



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2020; 6(1): 236-239
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www.oraljournal.com
Received: 19-11-2019
Accepted: 21-12-2019

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The use of a series of string quartet live music concert to reduce anxiety in first-year dental students

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Abstract

The objective of this study was to investigate the use of live music concerts to reduce anxiety in first-year dental students at the University of Michigan School of Dentistry. University of Michigan dental students pose moderate to high anxiety, being the first-year dental students mostly affected. Music interventions are a well-established alternative approach to reduce anxiety in adult populations. First-year dental students volunteered to participate in this study. The baseline anxiety and post-concert anxiety levels were assessed using the STAI-6 questionnaire. All live concerts took place during regular course sessions. Students' perceived experience with the live music concerts was also assessed. Our results demonstrated a significant anxiety reduction of 30% in first-year dental students. More importantly, live music concerts obtained an overwhelming 93% student approval rate. We conclude that music is a promising, feasible, cost-effective, fast acting and low-risk approach to reduce anxiety in first-year dental students.

Keywords: Anxiety, dental students, music therapy

1. Introduction

Anxiety has been considered the most prevalent mental health condition worldwide [1]. In the US, anxiety affects one in four people [2, 3]. Furthermore, anxiety often associates with overall health complications and even disability [4, 5].

General anxiety disorders highly affect dental students, because dentistry has been considered as one of the most challenging, demanding and stressful fields of study [6, 7]. Dental training requires students to acquire several academic and clinical competencies while improving interpersonal and professionalism skills [8]. Different stages along the dental education program offer different stressors and challenges that may increase the anxiety levels among students over the years of dental school [9, 10]. Therefore, dental students often report high levels of anxiety along the dental education program [11]. As verified in other populations, anxiety among dental students also compromises academic performance and students' overall health [11, 12]. Consequently, dental students' anxiety has become a major concern for dental educators [13].

Music as a therapeutic tool has been used since ancient times [14]. The therapeutic use of music, more specifically music therapy, is defined as an intervention where the therapist uses music to promote health [15]. Furthermore, many music interventions, such as listening to music or playing a musical instrument, have also been proved to relieve stress, anxiety and pain in patients with critical illness [16]. Music as an auxiliary therapeutic approach is effective for the treatment of nervous system conditions, mental health problems, reduced adaptation capabilities, pain and even autism [15, 16]. Music therapy and music interventions increase social contacts, length of life and can also improve mood and symptoms of depression [17, 18]. In addition, while other anti-anxiety therapeutic tools are inaccessible to many patients, the use of music has been considered as a feasible, promising, low-risk and cost-effective tool to reduce anxiety in different populations [19].

Music interventions are a relatively well-established alternative, complementary and integrative medicinal approach [20], which has been proved to reduce anxiety levels in adult populations [21, 22]. In young adults, more specifically dental students, practicing music has demonstrated to reduce anxiety and depression [23]. Furthermore, a series of piano concerts

reduced stress and improved work-life balance in dental students at the College of Dentistry at New York University [24].

As previously observed among dental students, the University of Michigan School of Dentistry (UMSoD) first-year dental students are highly affected by anxiety [6, 7]. Therefore, the aim of this study was to assess whether a series of string quartet live music concerts could reduce the levels of anxiety in first-year dental students. In addition, the study also measured the perceived value held by the students for this experience.

2. Materials and Methods

The University of Michigan Institutional Review Board reviewed and approved this study based on the following methods (HUM00151893). During the pre-clinical foundation dentistry course in the winter of 2017, first-year dental students (N = 109) were invited to attend a series of three string quartet live music concerts. Students were also invited to voluntarily and anonymously answer the State and Trait Anxiety Inventory short form (STAI-6) in six moments along the course. The STAI-6 contains 6 questions as shown in Table 1 [26]. STAI-6 scores vary from 20-80; being scores 34-36 considered normal anxiety level [26, 27]. Scores higher than 36 are considered moderate to severe anxiety, which suggests a need for further evaluation. To establish the baseline levels in the course (pre-concert anxiety levels), we randomly chose three regular course sessions. The anxiety levels after the live music concerts (post-concert anxiety levels) were surveyed right after each one of the three live music concerts. For demographic data, we only asked for the gender of the respondent, as there was no significant age gap among our student’s population.

The University of Michigan School of Music, Theater and Dance graduate music students, in partnership with the University Musical Society, performed the concerts. The duration of the concerts varied between 30-40 minutes. The live music concerts were framed with introductions of each work. Students in the audience were invited to follow along with the performance storyline and make emotional connections to each piece being performed. A variety of works were also offered, ranging from canonic classical selections to modern minimalist works, in an effort to share the diversity of musical options with the students. The music authors included Haydn, Debussy, Glass, Shaw, and others. After the concerts, the students were invited to answer the STAI-6 questionnaire again. The questionnaire on Table 2

was used to assess the student-perceived value held for the experience with the music concerts.

The responses were recorded and for statistical analysis we paired samples and used the T-test and multiple linear regression models to analyze the association between pre-concert and post-concert anxiety levels from our survey data.

3. Results & Discussion

We obtained 99% (N = 108) of responses for the first baseline survey, 83% (N = 90) for the second baseline survey and 80% (N = 87) for the third baseline survey. For the post-concert surveys, we obtained 100% (N= 109) of responses in the first concert, 95% (N = 103) in the second concert, and 98% (N = 107) in the last concert. In average, dental students reported pre-concert anxiety scores (baseline) above the normal levels according to the STAI-6 questionnaire. The observed pre-concert anxiety scores have been associated with moderate to high anxiety in the literature [26].

As a whole, after the concerts, UMSoD first-year dental students showed a significant decrease of 30% in the mean anxiety (M = 53.16, p value <0.0001) score levels. The anxiety reduction in female students was 34% (N = 55) and in male students was 26% (N = 54) (Figure 1a). Female students have also demonstrated higher pre-concert mean anxiety scores (M = 56.8) compared to male students (M = 49.2).

For the perceived experience with the music concerts, 93% (N = 102) of students responded that they have enjoyed the concerts and would like to attend the concerts again. In addition, 91% (N = 99) reported feeling calmer after the music concerts. We also observed that the mean anxiety levels at concerts 2 and 3 were lower than the anxiety level at concert 1 (Figure 1b).

After the musical concerts, the observed decrease in mean anxiety levels was consistent with the increase of the responses using the positive statements at the STAI-6 (Figure 2a): *I feel calm* (statement 1), *I am relaxed* (statement 4) and *I feel content* (statement 5). As students responded the STAI-6 questionnaire using the positive statements after the musical concerts, the responses using the negative statements decreased: *I am tense* (statement 2), *I feel upset* (statement 3) and *I am worried* (statement 6). Consequently, we could observe a significant shift from the percentages of the responses before and after concerts on the statement 5 (*I feel content*) versus statement 6 (*I am worried*) of the STAI-6 questionnaire (Figure 2b).

3.1 Tables and Figures

Table 1: State and Trait Anxiety Inventory – STAI-6

	Not at all	Somewhat	Moderately	Very much
1-I feel calm	1	2	3	4
2- I am tense	1	2	3	4
3- I feel upset	1	2	3	4
4- I am relaxed	1	2	3	4
5-I feel content	1	2	3	4
6-I am worried	1	2	3	4

Table 2: Music concerts perceived experience

1) I enjoyed the music concert today.				
Totally disagree	Neutral	Agree	Totally agree	Disagree
2) I felt calmer after the music concert today.				
Totally disagree	Neutral	Agree	Totally agree	Disagree
3) I would like to have another music concert before the lab sessions.				
Totally disagree	Neutral	Agree	Totally agree	Disagree

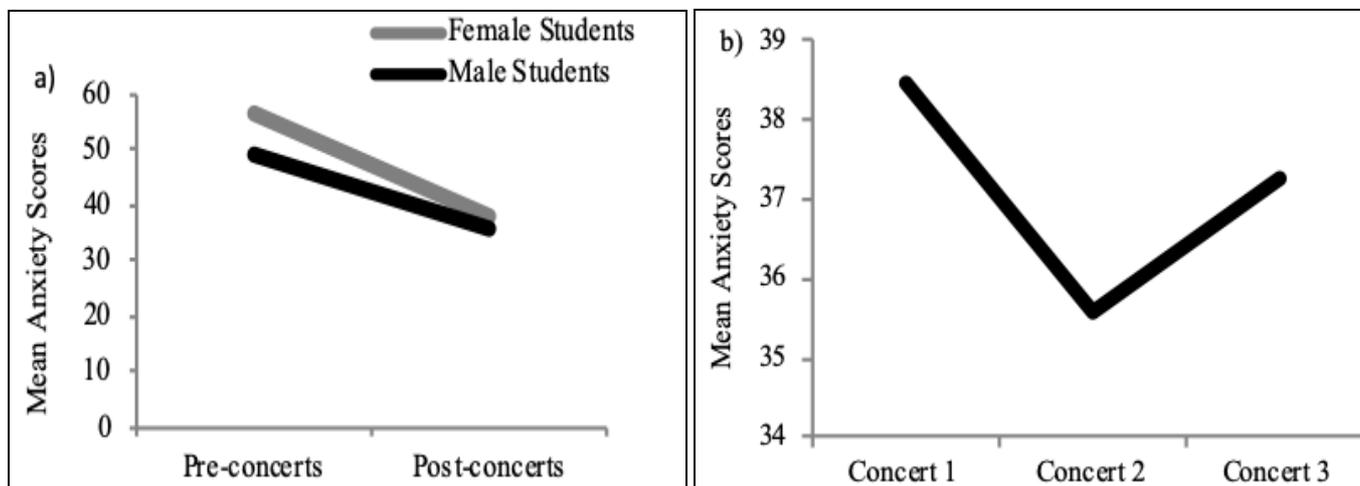


Fig 1: Mean Anxiety Scores in female and male dental students pre and post-concerts (a) and at the music concerts (b).

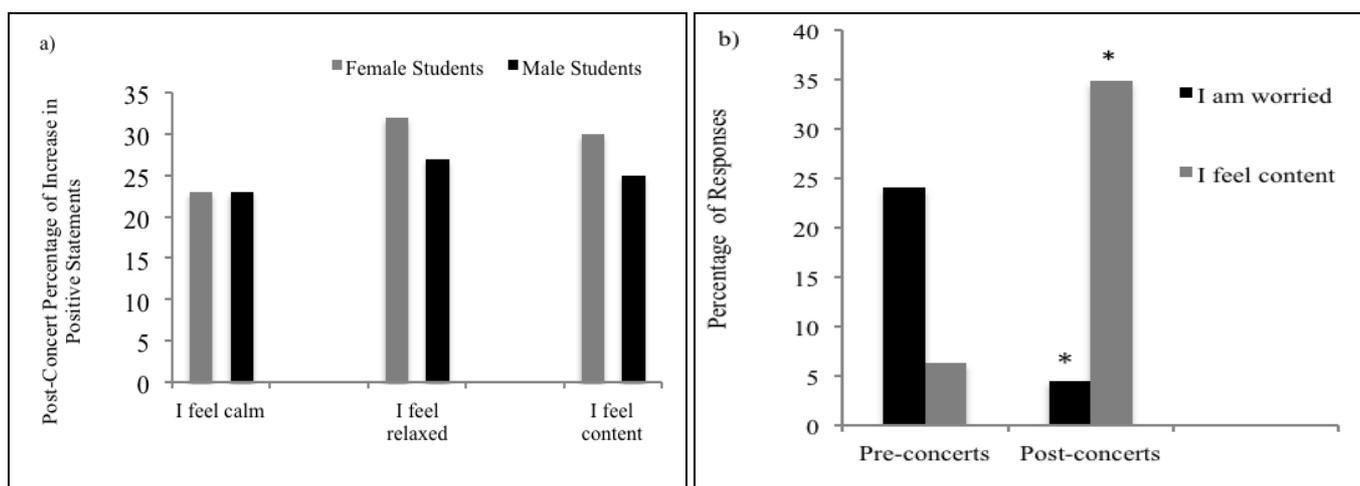


Fig 2: Percentage of the increase for the responses in the positive statements of the STAI-6 questionnaire (a), percentage of the students' responses pre and post-concerts for statements 5 (*I feel content*) and 6 (*I feel worried*) of the STAI-6 (b).

3. Conclusions

In this study, our goal was to verify whether a series of string quartet live music concerts could reduce anxiety in first-year dental students. Furthermore, our study aimed to verify whether music concerts are a feasible tool to include in pre-clinical dental teaching settings. Our results demonstrated that live music concerts are a feasible tool to reduce anxiety in first-year dental students.

Future studies are necessary to investigate other modalities of music interventions as an alternative approach to reduce anxiety levels and improve performance of dental students.

4. Acknowledgments

We would like to thank the University Musical Society for the encouragement and support throughout this project.

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