THE EFFECT OF BACKGROUND MUSIC ON ANXIETY AND VITAL SIGNS DURING BLOOD DRAWING PRACTICE: A RANDOMIZED TRIAL

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Annotation. Background: Drawing blood from patients is one of the stressful invasive interventions that students are required to carry out on real people. It is necessary to teach this technique in a stress-free environment before the student goes into the clinical field. Aim: To examine the effect of background music on the anxiety levels and vital signs of midwifery students at their first laboratory blood-drawing practice. Methods: This research designed as an experimental study. A total 68 midwifery students of a university attending the freshman course 'Fundamentals of Midwifery' were randomly enrolled to the control and the intervention group. The Visual Analogue Scale and the State-Trait Anxiety Inventory were used. The heart rate and blood pressure findings were recorded. All data were recorded before the practice and repeated after. Findings: The mean state anxiety scores between pre-procedure and post-procedure was found to be not statistically significant in each group. The pulse and systolic blood pressure readings revealed significant decrease in the intervention group and significant increase in the control group. Discussion: In addition to the psychological effects of music such as anxiety reduction, there are also physical effects such as lowering heart rate, blood pressure, body temperature and respiratory rate. Conclusion: The provision of background music in occupational skills laboratories during students' blood-drawing practice can be effective in reducing levels of stress.

Keywords: anxiety, blood draw, midwifery/nursing student, music.

INTRODUCTION

One of the aims of education in occupations such as nursing and midwifery, in addition to the transmission of professional knowledge, is to instill in students the ability to transfer the skills and information acquired into practice in the field. To achieve this, learning is imparted through a combination of theoretical and practical knowledge which stimulates individuals' cognitive, affective, and psychomotor domains (Kim & Hwangbo, 2010). It can be difficult and stressful for students to accommodate all these influences successfully. These stresses may result in lower achievement by the students and feelings of insecurity. Therefore, educators must consider the effects of stress and anxiety during students' education and take precautions in this regard (Sharif & Armitage, 2004; Fuson, 2012).

LITERATURE REVIEW

Students need to develop self-confidence, critical thinking skills and psychomotor skills before they are introduced to patients, in order to successfully complete their vocational training. For this reason, occupational skills laboratories are used where techniques can be practiced on models over and over again. In these occupational skills laboratories, environments similar to clinical practice are provided. Thus, by closing the gap in this way between clinical and theoretical conditions, students are assisted in preparing for the clinical environment (Tel et al. 2004). Drawing blood from patients is also of course one of the stressful invasive interventions that students are required to carry out on real people (Ince & Cevik, 2017). For this reason too, it is necessary to teach this technique in a stress-free environment before the student goes into the clinical field. In the literature, it is emphasized that there is a negative relationship between stress and learning (Sharif & Armitage, 2004). Prolonged exposure to this kind of stress gives rise to ineffective learning and the development of students' professional and vocational identities' may be affected adversely (Karaca et al. 2017).

Music therapy, a non-pharmacological adjuvant, is also widely used in clinical practice. The American Music Therapy Association states that music therapy should be used in a way which takes account of the physical, emotional, cognitive, and social needs of the individuals (Fuson, 2012). It is emphasized in the literature that listening to music increases comfort, improves mood, reduces pain, stress and anxiety and affects vital signs (Liu & Petrini, 2015). In addition, studies show that music is effective not only in the

clinical field but also in the field of education (Ince & Cevik, 2017). In a study by Ince and Cevik (2017), it was found that "playing background music during their first blood draw experience decreased their level of anxiety".

Although there are many studies in the literature investigating the effect of background music played in the clinical environment, only a limited number have been conducted which examine its effect on education. For this reason, our study set out to investigate the effect of background music on anxiety and vital signs of midwifery students in the laboratory environment during their first blood- drawing practice. It should be noted also that this procedure has the added benefit of being inexpensive and easy to administer, as well as having no significant negative side effects.

PARTICIPANTS, ETHICS AND METHODS

Study Population and Sample
The study was conducted with midwifery students of Çanakkale Onsekiz Mart University who were attending the freshman course 'Fundamentals of Midwifery', during the 2017–2018 academic year (April 2018).

Students whose ID numbers with an odd number were selected to the intervention group. Those with an even number were assigned to the control group. A total of 68 students; 35 assigned to the intervention group and 33 to the control group.

For information, the following were not included in the study: those who did not want to participate and those who were absent during the procedure.

Data collection tools
The following data collection tools were employed: a Student Identification Form, in order to compile basic background information on the students; he Visual Analogue Scale (VAS) and the State-Trait Anxiety Inventory, to translate the subjective data on anxiety into objective form; and a Vital Signs Follow-up Form, to measure physical indicators of anxiety using heart rate and blood pressure readings.

The Participant Description Form: This was designed by the researchers. It consisted of three questions relating to the social and demographic status of the participants.

Visual Analogue Scale (VAS): This scale is used to assess the severity of anxiety. It takes the form of a 6 cm long visual analogue scale. The scale begins with the statement "I am fully relaxed" at one end, and ranges to "I feel extreme and severe anxiety" at the other. The severity of the anxiety level experienced is rated between 0 and 6. '0' indicates absence of anxiety and '6' indicates the most severe anxiety. The participants were asked to select the point on the scale that best represented their anxiety level.

State-Trait Anxiety Inventory (STAI): This inventory, developed by Spielberger, Gorsuch and Lushene (1979), consists of two distinct sub-scales: state anxiety and trait anxiety. Each sub-scale has 20 items. While the state anxiety inventory assesses how a person feels at a particular time under specific conditions, the trait anxiety inventory assesses how a person feels in general, independent of the conditions he/she is in (Aydemir & Köroğlu, 2000). The validity and reliability of the State Trait Anxiety Inventory (STAI) were verified by Le Compte and Öner (1985). For this study the State Anxiety Scale was seen as appropriate as it determines how an individual feels at a particular time in specific circumstances. It is a 20-item, 4-point anxiety checklist. Possible anxiety scores range from 20 points to 80 points. The higher the score, the greater the anxiety level indicated. Cronbach's Alpha was assessed at 0,81 in pre-test and at 0,83 in post-test for this study.

Vital Signs Follow-up Form: This was used to record students' vital signs using systolic and diastolic blood pressure and pulse rate readings, taken in the laboratory environment.

Evaluation questions: Three questions were prepared by the researchers in order to examine the thoughts of the intervention group on the playing of background music during practice.

Ethical Statement: This research was reviewed and approved by the Çanakkale Onsekiz Mart University, Clinical Research Ethics Committee of the Faculty of Medicine (issue:18920478-050.01.04-E.1800058337, date: 19/April/2018).

PROCEDURE

Prior to the collection of data, written permission was obtained from the Non-Drug Clinical Research Ethics Committee of the Faculty of Medicine, Çanakkale Onsekiz Mart University (issue:18920478-050.01.04-E.1800058337, date:19/April/2018). Participation in the study was completely

voluntary. All participants were fully informed about the purpose of the study. After all needed information were given, written consent was obtained from the participants.

On arrival at the laboratory, students' anxiety levels were first assessed by measuring systolic blood pressure, diastolic blood pressure, and pulse rate (The readings were taken by the researchers using the same measuring devices). Participants then reported how much anxiety they felt by recording their cores on the Visual Analogue Scale (VAS) and the State Anxiety Scale.

In the laboratory, the researcher then demonstrated the blood-drawing process step by step on a life- sized model of the human arm. Then, under the supervision of the researcher, the students performed the blood-taking process on the model themselves. (The model replicates very closely the average adult arm in its dimensions. It incorporates simulated blood vessel structures and blood-like fluid and is designed for repeated blood- drawing and vascular access procedures. The same design of model was used for both groups). End of the course, the participants from both groups were assessed with the State Anxiety Scale and VAS one more time; hearth rate, blood-pressure readings were taken by the researchers.

Throughout occupational skills training, in the intervention group was played some background relaxing instrumental music. The classical music records were listened publicly, using a bluetooth speaker in the center of the lab. The control group took the same course without music. Finally, feedback was provided by the intervention group, giving their opinion about influence of the music they heard during the practice.

ANALYSIS

The data were analyzed using Statistical Package for Social Sciences software, version 18.0. Descriptive statistical methods were used to analyze the data, such as mean, standard deviation, the chi square test and the paired sample t-test. Total scores of the State Anxiety Scale were calculated. A comparison of the mean anxiety scores, heart rates and blood pressure data for each group, initial and the last records, was analyzed using a paired student's t-test. The level of significance was set at $p < 0,05$.

RESULTS

A total of 68 students participated in the study. All of them were female, with an average age $19,11\pm3,24$.

The average state anxiety score of the students before the blood-drawing session in the laboratory was $37,11 \pm 9,14$ for the intervention group (listening to music) and $37,58 \pm 12,65$ for the control group. It was $35,03 \pm 8,81$ for the intervention group (after the blood-drawing session with background music) and $35,39 \pm 12,53$ or the control group (after blood-drawing, without the playing of background music). The average state anxiety scores of the groups were not different at statistically significant level ($p>0,05$) (Table 1).

Table 1

Mean state anxiety scores of the experimental and control group students (n=68)

Groups	Pre-procedure mean + sd	Post-procedure mean + sd	t	p
Experimental group (n=35)	37,11+9,14	35,03+8,81	1,24	0,223
Control group (n=33)	37,58+12,65	35,39+12,53	1,43	0,160

The VAS anxiety levels of the intervention group did not show a statistically significant change compared to the period before music was played ($p>0,05$). In the case of the control group, VAS anxiety levels increased significantly compared to pre-intervention ($p<0,05$) (Table 2).

Table 2

Comparison of VAS scores of the experimental and control groups before and after blood drawing (n=68)

Groups	Pre-procedure mean + sd	Post-procedure mean + sd	t	p
Experimental group (n=35)	0,94+1,14	1,17+1,36	-1,000	0,324
Control group (n=33)	1,36+1,36	2,58+1,62	-8,123	0,001*

*significant

The evaluations made before and after the blood-drawing procedure revealed a statistically significant difference in pulse and systolic blood pressure values in the intervention group that was exposed to music (p<0.05). There was a significant reduction in both these readings. The evaluation made before and after the blood-drawing revealed a statistically significant difference in pulse and systolic blood pressure values for the control group (p<0.05). There was a significant increase in these two values (Table 3).

Table 3

Comparison of vital signs between the experimental and control groups before and after blood drawing (n=68)

Groups	Vital Signs	Pre-procedure mean + sd	Post-procedure mean + sd	t	p
Experimental group (n=35)	**Pulse**	84,14 + 9,63	79,37 + 11,73	-3,778	0,001*
	Systolic Pressure	109,43+10,55	104,86+ 7,81	-2.359	0,024*
	Diastolic Pressure	68,00 + 10,51	68,29 + 12,48	-0,128	0,899
Control group (n=33)	**Pulse**	85,06+11,41	93,76+14,71	-3,447	0,002*
	Systolic Pressure	109,39+11,44	116,97+14,68	-2,718	0,011*
	Diastolic Pressure	68,79+9,27	71,82+8,82	-1,665	0,106

*significant

54,3% of the intervention group stated that the playing of background music during practice was effective in reducing their stress. 60% of the students stated that music had a positive effect on their learning. The number of students who recommended the use of music during practical courses was 54,3% (Table 4).

Table 4

Students' thoughts on listening to music during practice (n=35)

	Yes	Undecided	No
	Frequency (Percentage)	Frequency (Percentage)	Frequency (Percentage)
Did the music reduce your stress during practice?	19 (54,3%)	7 (20%)	9 (25,7%)
Has the music had a positive impact on your learning?	21 (60%)	0 (0%)	14 (40%)
Do you think music should be played in practice classes?	19 (54,3%)	10 (28,6%)	6 (17,1%)

DISCUSSION

Since the work of nursing professionals directly involves the health and care of members of the general public, there can be very serious consequences for errors made during practice. For this reason, it is important that the theoretical knowledge taught throughout their university education is translated into consistent and effective practice. Previous studies emphasize the level of stress that students can experience during practice (Mankan et al. 2016; Bayar et al. 2009). Minimizing the levels of stress experienced in initial training helps to prevent malpractice that might occur later in the clinical environment and increases patient safety (Mankan et al. 2016). Nursing and midwifery teaching staff must ensure that students are able to practice stressful applications, such as drawing blood or giving injections, in a more comfortable setting before they start to operate in the clinical environment. Some proposals can be found in the literature for the integration of anxiety-reducing methods in educational curricula, in order to minimize the concerns that may arise during practice (Edelman & Ficorelli, 2005). Therefore, this study set out to examine the effect of background music, which is easy to implement with no side effects, on students' anxiety and vital signs during first blood-drawing in the laboratory. Results showed that pre-treatment and post-treatment state anxiety scores (STAI) in the study group and control group were not significantly different (p>0.05) (Table 1).

It was determined that the presence of background music in the work environment of the intervention group during practice did not affect state anxiety scores when compared with the control group. And when the average VAS anxiety point scores were examined, no significant change was observed in the experiment group before and after the application. In the control group, there was a significant increase compared to the pre-application level (p<0,05) (Table 2). It is demonstrated in the literature that the playing of background music can reduce anxiety levels for patients and this can be applied too to healthcare students in clinical educational practice (Liu & Petrini, 2015; Ince & Cevik, 2017). In the study by Jasemi et al. (2016), it was found that playing pre-recorded music in the background in the wards applied to cancer patients reduced anxiety and depression. Liu and Petrini (2015) observed that the playing of background music in the postoperative period reduced the anxiety of patients who underwent chest surgery. Ince and Cevik (2017) noted in their study that the playing of background music during nursing students' first blood-drawing practice served to reduce anxiety.

In addition to the psychological effects of music such as anxiety reduction, there are also physical effects such as lowering heart rate, blood pressure, body temperature and respiratory rate (Liu & Petrini, 2015; Ince & Cevik, 2017). In this study, a significant reduction in heart rate and systolic blood pressure was detected in the intervention group after blood-drawing practice compared to pre- administration (p<0,05). However, there was also a significant increase in heart rate and systolic blood pressure in the control group compared to pre- administration (p<0,05). Diastolic blood pressures were not found to be significantly different in the two groups in the pre-intervention and post-intervention periods (p>0,05). In a study by Zanini et al. (2009), where they examined the effects of background music on blood pressure levels of hypertensive sample. There was found to be a significant reduction in blood pressure in the intervention group between the pre- and post-intervention periods. There was no significant difference in the control group. In another study, it was reported that relaxing background music caused a significant reduction in systolic blood pressure compared to silence. However, it did not affect heart rate and diastolic blood pressure (Chafin et al.2004). On the other hand, in the study by Ince and Cevik (2017), after the background music session was carried out, diastolic blood pressure in the intervention group significantly decreased, while no difference was observed in heart rate and systolic blood pressure.

When the physiological effects of exposure to relaxing music were examined, it was determined that the music affected the release of endorphin secretions by the brain and caused an effect similar to morphine on the body. With the provision of background music, adrenaline levels and neuromuscular activity were reduced. Also, pulse rates slowed down, respiration rates decreased and were better-regulated and blood pressure decreased (Bora et al.2017). Our research results support these findings.

In our study, it was found that 54,3% of the students stated that the playing of music in the laboratory environment reduced their stress levels, 60% stated music had a positive effect on learning, and 54.3% stated that they recommended the playing of music during future practical courses. In the studies on this subject, no data was collected on students' opinions. However, student feedback is an effective way of enhancing and improving the educational skills of trainers, and of making decisions about staff and the program by the managers (Karabilgin & Sahin, 2006). This feedback from students also supports the idea that the provision of background music, which is cheap and easy to implement and has no evident side effects, is a viable and practical method for use in occupational skills laboratories.

CONCLUSIONS

Although there are many studies in the literature examining the effects of playing background music in the clinical environment, studies relating to the educational environment are much more limited. In this study, it was found that the playing of background music was effective in reducing stress, while the control group showed a significant increase in VAS anxiety levels, pulse and systolic blood pressure. From these results, we conclude that listening to music can be applied safely in occupational skills laboratories. We recommend that health educators to adopt the playing of background music with a view to dealing with the anxiety during laboratory practice of health learners.

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