DOI: 10.14744/cm.2024.96158
Comprehensive Medicine 2024;16(3):157-161

RESEARCH ARTICLE

The Effects of Music Therapy on Patients Undergoing Prostate Biopsy

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ABSTRACT

Objective: Transrectal ultrasound (TRUS)-guided biopsy is widely implemented for diagnosing prostate cancer histologically. During this procedure pain and anxiety are common. Music has well-established psychological effects, including the induction and modification of moods and emotions. In this study, we investigated the effectiveness of music therapy on patients' anxiety and pain during prostate biopsy.

Materials and Methods: A total of 88 individuals were randomly divided into two factions. In the music group, patients were allowed to listen to music of their preference, while the control group did not have any music intervention. The Hospital Anxiety and Depression Scale was utilized to measure patient anxiety and depression levels, while Visual Analog Pain Scale was employed to assess pain levels after biopsy.

Results: The control group exhibited higher anxiety than the music group (17.70±2.67, 15.63±2.35, respectively) and the control group exhibited higher depression score than the music group (18.81±2.43, 15.84±2.4, respectively). Both depression and anxiety scores showed statistically significant differences ($p<0.001$ and $p=0.02$, respectively). The pain score of the music group indicated a substantial decline when compared to the control group ($p<0.001$). The mean pain score of the music group was 3.56±1.37 after biopsy procedure, however this value was 6.65±1.19 for the patients in the control group.

Conclusion: The findings of study indicate that listening to music during TRUS-guided biopsy effectively reduces both anxiety and pain levels experienced by individuals. Music is an effective and inexpensive method with no obvious side effects.

Keywords: Anxiety, biopsy, music, pain, prostate

How to cite this article: Gevher F, Akçay M, Coşkun EC, İlktaç A, Özer Y, Karacabay M. The Effects of Music Therapy on Patients Undergoing Prostate Biopsy. CM 2024;16(3):157-161

INTRODUCTION

In terms of occurrence, prostate cancer holds the second position among cancers affecting men and represents 15% of all cancer diagnoses.[1] Prostate biopsy is recognized as the primary urological procedure for men who exhibit elevated serum prostate-specific antigen (PSA) levels or abnormal findings during digital rectal examination. The utilization of this procedure is vital in facilitating the accurate histological diagnosis of prostate cancer.[2] There are some biopsy options. According to the recent European Association of Urology (EAU) guidelines, transperineal biopsy is recommended as the first step due to the lack of infectious complications in comparison with TRUS biopsy if it is feasible.[3] On the other hand, cognitive transrectal ultrasound (TRUS)-guided biopsy is still widely implemented all around the world.

Music is extensively acknowledged for its well-established psychological effects, which encompass its capacity to induce and modulate various moods and emotions. It has been shown that music relaxes patients and relieves anxiety and pain during various surgical procedures.[4] Music leads to the activation of the cingulo-frontal cortex by distracting the patient and reduces pain perception via pain modulation and attention shifting.[5,6] In addition to its analgesic and anxiolytic effects; it is a safe, cheap, and noninvasive method.[7]

The number of studies investigating the effect of music on patients during prostate biopsy is limited and the results are conflicting. In this study, we investigated the effectivity of musical intervention throughout TRUS-guided prostate biopsy on patients' anxiety and pain.

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Received date: 17.03.2024
Revised date: 25.06.2024
Accepted date: 02.07.2024
Online date: 01.08.2024

MATERIALS and METHODS

Men who underwent TRUS-guided biopsy due to elevated PSA and/or abnormal digital rectal examination between April and November 2021 were prospectively enrolled in the study. Exclusion criteria were hearing loss, history of previous prostate biopsy or any kind of anorectal problem, patients ≤40 years old, patients ≥80 years old, and using analgesics 24 hours before the biopsy. Baseline characteristics of the patients were mentioned in Table 1. A total of 88 patients were randomly divided into 2 groups as the music group and the control group. 44 patients were selected for each group. These two groups were determined by simple randomization. In the music group, patients were provided with the opportunity to listen to music of their own choice throughout the procedure. Patients in the control group underwent a biopsy without listening to any music. The patients listened to music from a portable speaker with Bluetooth that we provided. Patients were placed in a lateral decubitus position and Lubragel, 2% lidocaine gel, was administered as a local anesthetic into the rectum 10 minutes before the biopsy in both groups. Music began to play before the administration of the gel and continued playing throughout the biopsy. A 12-core needle biopsy was performed in all procedures and samples were taken from the lateral and medial sides of the base, apex, and mid-gland of bilateral prostate lobes. In patients with Prostate Imaging–Reporting and Data System (PI-RADS) 3, 4, or 5 lesions on multi-parametric Magnetic Resonance Imaging (mpMRI), additional biopsies were performed with cognitive fusion from these lesions. All biopsies were performed by the same surgeons with an 18G disposable core tissue biopsy needle with a biopsy instrument (Bard Magnum; Murray Hill, New Jersey, USA). The Hospital Anxiety and Depression Scale (HADS) and Visual Analog Scale (VAS) questionnaires were administered to the patients after the biopsy. HADS is used for the assessment of the depression and anxiety of the patients.[8] A validated Turkish HADS questionnaire was used for the assessment which included seven questions specifically designed to evaluate anxiety levels and an additional set of seven questions to assess depression levels.[9] The scoring for these questions was conducted separately in order to analyze anxiety and depression as distinct variables. For both scales, scores of less than 7 indicate no anxiety, scores between 8–10 indicate mild, scores between 11–14 indicate moderate and scores between 15–21 indicate severe anxiety and depression. VAS measures the satisfaction and pain of patients during the procedure. It has a scale of 0 to 10. Patients mark a point on the scale; 0 points indicate 'no pain', and 10 points indicate the 'worst pain imaginable'. HADS and VAS scores of patients were calculated for both groups. Before participating in the study, all patients were required to provide written informed consent. Institutional Ethics Committee approval was obtained on February 16, 2021, with approval number 03/70. The study was conducted in line with the principles of the "Helsinki Declaration".

Statistical Analysis

To detect a difference of 2.5 points between means, with a significance criterion (α) of 0.05, 95% confidence interval, and a standard deviation of 2.5, a sample size of 44 patients was determined to be necessary in each group to achieve a power of 80%. Data were analyzed with IBM SPSS 22.0 package program. Statistical significance was determined using an independent t-test. To define the direction and degree of inter-variable relationships Spearman Correlation analysis was used. Mann-Whitney U test was used to look at the mean difference of parameters between two independent groups in the study and $p<0.05$ was considered statistically significant. We did not perform any statistical test for the distribution of data.

RESULTS

There were no significant differences noted between the music and control groups regarding demographic or clinical characteristics. The mean age of the patients in the music group was 64.06±7.45 years and mean age of the patients in the control group was 65.43±7.75 years. There was no significant difference between these two groups (p=0.517).

The mean PSA value was 11.76±15.9 ng/dl and 10.99±9.89 ng/dl for the music and control groups, respectively. There was no significant difference between these two groups as well (p=0.408). The mean number of cores obtained during the biopsy procedure was similar in music and control groups (12.48±1.33, 12.29±1.69, respectively). There was no significant difference (p=0.587). The mean prostate volume of patients in the music group was 93.88±60.46 and the mean prostate volume of patients in the control group was 89.05±61.59. There was no significant difference in terms of prostate volume (p=0.626).

Both depression and anxiety scores on the HADS questionnaire were significantly higher in the control group in comparison with the music group (p<0.001 and p=0.02, respectively). The control group exhibited higher anxiety than the music group (17.70±2.67, 15.63±2.35, respectively) and the control group exhibited higher depression score than the music group (18.81±2.43, 15.84±2.4, respectively). The pain score of the music group indicated a substantial decline when compared to the control group (p<0.001). The mean

Table 1. Baseline characteristics of the patients

	Music group (n=44)	Control group (n=44)	p
Mean age (years)	64.06±7.45	65.43±7.75	0.517
Mean Prostate volume (ml)	93.88±60.46	89.05±61.59	0.626
Mean PSA (ng/dl)	11.76±15.90	10.99±9.89	0.408
Number of cores	12.48±1,33	12.29±1.69	0.587

PSA: Prostate specific antigen

pain score of the music group was 3.56±1.37 after the biopsy procedure, however this value was 6.65±1.19 for the patients in the control group (Table 2).

DISCUSSION

Transrectal ultrasound-guided biopsy is an important diagnostic method for the detection of prostate cancer. During the procedure, despite local anesthesia and lubrication, patients may still experience pain, discomfort, and anxiety. Approximately, 1 in every five patients reported having unacceptable pain, a VAS score of 8–10, during TRUS biopsy.[10] Nowadays, music is accepted as a cheap and effective way for decreasing anxiety and pain during a lot of endoscopic and surgical interventions. But still, it is not easy to assure if music has a real effect on pain.[11] Music reduces sympathetic nervous system activity, provides a relaxation reaction in the body, and constitutes well-being feelings.[12,13] In this study, we conducted an evaluation of the impact of listening to music during the TRUS biopsy procedure. The results revealed that the music group exhibited significantly lower anxiety, depression, and pain scores in comparison to the control group.

In the literature, the number of studies investigating the effect of listening to music on pain and anxiety during the prostate biopsy is limited and the results are contradictory. Lee et al.[14] compared 47 patients who listened to music with noise-canceling headphones with 47 patients who wore noise-canceling headphones but did not listen to music during the biopsy. They found that patients who listened to music had significantly lower anxiety and pain scores. Also, patients' satisfaction and willingness to repeat the procedure were higher in patients who listened to music. Chang et al.[15] reported similar results in patients who listened to classical music through a headset during the biopsy. On the other hand, Tsivian et al.[16] evaluated 88 patients randomized into 3 groups as the control group, noise canceling headphone group, and music group, and reported no difference in anxiety and pain scores between the groups after the TRUS biopsy. Cho and Choi[17] reported no significant difference in pain scores between music and control groups.

Table 2. Comparison of music group and control group

	Music group	Control group	p
Mean VAS score	3.56±1.37	6.65±1.19	<0.001
Mean depression score	15.84±2.4	18.81±2.43	<0.001
Mean anxiety score	15.63±2.35	17.70±2.67	0.02

VAS: Visual analog scale

TRUS biopsy is usually performed under local anesthesia but, it can still be a very unpleasant experience for many men. Pain is common among patients during this procedure and patients who decide to undergo a biopsy may experience remarkable anxiety.[18,19] Patients may not accept to undergo the biopsy or may demand to have the biopsy under general anesthesia due to these concerns. Pain during the prostate biopsy occurs mainly during two stages. First, the insertion of the ultrasound probe may cause pain by mechanically stretching the anal sphincter. Second, patients may feel pain during the passage of the biopsy needle through the rectum and prostate.[20] There are different methods used for reducing pain, like intrarectal local anesthetic gel or peri-prostatic block. Peri-prostatic block is recommended due to the recent guidelines.[3] However, it can be a discomforting situation for an awake patient as it requires lithotomy position and the exposure to another needle pain in the perineum, which is a sensitive area. That's why we applied only local anesthetic gel into the rectum 10 minutes before biopsy. Chang et al.[15] and Packiam et al.[21] used only local gel applications for anesthesia just like we did; on the other hand, in some studies, periprostatic injections and/or intravenous Pethidine were used.[14,16,17,22,23]

Packiam et al.[21] reported that music did not have any positive effect on anxiety and pain in their randomized study. Belgi et al.[24] performed a systematic review about the role of music in TRUS biopsy and reached the conclusion that music had positive effects on anxiety and pain control. In a recent meta-analysis, it is stated that music has a beneficial impact on several outpatient urological procedures like shock wave lithotripsy, urodynamics, TRUS biopsy, percutaneous nephrostomy tube placement, and cystoscopy.[7] Chiu et al.[22] used a simulation education process in addition to music which involves giving information to patients one-on-one about preparations before biopsy, the process of biopsy, and complications. Patients in the control group did not listen to music during the procedure and had only standard nursing care. Anxiety and pain scores

were significantly lower in the music+simulation group. In a similar study, the experimental group watched a 5-minute animation video providing information about the details of the biopsy, and also, listened to the music of their preference during the procedure. Anxiety and pain scores were significantly lower in the experimental group compared to the control group.[23] In our study, the same standard information about the TRUS biopsy was given to both groups before the procedure. But we did not use any animation or video.

It is difficult to standardize the studies investigating the relationship between music and pain during TRUS biopsy. Song selection criteria, method of listening and anesthesia techniques differ between studies. In 3 studies the music preferred by the patient was played.[14,17,23] However, in some studies the choice of music was made by the physician.[15,16,21,22] In 4 studies headphones were used to deliver music.[14–16,22] However, Cho and Choi,[17] Packiam et al.,[21] and Turgut and Ozgur [23] used no headphones. In a meta-analysis evaluating the role of music on postoperative recovery, it was reported that playing the music chosen by the patient or the physician had no significant effect on anxiety and pain scores.[4] We didn't use headphones in our study as we believe it may cause miscommunication between the physician and the patient. Also, we believe that the patient should determine the music to be played during the procedure. It can be assumed that different kinds of music genres can have different effects on pain perception and anxiety, but in a recent study that included 415 volunteers, it has been shown that for people who are exposed to a painful stimulus; choosing the music to be played during the procedure in line with the person's own tastes and preferences is potentially more advantageous in terms of increasing the pain threshold and decreasing the perception of pain.[25] It is meaningless to force a patient to listen to a song he doesn't like during a painful medical procedure.

Since the State-Trait Anxiety Inventory was being used in all of the studies to measure the impact of music on anxiety in patients undergoing TRUS biopsy; we preferred to use HADS which is a short and simple questionnaire that evaluates both depression and anxiety. This is the only study using HADS to investigate the effects of music on TRUS biopsy patients.

This study has some limitations. It is not a blind study and this may cause bias. Prebiopsy baseline VAS and HADS scores were not determined. Also, parameters like blood pressure, heart rate, and oxygen saturation levels were not investigated in this study. We did not evaluate if the number of cores taken from the prostate affected the anxiety or pain scores. Except these, due to the lack of accessibility of MR fusion biopsy and lack of experience with transperineal biopsy; we did not perform transperineal biopsy with/without MR fusion.

CONCLUSION

The findings of our study indicate that the act of listening to music during TRUS-guided biopsy effectively reduces both anxiety and pain levels experienced by individuals. Music is an effective and inexpensive method with no obvious side effects. Additional studies are needed about this subject.

Disclosures

Ethics Committee Approval: The study was approved by the Bezmialem Vakıf University Non-Interventional Clinical Research Ethics Committee (No: 03/70, Date: 16/02/2021).

Authorship Contributions: Concept: F.G., A.İ., M.A.; Design: E.C.C., F.G., A.İ.; Supervision: M.A., Y.Ö., M.K.; Data Collection or Processing: M.K., Y.Ö., E.C.C.; Analysis or Interpretation: F.G., A.İ., M.A.; Literature Search: E.C.C., Y.Ö., M.K.; Writing: F.G., A.İ., E.C.C.; Critical review: M.A., Y.Ö., M.K.

Conflict of Interest: No conflict of interest was declared by the authors.

Informed Consent: Written informed consent was obtained from all patients.

Use of AI for Writing Assistance: The authors declared that they did not use AI during the preparation of the manuscript.

Financial Disclosure: The authors declared that this study received no financial support.

Peer-review: Externally peer reviewed.

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