# Effect of Music on Reducing Anxiety for Patients Undergoing Transrectal Ultrasound-Guided Prostate Biopsies: Randomized Prospective Trial

Seong Whi Cho, Hyuck Jae Choi*

**Purpose:** The purpose of this study was to assess the impact of music on anxiety and perceived pain during transrectal ultrasound-guided prostate biopsy.

**Materials and Methods:** Forty consecutive men with an elevated serum prostate specific antigen (PSA) level and/or an abnormal digital rectal examination referred for transrectal ultrasound-guided prostate biopsy were recruited and allocated to a music (n = 20) or a non-music (n = 20) group. Anxiety was assessed prior to and after biopsy and pain was assessed after biopsy in each patient using visual analog scales (VAS) in the same setting, and group anxiety scores were compared.

**Results:** Patients in the music group experienced less anxiety ($P$ = .046) during the procedure, but group pain scores were not significantly different.

**Conclusion:** Music was found to decrease anxiety effectively during transrectal ultrasound-guided prostate biopsy.

**Keywords:** prostatic neoplasms; diagnosis; ultrasonography; interventional/methods; biopsy; pain management; analgesia; anxiety; prevention & control; music therapy; instrumentation.

## INTRODUCTION

The prostate is the most common site of cancer in older males in the US, and transrectal ultrasound-guided prostate biopsy is the standard procedure used to determine the presence of prostate cancer.[1,2] Local anesthesia is usually adopted to reduce anxiety and pain during prostate biopsy, but some studies have reported that a considerable proportion of patients experience significant anxiety and pain.[3,4] Furthermore, it has been suggested that anxiety and pain related to prostate biopsy are influenced not only by physical aspects of the procedure but also by psychological factors.[5] However, no study has previously investigated the use of music to reduce anxiety and pain during prostate biopsy. Accordingly, the aim of the present study was to investigate the impact of music on anxiety and pain during transrectal ultrasound-guided prostate biopsy.

## MATERIALS AND METHODS

Institutional review board approval was not required for this study and written informed consent was obtained from all patients prior to study commencement. The study was performed using a prospective, randomized design on 40 consecutive men suspected of having prostate cancer and scheduled for transrectal ultrasound-guided biopsy from June 2004 to December 2004. The inclusion criteria for the study were an elevated serum prostate specific antigen (PSA) level (≥ 4.0 ng/mL) and/or abnormal digital rectal examination findings. No patient had a history of previous prostate biopsy. Patients with a painful condition of the rectum and/or anus (e.g., hemorrhoids, anal fissure, or clinically evident prostatitis) or a known allergy to prilocaine were excluded from the study; 10 patients were excluded for these reasons. Patients allocated to the music and non-music groups randomly using a computer generated randomization list. Group designations were placed in sealed envelope and allocated consecutively. All study participants and those that assessed outcomes were unaware of group assignments.

Patients in the experimental group chose music before the procedure from a compilation of ballads. Volume and pitch were controlled at a comfortable level. Music was played continuously from before patient arrival until after patient departure. A controlled environment was created to minimize the effects of additional variables. The office door was closed, a “research in progress-do not disturb” sign was posted and lights were turned on. Before biopsy, anxiety was assessed in each subject using a visual analog scale (VAS). Bilateral

Department of Radiology, Kangwon National University Hospital, Chuncheon, Korea.
*Correspondence: Department of Radiology, Kangwon National University Hospital, 156 Baengnyeong-ro, Chuncheon 200-722, Korea.
Tel: +82 33 2582479. Fax: +82 33 2582120. E-mail: choihjmd@gmail.com.
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**Table.** Patient characteristics and visual analog scale scores for music and non-music groups.

| Groups | Prostate Volume ($cm^3$) | Serum PSA (ng/mL) | Age (year) | Visual Analog Scale Score | | | |
|---|---|---|---|---|---|---|---|
| | | | | Anxiety* | Anesthesia | Biopsy | Anxiety** |
| Music (n = 20) | 65.4 ± 49.4 | 16.3 ± 12.2 | 63.4 ± 7.2 | 5.6 ± 1.8 | 5.0 ± 2.2 | 5.6 ± 2.5 | 4.1 ± 2.1 |
| Non-music (n = 20) | 68.1 ± 37.1 | 13.41 ± 11.8 | 59.8 ± 10.9 | 4.2 ± 1.7 | 4.8 ± 2.3 | 5.6 ± 2.4 | 5.0 ± 2.6 |
| *P* value | .246 | .766 | .502 | .046 | .663 | .865 | .303 |

**Abbreviations:** PSA, prostate specific antigen.
* Anxiety before biopsy.
** Anxiety after biopsy.
Values are presented as mean ± standard deviation

periprostatic nerve blockages (PNB) were performed bilaterally using 5 mg of 1% prilocaine into the prostatic vascular pedicle region. Each subject also assessed for pain during anesthesia, biopsy, and immediate after biopsy using a 10 point VAS scale, were 0 indicated "no pain" and 10 indicated "worst pain imaginable". Fluoroquinolone was administered 30-60 min before biopsy and continued for 2-3 days after biopsy.

The primary outcome measures were VAS anxiety and pain scores during prostate biopsy. There was no secondary outcome measure because music therapy has no side effects is easily performed. The Mann-Whiney *U* test was used to compare group scores. *P* values of < .05 were considered statistically significant, and post-hoc powers were calculated.

## RESULTS

Of 50 men that underwent biopsy at our institute during a 7-month period, 40 were randomized equally to the music (n = 20) or non-music (n = 20) groups. The two groups were well-matched, and no significant intergroup differences were found for patient characteristics, which included prostate volume, PSA level, and age (**Table**). A statistical difference was found between VAS anxiety scores before prostate biopsy (*P* = .046) but no significant difference was found between pain scores during anesthesia, during biopsy, or immediately after biopsy (**Table**). Post-hoc power analysis showed statistical power was greatest for pre-biopsy anxiety.

## DISCUSSION

Transrectal ultrasound-guided prostate biopsy is an important component of the urologic armamentarium and is frequently performed in offices and outpatient urology centers worldwide.[1,2] Men undergoing transrectal ultrasound-guided prostate biopsy experience considerable stress, due to fear of a diagnosis of cancer, anal penetration, anticipated pain, and fear associated with the fact that the subject organ is part of the sexual system.[2,6] Music therapy has been demonstrated to be effective in patients before surgery and in medically ill patients[8-13] and to reduce sympathetic nervous system activity, to induce a relaxation response, and to produce a sense of well-being.[11,12] Recently the effectiveness of music therapy has been evaluated for biopsies and other painful procedures and shown to usefully reduce anxiety and pain.[14-17] Furthermore, it has been reported music may increase pain thresholds by promoting relaxation and reducing anxiety[18,19] and to distract patients from worries and anxieties, and thus, reduce pain and distress.[20,21] In the present study, a significant reduction in anxiety was found pre-biopsy step with a statistical power of 72.5%. On the other hand, pain scores were not significantly different in the two study groups, no significant pain reduction was observed in the music group during or immediately after biopsy. Some limitations of this study warrant consideration. First, the number of patients enrolled was small, which we suspect was responsible for the lack of significant differences between pain scores. Second, pain associated with ultrasound probe manipulation and anxiety on arrival at the office were not assessed. Third, we used a VAS scale to evaluate anxiety rather than the Hamilton Anxiety Scale or the Beck Anxiety Inventory, and thus, we suggest that these tools be utilized any future study.

## CONCLUSIONS

In conclusion, this preliminary study suggests music can reduce anxiety before transrectal ultrasound-guided prostate biopsy, and that, although not found to be statistically significant, music has the potential to reduce pain during and after the procedure.

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## CONFLICT OF INTEREST

None declared.

## REFERENCES


1. Cooner WH, Mosley BR, Rutherford CL, et al. Prostate cancer detection in a clinical urological practice by ultrasonography, digital rectal examination and prostate specific antigen. J Urol. 1990;143:1146-54.
2. Collins GN, Lloyd SN, Hehir M, McKelvie GB. Multiple transrectal ultrasound guided prostatic biopsies: true morbidity and patient acceptance. Br J Urol. 1993;71:460-3.
3. Nash PA, Bruce JE, Indudhara R, Shinohara K. Transrectal ultrasound guided prostatic nerve blockage ease systematic needle biopsy of the prostate. J Urol. 1996;155:607-9.
4. Soloway MS, Obek C. Periprostatic local anesthesia before ultrasound guided prostate biopsy. J Urol. 2000;163:172-3.
5. Oliffe J. Transrectal ultrasound prostate biopsy (TRUS-Bx): patient perspectives. Surgeon 2004;2:221-4.
6. Rodrigez LV, Terris MK. Risks and complications of transrectal ultrasound guided prostate needle biopsy: a prospective study and review of the literature. J Urol. 1998;160:2115-20.
7. Zemann DH, Ishigooka M, Doggweiler R, Schimidt RA. Neurological insights into the etiology of genitourinary pain in men. J Urol. 1999;161:903-8.
8. Buers JF, Smyth KA. Effect of a music intervention on noise annoyance, heart rate, and blood pressure in cardiac surgery patients. Am J Crit Care. 1997;6:183-91.
9. Miluk KB, Matejek M, Stupnicki R. The effects of music listening on changes in selected physiological parameters in adult pre-surgical patients. J Music Ther. 1996;33:208-18.
10. Johnston K, Davis RJ. An introduction to music therapy: helping the oncology patient in the ICU. Crit Care Nurs. 1996;18:54-60.
11. Weber S. The effects of relaxation exercises on anxiety levels in psychiatric patients. J holistic Nurs. 1996;14:196-205.
12. Yung PMB, Szeto CK, French P, Chan TMF. A controlled trial of music and pre-operative anxiety in Chinese men undergoing transurethral resection of the prostate. J Adv Nurs. 2002;39:352-9.
13. Chan YM, Lee PW, Ng TY, Wong LC. The use of music to reduce anxiety for patients undergoing colposcopy: a randomized trial. Gynecol Oncol. 2003;91:213-7.
14. Zahid MF. Methods of reducing pain during bone marrow biopsy: a narrative review. Ann Palliat Med. 2015;4:184-93.
15. Shabanloei R, Golchin M, Esfahani A, Dolatkhah R, Rasoulian M. Effects of music therapy on pain and anxiety in patients undergoing bone marrow biopsy and aspiration. AORN J. 2010;91:746-51.
16. Nguyen TN, Nilsson S, Hellström AL, Bengtson A. Music therapy to reduce pain and anxiety in children with cancer undergoing lumber puncture: a randomized clinical trial. J Pediatr Oncol Nurs. 2010;27:146-55.
17. Bufalini A. Role of interactive music in oncological pediatric patients undergoing painful procedures. Minerva Pediatr. 2009;61:379-89.
18. Amir D. Musical and verbal intervention in music therapy: a qualitative study. J Music Ther. 1999;36:144-75.
19. Almerud S, Petersson K. Music therapy: a complementary treatment for mechanically ventilated intensive care patients. Intensive Crit Care Nurs. 2003;19:21-30.
20. Burns JL, Labbe E, Arke B, Capeless K, Cooksey B, Steadman A, Gonzales C. The effects of different types of music on perceived and physiological measures of stress. J Music Ther. 2002;39:101-16.
21. Magil Levreault L. Music therapy in pain and symptom management. J Palliat Care. 1993;9:42-8.