

Effect of educational music intervention on college students' aggressive behaviour

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Abstract

Background: Students' aggressive behavior and its negative implications have continued to intrigue researchers. Thus, the present study examined the effect of educational music intervention in reducing aggressive behavior among college students.

Method: Quantitative data were collected from 30 college student participants in the treatment group and 30 college student participants in the control group using the teacher-rating of students' aggressive behaviors and self-rated aggression scale instruments. This study adopted the IBM SPSS version 25 program and JASP statistical program for data analysis.

Results: The result of the study indicated that college students in the educational music group showed considerable mean decline in aggressive behavior at posttest compared to their counterparts in the control group. At follow-up, it was revealed that educational music intervention consistently reduced the college students' aggressive behavior.

Conclusion: Educational music intervention proved to be a helpful intervention in reducing Nigerian college students' aggressive behavior. In light of this, it would be beneficial to implement educational music intervention to reduce aggressive behavior among college students in other localities.

Abbreviations: SRAS = self-rated aggression scale, TRAB = teacher-rating of students' aggressive behaviors.

Keywords: aggressive behaviour, college students, educational music intervention, group, music educators

1. Introduction

The issue of aggression among adolescents has long been a major concern for public health around the world, and its implications for the future are of interest to experts. In studies, researchers have observed an adverse relationship between aggressive behavior and both short- and long-term social and emotional wellbeing.^[1-3] Behavioral difficulties negatively affect the educational opportunities for students since they are frequently reprimanded for their behaviors and may establish conflicting relationships with teachers, resulting in negative attitudes about school and reduced academic achievement.^[4] College students who wish to reduce aggressive behavior may find that music intervention is an effective intervention strategy. In many cases, playing or listening to music reduces pain by producing endorphins, modulating moods, and reducing stress.^[5,6] A positive impact of music on the neurological, hormonal, and autonomic nervous systems is known to increase psychological well-being, satisfaction, and self-confidence.^[7] Music educators and therapists can utilize music activities to help students improve their physical, communicative, cognitive, and social abilities. With the appropriate music

intervention, some physical, emotional, and psychological illnesses may be alleviated.^[8] Music can treat a wide range of disorders, including pain, anxiety, grief, and relationship issues.^[9] Vocal and instrumental performance, as well as music theory, is taught to high school students by music educators. In addition, music educators are responsible for leading the school's marching band, choir, jazz band, and orchestra, among other ensembles. The music educator also teaches students how to sing or play an instrument as part of the music lesson. It is the responsibility of music educators to instruct and train students in the abilities necessary to be successful musicians. Their explanations and demonstrations concerning pitch, tempo, rhythm, and other key concepts relevant to singing and performing music helps to build confident musicians and prospective music teachers.^[10]

It has been shown that music intervention is helpful in lowering aggression and enhancing self-control in teenagers.^[11] It was also found that music improved pupils' academic experiences^[12] and children who took part in music intervention showed less aggressive behavior and had higher self-esteem than those who did not.^[13] Music intervention had a greater impact on patients' aggression and agitation reduction than pharmaceutical

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

The research ethics committee at the authors' institution approved the study. Informed consent was required from all participants.

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interventions.^[14] Music intervention also significantly reduced aggressive behavior in children with mild intellectual disabilities.^[15] More so, music intervention considerably lessened anxiety, despair, pain, and weariness in adult patients.^[16] Music intervention decreased patients' first postoperative day complaints about noise, heart rate, and systolic blood pressure.^[17] Music had a significant impact on graduate students' depressive symptoms.^[18] Past group-based studies showed that music intervention is an effective approach for assisting children and adolescents with problems of aggression and low self-esteem.^[19] According to some studies, the effects of music intervention on individual's aggression may be realized by providing them with a psychologically healthy environment.^[19-23] Through emotional catharsis, studies in adults have indicated that participation in musical activities improves an individual's ability to control their emotions, particularly aggression and anger.^[23,24] A study conducted on children found that those who listened to music showed statistically significant improvements in their results on Achenbach Teacher's Report Form on aggression/hostility scale when compared with those who did not listen to music.^[25] But, there is a lack of evidence concerning the effect of music intervention on Nigerian college students' aggressive behavior in spite of the increasing number of studies indicating that aggression is a significant issue among Nigerian college students.^[26-29] The present study seeks to examine the effect of educational music intervention in reducing aggressive behavior among college students in Nigeria.

1.1. Study objective

To ascertain the effect of educational music intervention on college students' aggressive behavior.

1.2. Hypotheses

H_{a1} : There is a significant effect of educational music intervention on college students' aggressive behavior.

2. Method

2.1. Study location and participants

The research was conducted in secondary schools in Enugu, South-East Nigeria. An aggregate of 60 college students partook in the investigation (Fig. 1). College students were preferred for this study because aggressive behaviors have been reported among them.^[11,13,26-29] More so, researchers have observed aggressive behaviors among college students in the study area.^[26-29] Thus, the researchers decided to embark on this study using college students as the research subjects. To recruit participants for the study, an initial assessment of eligibility was conducted with 100 college students using a volunteer method. Each participant was asked to read and return a consent document signed by their parents before participating in the study. Through randomized procedure, 30 participants each were assigned to educational music group and control group. Specifically, participants were allotted to each group using a simple random sampling technique. The sample of this study was determined using GPower 3.1 software,^[30] and this indicated an average effect size of 0.5 and a probability level of 0.05.

2.2. Data collection instruments

1.2.2. Teacher-rating of students' aggressive behaviors (TRAB). We adapted the 15-item questionnaire from earlier investigation.^[31] Students were questioned about their participation in common instances of overt aggression in the classroom, such as teasing, threatening, and starting fights with other students. A 5-point Likert scale was used to evaluate each

student's response. The ratings for the questions on the 5-point Likert scale varied from "never true" (0) to "almost always true" (4). Based on the total score, the range was 0 to 42, with higher scores indicating more aggressive behavior.

2.2.2. Self-rated aggression scale (SRAS). In a prior study in Nigeria, the SRAS was used.^[32] Students responded to questions on whether they had hit, called names, or teased someone in the previous 3 weeks using a 3-point Likert scale. These items have response scores that range from "Not True" (0) to "Very True" (2). A total score was given to each participant ranging from 0 to 14, with higher ratings denoting more aggressive behavior. They were also questioned if they had ever used a weapon, whether they had been hurt during a fight or hurt someone else, and whether they belonged to a gang.

2.3. Experimental procedure

We informed the school administrators about the study before conducting the research in the study area. Flyers were also distributed to let students know about the screening. Pretesting was provided to those who met the eligibility criteria. Before the commencement of the intervention program, the researchers conducted a 2-week briefing for the music educators. Music educators learned and prepared for the intervention delivery through 4-session briefing. Music intervention took place in a designated classroom at the selected colleges. Two meetings per week, lasting 8 weeks, were scheduled between the hours of 3 and 4 PM. The sessions lasted 45 minutes each. A 2-week (4-session) follow-up phase was undertaken at the end of the treatment after 3 months.

2.4. Intervention explanation

We developed an educational music intervention module designed to reduce aggressive behavior among the participants. The types of musical techniques include singing rational songs, analyzing librettos, designing musical instruments, playing pianos and handbells, creating artwork, and writing songs. Three music educators were responsible for conducting the program. A percussion instrument was used to express the students' inner anger during catharsis. It aided in relaxing them, regulating and reducing negative emotions. According to some studies, giving participants a choice of music eases anxiety, encourages relaxation, and speeds up the healing process.^[33-35] During the study period, no structured therapeutic programs were offered to the control group of participants. After the study was completed, participants in the control group received complementary music intervention program.

2.5. Data analysis method

The data set were subjected to preliminary tests. IBM's statistical package for social sciences and JASP statistical software were used for the preliminary test. Preliminary analysis was conducted to check assumptions guiding the analysis of repeated analysis of variance such as internal consistency, temporary stability, Levene test of equality of variance, homogeneity of regression slope, and test of sphericity. An evaluation of Cronbach α reliability was performed on the dataset obtained from the TRAB and SRAS instruments to assess their internal consistency. Cronbach reliability is suitable for instruments that do not have an exact answer. The temporal stability of the TRAB and SRAS dataset was established using Pearson product moment correlation. The dataset was subjected to temporary stability because the instruments were administered to the participant >2 times. The score generated at the pretest was correlated with posttest and follow-up scores. The dataset of students' aggressive behavior was subjected to Levene test of

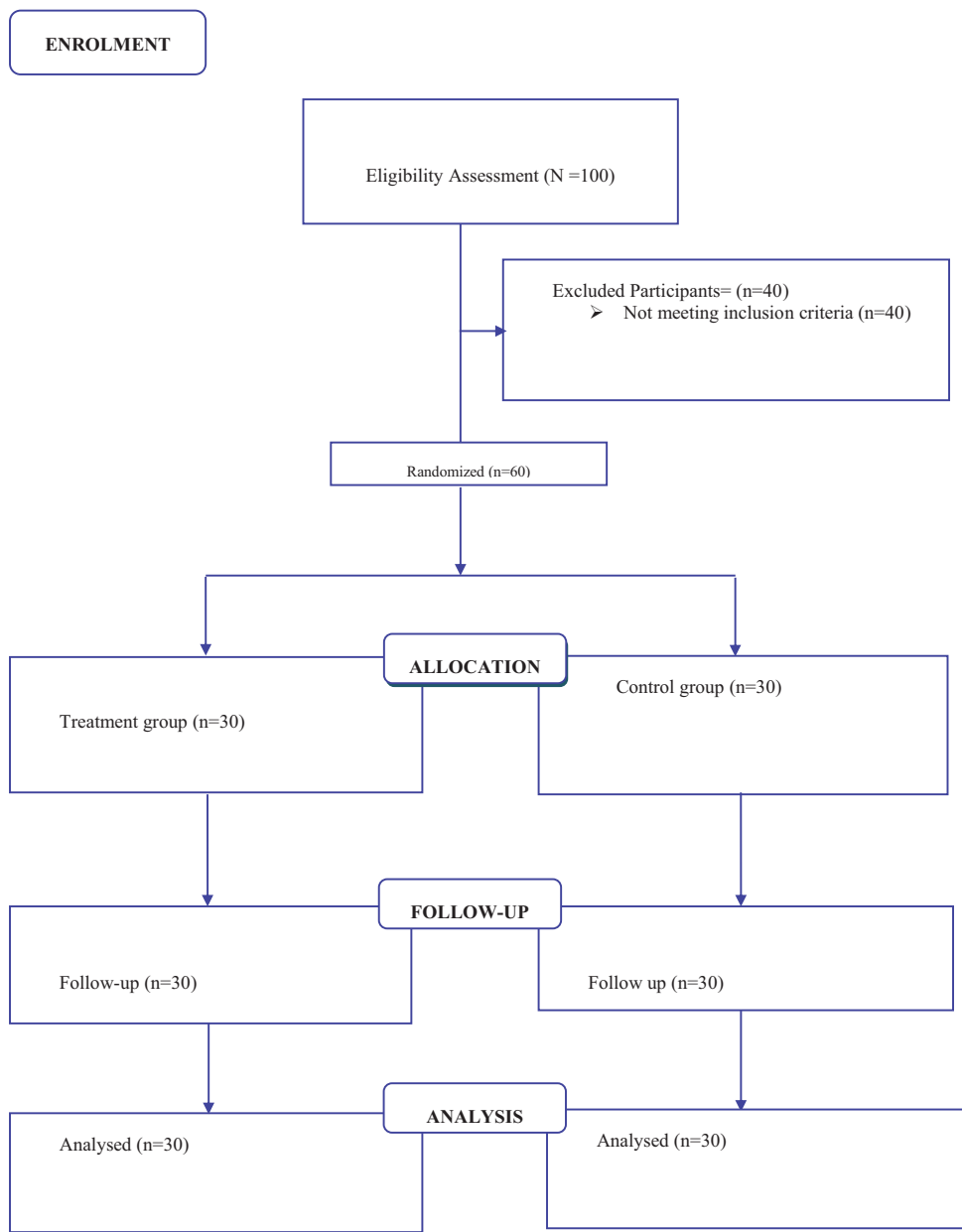


Figure 1. Participants' allocation flow diagram.

equality of variance. Homogeneity of regression slope and test of sphericity were established for college students' aggression. It is pertinent to note that for violations of the sphericity assumption, Greenhouse–Geisser estimators were used to evaluate sphericity when ϵ is ≤ 0.75 .

3. Results

The demographic information of the participants with respect to age showed that 23.3% of the respondents were within the age bracket of 17 to 21. Additionally, 50% of respondents are between the ages of 22 and 26, while 26.7% are between the ages of 27 and above. Furthermore, the demographic variable revealed that 46.7% of the respondents were male, while 53.3% were female.

The pretest dataset generated from TRAB and SRAS had internal consistency coefficients of .757 and .729, respectively. Reliability coefficients >0.6 are considered highly reliable.^[26] The dataset generated during the posttesting phase showed

higher internal consistency with a coefficient of .892 for the TRAB and lower internal consistency with a coefficient of .710 for the SRAS. However, the coefficients of the dataset were reliable at the posttest. Finally, at posttest, the datasets generated recorded higher internal consistency with coefficients of .970 and .801 respectively. This indicates a high degree of reliability. In summary, the internal consistency of the dataset generated from students' aggressive behavior was highly reliable.

Low and negative temporary stability coefficients of .021 and $-.055$ were recorded respectively for TRAB. This was expected because the dependent variable which is students' aggressive behavior was supposed to decline due to the intervention program. However, the dataset generated at the posttest was correlated with the follow-up dataset. A very high temporary stability coefficient of .706 was recorded. This was expected since these 2 datasets (posttest and follow-up) were generated after the intervention (educational music intervention) aimed at reducing aggressive behavior.

Furthermore, for SRAS datasets, pretest score was correlated with posttest and follow-up scores and a low coefficient of temporary stability of $-.055$ and $-.050$ was recorded. As usual, it was expected since the dependent variable which is students' aggressive behavior was supposed to decline due to the intervention program. However, the dataset generated at the posttest was correlated with the follow-up dataset and a very high temporary stability of $.706$ was established. This was expected since these 2 datasets (posttest and follow-up) were generated after the intervention (educational music intervention) aimed at reducing aggressive behavior.

The result showed that there was no significance difference in the variance of the 2 groups as measured by TRAB $F(1, 58) = .372, P = .544$, and SRAS $F(1, 58) = .098; P = .755$, since the P values of these datasets are $>.05$. Thus, the assumption of homogeneity of variance was not violated by the dataset used to measure college students' aggressive behavior due to educational music intervention.

The Mauchly test for TRAB [$\chi^2(2) = .845, P = .008$] and SRAS [$\chi^2(2) = .694, P = .000$] was violated since the P values were significant for both datasets (TRAB and SRAS). Therefore, this test suggests that researchers should utilize Greenhouse-Geisser correction for data interpretation which is an alternative.

Figure 2 shows the homogeneity of the regression slopes of the dataset of SRAS. The dataset of SRAS used in this figure comprises of posttest score (SRAS) and follow-up score (SRAS). The regression slopes of the control and music educator lines indicate similar orientation. This means that they exhibited a similar upward slope, hence, the assumption of homogeneity of the slope is not violated. Therefore, there is no interaction between the covariate and the treatment. Figure 3 shows the homogeneity of regression slopes in the dataset of TRAB. The dataset of SRAS used in this figure comprises of posttest score (TRAB) and follow-up score (TRAB). The regression slopes of the control and music educator lines indicate different orientations. This means that they exhibited different upward slopes, hence, the assumption of homogeneity of the slope is violated. Therefore, there is an interaction between the covariate and the treatment. This is common especially when the dependent variable score is expected to decline due to treatment conditions.

Table 1 shows that pretest TRAB scores were similar between the music intervention and control, music intervention ($M = 52.467, SD = 4.904$), and those in the control group ($M = 52.00, SD = 3.29$). At the posttest, there was a difference between the 2 groups, music ($M = 26.36, SD = 3.75$) and control ($M = 39.63, SD = 2.78$) indicating that there was more decline in aggressive behavior scores of college students exposed to music intervention. The follow-up test also showed that there was a continued mean decline in aggression score of college students exposed to music intervention music

($M = 13.83, SD = 4.55$) compared to control ($M = 39.63, SD = 2.78$).

Since the sphericity assumption was violated by Mauchly test [$\chi^2(2) = .845, P = .008$], researchers used the Greenhouse-Geisser correction for data interpretation. There was a statistically significant effect of time on TRAB scores of college students' aggressive behavior [$F(2, 58) = 898.124, P < .001, \eta_p^2 = .584$]. Based on intervention, there was a significant difference in aggressive behavior score between the control and music intervention group [$F(1, 59) = 393.459; P < .001, \eta_p^2 = .0205$]. Furthermore, the results revealed a significant intervention and time interaction effect on the TRAB scores of the college students ($F[2, 58] = 219.484; P < .001$ [see Table 2]).

Holm post hoc test was conducted to compare the scores based on instructional intervention. It was discovered that the music intervention group scored less on the aggression scale than the control group (mean difference = -12.867 , standard error = $0.649, P < .001$) as measured by TRAB. Based on time, there was a mean difference between pretest score and posttest score as measured by TRAB (mean difference = 19.23 , standard error = $0.62, P < .001$), and pretest and follow-up (mean difference = 25.500 , standard error = $0.62, P < .001$). Furthermore, the posttest score was compared to the follow-up test (mean difference = 6.26 , standard error = $0.62, P < .001$) and there was a significant difference in mean scores (see Table 3).

Table 4 depicts that the pretest scores were similar between the music intervention and control, ($M = 23.800, SD = 3.56$) for the music control group and ($M = 23.73, SD = 2.37$) for those in the control group as measured by the SRAS instrument. At posttest, there was a difference between the 2 groups, music ($M = 10.26, SD = 3.05$) and control ($M = 14.93, SD = 3.42$) indicating that there was more decline in aggressive behavior scores of college students exposed to music intervention. The follow-up scores also showed that there was a continued mean decline in aggression score of college students exposed to music intervention music ($M = 7.33, SD = 2.30$) compared to control ($M = 15.900, SD = 2.18$).

Since the sphericity assumption was violated by Mauchly test ($\chi^2[2] = .694, P = .000$), researchers used the Greenhouse-Geisser correction for data interpretation. There were statistically significant effects of time on TRAB scores of college students' aggressive behavior ($F[2, 58] = 313.29, P < .001, \eta_p^2 = 0.66$). Based on intervention, there was a significant difference in the aggressive behavior score between the control and music intervention groups ($F[1, 59] = 109.11; P < .001, \eta_p^2 = .0102$). Furthermore, the results revealed a significant

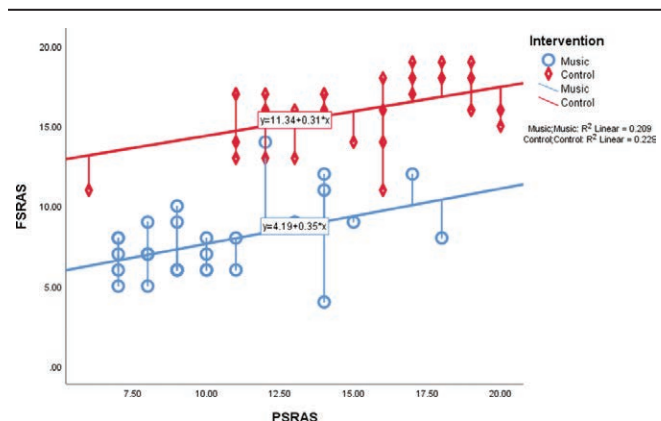


Figure 2. Homogeneity of regression slope of SRAS dataset. SRAS = self-rated aggression scale.

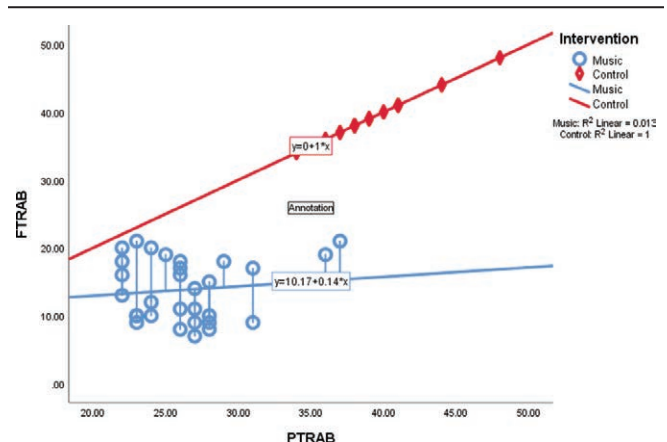


Figure 3. Homogeneity of regression slope of TRAB dataset. TRAB = teacher-rating of students' aggressive behaviors.

Table 1
Descriptive statistics based on TRAB instrument.

Times	Intervention	Mean	SD	N
Pretest	Control	52.000	3.259	30
	Music	52.467	4.904	30
Posttest	Control	39.633	2.785	30
	Music	26.367	3.755	30
Follow-up	Control	39.633	2.785	30
	Music	13.833	4.557	30

TRAB = teacher-rating of students' aggressive behaviours.

Table 2
Repeated ANOVA test as measured by TRAB.

Cases	Sum of squares	df	Mean square	F	P	η^2
Times	21188.844	2	10594.422	898.124	<.001	0.584
Intervention	7449.800	1	7449.800	393.459	<.001	0.205
Times × intervention	5178.133	2	2589.067	219.484	<.001	0.143
Residuals	1368.356	116	11.796			

Type III sum of squares.

ANOVA = analysis of variance, df = degrees of freedom, TRAB = teacher-rating of students' aggressive behaviours.

Table 3
Post hoc comparisons – times and group.

		Mean difference	SE	t	p_{holm}
Treatment	Control	-12.867	0.649	-19.836	<.001
Pretest	Posttest	19.233	0.627	30.672	<.001
	Follow-up	25.500	0.627	40.666	<.001
Posttest	Follow-up	.267	0.627	9.994	<.001

SE = standard error.

intervention and time interaction effect on SRAS scores of the college students ($F [2, 58] = 247.550; P < .001$ [see Table 5]).

Holm post hoc test was conducted to compare the scores based on intervention which revealed that the music intervention group had a lower aggressive score in comparison to the control group (mean difference = -4.300, standard error = 0.412, $P < .001$) as measured by SRAS. Based on time, there was a mean difference between pretest score and posttest as measured by SRAS (mean difference = 11.16, standard error = 0.534, $P < .001$), and pretest and follow-up (mean difference = 11.95, standard error = 0.534, $P < .001$). Furthermore, the posttest score was compared to the follow-up test (mean difference = 0.783, standard error = 0.534, $P < .001$) and there was a significant difference in mean scores (see Table 6).

Table 4
Descriptive statistics based on SRAS instrument.

Times	Intervention	Mean	SD	N
Pretest	Control	23.800	3.566	30
	Music	23.733	2.377	30
Posttest	Control	14.933	3.423	30
	Music	10.267	3.051	30
Follow-up	Control	15.900	2.187	30
	Music	7.733	2.303	30

SD = standard deviation, SRAS = self-rated aggression scale.

4. Discussion

The objective of this study is to find out whether educational music intervention impacts college students' aggressive behavior. According to the findings, there was a significant decrease in aggressive behavior in the music intervention group when compared to the control group. The results of the follow-up indicate that the music intervention effect on students' aggressive behavior was maintained. Therefore, we believe that educational music interventions should be prioritized for the treatment of aggression in college students. The findings are consistent with previous researchers,^[36] who found that music interventions outperformed non-music therapy. According to the author, the music sessions were beneficial to clients and improved their behavior. Given the high rate of aggressive behavior in Nigerian schooling adolescents,^[37] music intervention is a significant approach for assisting this population. Study discovered that those with patients who underwent responsive music therapy displayed a marked decrease in hostility when compared to the control group.^[38] Studies also demonstrate that music intervention is relevant for managing behavioral and psychological symptoms in patients.^[39,40] The music therapy group displayed much less hostile behavior than the control group.^[11] Choi et al discovered that music therapy boosts self-worth and reduces hostility.^[13] This study supports earlier studies that suggest music therapy may lessen hostility. Music therapy is beneficial for aggression reduction in children and adolescents.^[41-43] Student participants in one study showed evidence of a reduction in both physical and verbal aggression as a result of participating in a music intervention program.^[44] Music intervention can improve the mental health of children and adolescents struggling with aggression, according to a study.^[45] Other research suggests that music intervention is beneficial for participants in terms of improving behavior disorders, anxiety, and agitation.^[46,47] According to another study, student participants in music intervention experienced significant improvements in coping skills and a decrease in avoidance behavior; students' anger was reduced more effectively by music intervention than other interventions.^[48] Music intervention is useful in regulating emotional concerns among adults, according to past studies,^[49,50] and developing skills of emotional regulation by students.^[51] According to previous study, hostility, irritability, and stress increased during anger induction and decreased after music intervention.^[49] Hence, taking part in music intervention may represent a healthy way of processing anger for the participants.^[49] Accordingly, the results of this study are supported by these previous findings.

4.1. Limitations

Although the findings of this study are positive, they must be regarded in the context of a number of limitations. The small sample size is the first drawback. The study's brief time span was another drawback. Rather than independently observing

Table 5**Repeated ANOVA test as measured by SRAS.**

Cases	Sum of squares	df	Mean square	F	P	η^2
Times	5362.211	2	2681.106	313.299	<.001	0.660
Intervention	832.050	1	832.050	109.114	<.001	0.102
Times × intervention	495.100	2	247.550	28.927	<.001	0.061
Residuals	992.689	116	8.558			

ANOVA = analysis of variance, df = degrees of freedom, SRAS = self-rated aggression scale.

Table 6**Post hoc comparisons – times and group.**

		Mean difference	SE	t	P_{holm}
Treatment	Control	-4.300	0.412	-10.446	<.001
Pretest	Posttest	11.167	0.534	20.908	<.001
	Follow-up	11.950	0.534	22.374	<.001
Posttest	Follow-up	0.783	0.534	1.467	0.145

SE = standard error.

changes in behavior, the outcomes were based on instructors' evaluations and students' self-reports. But socially desirable responses may help to explain some of the encouraging findings. Finally, because this study was undertaken in a heavily populated urban area in South-East Nigeria, its findings may not be applicable to all schools especially those in rural parts of Nigeria.

4.2. Implications for music educators

Generally speaking, music educators are in charge of planning lessons according to each student's needs and the requirements of the exams, acquiring the right teaching resources and materials, instructing students in music theory, aural skills, and practical techniques, enforcing and motivating students, evaluating students' abilities, giving feedback, and writing reports, as well as planning recitals and concerts for students. However, the music educator should be encouraged to plan and manage the learning environment in order to facilitate the desired results by combating the problems that may hinder student development. Moreover, music educators should recognize issues both inside and outside the school that can hinder the use of effective methods for reducing aggressive behavior. To reduce aggressive behavior among college students, music educators are encouraged to implement interventions such as educational music intervention. The school setting should be able to facilitate the introduction of this program to reach utmost number of students. It is hoped that by implementing the program in schools, Nigeria's educational ethos will be incorporated into it, thus improving its long-term viability.

5. Conclusion

Aggression among college students and its negative influences on students' daily functioning and interpersonal relationship have been a source of concern to mental health professionals. Hence, this study investigated the effect of educational music intervention on college students' aggressive behavior. The findings of the study showed that educational music intervention is significantly effective in reducing college students' aggressive behavior. Hence, mental health professionals are enjoined to adopt this intervention in treating clients with aggressive behavior.

Author contributions

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Writing – review & editing: Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

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