BREAST BIOPSY: The Effects of Hypnosis and Music

ARNOLDO TÉLLEZ, TERESA SÁNCHEZ-JÁUREGUI, AND DEHISY M. JUÁREZ-GARCÍA

Universidad Autónoma de Nuevo León, Monterrey, México

MANUEL GARCÍA-SOLÍS

Hospital Metropolitano “Dr. Bernardo Sepúlveda”, Monterrey, México

Abstract: The authors evaluated the efficacies of audio-recorded hypnosis with background music and music without hypnosis in the reduction of emotional and physical disturbances in patients scheduled for breast biopsy in comparison with a control group. A total of 75 patients were randomly assigned to 3 different groups and evaluated at baseline and before and after breast biopsy using visual analog scales of stress, pain, depression, anxiety, fatigue, optimism, and general well-being. The results showed that, before breast biopsy, the music group presented less stress and anxiety, whereas the hypnosis with music group presented reduced stress, anxiety, and depression and increased optimism and general well-being. After the biopsy, the music group presented less anxiety and pain, whereas the hypnosis group showed less anxiety and increased optimism.

Breast cancer is the second-most prevalent type of cancer in the world and is the most common cancer in women. It is estimated that 1.67 million new cases were diagnosed in 2012, and this figure corresponds to 25% of all types of cancer (Ferlay et al., 2012).

Early detection of breast cancer through physical examination and imaging studies in individuals who do not yet have symptoms allows for medical treatment in the early stages of the disease, thus reducing mortality rates (Bleyer & Welch, 2012). Physicians decide to perform breast biopsies by relying on mammographic findings based on the classification established by the Breast Imaging Reporting and Data

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Address correspondence to Arnoldo Tellez, Facultad de Psicología y Unidad de Psicología de la Salud del Centro de Investigación y Desarrollo en Ciencias de la Salud (CIDICS), Universidad Autónoma de Nuevo León, Av. Gonzalitos y Dr. Canseco col, Mitrás Centro, Monterrey, Nuevo León, México, CP66460. E-mail: arnoldo.tellez@uanl.mx
System (BI-RADS) for lesions with suspicion of malignancy (Burnside, Chhatwal, & Alagoz, 2012).

Patients who do not have a clear diagnosis in mammography and who have to undergo additional studies including ultrasound or breast biopsy exhibit anxiety associated with the pain and uncertainty of a possible cancer diagnosis (Brett, Bankhead, Henderson, Watson, & Austoker, 2005). Other studies show that patients who underwent biopsies experience anxiety and depression before and after the surgical procedure with a negative impact on their quality of life (Iwatani, Matsuda, Kawabata, Miura, & Matsushima, 2013; Kamath et al., 2012). Factors that predict preoperative distress include concern regarding the procedure itself, the possibility of a positive diagnosis of cancer, and patients’ degree of optimism. For this reason, different therapeutic interventions are necessary to reduce distress and to strengthen optimism (Montgomery et al., 2003).

Hypnosis can be very effective as a therapeutic tool in medical contexts because it focuses on the mind-body relationship and its effects on health and disease (Wahbeh, Elsas, & Oken, 2008). Clinical hypnosis or hypnotherapy has been defined by Division 30 of the American Psychological Association (APA) as “the use of hypnosis in the treatment of a medical or psychological disorder or concern” (Elkins, Barabasz, Council, & Spiegel, 2015, p. 7). It has been found that a single 15-minute hypnosis session with suggestions aimed at increasing relaxation before entering a breast biopsy surgery not only significantly reduces anxiety and depression levels and increases relaxation (Schnur et al., 2008) but also decreases the intensity of pain, fatigue, nausea, emotional distress, and the use of medications after surgery (Montgomery et al., 2007).

Similarly, music has been used in oncology to manage symptoms associated with the disease and treatment of side effects. This technique, in which the patient simply listens to prerecorded music provided by medical staff, has been called music medicine. It has been found that this technique can have a beneficial effect on anxiety, pain, mood, and quality of life (Bradt, Dileo, Grocke, & Magill, 2011). It has also been found that music has a positive effect on reducing anxiety before breast biopsy and other surgical procedures (Bradt, Dileo, & Shim, 2013; Lee, Chao, Yiin, Chiang, & Chao, 2011).

The objective of the present work is to evaluate the effects of an audio-recorded hypnotic intervention with background music (H + M) and recorded music (M) on stress, pain, anxiety, depression, fatigue,
optimism, and well-being before and after breast biopsy, compared with a control group.

**Method**

A randomized experimental design was used in this study. A total of 75 women scheduled for breast biopsy, all of Mexican nationality and ranging between 35 and 70 years of age, agreed to participate. Patient demographic data are shown in Table 1. Patients who underwent a biopsy or had a previous diagnosis of cancer were excluded from this study. A total of 13 patients were eliminated due to cancellation of the biopsy procedure, which prevented assessment completion.

**Instruments**

*Visual Analog Scale (VAS).* This visual analog scale in the form of a thermometer is based on the distress instrument developed by Roth et al. (1998). Its scores range from 0 to 10, where 0 represents the absence of emotion and 10 the maximum of perceived emotion. These thermometers are used to assess the following: stress, depression, pain, anxiety, and fatigue, in addition to optimism and general well-being.

**Procedure**

The study was approved by the Bioethics Committee of the Bernardo Sepúlveda Hospital of the Secretariat of Health of the state of Nuevo León. Randomization was performed by means of an MS Excel program. This program provided a list assigning patients to each group.
Patients scheduled for biopsy received standard hospital care and were referred to the psychology team by the lead surgeon of the breast clinic. Recruiters invited patients to participate in the study. After agreeing to participate, patients signed the informed consent form and were assigned to the corresponding group according to the random list. All the patients individually answered the VAS for each psychological variable. The patients in the H + M group listened to a 17-minute recorded script with hypnotic suggestions directed at promoting relaxation and reducing anxiety and pain through dissociation and healing suggestions, in addition to posthypnotic suggestions for well-being and physical recovery, with background new age music (A Summer’s Day by Aeoliah and Mike Rowland). The script was prepared by the first author (see Appendix 1), a hypnotherapist with more than 20 years of experience in the implementation of clinical hypnosis and certification from the Mexican Council of Clinical Hypnosis. Patients in the M group listened to the same background music for the same duration but without the hypnotic suggestions. The control group (C) received standard care, remaining in the waiting room for 17 minutes. After intervention and prior to the biopsy, patients again completed the VAS. Subsequently, all the patients underwent Trucut (Biopsy System Bard) needle biopsy guided by palpation, ultrasound, or stereotaxy, and, after the procedure, they completed a third evaluation with VAS.

**Statistical Analysis**

Rather than using raw scores, change scores were used in this study. Change scores were obtained by calculating the difference between the baseline scores and the scores obtained after the intervention before the biopsy ($X_2 - X_1$) and the baseline data and the scores obtained after the biopsy ($X_3 - X_1$).

Comparison analyses between groups were performed through the Kruskal-Wallis nonparametric test, using SPSS 17 (SPSS, Inc., 2008 with change scores. A post hoc analysis using the Mann-Whitney $U$ test was performed to compare each intervention group with the control group. The $p$ value was .05; because various tests were conducted during the post hoc analysis, a modified version of the Bonferroni method named the Simple Interactive Statistical Analysis Bonferroni tool (SISA) (Uitenbroek, 1997) was used to reduce the probability of Type I error, resulting in a corrected $\alpha = 0.013$. Additionally, the effect size was obtained through the value of the correlation coefficient ($r$) with the following formula:

$$r = \frac{z}{\sqrt{N}}.$$  (Fritz, Morris, & Richler, 2012)  (1)
Results

Change scores obtained before biopsy ($X_{2-X_1}$) showed significant differences among the three groups, with reductions in the variables of stress, pain, depression, and anxiety and increases in optimism and well-being (see Figure 1). After the biopsy ($X_{3-X_1}$), a significant reduction in the pain and anxiety scores remained, in addition to increased optimism (see Figure 2).

Post hoc analyses showed that the M group presented a significant reduction in stress and anxiety before the biopsy in comparison with the control group. The H + M group presented a significant reduction in the
variables of stress, depression, and anxiety and an increase in optimism and well-being in comparison with the control group (see Table 2).

After the biopsy, the results showed that the M group had a significant reduction in pain and anxiety whereas the H + M group showed a reduction in anxiety and an increase in optimism (see Table 3).

**Discussion**

Biopsy to rule out breast cancer produces anxiety in most patients (Miller et al., 2014). Recently, nonpharmacological techniques have been implemented to reduce or eliminate these adverse emotional effects (Montgomery et al., 2007; Park et al., 2013). The results of this study show that conducting a single 17-minute session of recorded hypnotic suggestions with background music or a music session of the same length significantly reduce stress and anxiety before biopsy. These results are consistent with those of Lee et al. (2011), who found that a 10-minute music session significantly reduced preoperative anxiety. Similarly, Schnur et al. (2008) use hypnosis prior to surgery, reducing emotional distress, depression, and anxiety and increasing relaxation.

In addition, the H + M group presented a reduction in depression and an increase in optimism and well-being. These data indicate that hypnotic suggestions plus music produce an additional benefit in psychological well-being prior to a biopsy.

With regard to perceived pain after the biopsy, there are no significant changes between the M and H + M groups. Nonetheless, when compared with the control group, only the M group presents significantly less pain. This result is unexpected because several studies have shown the analgesic effect of hypnosis (Lew, Kravits, Garberoglio, & Williams, 2011; Montgomery et al., 2007). This result may be due to differences in the types of suggestions employed. It is important to note that the differences between the H + M group and the control group have an effect size of \( r = .27 \), which corresponds to a medium effect size. Some authors consider this effect size to be clinically significant (Norman, Sloan, & Wyrwich, 2003; Sloan, 2003; Sloan, Cella, & Hays, 2005), although statistical significance is not reached, most likely due to the low number of participants.

Other studies have shown that music interventions and hypnosis with music are effective in reducing pain and fatigue, without significant differences between both techniques (Nilsson, Rawal, Enqvist, & Unosson, 2003; Nilsson, Rawal, Uneståhl, Zetterberg, & Unosson, 2001).

The increase in optimism observed in the H + M group after the biopsy may be considered to be of importance because inferences made regarding what may happen in the near or remote future are essential
<table>
<thead>
<tr>
<th></th>
<th>Hypnosis + Music</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Control $n = 18$</td>
<td>Change Score</td>
<td>$z (p)$</td>
<td>$r$</td>
<td>Music $n = 20$</td>
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<tr>
<td>Stress</td>
<td>0.38 (1)</td>
<td>−4 (2.8)</td>
<td>−4.2 (.000)</td>
<td>−.65</td>
<td>−3.2 (2.9)</td>
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<tr>
<td>Pain</td>
<td>−0.22 (1.8)</td>
<td>−1.3 (1.9)</td>
<td>−2.01 (.044)</td>
<td>−.31</td>
<td>−1.7 (2.4)</td>
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<tr>
<td>Depression</td>
<td>−1 (2)</td>
<td>−3.1 (3.1)</td>
<td>−2.4 (.013)</td>
<td>−.37</td>
<td>−0.90 (3.3)</td>
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<tr>
<td>Anxiety</td>
<td>−0.22 (2.6)</td>
<td>−4.5 (3.1)</td>
<td>−4.10 (.000)</td>
<td>−.64</td>
<td>−3.3 (3.1)</td>
</tr>
<tr>
<td>Fatigue</td>
<td>−1 (2.3)</td>
<td>−1.5 (3.1)</td>
<td>−0.849 (.396)</td>
<td>−.13</td>
<td>−2.6 (3.3)</td>
</tr>
<tr>
<td>Optimism</td>
<td>−0.33 (1)</td>
<td>1.3 (1.7)</td>
<td>−3.63 (.000)</td>
<td>−.56</td>
<td>0.40 (1.1)</td>
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<td>Well-being</td>
<td>0.61 (2.1)</td>
<td>2.3 (2.7)</td>
<td>−2.63 (.008)</td>
<td>−.40</td>
<td>1.7 (3)</td>
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Table 2
Post Hoc Results After Intervention and Before Biopsy
Table 3
Post Hoc Results After Biopsy

<table>
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<tr>
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<th>Hypnosis + Music</th>
<th></th>
<th>Music</th>
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<td>Control (n = 18)</td>
<td>Change Score</td>
<td>z (p)</td>
<td>r</td>
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<td>Stress</td>
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<td>−1.5 (4.2)</td>
<td>−4.4 (4.0)</td>
<td>−2.2 (.025)</td>
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<td>Pain</td>
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<td>2.2 (3.1)</td>
<td>0.75 (3.9)</td>
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<tr>
<td>Depression</td>
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<td>−2.7 (3.9)</td>
<td>−3.7 (3.8)</td>
<td>−0.865 (.387)</td>
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<td>Anxiety</td>
<td></td>
<td>−0.61 (3.2)</td>
<td>−4.1 (3.3)</td>
<td>−2.93 (.003)</td>
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<tr>
<td>Fatigue</td>
<td></td>
<td>−0.11 (2.3)</td>
<td>−0.50 (4.3)</td>
<td>−0.837 (.403)</td>
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<td>Optimism</td>
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<td>1.6 (2.1)</td>
<td>−2.50 (.012)</td>
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<tr>
<td>Well-being</td>
<td></td>
<td>0.27 (3)</td>
<td>2.3 (2.7)</td>
<td>−2.39 (.017)</td>
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</table>
for making decisions in the present and taking actions to avoid the risk of damage or to obtain certain benefits (Sharot, 2011). High levels of optimism have been associated with the use of active coping strategies, less anxiety, less depressive symptoms, less despair, and a better quality of life (Applebaum et al., 2014; Mera & Ortiz, 2012). Conversely, high levels of pessimism have been associated with increased mortality in the general population (Brummett, Helms, Dahlstrom, & Siegler, 2006). Consequently, future research should evaluate the long-term effects of hypnotic suggestions on optimism.

The study limitations relate to the small sample size, the lack of the concealment allocation sequence in the procedure, and the absence of assessment regarding each patient’s hypnotic susceptibility. Furthermore, emotional thermometers, even when validated, are essentially a form of tracking; thus, if an accurate diagnosis of any of the variables is required, then additional scales should be applied (Sloan et al., 2006).

Despite these limitations, the present study shows that music and hypnosis with music benefit patients scheduled for breast biopsy by reducing the anxiety generated by the procedure. The works cited above show the effectiveness of brief hypnotic interventions performed “in vivo.” However, recorded hypnotic interventions can be conducted in public hospital institutions with limited financial resources because of their efficacy, ease of use, and low cost.

The use of effective techniques for the proper handling of emotional distress, which, as in the case of hypnosis or music, are easy to use, is highly recommended in patients who are scheduled for any type of breast biopsy, especially during the waiting time before entering any tissue sampling procedure.

References


Arnheldo Téllez, Teresa Sánchez-Jáuregui, Dehisy M. Juárez-García, und Manuel García-Solís


Stephanie Reigel, MD
Biopsie du sein : les effets de l'hypnose et de la musique

Arnoldo Téllez, Teresa Sánchez-Jáuregui, Dehisy M. Juárez-García et Manuel García-Solís

Résumé: Dans le cadre d’une étude contrôlée, les auteurs ont comparé l’efficacité de l’administration de suggestions hypnotiques enregistrées avec musique de fond et celle de l’écoute de musique non accompagnée d’hypnose dans la réduction de perturbations émotionnelles et physiques chez des patientes en attente d’une biopsie du sein. Un total de 75 patientes ont été aléatoirement réparties en 3 groupes et évaluées au début de l’étude, puis tout juste avant et après la biopsie à l’aide d’échelles visuelles analogiques évaluant le degré de stress, de douleur, de dépression, d’anxiété, de fatigue, d’optimisme et de bien-être général. Les résultats ont montré qu’avant la biopsie, la musique avait réduit le stress et l’anxiété des patientes du groupe n’ayant pas reçu de suggestion hypnotique, tandis que l’hypnose avec musique avait réduit le niveau de stress, d’anxiété et de dépression des patientes du groupe ayant reçu des suggestions hypnotiques avec musique, en plus d’accroître leur optimisme et leur bien-être général. Après la biopsie, on a signalé une diminution de l’anxiété et de la douleur chez les patientes du groupe ayant écouté de la musique sans suggestion hypnotique, alors que les patientes ayant reçu une suggestion hypnotique avec musique ont présenté une baisse de leur anxiété et une hausse de leur niveau d’optimisme.

Biopsia de seno: Los efectos de hipnosis y música

Arnoldo Téllez, Teresa Sánchez-Jáuregui, Dehisy M. Juárez-García, y Manuel García-Solís

Resumen: Los autores evaluaron la eficacia de una audio grabación hipnótica con música de fondo y otra de música sin hipnosis en la reducción de perturbaciones emocionales y físicas en pacientes programados para una biopsia de mama en comparación al grupo control. Un total de 75 pacientes fueron aleatoriamente asignados a tres grupos diferentes y evaluados durante la línea basal, durante y después de la biopsia de mama usando escalas visuales análogas para estrés, dolor, depresión, ansiedad, fatiga, optimismo y bienestar general. Los resultados muestran que antes de la biopsia de mama, el grupo de música presentó menos estrés y ansiedad, mientras que el grupo de hipnosis y música presentó menos estrés, ansiedad y depresión y mayor optimismo y bienestar general. Después de la biopsia, el grupo de música presentó menos ansiedad y dolor, mientras que el grupo de hipnosis mostró menos ansiedad e incrementó su optimismo.

Omar Sánchez-Armáss Cappello
Autonomous University of San Luis Potosí, Mexico
Appendix 1

Hypnotic Analgesia for Surgical Biopsy
Arnoldo Téllez López

Okay, I’m going to ask you to close your eyes . . . that’s it . . . now, I want you to focus on your breathing. I would like you to become aware of your breathing. Breathe deeply, two or three times . . . deeply, with each breath you feel more and more calm, more and more relaxed. With each breath, allow the relaxation to spread through your whole body and your mind . . . relaxing your muscles, calming your nerves, giving way to relaxation, giving way to this peace of mind. Feel how the air enters and exits your body . . . feel the fresh air entering your body and the warm air leaving it, feel how fresh air enters and oxygenates your mind and your body. With each breath, you feel more and more calm, more relaxed. That’s it, and perhaps you can remember a time, any moment in which you were completely calm, totally at peace, where nothing, absolutely nothing was as important as this relaxation, as this tranquility, as this peace, this inner peace. And, at any time you may discover that it is not necessary to pay attention to my voice, that it is not necessary to listen to the sound of my words, because your inner mind, your subconscious mind is listening to me very carefully . . . and now, I’d like to teach you a way to go through surgery comfortably and safely. Just keep your eyes closed for a little while longer . . . Allow your muscles to loosen . . . allow them to relax, from head to toe, very good, that’s right. Now, we are going to go to a quiet, comfortable place, a place you always liked. It is a comfortable place, where you can enjoy every minute, every moment, and while you’re here, feeling very comfortable, very quiet, I’ll explain what’s going to happen in a moment . . . and how I will prepare you to have a relaxed and restful sleep, so that the doctor can carry out the surgery, this minor surgery, in the best and most comfortable way possible, with all his or her skills and experience. Listen only, listen only to my voice, only to my voice, my voice will go with you wherever you go, and all the sounds that you hear will not matter to you, they will be like background music for your relaxation, like the background music of your total peace of mind . . . that’s it, nice, very good, in a moment, the doctor is going to get you ready for the intervention, you may need some anesthesia, I don’t know, but after everything is ready, and the doctor performs the surgery, all the sensations, the lights, the sounds, the voice of the doctor or nurse, will help you relax more deeply . . . and my voice will be with you, it will be in your mind, during the surgery, my voice will be with you even when I am not, your mind will hear my voice, and this will make you feel very comfortable, you will feel very safe. You will close your eyes when the doctor is working, perhaps you can go far, far away from here
to a place, a place that you like, such as when you were in elementary school, and some classes were long and boring and you would look out the window and go far, far away in your mind, someplace where you liked to sit, and when you mentally returned to the classroom, you’d realize that you had lost track of what the teacher said, but it didn’t matter, it didn’t matter, because your subconscious inner mind was capturing every word, just like now, your subconscious mind is listening to me and it’s going to do big things, positive healing things for you . . . and when you’re already really comfortable, calmly relaxing, as you are now, you will cease to feel a lot of things in your body, and when you wake up at the end of the surgery, you will feel as if you were waking up from a short, deep, relaxing sleep, you will feel relaxed and contented, and happy to feel so well. And after that, all of the physiological functions, your whole body, will be working normally and in a healthy way, you probably won’t feel a thing, or you may feel a little discomfort that will tell you that everything is healing, that’s it, you will realize that the doctor, nurse, and psychologists are aware and taking care of you. After that, after the surgery, you will feel safe and quiet, but you will be very relaxed, knowing that you may have a friend or family members waiting for you, you will be very relaxed, and since you’ll be very relaxed, healing, the processes of healing and scarring, will be faster, helping your recovery, helping your healing. Allow all those feelings to become a sign that lets you be relaxed and quiet, there is nothing, nothing to think about, nothing to do, just keeping and enjoying this deep relaxation. You will have time to rest and heal, to plan your return home, your inner mind will be able to eradicate any uncomfortable sensation or pain from your mind, it will simply erase them, and you’ll be so surprised, you’ll be so pleasantly surprised at how short it seemed, how fast the stay in the hospital went by. And now, take a nice moment to continue with that, a little bit deeper, now, take the time you need, all the time you need, breathe deeply two or three times, to be fully alert, relaxed and awake, knowing that when you go to the office, the doctor’s office and the intervention starts you will close your eyes, you will breathe deeply, and you will be redirected to a state of calm and peace again, again. How are you? How do you feel?