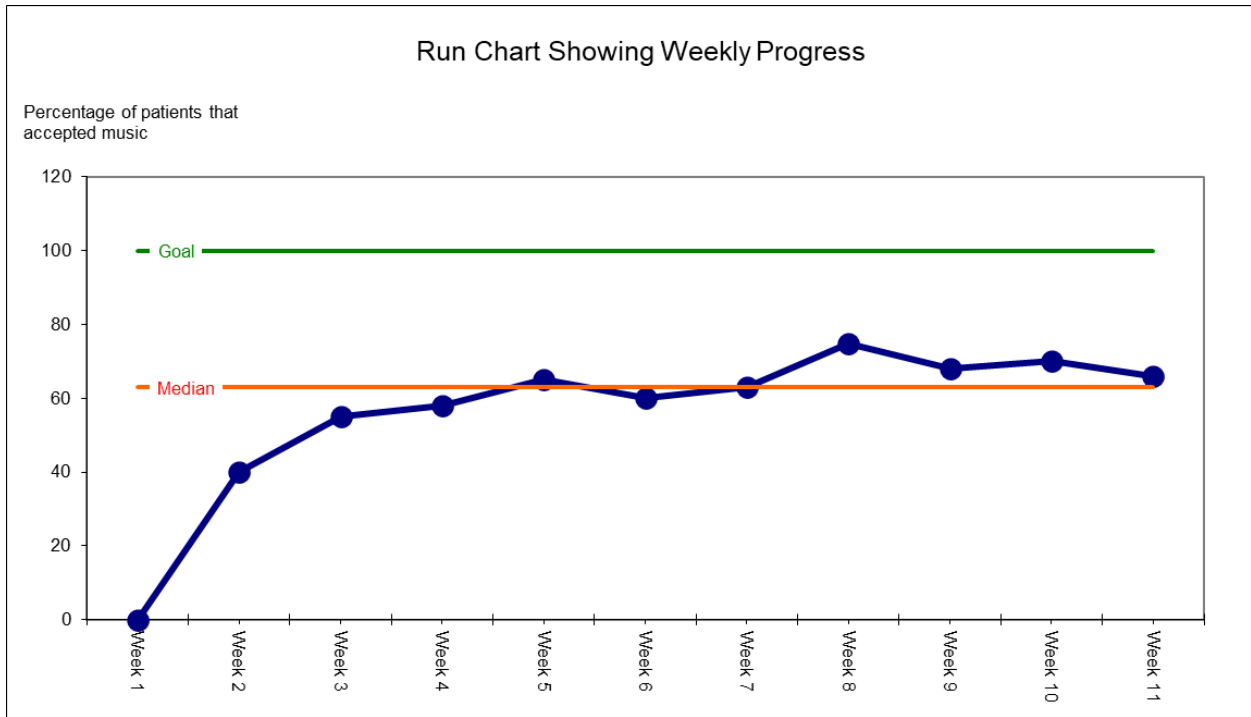
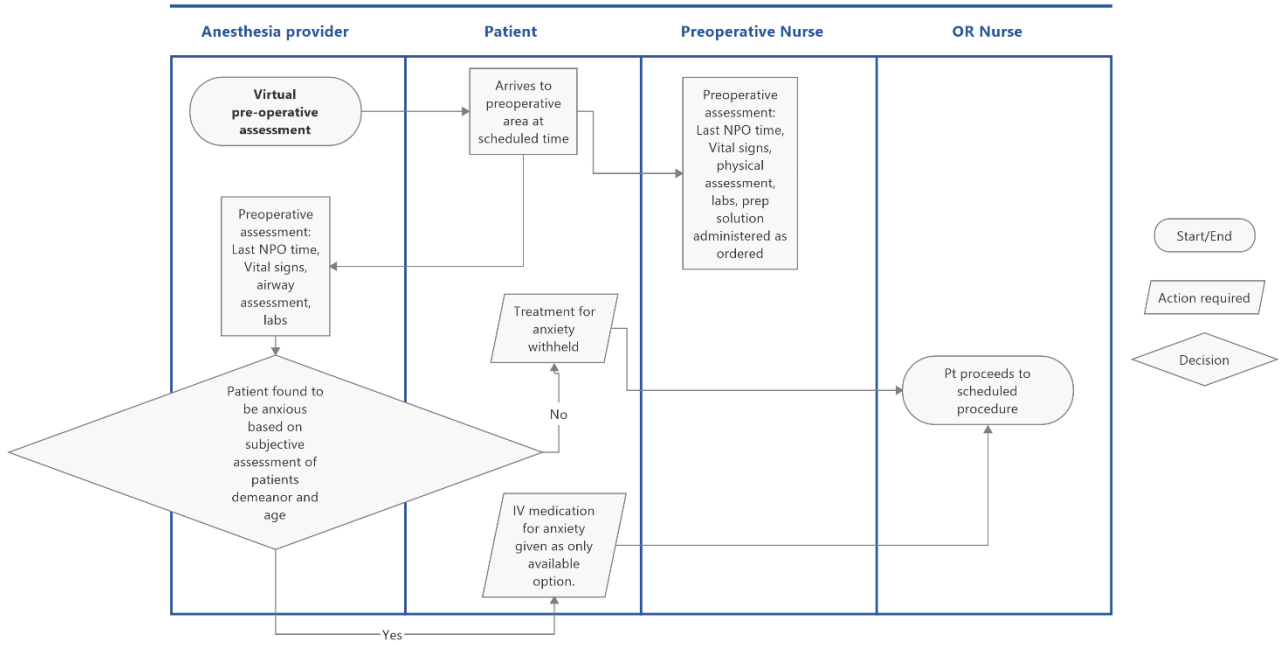


Figure 3



Appendix A

Current Process Map for Patients Scheduled for GI Procedures



Appendix B

Process Map of Desired State

