



## Effectiveness of different music-playing devices for reducing preoperative anxiety: A clinical control study

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### ARTICLE INFO

#### Article history:

Received 21 September 2010

Received in revised form 5 April 2011

Accepted 8 April 2011

#### Keywords:

Anxiety

Preoperative

Surgery

Music therapy

Infection control

### ABSTRACT

**Background:** While waiting for surgery, patients often exhibit fear and anxiety. Music is thought to be an alternative to medication to relieve anxiety. However, due to concerns about infection control, devices other than headphones may be considered for this purpose.

**Objectives:** The purpose of this study was to determine the anxiety-relieving effect of broadcast versus headphone music playing for patients awaiting surgery.

**Design:** A randomized controlled clinical study.

**Setting:** The waiting area of an operating theater of a metropolitan teach hospital in Taiwan.

**Participants:** Alert adult with age between 20 and 65 years old waiting for surgery without premedications.

**Methods:** A total of 167 patients were randomly assigned to the headphone, broadcast and control groups. Both the headphone and the broadcast groups were provided with the same instrumental music, while the control group did not listen to any music. The tools for measuring anxiety were visual analogue scale (VAS) ranging from “not anxious at all” to “extremely anxious” and heart rate variability (HRV).

**Results:** The VAS score exhibited a significant decrease for both the headphone and broadcast groups.

The low frequency and low-to-high frequency LF/HF ratio of the broadcast and headphone groups were significantly lower than those of the control group. None of the heart rate variables showed significant differences between the broadcast group and the headphone group.

**Conclusion:** Both headphone and broadcast music are effective for reducing the preoperative patient’s anxiety in the waiting room.

**Relevance to Clinical Practice:** In order to take infection control into account, broadcast speakers can substitute for headphones for playing music to lower the anxiety level of patients waiting for surgery.

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### What is already known about the topic?

- Music is thought to be an adjunctive process to medication to relieve anxiety.

### What this paper adds

- We found both headphone and broadcast music are effective for reducing the preoperative patient's anxiety in the waiting room.
- Our study provides evidence to support broadcast speakers to be a good substitute for headphones for playing music to lower the anxiety level of patients waiting for surgery when infection control is concerned.

## 1. Introduction

Pre-operative anxiety is among the most unpleasant experiences associated with surgery. An unfamiliar environment, loss of control, perceived or actual physical risk, dependence on strangers, separation from family and friends (Gillen et al., 2008), the threat of death, and possible postoperative complications are factors that may cause patients to feel anxious in the waiting area before surgery (Mitchell, 2003). The waiting period is also the time during which patients are most likely to imagine any potential danger they may face (Cooke et al., 2005; Haun et al., 2001). Preoperative anxiety is characterized by subjective, consciously perceived feelings, of apprehension and tension accompanied by autonomic nervous system arousal, which cause physical and psychological changes, including changes in heart rate, blood pressure, and respiratory rate, as well as feelings of pressure, fear, and uncertainty (Gail, 2005). Anxiety can affect an individual's cognitive abilities and cause discomfort both mentally and physically (Vaughn et al., 2007). This, in turn, may increase postoperative pain, prolong postoperative recovery, and increase the potential for complications (Ozalp et al., 2003; Katz et al., 2005).

Given the potential effects of anxiety, there are strategies to limit patient anxiety and improve comfort levels when waiting for surgical and invasive procedures. It has been reported that even though doctors usually provide anxiolytics or sedatives for patients, most still feel anxious (Duggan et al., 2002). Other research has revealed that patients do not want excessive medication to lower their anxiety, but would rather listen to music or read (Hyde et al., 1998). Among various non-pharmaceutical anxiety-relieving alternatives, music intervention had been reported to have a consistently positive and statistically significant effects on reducing pre-operative anxiety and post-operative pain (Nilsson, 2008). The common theory regarding the anxiety and stress-reducing effect of music is that music acts as a distracter, focusing the patient's attention away from negative stimuli to something pleasant and encouraging (Mitchell, 2003; Nilsson, 2008). Music involves the patient's mind with something familiar and soothing, which allows patient to escape into his or her own world. Patients can focus their awareness on the music to aid relaxation (Thorgaard et al., 2005; White, 2000; White, 2001). Most prior studies used a

compact-disk or cassette player with headphones to listen to music (Gillen et al., 2008). However, re-using headphones among patients raises a concern about nosocomial infection control. Since the organisms causing most nosocomial infections can come from contact with staff (cross-contamination), contaminated instruments and needles, and the environment (exogenous flora), WHO (2002) suggested highly susceptible patients or protected areas such as operating suites need separate cleaning equipment. Though disposable headphones and small plastic sealable bags may help reduce nosocomial infections (Short et al., 2010), it increased extra cost. Therefore, non-contact alternative music delivering devices other than headphones need to be considered out of concern for infection control. The purpose of the present research is to evaluate the effectiveness of broadcast music versus headphone music playing to relieve preoperative anxiety levels of patients in the waiting area of an operating theater.

## 2. Materials and methods

### 2.1. Research design and setting

The present study is a randomized controlled clinical study that took place in the operating theater of a metropolitan teaching hospital in Taiwan. The aim of this study is to evaluate the effectiveness of broadcasting compared with headphone in delivering music intervention to reduce pre-operative anxiety of the patient in holding area of an operation theatre. To contrast the effect of music intervention in our study, control group was considered in addition to broadcasting and headphone groups. The study hospital is JCIA (Joint Commission International Accreditation) certified. It is required to assess patients' anxiety and pain on admission and each significant event such as surgery and procedure. The waiting area is independent, but not completely isolated, from the nursing station. It is 12.6 m × 3.9 m, and it can take seat eight patients simultaneously. The temperature of the room was maintained between 19 and 21 °C.

### 2.2. Sampling and sample size

Patients who were sent to the waiting area between 07:00 and 14:00 were recruited for enrollment. The inclusion criteria were that the patient: (1) was conscious and aged 20–65 years, (2) had not consumed any medications for hypertension or heart disease, or caffeine, sedatives, or operative premedication, (3) had not been diagnosed with hearing impairment, visual impairment, arrhythmias, or heart disease, (4) stayed at least 25 min in the waiting area, and (5) was willing to participate in the study and signed an informed consent form.

We applied random table to divide numbers 1–30 to three groups to determine each day of a month to be 'headphone day,' 'broadcast day' or 'control day'. Subjects who were sent to the operating theater for surgery on 'headphone day' were assigned to the headphone group. The same rule was applied to recruit subjects into the broadcast and control groups.

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