Original Article

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Effectiveness of Music Interventions in Occupational Stress of Women

Majid Akhshabi[1]*, Nahid Namjoo[2] and Homa Khakbaz[3]

1. Payame Noor University, Tehran, Iran
2. Department of Art & Media, Payame Noor University, Tehran, Iran
3. Department of Psychology, Islamic Azad University, Tehran Branch, Tehran, Iran

Abstract

Background: The aim of this study was to investigate if listening to music can help reduce stress for women who work in an electric car parts factory in Mashhad.

Methods: Out of 200 people in this study, 32 were chosen at random and split into two groups: one for the experiment and one for comparison. To gather information, we used a job stress questionnaire and a music therapy plan that consisted of 30 sessions, which lasted for one month. In this study, we played the music that the participants liked 4 times during each session. Each time, we played the music for 15 minutes, while they were taking a break or before they started working.

Results: There were 16 participants in the group we tested. The people in the control group followed their normal way of doing things and did not use this procedure. The research found that music intervention helps decrease the occupational stress in women more than the traditional work schedule method. The effect size of the music intervention was 0.809, which means it had approximately an 81% impact on reducing stress.

Conclusion: The results of the pre-tests and post-tests indicated that the stress levels of women in the experiment group decreased significantly after listening to music. Based on these findings, it can be concluded that listening to music while taking breaks at work helps to lower job stress.

Keywords: Female, Music, Music therapy, Occupational stress

*** Corresponding author**

Majid Akhshabi, PhD
Payam Noor University, Tehran, Iran
Tel: +98 912 1259990
Email: majidakhshabi@pnu.ac.ir

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Introduction

The occurrence of physical and mental issues can largely be attributed to stress. Problems like heart diseases, certain types of cancers, feeling anxious, being depressed, feeling overwhelmed at work, and other similar issues are caused by stress (1,2). Nowadays, music is commonly used to help people relax and unwind (3,4). Numerous studies have been conducted to understand how music can help reduce stress (6-8). For this reason, music therapy is commonly used around the world to help people feel less stressed and improve their mental health 5 (9-12). In the fields of physiology and medicine, Selye has given a simple explanation of stress. This definition represents that stress is how our bodies respond to something that happens to us. It can be either a good or bad thing (13). Aldwin focuses on the bad side of stress. According to Aldwin, stress is when a person and their surroundings interact in a way that makes them feel pressured. This pressure can be caused by feeling too active or not active enough, and it affects the mind and body (14). When we experience stress, our bodies can react in two ways: through physical changes in our body and through our emotions (15,16). These two reactive states, when combined, control the systems involved in stress and affect each other while we are stressed (17,18).

The physiological response to stress indicates the activation of the hypothalamus-pituitary-adrenal axis (7). In such a way, by releasing adrenaline and noradrenaline, the sympathetic activity of the nervous system increases and leads to an increase in physiological arousals such as: increased heart rate, increased blood pressure and sweating (5,19,20). In a parallel process, which occurs in the hypothalamus-adrenal (adrenal) axis, cortisol is released. The emotional response to stress can also be described as emotional states related to psychological concern such as: anxiety, restlessness and the occurrence of some neurological problems (21-24). Stress also occurs abundantly in the work environment, which is referred to as occupational stress. In a general definition, occupational stress is a mental, physical or behavioral reaction caused by acute or chronic stress, which causes a deviation from normal functioning (25). Job stress happens when individual resources are not enough to deal with the needs of the work environment (26).

Accordingly, the American Psychological Association defines occupational stress as a physiological and psychological response to events or conditions in the work environment that are harmful to health and well-being (27). Some occupational stressors are: the feeling of work pressure, poor time management, problems related to shift work (shift work) and conflict in the workplace (28). By systematically reviewing the research literature, it can be stated that occupational stress, annually costs a lot of money for the communities (29). According to the joint report by the European Foundation for the Improvement of Life and Working Conditions 10, as well as the European Representation of Safety and Health at Work 11, 25% of workers have experienced work-based stress during all or most of their working hours. In this joint report, the intensity of work is the key stress factor mentioned. Also, approximately 80% of managers have experienced job stress, and more than half of them have expressed time pressure as their main concern (30).

The occurrence of stress at work on a regular basis can result in psychological difficulties related to one's profession (31). Since stress has a big impact on our health and money, the World Health Organization thinks it is really important to take care of our mental health at work (26). After reviewing the theories behind music therapy for occupational stress, it was found that using music in two ways can be effective: doing specific exercises and activities like listening, playing an instrument, or singing. When it comes to music interventions, there is a big difference between those conducted by music therapists and those conducted by other healthcare professionals or non-supportive individuals (32). This difference can be observed both in theory and in practice. In the first type, if musical interventions have one of these three conditions, they are considered as purposeful musical activities:

1. Listening to recorded music, provided by medical professionals or health care providers.
2. Music intervention is when the patient themselves use music as a form of medicine.
3. Playing music or singing without a music therapist present or outside of a therapy session (33).

In the second type, trained music therapists use music to help with therapy. This type of intervention is known for using personal and artistic musical experiences (11,34,35).

In the real world, when it comes to music therapy, using music to help people can involve either listening to it or playing it. At the same time, it also involves creating music, writing songs, and engaging with music. This method assumes that using music programs to intervene can help lower stress levels (23,34,36). In this situation, the speed of music, tempo, is very important for changing the music. The speed of music can either make people feel energetic or calm. Music that is slow and calming, like meditation music, can help make your heart beat slower and help you relax more (37-41). On the other hand, quiet music, rather than music with words, can have a stronger impact on reducing stress. Some scientists believe that music with lyrics can make it hard to stay calm and focused and instead makes a person feel distracted and energized. Contradicting this, Kolesh *et al* argue that music with lyrics can actually help decrease stress. They believe this is because the words in the songs have a soothing effect. Another part of using music to help reduce stress involves how the music is played, whether it is performed live or listened to from a recording. Some studies have looked at how live music and recorded music can help reduce anxiety. The results demonstrated that people who listened to live music had more anxiety reduction compared to those who listened to recorded music (19,42,43).

The current study was conducted to find out if using music can help reduce stress for women at work.

- The researchers aimed at answering the following questions:

Can music help women stress less at work?

- Is there a difference between using music to help with stress at work compared to the regular way of doing things for women?
- How are the pre-test and post-test of the control and experimental groups related to each other?

Based on the basic principles and theories, the research's overall plan is shown in figure 1.

Materials and Methods

This study is a type of research that used a method called pre-test-post-test with a control group to conduct the research. The group of people we studied, included women who worked in a factory assembling electrical parts for cars in Mashhad. Based on the type of design used, it is recommended to have a sample size of at least 15 people (44). However, in this case, the research sample consisted of 32 people individuals were chosen using the available sampling method. Out of all the participants, 16 were chosen randomly to be in the experimental group, while another 16 were assigned the same way to be in the control group. During the time between the initial test and the final test, the participants in the experimental group listened to the recorded music for 15 minutes. They did this four times a day, with two-hour breaks

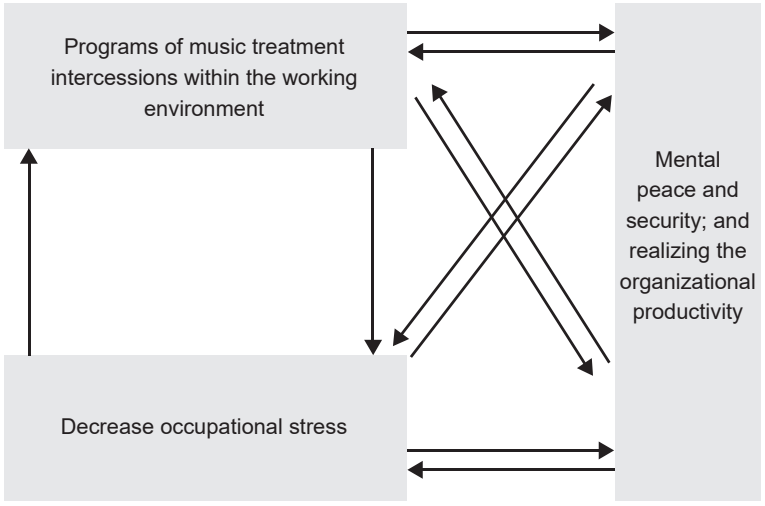

Figure 1. Overall plan of research.

in between. This continued for 30 working days. The control group did not get any help during this time. To be eligible for the research, the participants needed to achieve a high score on Elliott's job stress questionnaire from 1994. This survey measures how stressed you feel in your job. It has 20 questions. The questionnaire has been proven to be accurate by the maker, and a reliability score of 0. 72 has been found for it using Cronbach's alpha. This survey uses a scale of 1 to 4 to measure responses. The options are "never" (1), "sometimes" (2), "often" (3), and "always" (4) (45). Thus the scores on the questionnaire can be anywhere from 20 to 80. A score between 20 and 29 means you have good control over yourself and feel good about who you are. A score between 30 and 49 suggests that a person has a good life and feels in control, but they may feel anxious when dealing with stress, since they often have negative thoughts about themselves. A score of 50 to 69 demonstrates that the person is often very sad and thinks badly about themselves. A score between 70 and 80 means that someone is going through a tough time mentally (45).

They might feel stressed, tense, and have a hard time dealing with life's challenges. In Iran, Hamidi *et al* used Cronbach's alpha to conduct their research. In 2016, the reliability score was 0. In the study conducted by Ghaedamini Harouni *et al* (46,47), the reliability of the research was found to be 87%. There are reports regarding that.

To reach the research goals, we created a music therapy plan that followed Iranian culture and the preferences of the participants. In table 1, we have summarized the intervention protocol. This table shows that the music was played at 6:00 *a.m*. The start time is between 8:00 *a.m*. and 10:00 *a.m*. and noon in the beginning. Then, we chose the speed and style of the music to match the desired mood and mental state for the employees while working. We also considered the preferences of a group of people who received no special treatment or intervention according to an initial survey. Also, we made sure not to choose any pieces that had a sad or melancholic theme. Each package lasted for 15 *min* and had different types of music like traditional, folk, classical, and pop. The music did not have any lyrics except for the last piece, which had words that were hopeful and romantic.

The first measurement, before the music therapy interventions, was done through the pre-test and the second measurement, after the music therapy interventions in the experimental group, was done through the post-test.

Statistical analysis

The data was collected and analyzed using SPSS software Version 24 (IBM Corp, Armonk, New York, USA) and Amos (Version 26.0). To assess the normality of the data, the Kolmogorov-Smirnov and Shapiro-Wilk tests were employed, and the test output indicated that all the variables follow a normal distribution. Various statistical tests were conducted to test the hypotheses, including t-tests, analysis of covariance (ANCOVA), correlation coefficient tests, and covariance matrix analysis. Confirmatory factor analysis was also employed to validate the factor structure of a set of observed variables. The significance level was set at 0.05.

Table 1. Music intervention protocol

Broadcast duration	Targeting	Tempo/ type of music	Time
15 *min*	Waking up the sleepy mind to be alert and engaged	Andante/calm and fun	6:00 AM
15 *min*	Motivation, hope, and joy	allegro/dynamic and allegro	8:00 AM
15 *min*	Generating an abundance of emotional joy to restore mental and physical vigor and retrieve depleted vitality	Presto/exciting and sensational	10:00 AM
15 *min*	Relaxing and getting the mind ready for thinking, and making romantic feelings stronger	Lento/Love and romance	12:00 PM

Table 2. Kolmogorov-Smirnov and Shapiro-Wilk normality test results

	Kolmogorov-Smirnov test			Shapiro-Wilk normality test		
	Statistics	Degrees of freedom	The significance level	Statistics	Degrees of freedom	The significance level
Pre-test of the control group	0.162	16	0.200	0.912	16	0.123
Post-test of the control group	0.140	16	0.200	0.932	16	0.263
Pre-test of the experimental group	0.121	16	0.200	0.940	16	0.348
Post-test of the experimental group	0.111	16	0.200	0.955	16	0.572

Table 3. Correlated t-test

Variables	Average deviation	Standard deviation	t	Degrees of freedom	The significance level
Post-test scores of experimental and control groups	35.188	17.267	8.151	15	<0.001

Results

In this study, after examining the data using a statistical test called the Kolmogorov-Smirnov test, we found that the significance level was 0.200. Since this value is higher than 0.05, we can conclude that the data follows a normal distribution. This finding also applies to the Shapiro-Wilk test, which means that all the variables in the research have a normal distribution. Therefore, we can use parametric tests to test the research hypotheses. Table 2 shows the findings of the normality test.

First, let us address the question: Does using music to help reduce stress have an impact on women's work stress. We used a type of statistical test called a correlated t-test to find the answer. The findings of this test are shown in table 3.

The result demonstrates that the music intervention method has a positive effect on reducing women's occupational stress, with a 99% confidence level. Furthermore, in the answer to the question: Is there a noticeable difference between using music methods during work and the usual and traditional methods to decrease stress for women in their jobs. We conducted a statistical test called analysis of covariance. The average scores and variation of the tests before and after the experiment for both the experimental and control groups are shown in table 4. The findings from the analysis of the data are presented in table 5. Based on the information in the tables above, the F value calculated for the groups is 23.815. This F value is greater than the critical F value and the significance level. Therefore, it can be stated with 99% confidence that music therapy works better than a regular work schedule in reducing stress for women. Put simply, the music method helps to reduce stress for women at work. The results indicate that music intervention had a significant impact on reducing job stress in women. The effect size of 0.809 means that about 81% of the decrease in stress can be attributed to the music intervention. In simpler terms, the correlation coefficient test and variance-covariance model were used to examine the connections between the pre-test and post-test scores in both the control and experimental groups. Before doing the tests mentioned above, it is important to test Keyser-Meir-Elkin and Bartlett's sphericity test using SPSS software. The Kaiser-Meir-Elkin test checks if the observed values in a sample are appropriate by comparing them with partial correlation. When the score of the Keyser-Meir-Elkin test is higher than 0.6, these tests can be done. Bartlett's sphericity test is utilized to determine if the data matrix is suitable

Table 4. Mean results and standard deviation of pre-test and post-test of experimental and control groups

Groups	Pre-test		Post-test	
	Average	Standard deviation	Average	Standard deviation
Control group	25/59	99/15	38/58	10/17
Examination Group	69/59	64/15	75/23	77/2

Table 5. The results of covariance analysis test

Sources of changes	Sum of squares	Degrees of freedom	Mean of squares	F ratio	The significance level	Effect size	Statistical power
Pre-test	1938.012	1	1938.012	23.815	<0.001	0.451	0.997
Groups	10011.624	1	10011.624	123.028	<0.001	0.809	1.000
Error	2359.926	29	81.377				
Total	68901.000	31					

Table 6. Keyser-Meir-Elkin test values and Bartlett's sphericity test

Sampling Adequacy Index (Keyser-Meir-Elkin test)		801/0
Bartlett's sphericity test	Chi-square statistic	486/908
	Degrees of freedom	66
	The significance level	<0.001

Table 7. Correlation coefficients of two-way relations between pre-test and post-test of control and experimental groups

RGRT2	RGRT1	RGCT1	RGCT2	
			1/000	RGRT2
		1/000	- 0.12	RGRT1
	1/000	0/95	- 0.12	RGCT1
1/000	0/99	0/98	- 0.13	RGCT2

for first-order confirmatory factor analysis, second-order confirmatory factor analysis, and structural equation modeling. The test is important because it is the minimum requirement to carry out these tests. In table 6, you can find the results of two tests called the Kaiser-Meir-Elkin test and the Bartlett sphericity test. According to the table above, the Keyser-Meir-Elkin test is valued as 0.961. Thus, the number of samples we have is good enough for doing first-order confirmatory factor analysis, second-order confirmatory factor analysis, and structural equation modeling. In simple terms, the significance level of Bartlett's test is less than 0.001. Hence, we have what we need to do the statistical analysis mentioned above. Based on the information given, first-order confirmatory factor analysis, second-order confirmatory factor analysis, structural equation modeling, and model fitting are discussed separately in the above explanations.

According to table 7, the relationship between the post-test scores of the experimental group and the pre-test scores of the control group, as well as the post-test scores of the control group and the pre-test scores of the experimental group, is negative. In simpler words, the post-test results of the control group and the pre-test results of the experimental group show positive outcomes. In this study, it was discovered that women's job stress reduced after the music intervention. The relationship between the post-test scores of the experimental group and the pre-test scores of the control group, the post-test scores of the control group, and the pre-test scores of the experimental group is not significant. The

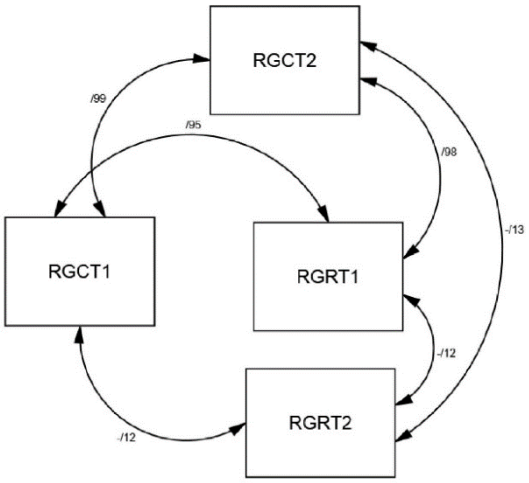

Figure 2. Variance-covariance model based on all two-way relationships between pre-test and post-test groups.

relationships of the pre-test and post-test of the control group and the pre-test of the experimental group are important. This means that when the experimental group listened to music, their job stress scores decreased significantly.

Discussion

his study was conducted to check if music can help reduce stress for women at work. The findings of this study represented that using music as a method of treatment can reduce stress in women who have work-related stress. Additionally, the music intervention method was more effective than the traditional routine work program in helping women decrease their work-related stress. Also, the relationship between the scores on the post-test of the experimental group and the scores on the pre-test of the control group, the scores on the post-test of the control group, and the scores on the pre-test of the experimental group was not positive. However, the connection between the test scores of the control group before and after, as well as the test scores of the experimental group before, were positive. It was also discovered that when comparing this research to others, the results are very similar and have a lot in common. Because the issue is very important, we can use studies about the brain to explain the results. This study has given us new knowledge about how music can help us feel less stressed and happier. The first thing to understand is that music calms down our body when we are stressed. In addition, research has shown that music can lower stress by reducing cortisol (a stress hormone) levels and by lowering heart rate and blood pressure. This has been proven in multiple studies (48-55). These results, in the study of the brain and body, have been identified as clear signs of stress. Another reason why music can help reduce stress is because it takes your mind off of stressful thoughts or feelings (56,57). Music is known to help take people's minds off of negative thoughts and feelings. This can help reduce stress, especially when listening to music for a short time or with other people (58,59). In this situation, experts think that the reason for this is to make people feel happier and healthier emotionally (7,60) and to make people feel more connected to each other (17,24,29,61). Therefore, the results of this study are similar to the other studies about using music for a short time. However, this research found that playing music at work can help lower stress levels. It is clear that when people are less stressed, they are able to work better and be more productive.

The study had some limitations. First, only a small group of people were included in the research. This makes it difficult to apply research findings to other groups of people. Secondly, in the present study, it was not feasible to have live music. As a result, pre-recorded music was played for the participants. Although there are some limitations, this study has important implications for future research and practical applications.

Musical interventions are simple and cheap; thus, they can be used in everyday life and at work. Next, it

is recommended that further studies focus on specific aspects of music intervention. This could include factors like the tempo and style of the music, whether it is performed live or recorded, and the number of music therapy sessions provided.

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Conflict of Interest

The authors have no conflicts of interest to declare.

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