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Clinical Hypnosis and Music In Breast Biopsy: A Randomized Clinical Trial

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A randomized clinical study was conducted to evaluate the effects on anxiety, depression, stress and optimism levels of an audio-recorded clinical hypnosis intervention and a music session and compare them with a control group in women scheduled for breast biopsy. We analyzed the data of 170 patients with an average age of 47 years, who were randomly assigned to each of the groups. The psychosocial variables were measured in three moments: baseline, which corresponds to the period before the intervention with hypnosis, music or waiting in the room before biopsy; a second measurement after the interventions and a third measurement after the breast biopsy procedure was finished. The results showed a statistically significant reduction in the stress ($p < .001$, $\eta^2p = .06$); pain, ($p < .01$, $\eta^2p = .04$); anxiety, ($p < .001$, $\eta^2p = .07$) and depression, ($p < .001$, $\eta^2p = .05$) in hypnosis and music groups compared with the control group. Before biopsy, hypnosis decrease significantly pain and depression levels compared with music, but after biopsy there were no differences between both groups. It is recommended to use audio-recorded hypnosis and music interventions to reduce physical and emotional discomfort during the biopsy procedure and to improve the quality of life of patients with suspected breast cancer.

Keywords: breast biopsy, hypnosis, music, anxiety, depression, stress, optimism

In Mexico, as in other countries of the world, cancer is the second leading cause of death among women 20 years and older, in 2015 there were 14.80 new cases per 100,000 people, with a mortality rate of 0.015% (Instituto Nacional de Estadística y Geografía, INEGI, 2016).

The detection of a palpable mass in the breast, found during breast self-examination or during clinical examination, is one of the main characteristics of breast cancer. Although most masses are benign, they must be evaluated by means of imaging studies such as mammography, ultrasound or magnetic resonance imaging. In any mass with

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suspected cancer, a biopsy should be performed to obtain a tissue sample and determine whether or not the lesion corresponds to a breast cancer (Harvey et al., 2013; Lehman, Lee, & Lee, 2014; Ma et al., 2012).

Image-guided biopsies have become the procedure of choice for breast lesions that require tissue diagnosis because they have the advantage of being more accurate and have fewer complications, fewer scars and faster recovery (American College of Radiology, 2014). However, some studies have reported emotional disturbances before, during and after the biopsy procedure, such as anxiety, worry, fear, stress and pain associated on the one hand with possible outcomes and, on the other hand, with the procedure itself (Brandon & Mullan, 2011; Bredal, Kåresen, Skaane, Engelstad, & Ekeberg, 2013; Bugbee et al., 2005; Humphrey et al., 2014; Miller et al., 2013).

Regardless of the result of the biopsy, patients present symptoms of anxiety with a negative impact on their quality of life, so that psychosocial interventions can be justified to address these alterations (Kamath et al., 2012). During the biopsy procedure, different interventions have been used. For instance, Bugbee et al. (2005) used relaxation with ocean sounds to decrease anxiety without significant results. Robinson, Jarrett, Vedhara, and Broadbent (2017) used expressive writing two weeks before the biopsy and found an improvement in wound healing, but without effect on the stress. Aromatherapy has also been used during the biopsy procedure, however only some types of aromas have the capacity to reduce the anxiety of patients (Trambert, Kowalski, Wu, Mehta, & Friedman, 2017) and interventions with Reiki, before and after the biopsy failed to find benefits on anxiety, depression, and distress (Potter, 2007).

Interventions with music have been widely used in the hospitals (Nilsson, 2008), however, among the few studies on breast biopsy patients in which music has been applied a decrease in anxiety, fatigue and pain levels was observed (Bugbee et al., 2005; Haun, Mainous, & Looney, 2001; Soo et al., 2016). There have also been few studies where hypnosis has been used during breast biopsy. In one of these studies, hypnosis was used *in vivo*, that is, the session was performed directly by a professional trained in clinical hypnosis and a decrease in the levels of distress and pain was found (Lang et al., 2006; Montgomery, Weltz, Seltz, & Bovbjerg, 2002; Schnur et al., 2008). In a study by Montgomery et al. (2007), a reduction in pain, fatigue and emotional distress was reported when applying an intervention with hypnosis before the excisional biopsy, which is a procedure that requires surgery and deep sedation. In a preliminary study, Téllez, Sánchez-Jáuregui, Juárez-García, and García-Solís (2016) found that a 17-minute session of audio-recorded music reduced stress and anxiety, while clinical hypnosis reduced anxiety, stress, depression and increased optimism and general well-being.

On the other hand, optimism can influence the experience of a biopsy, which is defined as the generalized expectation of positive results (Carver, Scheier, & Segerstrom, 2010) and acts as a shock absorber of distress at the moment of diagnosis.

High optimism levels are associated with lower anxiety and depression (Gustavsson-Lilius, Julkunen, Keskivaara, Lipsanen, & Hietanen, 2012).

The aim of this study was to evaluate the effects of two audio-recorded interventions included: (1) clinical hypnosis with background music and (2) music without hypnotic suggestions on stress, pain, anxiety, depression, and optimism in women scheduled for breast biopsy and compared to a non-intervention control group.

Method

Two hundred nineteen women scheduled for stereotactic or ultrasound-guided breast biopsy were invited on the basis of the following inclusion criteria: (1) age 25–80 years, (2) able to speak and read Spanish, (3) without previous cancer diagnosis or previous biopsy, (4) having no history of psychiatric illness, (5) not taking anxiolytic medications. Of the total of the invited patients, seven did not meet the inclusion criteria, 36 patients had biopsies cancelled and subsequently reprogrammed. Data of 170 women was analyzed, their informed consent was obtained and procedure was fully explained (Figure 1).

The patients were recruited in the breast disease clinic of the Dr. Bernardo Sepúlveda Metropolitan Hospital of the Secretary of Health of Nuevo León, Mexico, over

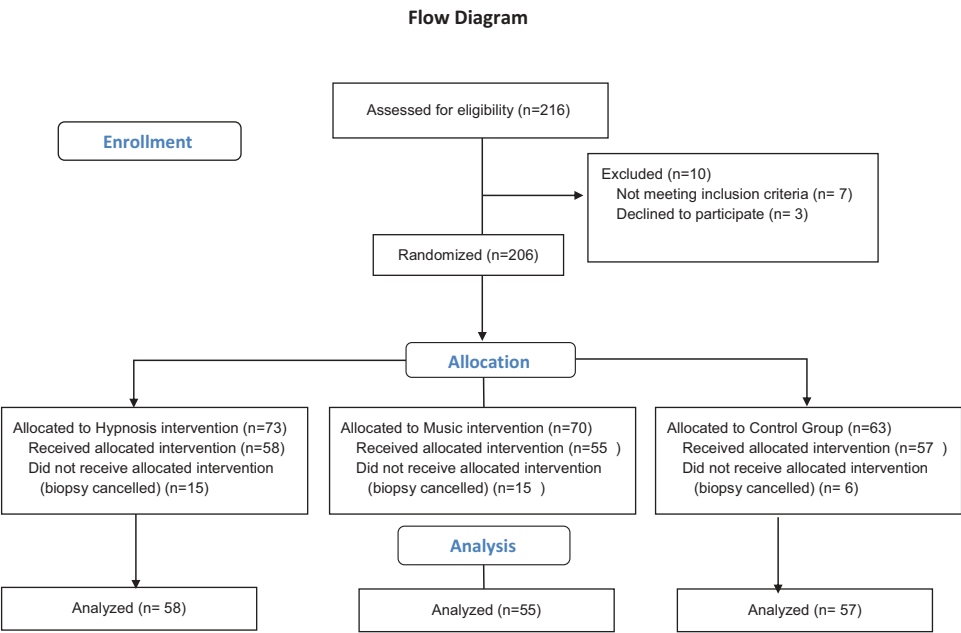


FIGURE 1 Enrollment, intervention allocation, and data analysis for the three groups.

24 months, from January 2015 to December 2016. The random assignment to the groups was performed using a Microsoft Excel random number generation program. The assignment, the application of the instruments and the intervention was conducted in the psychology department of the hospital by trained psychologists.

The sociodemographic characteristics of the study groups are presented in Table 1. The three groups had on average the same number of children, and the same educational level, in addition to presenting similar averages in monthly income, housing, marital status and employment status.

Instruments

Analog visual scales in the form of a thermometer were used to measure anxiety, depression, stress, pain and optimism based on the emotional thermometer (*TE*) developed by Mitchell, Baker-Glenn, Granger and Symonds (2010), where 0 represents absence of emotion and 10 the maximum of perceived emotion. The cutoff point recommended by Mitchell et al. (2010) is 3 vs 4 for all scales. Sánchez-Jáuregui, Juárez-García, and Téllez (2018) validated the visual scales against the HADS Hospital Anxiety and Depression scale and the PSS-14 perceived stress scale in patients scheduled for breast biopsy and suggested a cut-off point of three for patients who were will undergo breast biopsy.

Procedure

Three groups were used, two experimental and one control, with three measurement times: baseline, corresponding to the period before the intervention with hypnosis, music or waiting

TABLE 1
Demographic Characteristics of Participants by Group

<i>Characteristic</i>	<i>Hypnosis</i> (<i>n</i> = 58) $\bar{x}$ <i>DS</i>	<i>Music</i> (<i>n</i> = 55) $\bar{x}$ <i>DS</i>	<i>Control</i> (<i>n</i> = 57) $\bar{x}$ <i>DS</i>
Age	48 (10)	45 (11)	48 (12)
Number of children	3 (2)	3 (2)	3 (3)
Education in years	8.1 (3.3)	8.4 (3.8)	8.6 (3.9)
Monthly Income (Mexican pesos)	3095 (3277)	3775(3742)	3409(3409)
Marital Status (%)			
Single	12	22	18
Married	53	49	44
Free Union	16	20	23
Divorcee	12	7	10
Widow	7	2	5
Work (%)			
Si	31	33	41
No	69	67	59

room, a second measurement after these interventions but before the biopsy and a third time corresponding to the moment in which the procedure of the breast biopsy finished.

The semi-structured interview was applied to all the patients individually for the collection of sociodemographic data. Each patient was briefly explained what the emotional thermometer consists of and the variable studied: Anxiety, depression, stress, pain and optimism, for example: “anxiety is a sense of apprehension and fear, in which you can feel your heart faster, sweating or breathing faster; in this thermometer, zero means that you have not felt any anxiety and 10 indicates that you felt a maximum level of anxiety; At what level of anxiety are you now?” Other example was: “Optimism is the expectation that you have that things go well, 0 is that you have been nothing optimistic and 10 indicates that you have felt totally optimistic.” Subsequently, the randomization list was consulted to know the group to which the patient would be assigned.

The hypnosis group was provided with a set of MP3 and sound-isolating hearing buds to listen the audio-recorded hypnosis intervention. The hypnosis script contained the recommended components for the use of clinical hypnosis in the context of breast cancer (Montgomery, Schnur, & Kravits, 2013) such as: an induction phase, a deepening procedure, suggestions aimed at reducing anxiety and pain, increasing the sensation of physical relaxation and emotional well-being, providing patients with suggestions to perform self-hypnosis at the end of the session. The hypnotic suggestions were recorded with a music background (New Age, A Summer's Days of Aeolia & Mike Rowland) selected by the researchers. The recommendations for music used for therapeutic interventions are: no lyrics, slow tempo, low tone, regular rhythm and pleasant harmony, with string music, flute or piano (Nilsson, 2008). This 17-minutes intervention was reported in detail in a previous study (Téllez et al., 2016).

The music group used the same MP3 and headphones, but listened only to the music background without the suggestions during the same period of time. The patients in the control group stayed 17-minutes in the waiting room. After 17-minutes of hypnosis, music or waiting in the room, the emotional thermometers were applied and then the patient was sent back to the doctor to have the biopsy performed. The psychosocial intervention lasted a total of 30-minutes. Immediately after the biopsy, a third application of the emotional thermometers was made individually to the patients.

Data analysis

The data were analyzed using the software Statistical Package for Social Sciences (SPSS), version 22. The Kolmogorov-Smirnov test was used for the analysis of normal distribution of the variables. Descriptive statistics were used for the sociodemographic and psychosocial variables of each group. The analysis of variance (ANOVAs) was performed with repeated measures to identify the effects of time (baseline, after psychosocial intervention and after biopsy) and the interaction effects of the groups

(Hypnosis vs. Music vs. Control). The effect size was obtained with the partial square eta (η^2p), the values indicated by Cohen (1988) are the following: $\eta^2 = 0.01$ is considered as a small effect, $\eta^2 = 0.06$ medium effect and $\eta^2 = 0.14$ large effect. The size of the medium and large effect is considered as a form of clinical significance (Téllez, García, & Corral-Verdugo, 2015). A Student's *t* test was performed to compare the interventions with each other, the effect size was obtained with the Cohen's *d*, using the Campbell Collaboration Effect Size Calculator (<https://www.campbellcollaboration.org/effect-size-calculato.html>).

Results

The results obtained show that there were significant differences between the comparison groups.

There was a statistically significant difference between the groups, $F(4, 334) = 5.9$, $p < .001$, in the stress thermometer with a medium effect size ($\eta^2p = .06$). Likewise, the main effect was statistically significant, $F(2, 334) = 33.8$, $p < .001$, with a large effect size ($\eta^2p = .16$) (Figure 2). The analysis with the *t* test shows that both the hypnosis and music groups had a significant reduction in stress compared to the control group after the intervention and after the biopsy, with a medium effect size, with no differences between intervention groups (Tables 2 and 3).

We also found a statistically significant change in pain perception in groups, $F(3, 284) = 3.5$, $p < .01$, with a small to medium effect size ($\eta^2p = .04$), the main effect was also significant, $F(2, 334) = 15.6$, $p < .001$, $\eta^2p = .08$ (Figure 3). The analysis with the *t* test shows that pain reduction was statistically significant in the hypnosis group after the intervention, with a medium effect size, while the music did not have a statistically significant effect (Table 2). After the biopsy only the music group showed a statistically significant reduction in pain compared to the control group, with a medium effect size.

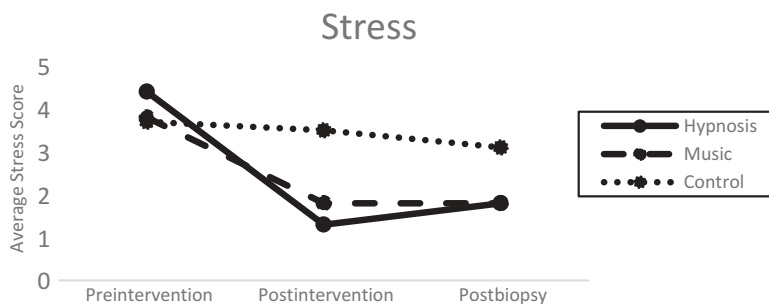


FIGURE 2 Average stress thermometer between groups before and after the intervention and after the biopsy.

TABLE 2
Statistically Significant Changes between the Groups after the Intervention

Prebiopsy Group	Stress		Pain		Anxiety		Depression		Optimism	
	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>
Hypnosis vs control	.000**	0.45	.000**	0.68	.000**	1.00	.000**	0.73	.10	0.23
Music vs control	.001**	0.61	Ns.11	0.22	.000**	0.77	.023*	0.38	.70	0.26
Hypnosis vs music	.10	0.23	.002**	0.54	.80	0.26	.020*	0.39	.48	0.00

p* < .05, *p* < .01, *d* = Cohen's *d*

TABLE 3
Statistically Significant Changes between the Groups after the Biopsy

Group	Stress		Pain		Anxiety		Depression		Optimism	
	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>
Hypnosis vs control	.017**	0.45	.21	0.23	.030*	0.35	.22	0.22	.90	0.02
Music vs control	.020*	0.44	.016*	0.40	.19	0.16	.19	0.15	.20	0.15
Hypnosis vs music	.48	0.00	.18	0.16	.16	0.18	.35	0.07	.19	0.16

p* < .05, *p* < .01, *d* = Cohen's *d*

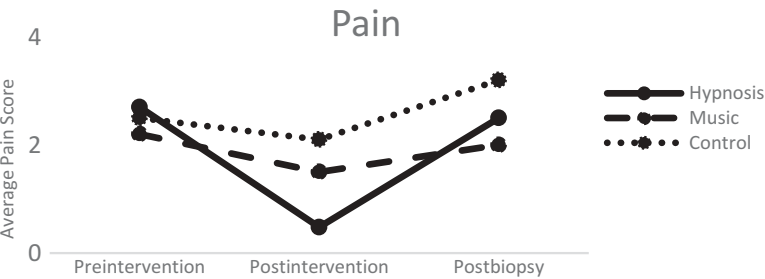


FIGURE 3 Pain perception between group before and after the intervention and after the biopsy.

In anxiety, hypnosis and music showed more remarkable effects after intervention, $F(4, 334) = 6.3, p < .001$, with a medium effect size $\eta^2p = .07$, obtaining a significant main effect, $F(2, 334) = 42.5, p < .001$, with a large effect size ($\eta^2p = .20$). As can be seen in Table 2, the *t* test shows that both hypnosis and music had a large effect size in reducing anxiety compared to the control group. However, after the biopsy, only the hypnosis group managed to maintain lower levels of anxiety compared to the control group with a small to medium effect size (Figure 4).

There was a statistically significant change in depression levels, $F(4, 334) = 4.6, p < .001$, with a small to medium effect size ($\eta^2p = .05$) after the intervention and after

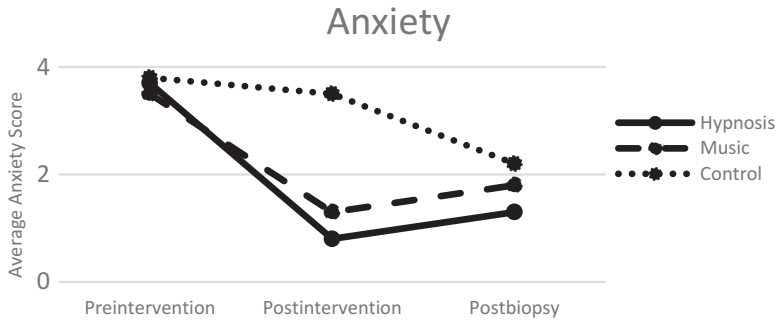


FIGURE 4 Average of anxiety thermometer between groups before and after intervention and after biopsy.

the biopsy compared to the control group with a significant main effect, $F(2, 334) = 31.1$, $p < .001$, with a large effect size ($\eta^2p = .15$) (Figure 5). In the t test, both groups had a statistically significant reduction of depression after the intervention compared to the control group, although the effect was greater in the hypnosis group compared to the control with a medium to large effect size. It was also found that after the intervention, hypnosis significantly reduced depression levels compared to music. After the biopsy, no differences were observed between both groups (Tables 2 and 3).

On the other hand, optimism levels did not show significant changes after the intervention or after the biopsy, $F(4, 334) = 1.3$, $p > .05$, $\eta^2p = .00$, and also showed no significant main effects, $F(2, 334) = .89$, $p > .05$, $\eta^2p = .01$ (Figure 6).

The comparison between the interventions showed that hypnosis is more effective than music in the variables of pain ($p < .005$) and depression ($p < .04$). Neither hypnosis nor music had effects on optimism levels when compared with the control group (Table 2).

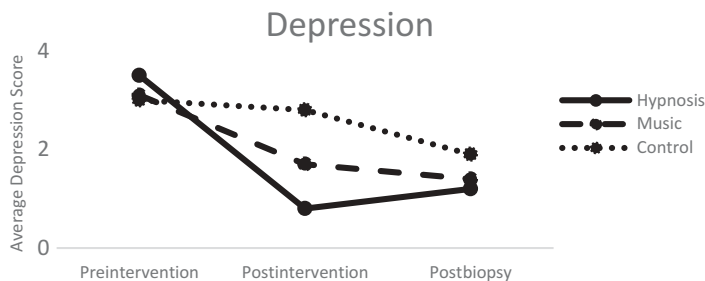


FIGURE 5 Average of depression thermometer between groups before and after intervention and after biopsy.

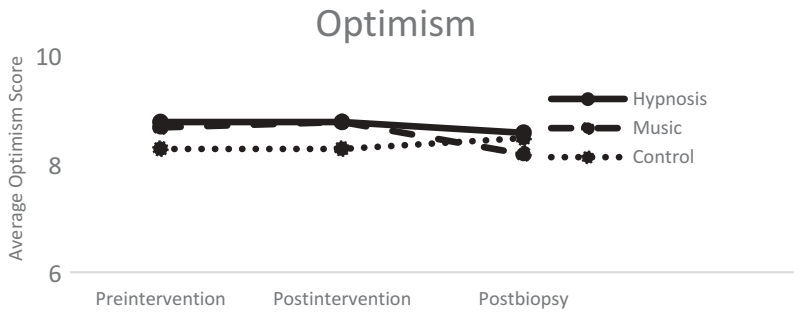


FIGURE 6 Average of optimism between groups before and after intervention and after biopsy.

After the biopsy, the hypnosis group showed a significant decrease in stress and anxiety levels, while the music group had a decrease in stress and pain compared with the control group. Consequently, there were no significant differences between hypnosis and music (Table 3).

Discussion

This randomized clinical study showed that prior to breast biopsy, hypnosis significantly reduced stress, pain, anxiety and depression levels, with a large effect size in the latter two. Music also significantly reduced stress and depression levels with a medium effect size, and a reduction in anxiety levels with a large effect size. When the two interventions were compared, hypnosis was also superior to music in reducing depression and pain levels with a medium effect size. The above indicated both hypnosis and music are effective for reducing emotional discomfort before entering the biopsy, with a certain advantage of hypnosis.

However, after the biopsy in the hypnosis group only the stress and anxiety levels were significantly lower, with a medium effect size. In the music group the stress and pain levels were lower, comparing to the control group. No difference was found between the hypnosis and music groups.

Although some studies have reported mild to moderate pain in patients during the biopsy (Potié, Roelants, Pospiech, Momeni, & Watremez, 2016; Seely, Hill, Peddle, & Lau, 2017), other studies reported moderate to severe pain (Pang, Crystal, Kulkarni, Murphy, & Menezes, 2016). In the present study pain reached a level of 2–3 before the intervention, which is considered mild to moderate (Woo et al., 2015), after the hypnosis intervention pain levels dropped significantly, but in the music group there was no significant effect. After the biopsy, there was an increase in pain levels in the three groups, but in hypnosis and music groups did not exceed the baseline levels, contrary to what happened in the control group, which had an increase above the baseline levels. Only the music group maintained

significantly lower pain levels compared to the control group. These results suggest that although both music and hypnosis modified the perception of pain, hypnosis reduced pain levels before the biopsy and music after it.

In this study, anxiety, depression and stress levels, which initially were above the cutoff point 3 vs. 4, recommended by Mitchell et al. (2010) as an indicator of alteration at clinical level, decreased significantly after hypnosis and music interventions, and remained at a lower level after the biopsy, indicating that both interventions are effective in regulating these psychosocial variables during the biopsy.

The most commonly accepted explanation for the music effects in reducing anxiety, pain and stress is that music acts as a distractor, the patient shifts his attention from negative stimuli to something familiar, soothing and pleasant (Nilsson, 2008). On the other hand, it has been suggested that, during hypnosis, the suggestions for analgesia give rise to a higher pain threshold and decrease the perception of pain in the intensity, discomfort and emotional discomfort reported by the patient especially patients who have a high hypnotic susceptibility (Potié et al., 2016). The cognitive processes of dissociation, accommodation and sensory transformation are the mechanisms that Wortzel and Spiegel (2017) have proposed to explain the phenomenon of hypnotic analgesia.

The use of group hypnosis and self-hypnosis in patients with breast cancer have shown an improvement in the quality of life, an increase in optimism and self-esteem and a reduction in anxiety, pain and insomnia (Forester-Miller, 2017; Téllez, Rodríguez-Padilla, et al., 2017; Téllez, Juárez-García, Jaime-Bernal, De La Garza, & Sánchez, 2017).

To date, few studies have been published about the use of hypnosis in breast biopsy, and all of them used live hypnosis (face-to-face with the therapist), with beneficial effects on distress, anxiety, pain and relaxation levels (Lang et al., 2006; Montgomery et al., 2002; Schnur et al., 2008). This study suggests that audio-recorded hypnosis can also produce beneficial changes by reducing anxiety, stress, depression and pain before breast biopsy procedure. These psychological changes may improve patients' ability to tolerate future routine breast examinations (Whelehan, Evans, Wells, & MacGillivray, 2013). Furthermore, it has been considered that anxiety during biopsy is a distress predictor during oncological treatments (Novy, Price, Huynh, & Schuetz, 2001).

Soo et al. (2016) found out that guided meditation reduced anxiety and pain, while pain levels increased in the music and control group, which could indicate that as in the present study, the suggestions play an important role in reducing pain and anxiety.

Other studies have suggested that interventions with clinical hypnosis are effective in changing expectations of response to medical procedures and the management of side effects of medical treatments (Lynn, Laurence, & Kirsch, 2015; Sucala, Schnur, & Montgomery, 2016).

Regarding the change in expectations, in the present study we observe a lack of significant effect of the hypnotic intervention on optimism, which may be due to the way in which the question was asked: "Expectations that you have that things go well "

may reflect a more dispositional and generic than situational and oriented to the specific health problem and, therefore, more difficult to be modified through a brief intervention (Segerstrom, Taylor, Kemeny, & Fahey, 1998), although previous studies with a smaller sample did show positive effects (Téllez et al., 2016). Another explanation would be “a ceiling effect”, since, as can be seen in Figure 6, the three groups presented very high scores of optimism since the pre-treatment (8.5 on average) which was maintained after the application of hypnosis and music and after the biopsy.

The present study has limitations, one of them is the absence of short-term follow-up of patients to evaluate the effects of the interventions. In future studies, it would be convenient follow-up the effects of music and hypnosis one or two weeks later, before biopsy results, since it has been shown that distress also occurs during this period (Steffens, Wright, Hester, & Andrykowski, 2010). Another limitation of this study was that music was selected by researchers, and it would be important to consider the patient's preference for different music styles (e.g., classical, new age and/or jazz) for future studies. Furthermore, it would be of interest to assess patients' levels of hypnotic suggestibility that could explain the possible differences in the response to hypnotic suggestions.

Conclusion

The findings in the present study suggest that hypnosis and music may be useful as an adjunct to medical procedures during the breast cancer diagnosis, especially at the time of biopsy. Hypnosis and music intervention can reduce anxiety, stress, depression and pain levels. These findings provide a rationale for future research in the use of hypnosis and music for the emotional well-being of patients while undergoing breast biopsy.

The use of this type of techniques to reduce physical and emotional discomfort could be considered as part of routine medical care, since the interventions are short, effective and inexpensive. The main advantage is that those techniques can be easily applied by the medical personnel after short training.

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References

- American College of Radiology. (2014). *ACR practice parameter for the performance of stereotactic-guided breast interventional procedures*. Reston, VA: Author. Retrived from <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Stereo-Breast.pdf>

- Brandon, C. J., & Mullan, P. B. (2011). Patients' perception of care during image-guided breast biopsy in a rural community breast center. *Journal of Cancer Education*, 26(1), 156–160.
- Bredal, I. S., Kåresen, R., Skaane, P., Engelstad, K. S., & Ekeberg, Ø. (2013). Recall mammography and psychological distress. *European Journal of Cancer*, 49, 805–811. doi:10.1016/j.ejca.2012.09.001
- Bugbee, M. E., Wellisch, D. K., Arnott, I. M., Maxwell, J. R., Kirsch, D. L., Sayre, J. W., & Bassett, L. W. (2005). Breast core-needle biopsy: Clinical trial of relaxation technique versus medication versus no intervention for anxiety reduction. *Radiology*, 234(1), 73–78. doi:10.1148/radiol.234103016325
- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, 30(7), 879–889. doi:10.1016/j.cpr.2010.01.006
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York, NY: Academic Press.
- Forester-Miller, H. (2017). Self-hypnosis classes to enhance the quality of life of breast cancer patients. *American Journal of Clinical Hypnosis*, 60(1), 18–32. doi:10.1080/00029157.2017.1316234
- Gustavsson-Lilius, M., Julkunen, J., Keskivaara, P., Lipsanen, J., & Hietanen, P. (2012). Predictors of distress in cancer patients and their partners: The role of optimism in the sense of coherence construct. *Psychology & Health*, 27(2), 178–195. doi:10.1080/08870446.2010.484064
- Harvey, J. A., Mahoney, M. C., Newell, M. S., Bailey, L., Barke, L. D., D'Orsi, C., . . . Mainiero, M. B. (2013). ACR appropriateness criteria palpable breast masses. *Journal of the American College of Radiology*, 10(10), 742–749. doi:10.1016/j.jacr.2013.06.013
- Haun, M., Mainous, R. O., & Looney, S. W. (2001). Effect of music on anxiety of women awaiting breast biopsy. *Behavioral Medicine*, 27(3), 127–132. doi:10.1080/08964280109595779
- Humphrey, K. L., Lee, J. M., Donelan, K., Kong, C. Y., Williams, O., Itauma, O., . . . Swan, J. S. (2014). Percutaneous breast biopsy: Effect on short-term quality of life. *Radiology*, 270, 362–368. doi:10.1148/radiol.13130865
- Instituto Nacional de Estadística y Geografía. (2016). Estadísticas a Propósito del día Mundial Contra el Cáncer: Datos Nacionales. Recuperado el 20 de julio del 2017 de. Retrieved from http://www.inegi.org.mx/saladeprensa/aproposito/2016/cancer2016_0.pdf
- Kamath, J., Cruess, D. G., Claffey, K., Wilson, L., Phoenix, N., & Tannenbaum, S. (2012). Symptom distress associated with biopsy in women with suspect breast lesions. *International Scholarly Research Network Oncology*, 2012, 1–9. doi:10.5402/2012/898327
- Lang, E. V., Berbaum, K. S., Faintuch, S., Hatsiopoulou, O., Halsey, N., Li, X., . . . Baum, J. (2006). Adjunctive self-hypnotic relaxation for outpatient medical procedures: A prospective randomized trial with women undergoing large core breast biopsy. *Pain*, 126(1), 155–164. doi:10.1016/j.pain.2006.06.035
- Lehman, C. D., Lee, A. Y., & Lee, C. I. (2014). Imaging management of palpable breast abnormalities. *American Journal of Roentgenology*, 203(5), 1142–1153. doi:10.2214/AJR.14.12725
- Lynn, S. J., Laurence, J. R., & Kirsch, I. (2015). Hypnosis, suggestion, and suggestibility: An integrative model. *American Journal of Clinical Hypnosis*, 57(3), 314–329. doi:10.1080/00029157.2014.976783
- Ma, I., Dueck, A., Gray, R., Wasif, N., Giurescu, M., Lorans, R., . . . Pockaj, B. (2012). Clinical and self breast examination remain important in the era of modern screening. *Annals of Surgical Oncology*, 19(5), 1484–1490. doi:10.1245/s10434-011-2162-9
- Miller, L. S., Shelby, R. A., Balmadrid, M. H., Yoon, S., Baker, J. A., Wildermann, L., & Soo, M. S. (2013). Patient anxiety before and immediately after imaging-guided breast biopsy procedures: Impact of radiologist-patient communication. *Journal of the American College of Radiology*, 10, 423–431. doi:10.1016/j.jacr.2012.11.005
- Mitchell, A. J., Baker-Glenn, E. A., Granger, L., & Symonds, P. (2010). Can the distress thermometer be improved by additional mood domains? Part I. Initial validation of the emotion thermometers tool. *Psycho-Oncology*, 19(2), 125–133. doi:10.1002/pon.1523

- Montgomery, G. H., Bovbjerg, D. H., Schnur, J. B., David, D., Goldfarb, A., Weltz, C. R., . . . Silverstein, J. H. (2007). A randomized clinical trial of a brief hypnosis intervention to control side effects in breast surgery patients. *Journal of the National Cancer Institute*, 99(17), 1304–1312. doi:10.1093/jnci/djm106
- Montgomery, G. H., Schnur, J. B., & Kravits, K. (2013). Hypnosis for cancer care: Over 200 years young. *CA: a Cancer Journal for Clinicians*, 63(1), 31–44. doi:10.3322/caac.21165
- Montgomery, G. H., Weltz, C. R., Seltz, M., & Bovbjerg, D. H. (2002). Brief presurgery hypnosis reduces distress and pain in excisional breast biopsy patients. *International Journal of Clinical and Experimental Hypnosis*, 50(1), 17–32. doi:10.1080/00207140208410088
- Nilsson, U. (2008). The anxiety-and pain-reducing effects of music interventions: A systematic review. *AORN Journal*, 87(4), 780–807. doi:10.1016/j.aorn.2007.09.013
- Novy, D. M., Price, M., Huynh, P. T., & Schuetz, A. (2001). Percutaneous core biopsy of the breast: Correlates of anxiety. *Academic Radiology*, 8(6), 467–472.
- Pang, E., Crystal, P., Kulkarni, S., Murphy, K., & Menezes, R. J. (2016). An audit of pain experienced during image-guided breast biopsy procedures at an academic center. *Canadian Association of Radiologists Journal*, 67(3), 250–253.
- Potié, A., Roelants, F., Pospiech, A., Momeni, M., & Watremez, C. (2016). Hypnosis in the perioperative management of breast cancer surgery: Clinical benefits and potential implications. *Anesthesiology Research and Practice*, 2016, 1–8. doi:10.1155/2016/2942416
- Potter, P. J. (2007). Breast biopsy and distress feasibility of testing a reiki intervention. *Journal of Holistic Nursing*, 25(4), 238–248. doi:10.1177/0898010107301618
- Robinson, H., Jarrett, P., Vedhara, K., & Broadbent, E. (2017). The effects of expressive writing before or after punch biopsy on wound healing. *Brain, Behavior, and Immunity*, 61, 217–227. doi:10.1016/j.bbi.2016.11.025
- Sánchez-Jáuregui, T., Juárez-García, D., & Téllez, A. (2018). *Validation of emotional thermometer as screening tool in patients undergoing breast biopsy*. Manuscript submitted for publication.
- Schnur, J. B., Bovbjerg, D. H., David, D., Tatrow, K., Goldfarb, A. B., Silverstein, J. H., . . . Montgomery, G. H. (2008). Hypnosis decreases presurgical distress in excisional breast biopsy patients. *Anesthesia & Analgesia*, 106(2), 440–444.
- Seely, J. M., Hill, F., Peddle, S., & Lau, J. (2017). An evaluation of patient experience during percutaneous breast biopsy. *European Radiology*, 27(11), 4804–4811. doi:10.1007/s00330-017-4872-2
- Segerstrom, S. C., Taylor, S. E., Kemeny, M. E., & Fahey, J. L. (1998). Optimism is associated with mood, coping, and immune change in response to stress. *Journal of Personality and Social Psychology*, 74(6), 1646.
- Soo, M. S., Jarosz, J. A., Wren, A. A., Soo, A. E., Mowery, Y. M., Johnson, K. S., . . . Shelby, R. A. (2016). Imaging-guided core-needle breast biopsy: Impact of meditation and music interventions on patient anxiety, pain, and fatigue. *Journal of the American College of Radiology*, 13(5), 526–534. doi:10.1016/j.jacr.2015.12.004
- Steffens, R. F., Wright, H. R., Hester, M. Y., & Andrykowski, M. A. (2010). Clinical, demographic, and situational factors linked to distress associated with benign breast biopsy. *Journal of Psychosocial Oncology*, 29(1), 35–50. doi:10.1080/07347332.2011.534024
- Sucala, M., Schnur, J., & Montgomery, G. H. (2016). Response expectancy and cancer care. In S. Trusz & P. Babel (Eds.), *Interpersonal and intrapersonal expectancies* (pp. 69–75). New York, NY: Routledge.
- Téllez, A., García, H., & Corral-Verdugo, V. (2015). Effect size, confidence intervals and statistical power in psychological research. *Psychology in Russia: State of the Art*, 8(3), 27–46. doi:10.11621/psr.2015.0303
- Téllez, A., Juárez-García, D. M., Jaime-Bernal, L., De La Garza, C. E. M., & Sánchez, T. (2017). The effect of hypnotherapy on the quality of life in women with breast cancer. *Psychology in Russia: State of the Art*, 10(2), 228–240.

- Téllez, A., Rodríguez-Padilla, C., Martínez-Rodríguez, J. L., Juárez-García, D. M., Sanchez-Armass, O., Sánchez, T., . . . Jaime-Bernal, L. (2017). Psychological effects of group hypnotherapy on breast cancer patients during chemotherapy. *American Journal of Clinical Hypnosis*, 60(1), 68–84. doi:[10.1080/00029157.2016.1210497](https://doi.org/10.1080/00029157.2016.1210497)
- Téllez, A., Sánchez-Jáuregui, T., Juárez-García, D. M., & García-Solís, M. (2016). Breast biopsy: The effects of hypnosis and music. *International Journal of Clinical and Experimental Hypnosis*, 64(4), 456–469. doi:[10.1080/00207144.2016.1209034](https://doi.org/10.1080/00207144.2016.1209034)
- Trambert, R., Kowalski, M. O., Wu, B., Mehta, N., & Friedman, P. (2017). A randomized controlled trial provides evidence to support aromatherapy to minimize anxiety in women undergoing breast biopsy. *Worldviews on Evidence-Based Nursing*, 1–9. doi:[10.1111/wvn.12229](https://doi.org/10.1111/wvn.12229)
- Whelehan, P., Evans, A., Wells, M., & MacGillivray, S. (2013). The effect of mammography pain on repeat participation in breast cancer screening: A systematic review. *The Breast*, 22(4), 389–394. doi:[10.1016/j.breast.2013.03.003](https://doi.org/10.1016/j.breast.2013.03.003)
- Woo, A., Lechner, B., Fu, T., Wong, C. S., Chiu, N., Lam, H., . . . Chow, E. (2015). Cut points for mild, moderate, and severe pain among cancer and non-cancer patients: A literature review. *Annals of Palliative Medicine*, 4(4), 176–183.
- Wortzel, J., & Spiegel, D. (2017). Hypnosis in cancer care. *American Journal of Clinical Hypnosis*, 60(1), 4–17. doi:[10.1080/00029157.2017.1290577](https://doi.org/10.1080/00029157.2017.1290577)