Effects of educational music training on music performance anxiety and stress response among first-year undergraduate music education students

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Abstract

Background: The effectiveness of educational music training in lowering stress and performance anxiety among first-year undergraduate music education students is an understudied area. The goal of this study was to determine if educational music training affects first-year undergraduate music education students' stress and anxiety associated with musical performance.

Methods: A randomized controlled trial design was used in this study. A waiting list group of 35 students and an educational music training intervention group of 35 first-year undergraduate music education students were randomized for the study to commence. The Kenny music performance anxiety (MPA) scale and perceived stress scale (PSS) were used as outcome measures.

Results: The findings show that, among first-year undergraduate music education students, educational music training decreased their stress level associated with music performance [$F(1, 68) = 390.751$; $P = .001$, $\eta_p^2 = 0.270$]. It was also found that after the educational music training, the students reported decreased anxiety level associated with music performance [$F(1, 68) = 1375.495$; $P = .001$, $\eta_p^2 = 0.344$]. Significant interaction effects of educational music training and time on students' stress [$F(2, 68) = 127.301$; $P = .001$] and anxiety levels [$F(2, 68) = 260.535$; $P = .001$] were also found.

Conclusion: Educational music intervention can be successful as a means of reducing anxiety and stress in undergraduate music education students during the first year of study.

Abbreviations: K-MPAI = Kenny Music Performance Anxiety Inventory, MPA = music performance anxiety, PSS = perceived stress scale.

Keywords: music educators, music performance anxiety, music training, stress response, undergraduate music education students

1. Introduction

The effects of performance anxiety have been studied in a variety of contexts, including public speaking,[1] performing arts, job interviews, test-taking, and sporting events.[2–5] One of the most crucial aspects of learning music is performing but a lot of students experience music performance anxiety (MPA) and stress.[5–9] A state of intense apprehension and heightened anticipation associated with musical performances has been referred to as MPA.[6] Performance anxiety is associated with negative cognitions and the manifestation of physical symptoms (such as shaking hands, sweating, or gnawing at nails) that are the result of psychological distress.[6] A great deal of

talent in the realm of music and art regularly struggles with the issue of performance anxiety.[7] The determinants of this type of anxiety are numerous and interrelated, including heredity, environment triggers, individual's experience, emotions, cognition, and behavior.[6] The presence of MPA can vary in degree between musicians.[6]

Researchers have demonstrated that music has beneficial effects on processes connected to stress that include physiological, cognitive, and emotional benefits.[8–11] Stress and anxiety lead to similar brain activity, such as an increase in amygdala activity.[12,13] High levels of stress have been linked to several physical and mental health issues, such as cardiovascular disease, persistent pain, anxiety disorders, depression, burnout,

and addictions.[14–16] There has been evidence that listening to or making music reduces physiological arousal, as evidenced by lower cortisol levels, or a reduction in blood pressure and heart rate.[17–20] Due to the physiological and psychological benefits of listening to music, music intervention can be employed for stress reduction in a variety of circumstances.[21] The listening and making of music have been associated with numerous health and well-being benefits.[18,22,23] It has been extensively studied that music can relax and reduce stress.[18,24] Since the beginning of the 20th century, music has been utilized to relieve stress through various activities including singing and composing, listening to music tailored to specific patient groups (music as medicine), and live music therapy delivered by music therapists.[25,26]

According to research, listening to music can help people feel less anxious by increasing their awareness of and sensitivity to happy emotions.[27] Students with high MPA can improve the quality of their performances and lower their MPA by outlining and managing their sentiments and thoughts.[28] Playing music while providing basic medical care helped patients feel less anxious.[29] Participants who listened to music before reporting for jury duty showed noticeably decreased levels of state anxiety.[30] Physiological and psychological causes of performance anxiety include sadness, anxiety over criticism, social aversion, poor accomplishment motivation, and drug use.[31] The effectiveness of educational music training in lowering stress and performance anxiety in first-year undergraduate music education students has not received enough attention. As a result, this study was carried out to fill this knowledge gap by examining the effects of educational music training on performance-related stress and anxiety in first-year undergraduate music education students.

1.1. Study objectives

The following objectives guided this research:

a) To determine the effect of educational music training on undergraduate music education students' stress level associated with music performance.
b) To determine the effect of educational music training on undergraduate music education students' anxiety level associated with music performance.
c) To determine the interaction effects of educational music training and time on undergraduate music education students' stress and anxiety levels associated with music performance.

1.2. Hypotheses

These research hypotheses were tested at 0.05 alpha level.

H_1: There is a significant effect of educational music training on undergraduate music education students' stress level associated with music performance.

H_2: There is a significant effect of educational music training on undergraduate music education students' anxiety level associated with music performance.

H_3: There is a significant interaction effects of educational music training and time on undergraduate music education students' stress and anxiety levels associated with music performance.

2. Materials and Methods

2.1. Ethics statement and study design

This study was granted ethical approval by the Research Ethics Committee of the Faculty of Education, University of Nigeria. The study complies with the ethical research guidelines established by the American Psychological Association. The participants agreed to participate in the study by signing a written informed consent form.

2.2. Participants

The study was conducted in Nigerian universities located in the south-east region of the country. This study was carried out among first-year undergraduate students enrolled in Nigerian higher education institutions who were studying music education. At the preliminary stage of the recruitment process, 120 first-year undergraduate music education students were contacted using the volunteer method to determine their eligibility. A total of 70 students were randomly selected for the study from the accessed population. A waiting list group of 35 students and an educational music training intervention group of 35 first-year undergraduate music education students were randomized for the study to commence (see Fig. 1). The demographic variables were taken into consideration, such as the age and gender of the participants. The dataset revealed that 51.4% of the respondents were within the age of 17 to 20, 32.9% were within the age of 21 to 23, and 15.7% of the respondents were within the age of 15.7%. Furthermore, 45.7% of the participants are male while 54.3% of the respondents are female.

2.3. Data collection instruments

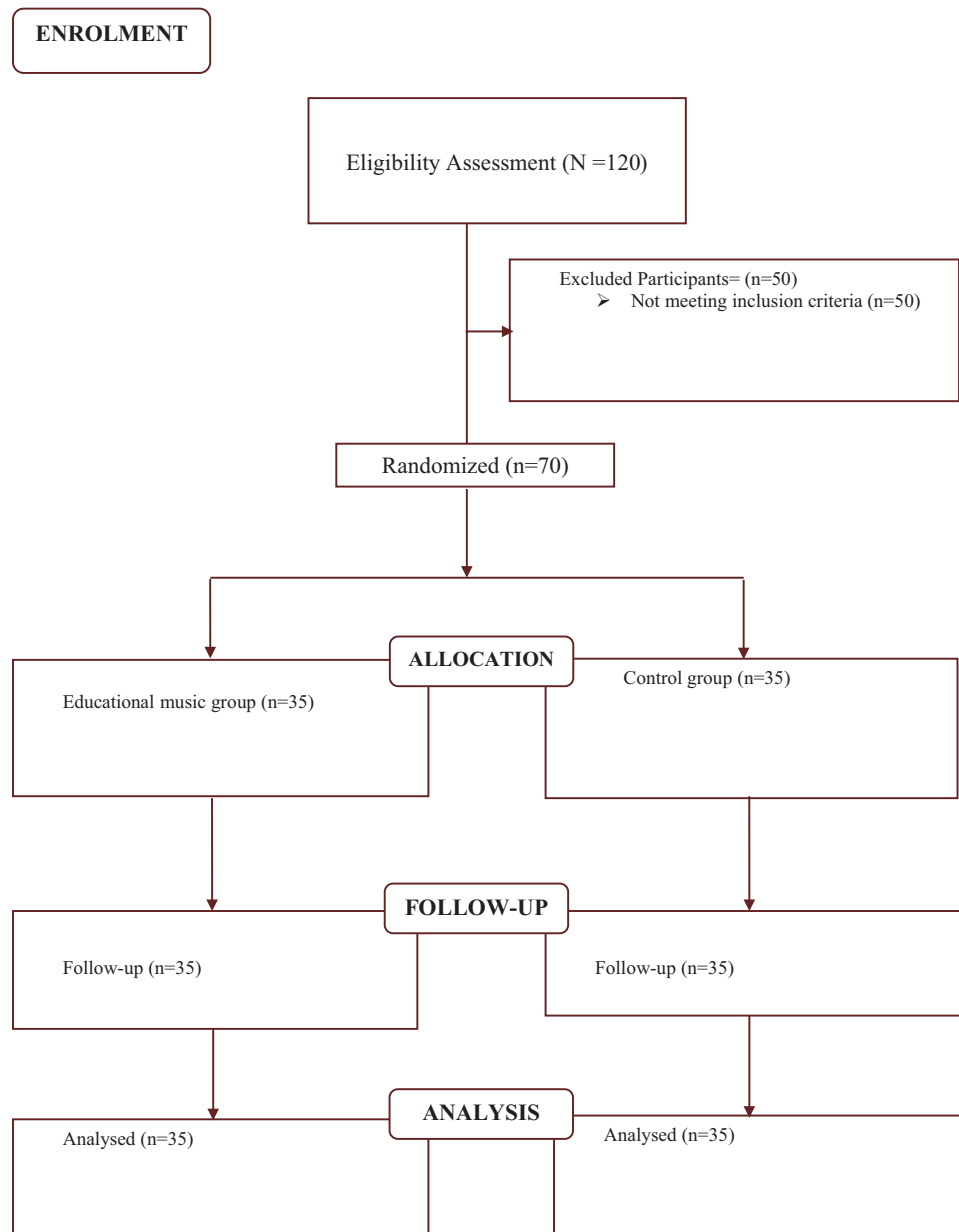#### 2.3.1. Kenny Music Performance Anxiety Inventory (K-MPAI). Dr Kenny created this test to determine whether Barlow emotion-based theory of anxiety applied to MPA.[6,32] Each of Barlow theoretical elements, including the manifestation of anxious propositions (uncertainty, uncontrollability, negative effect, and situational cues), shifts in attention (task or self-evaluation focus), physiological arousal, and memory bias, were taken into consideration while developing the 26-item questionnaire. The instrument is a 7-point Likert scale which had a response option ranging from "−3: In strong disagreement" to "+3: in strong agreement." With a maximum score of 156, higher scores show greater psychological distress and anxiety.

The Cronbach alpha test showed that the K-MPAI pretest, posttest, and follow-up dataset had internal consistency coefficients of .770, .979, and .987, respectively. These coefficients were greater than 0.6 which means that the instrument is reliable. The test of temporary stability was established, too. With a Pearson coefficient of .903, there was a significant association between posttest and follow-up. An equality of variance test was performed on the datasets of K-MPAI. A significant difference was not found between the pretest and follow-up datasets for K-MPAI datasets. $F(1, 68) = 1.799$, $P = .184$ for pretest and [$F(1, 68) = 1.940$, $P = .168$] for follow-up, respectively, at the 0.05 level of significance, indicating that the assumption of homogeneity of variance had not been violated. Based on the P value of 0.05, the posttest score of K-MPAI did not meet the homogeneity of variance assumption [$F(1, 68) = 7.715$, $P = .007$].

2.3.2. Perceived stress scale (PSS). The PSS was created by Cohen et al[33] The instrument is the most commonly used psychological tool to measure stress opinion. It is a measurement of the degree to which one perceives a particular situation as stressful. The instrument is made up of 10-item questionnaires. The instrument is designed with five Likert options which range from 0 = never to 4 = very often. It consists of a variety of items designed to measure how unpredictable, uncontrollable, and overloaded respondents' lives have become. The items are simple to understand, and the response options are straightforward. Furthermore, the inquiries are broad in scope and do not apply to any specific subgroup.

The dataset of PSS which is made up of pretest, posttest, and follow-up had internal consistency coefficients of .709, .937, and .952 alphas, respectively. Because the coefficients of these tests were above 0.6, this indicates that the PSS instrument is reliable. Posttest and follow-up scores were also used to temporarily stabilize PSS datasets. Posttest and follow-up were positively correlated, as indicated by the Pearson correlation coefficient of

ENROLMENT

Eligibility Assessment (N =120)

Excluded Participants= (n=50)
➤ Not meeting inclusion criteria (n=50)

Randomized (n=70)

ALLOCATION

Educational music group (n=35)

Control group (n=35)

FOLLOW-UP

Follow-up (n=35)

Follow-up (n=35)

ANALYSIS

Analysed (n=35)

Analysed (n=35)

Figure 1. Participants' flow diagram.

.822. The results of the pretest and follow-up datasets of the PSS datasets were not significant at the 0.05 significance level, indicating no violation of the assumption of homogeneity of variance. $F(1, 67) = .669$, $P = .416$, and $F(1, 68) = .097$, $P = .756$, respectively. However, the posttest score of PSS violated the assumption of the assumption of homogeneity of variance significant [$F(1, 67) = 21.781$, $P = .001$] for follow-up, since the P value was significant at .05.

2.4. Experimental procedure

Four music educators involved in the study received a one-month briefing from the researchers prior to the start of the intervention program. After giving consent, students were randomly allotted either to a control group or an experimental group employing a simple random selection method. Participants who met the eligibility criteria were given a questionnaire as a pretest. The educational music intervention was administered to participants in the treatment group, but not to those in the control group

(wait-listed). In addition to the 8-week treatment period, a follow-up of two weeks followed the conclusion of the treatment.

2.5. Intervention description

To help participants minimize their MPA and stress response, we created and applied a music intervention package. Sixteen sessions of music intervention were provided to the experimental group over the course of eight weeks. Participants engaged in a 40-min group music intervention that started with a 10-min warm-up session of static stretching and breathing and was followed by a 20-min session of active participation using percussion instruments under the direction of the music educators and finished with a 10-min stretching and soft music cool-down session. A selection of music and songs was played during the music session for the participants. During the intervention, music was chosen based on an analysis of participants' music preferences before the intervention, based on the majority of participants' favorite music with a moderate

rhythm and pace. When participants are allowed to decide their music, it can help to lessen their anxiety, stimulate relaxation, and bring about successful treatment.[34,35] Music was played while participants moved their extremities and played percussion instruments (such as handbells, tambourines, flappers, and loop bells). During some sessions, the group listened to a song and then discussed their reactions, thoughts, and feelings regarding the lyrical component of the song. In the session beginning, the music educators explained the relevance of the music, paying special attention to the relevant topics. There is a common theme present in all of the songs: the improvement of one's self-identity, the reduction of anxiety, and the reduction of stress.

2.6. Data analysis method

The data was statistically analyzed using the IBM Statistical Package for Social Sciences (SPSS, version 22), with repeated measures ANOVA at 0.05 level of confidence. A post hoc analysis was also performed using Pholm technique. In order to check for missing variables and to determine whether assumptions were violated, the data was scanned for missing variables. The internal consistency of the datasets of K-MPAI and PSS was assessed using Cronbach Alpha reliability estimates. The choice of this estimate stems from the dichotomous nature of the instruments. Basic assumptions guiding the survey questionnaire and repeated ANOVA were applied to the datasets of educational music training on MPA and stress. Some of these basic assumptions that are peculiar to this type of study were test of temporary stability, internal consistency, Homogeneity of regression slope, Levene test, and test of sphericity. Pearson product moment correlation was used to test the temporary stability of the dataset. The reason for this is that the instruments were used on the participants more than twice. There were three parts to the dataset: pretest, posttest, and follow-up. However, Pearson product moment correlation was used to correlate the posttest and follow-up. PSS dataset did not violate the assumption of sphericity [$x^2(2) = .884$, $P = .643$] since Mauchly test P values were greater than or equal to .05. In contrast, K-MPAI dataset violated the assumption of sphericity because Mauchly test P values were less than or equal to .05. This suggests the use of the Greenhouse-Geisser correction for the K-MPAI.

We graphed the datasets of K-MPAI and PSS to determine whether their regression slopes were homogeneous. Each instrument dataset is made of two posttest and follow-up scores. In the figures, two regression lines that slope in the same direction are used to identify the groups that received the educational music intervention and those that did not. The dissimilarity in the slopes of the lines in Figure 2 indicates a violation of the homogeneity assumption, as indicated by the slopes. However, in Figure 3, the slope of lines showed that there was a similar slope, indicating that the assumption of homogeneity had not been violated. Hence, there was an interaction between the covariate and the treatment in K-MPAI while there was no interaction between the covariate and the treatment as measured by PSS.

3. Results

3.1. Educational music training and students' stress level associated with musical performance

The results in Table 1 show that there were similar mean stress ratings associated with music performance between the music intervention group (mean = 34.94, standard deviation = 2.74) and the control group (mean = 34.26, standard deviation = 3.00) at pretest and students reported experiencing high levels of stress based on the PSS. Furthermore, there was a significant difference in mean stress ratings between first-year music education students in the music intervention group and control group [$F(1, 68) = 390.751$, $P = .001$, $\eta_p^2 = .270$]. The results showed a significant effect of time on students' stress ratings associated with music performance [$F(2, 68) = 369.331$, $P = .001$]. Also, there was a significant group and time interaction effect on students' stress ratings associated with music performance [$F(2, 68) = 127.301$, $P = .001$]. Analysis of post hoc results revealed that the music intervention group had a significant improvement in mean stress ratings associated with music performance than the control group (mean difference = 11.029, standard error = 0.558, $P = .001$). In addition, when comparing the pretest with posttest scores (mean difference = 14.414, standard error = .639, $P = .001$) and pretest with follow-up scores (mean difference = 15.614, standard error = .639, $P = .002$) of music intervention group, significant differences were found in mean stress ratings associated with music performance. There was also no significant difference between the posttest and follow-up mean stress ratings of music intervention group (mean difference = 1.200, standard error = .639, $P = .063$).

3.2. Educational music training and students' anxiety level associated with musical performance

In Table 2, the results show that there were similar mean anxiety ratings associated with music performance between music
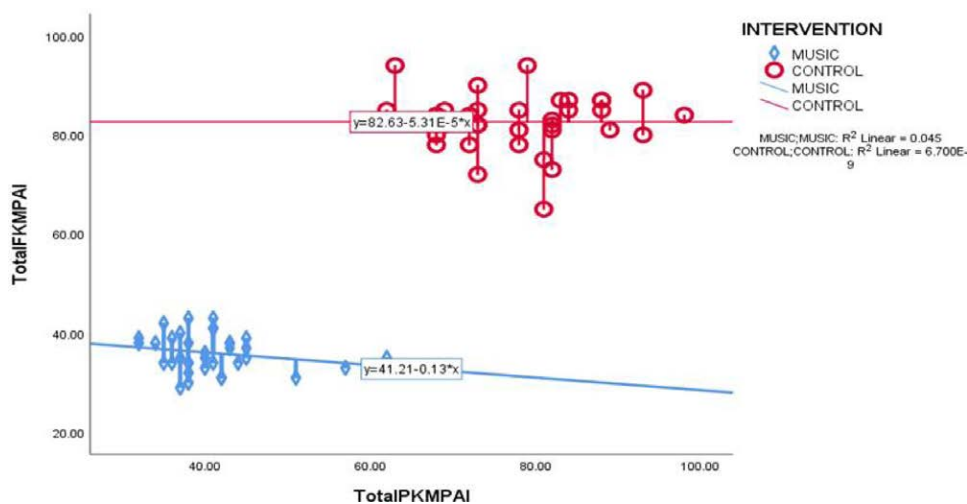
Figure 2. Homogeneity of the regression slope of the K-MPAI dataset. K-MPAI = Kenny Music Performance Anxiety Inventory.
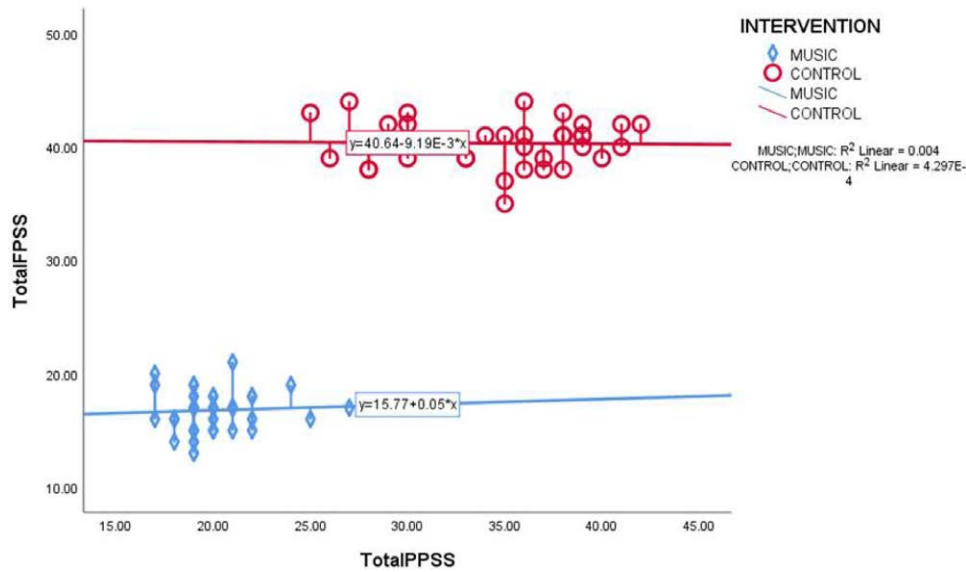
Figure 3. Homogeneity of the regression slope of the PSS dataset. PSS = perceived stress scale.

Table 1

Mean and standard deviation of participants' stress rating among first-year undergraduate music education students.

Times	Group	Mean	SD	N
Pretest	Control	34.26	3.00	35
	Educational music	34.94	2.74	35
Posttest	Control	28.09	4.65	35
	Educational music	12.29	3.84	35
Follow-up	Control	27.97	5.34	35
	Educational music	10.00	2.92	35

Table 2

Mean and standard deviation of participants' anxiety rating among first-year undergraduate music education students.

Times	Group	Mean	SD	N
Pretest	Control	91.46	4.84	35
	Educational music	91.80	6.14	35
Posttest	Control	78.14	8.89	35
	Educational music	40.71	6.19	35
Follow-up	Control	82.63	5.77	35
	Educational music	36.03	3.72	35

intervention group (mean = 91.80, standard deviation = 6.14) and control group (mean = 91.46, standard deviation = 4.84) at pretest and students reported experiencing high levels of anxiety based on the K-MPAI. Furthermore, there was a significant difference in mean anxiety ratings between first-year music education students in the music intervention group and control group [$F(1, 68) = 1375.495$, $P = .001$, $\eta_p^2 = .344$]. The results showed a significant effect of time on students' anxiety ratings associated with music performance [$F(2, 68) = 583.616$, $P = .001$]. Also, there was a significant group and time interaction effect on students' anxiety ratings associated with music performance [$F(2, 68) = 260.535$, $P = .001$]. Analysis of post hoc results revealed that the music intervention group had a significant improvement in mean anxiety ratings associated with music performance than the control group (Mean difference = 27.895, standard error = 1.090, $P = .001$). In addition, when comparing the pretest with posttest scores (mean difference = 32.200, standard error = 1.090, $P = .001$) and pretest

with follow-up scores (mean difference = 32.300, standard error = 1.090, $P = .001$) of music intervention group, significant differences were found in mean anxiety ratings associated with music performance. There was also no significant difference between the posttest and follow-up mean anxiety ratings of music intervention group (mean difference = .100, standard error = 1.090, $P = .927$).

4. Discussion

The goal of this study was to determine if educational music training positively affects first-year undergraduate music education students' stress levels and anxiety associated with musical performance. According to the results of this study, educational music training significantly reduced stress response associated with music performance among first-year undergraduate music education students; this reduction was consistent at follow-up. Also, there was a significant group and time interaction effect

on students' stress ratings associated with music performance. This study's outcome suggests that educational music training interventions can produce positive mental health outcomes among first-year undergraduate students studying music education. The results are consistent with some research which indicated that music intervention has the potential to lower stress levels in subjects.[36,37] This result is also supported by earlier studies which have found that the stress of people greatly reduced after receiving a group music intervention.[38,39] Using music intervention reduces stress, hypertension, and sedative use in patients.[40] According to another previous study, individuals who participated in a group music intervention had lower levels of stress than those in the control group.[41] In addition, previous findings show that music reduces pain and improves mood.[42,43] Another study also revealed that music intervention is effective for managing stress response in university students.[44] Music intervention has also been shown to reduce students' stress experience,[45] which is in line with our research findings.

The study also found that the first-year undergraduate students in music education felt significantly less anxious after participating in the educational music training; this reduction was consistent at follow-up. A significant reduction in anxiety levels was observed in the experimental group after receiving group education through music compared to the control group. Also, there was a significant group and time interaction effect on students' anxiety ratings associated with music performance. These results align with previous research which have shown that music therapy reduces individual's anxiety level.[36,37] Earlier studies have also demonstrated that group music intervention can make a significant difference in reducing anxiety.[38,39] The anxiety levels of participants in group music interventions were lower than those of the control group,[41] according to another previous study. Anxiety was found to be reduced by recorded music in cardiac patients.[46] There was a decrease in performance anxiety after being exposed to music intervention, according to another past research.[47] Additionally, evidence revealed that music intervention has beneficial effect on anxiety management particularly among women.[48] Research also suggests that music intervention can help patients overcome mood disorders such as anxiety and depression.[49] Music therapy has been shown to be effective in managing anxiety in patients with terminal illnesses.[50] It has been shown that listening to music through headphones can assist in anxiety management; this effect is achieved by modulating pain and anxiety on a central emotional-affective dimension.[51] Moreover, music therapists can offer patients the opportunity to express their emotions and minimize the anxiety related to dental treatments.[52] Lastly, the study finding is in line with past evidence indicating that music intervention is an effective approach for managing performance anxiety among students.[53,54]

4.2. Limitations

The study has some limitations, even though the findings are optimistic. This study's limitation includes being based on a single university program. Study participants were also supposed to be recruited from two or more distinct programs, which would have provided more variety in understanding the treatment effects on stress and performance anxiety among students. University and conservatory music programs are highly competitive, and classes tend to be small because of intensive training. There are also a lot of students who are extremely busy with their schedules and have little free time for extracurricular activities. Consequently, owing to these problems, the study is only able to recruit a limited number of participants for both groups. In addition, only first-year music education students were used for this study. Given the import of music intervention

for disabled and adult learners as well as couples,[55,56] it is suggested that future research examine its efficacy using large sample on performance stress and anxiety levels that are unique to these populations.

5. Conclusion

This research has shown that educational music intervention can be used to help first-year undergraduate students in the field of music education to feel less anxious and less stressed in relation to music performance. The findings of this research can be used by advocacy groups to push for the use of music interventions in the classroom. Medical treatment alone is not sufficient to alleviate anxiety and stress in students. Following the findings of the study, it can be concluded that educational music intervention could provide a non-medical alternative to manage stress and anxiety in schools.

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