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PAPER 11

THE EFFICACY OF MUSIC-BASED COGNITIVE BEHAVIOUR THERAPY IN THE REDUCTION OF TEST ANXIETY AMONG PRIMARY SCHOOL PUPILS IN BASIC SCIENCE

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Abstract

This study examined the efficacy of music-based cognitive behavior therapy (CBT) in the reduction of test anxiety among primary school pupils in basic science. Randomized pre-test, post-test, control group experimental design was adopted using a sample of 58 primary five (5) pupils. Test anxiety questionnaire was used for data collection. The instrument was face validated by test development experts. The internal consistency reliability of the items of the instrument was established to be 0.86 using the Cronbach's alpha method. Data were analyzed using mean and independent samples *t*-test. Findings revealed that music-based CBT is significantly efficacious in reducing test anxiety among the sampled pupils in basic science. This implies that test anxiety among primary school pupils can be reduced or better managed using the music-based CBT. It was thus, recommended that primary school teachers should be enlightened on how to make use of music-based CBT for basic science instructions in schools.

Keywords: *Cognitive behavior therapy, music-based, test anxiety, primary school pupils*

Introduction

The performance of pupils in basic science has not been encouraging and this constitutes worries to the basic education stakeholders and parents. In Nigeria, most pupils go in for their examinations or tests with high level of tension which results in the exhibition of different kinds of test-taking behaviors like text anxiety. According to Ugwuanyi et al. (2020), test anxiety is a physiological condition which makes the students experience distress before, during or after taking a test to such an extent of returning poor performance in such test. Test anxiety, according to Segool, Carlson, Goforth, Von der Embse and Barterianas cited in Nwokolo, Mokwelu and Eneasator (2016), is the emotional, physiological and behavioral responses surrounding the potential consequences of negative evaluation on an upcoming test or examination. A physiological situation in which pupils experience extreme anxiety and discomfort during and/or before taking a test is known as test anxiety.

Test anxiety is more prevalent in a school setting than people could imagine and the majority of text anxiety cases are not recognized easily in schools (Nwokolo, Mokwelu & Eneasator, 2016). This is because many students rarely seek help for any perceived emotional apprehension from significant adults. Test anxiety constitutes a serious academic impediment to lots of students in schools (Nwokolo, Mokwelu & Eneasator, 2016). In the Nigerian context, over 50% of the students are faced with anxiety before and during test conditions which usually affect their achievement in such tests (Ugwuanyi et al., 2020). Earlier research showed that test anxiety rates were found to be much higher than 33% among the school children and adolescents (Whitaker,

Lowe & Lee, 2007). Despite the prevalence of anxiety disorder in developing regions (e.g. Nigeria), many adolescents with social anxiety disorder rarely receive treatment (Chavira, Stein & Ailey, 2004; Sweeney, Rapee, Crozier & Alden, 2005). According to Asghari, Faramarzi and Mohammadi (2016), Herbert, Gaudiano and Rheingold (2009), Khalid-Khan, Santibanez and McMicken (2007), there are still a few interventions that attempt to treat anxiety disorder in students.

Egenti et al. (2019) found that music therapy with cognitive behavioral therapy (CBT) intervention can help reduce social anxiety among socially anxious schooling adolescents. According to Trimmer, Tyo and Naeem (2016), music is a universal activity that enriches every culture. Music can allow adolescents to open up channels of self-expression at a deeply personal level (Tervo, 2001). According to Egenti et al. (2019), music can be used as a tool for socializing and promoting interaction among people. Leubner and Hinterberger (2017) noted that music interventions are a potential alternative for depression therapy but the number of up-to-date research literature is quite limited. According to Trimmer, Tyo and Naeem (2016), music as a therapeutic metaphor facilitates the understanding of psycho-therapeutic materials, promote discussion of difficult topics, and be harnessed to promote a connection between facilitators and group members—thus placing a positive light on therapy for the client. Moreover, music, as a collective activity can introduce clients to CBT therapy concepts by adding non-verbal facilitation, and as such, it may be able to sustain therapeutic engagement beyond the talking form of CBT.

Cognitive behavioral therapy (CBT) is an effective treatment of depression and anxiety (Butler et al., 2006). CBT is an approach that links cognitions to feelings and behaviors (Garry & Katie, 2012). According to Garry and Katie (2012), one of the principles of CBT is that faulty thinking can lead to strong feelings and behaviours that are not appropriate for the context. CBT encourages the client to reflect on their thinking and to consider the evidence for their beliefs and resulting feelings and behaviours. Various forms of CBT are: an individual, group, brief, guided self-help, and online. Among these forms, the delivery of CBT in a group format is common in North America as it has been established to be more effective than the others (Trimmer, Tyo & Naeem, 2016). According to Trimmer, Tyo and Naeem as cited in Ugwuanyi et al. (2020), CBT group therapy has the advantages of connecting group members to facilitate symptom reduction and insight as well as increase the efficiency of service delivery.

Several studies have proved the efficacy of music-based CBT interventions. Dingle et al. (2008) used music therapy as an adjunct to group CBT and found increased attendance and engagement for CBT. Trimmer, Tyo and Naeem (2016) conducted a feasibility study (a randomized control trial) and found promising results for the CBT-music group for individuals with mild-to-moderate symptoms of anxiety and/or depression. Egenti et al. (2019) found that music therapy with cognitive-behavioral therapy was significantly beneficial in decreasing social anxiety symptoms of the treatment group. However, Trimmer, Tyo, Pikard, McKenna and Naeem (2017) found that music-based CBT is effective in reducing disability, although there appears to be a negligible effect on symptoms of anxiety and depression. Ugwuanyi et al (2020) found that the participants who were exposed to the CBT-music intervention programme significantly had lower test anxiety scores at the post-treatment than the participants in the control group. However, some studies

found that music therapy does not decrease social anxiety disorder (Evans, 2002; Nilsson, 2008; Richards, Johnson & Sparks, 2007).

The foregoing has shown that there are inconsistencies in the findings of previous works on the effectiveness of CBT-music in the reduction of psychological disorders like test anxiety, depression, etc. Moreover, the participants used for the studies are mainly secondary school students or in-school adolescents and university undergraduates. It has been suggested that teachers who use cognitive behavioural strategies in their classrooms will have positive effect in managing students' psychological behaviors (Smith & Daunic, 2006). Cognitive behavioral therapeutic interventions are increasingly being recognized as a viable, research-based approach appropriate for use in school settings. Based on these premises, the researchers sought to determine the efficacy of music-based CBT in the reduction of test anxiety among pupils in basic science.

Research Questions

The following research questions were posed and answered in the study.

1. What are the pre-test mean test anxiety scores of pupils exposed to music-based CBT and those exposed to conventional counseling?
2. What are the post-test mean test anxiety scores of pupils exposed to music-based CBT and those exposed to conventional counseling?
3. What are the follow-up mean test anxiety scores of pupils exposed to music-based CBT and those exposed to conventional counseling?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

- H₀1:** There is no significant difference in test anxiety pre-test scores of pupils exposed to music-based CBT and those exposed to conventional counseling.
- H₀2:** There is no significant difference in test anxiety post-test scores of pupils exposed to music-based CBT and those exposed to conventional counseling.
- H₀3:** There is no significant difference in test anxiety follow-up mean scores of pupils exposed to music-based CBT and those exposed to conventional counseling.

Methodology

The randomized pre-test, post-test, control group experimental design was adopted. Subjects were randomized into experimental and control groups through simple random sampling technique. A total of 58 primary five (5) pupils, (male (n = 25) and female (n = 33), in Enugu state Nigeria, who met the inclusion criteria formed the participants. G-Power, version 3.1 gave 0.84 which is adequate sample size for this study (Faul, Erdfelder, Lang & Buchner, 2007). A total of 103 primary five pupils who showed interest and volunteered to participate in the intervention programme were screened for eligibility based on the eligibility criteria set by the researchers, including that: (i) the pupil must be regular on the school attendance register; (ii) pupil must score high on the test anxiety scale which was used for the identification of the pupils who showed signs of test anxiety. Test anxiety questionnaire was used for the identification of the 58 pupils with signs of text anxiety. Any pupil who score 25 and above in the text anxiety scale was regarded as having an unhealthy level of anxiety and thus satisfied criterion ii. After that, the 58 pupils who met all the inclusion criteria were randomly assigned to experimental and control

groups conditions using the simple random sampling technique (participants were asked to pick 1 envelope containing pressure-sensitive paper labeled with either E-experimental group or C-control group) from a container. The students were randomly assigned to experimental (29) and control (29) groups.

Instrument - Test Anxiety Questionnaire

Test anxiety questionnaire (TAQ) developed by Nist and Diehl (1990) was adopted for the study. TAQ was a 10-item instrument structured on a 5-point scale of Never =1, Rarely =2, Sometimes =3, Often =4, and Always = 5. Example of items include: “I have visible signs of nervousness such as sweaty palms, shaky hands, and so on right before a test.”, “I have butterflies in my stomach before a test”, and “I feel nauseated before a test”.

The scores obtainable ranged from 10 to 50. A low score (10-19) indicates that a pupil does not suffer from test anxiety, scores between 20–35 indicate that, although the pupil may exhibit some of the characteristics of test anxiety, the level of stress and tension is probably healthy, scores over 35 suggest that a pupil is experiencing unhealthy level of anxiety. The internal consistency, reliability index, of the items of the instrument as determined by Nist and Diehl (1990) was 0.73.

Procedure

The researchers visited the headmasters of each of the primary schools in Enugu state Nigeria to notify and obtain permission to carry out the study in their schools. During the course of the visits, the researchers explained to the school authorities what music-based CBT is all about and how the intervention can be beneficial to them in reducing test anxiety among pupils. With the permission of the headmasters, the researchers went to the schools the next day to conduct the selection process based on the inclusion criteria. That was done by first identifying each pupil with a number and thereafter administering the test anxiety questionnaire on the pupils. A period of 15 minutes was allowed for the pupils to respond to the items of the TAQ. At the end, the copies of the questionnaire were collected and scoring was done to enable the researchers select the 58 pupils who showed signs of test anxiety by their scores and willingness to participate in the study.

A demographic questionnaire was administered on the eligible participants to collect information on their age, gender, and location. To remove randomization bias, information from the demographic questionnaire were concealed from the research assistant who randomized the participants to experimental and control conditions. Before the commencement of the experiment, the researchers assured the participants of the confidentiality of interactions and personal information as they work together in self-disclosure. The researchers were pleasantly surprised when participants used music as a metaphor to add additional aspects to the group therapy experience. For example, participants developed music-based group guidelines (e.g., “Only one solo at a time” to address speaking in turns, and “everyone shows up on time for band practice” to address punctual attendance). Thereafter, the pre-test assessment was conducted using the test anxiety questionnaire to collect baseline data.

After that, the experimental group was exposed to 90 minutes of music-based CBT programme. This lasted once a week for 12 weeks. At the end of the treatment, the post-test assessment was conducted. In this study, TAQ was used for the identification of the pupils with signs of test anxiety, and the data obtained was also used as the pre-test scores for the sampled pupils. At the

end of the intervention programme, the same TAQ was re-administered on the same set of participants, and the data obtained served as the post-test scores. Three months after the intervention programme, a follow-up assessment measure was conducted by the researchers by administering the TAQ on the participants for the third time (T_3). Data collected from the experimental group at each assessment stage were compared to that from the no-intervention control group during the analysis stage.

Music-based CBT Intervention Programme

CBT-Music programme is a 12-week guided self-help group derived from a guided self-help approach which is an established protocol (Naeem, Johal & Godfrey, 2016). Each session was held once a week and lasted for 90 minutes. The sessions were group-oriented. The programme was implemented by four facilitators with basic training in CBT and supervised by two experienced CBT therapists and music therapists. The programme aimed at reducing the level test anxiety among pupils in basic science using music-based CBT group therapy by infusing music into nearly every aspect of CBT group therapy as a means for further comprehension and engagement with the material by participants. Such infusion involved the use of critical listening to the musical material, songwriting, playing various musical instruments, and using music as a point of reference in group discussion and homework assignments. All music playing was geared towards the non-musician through the use of easily playable instruments (e.g., shakers and bells) that integrate well together (i.e., all pitched instruments are played in the key of C). The group adhered to a traditional CBT group structure, including theme weeks (e.g., thinking, behavior and emotions), and the use of CBT tools such as behavioral experiments, thought records, and homework after each session. A secondary goal of the facilitators was to promote a feeling of coherence similar to attending “band practice.”

During sessions one to three, the facilitators familiarized the participants with the objective of the intervention, built rapport, established rules and regulations, discussed anxiety, symptoms, and causes of phobia. After the sessions, an assignment was given based on basic science workbook. Between the fourth and seventh sessions; activation of events, consequences, how to change automatic thoughts about a task in basic science to rational thoughts were discussed and followed by a review of previous exercise and homework. Sessions eight to eleven involved critically listening to the musical material, songwriting, playing various musical instruments, and using music as a point of reference in group discussion and homework assignments were learned. Every week was devoted to the performance and discussion of a CBT-related distinct song. Songs chosen for each week were pre-written and adapted from recognizable classic rock songs with the original lyrics replaced with lyrics about CBT.

The participants in the intervention group were made to adhere to a traditional CBT group structure, and the use of CBT tools such as behavioral experiments thought records and homework after each session. Music techniques were adopted namely opera, rock, pop, classical relaxation song and breath control. CBT techniques such as cognitive restructuring, cognitive disputation, reframing, rhythmic-based skills, attention training and mood monitoring skills were used (Ezegbe et al., 2018). The manual as developed by Naeem, Johal and Godfrey (2016) has been successfully used by Ugwuanyi et al (2020) who did a similar study with secondary school students.

Data collected were analyzed using mean and independent sample *t*-test. Mean was used to answer the research questions while the independent sample *t*-test was used to test the hypotheses formulated in the study at $p \leq 0.05$ probability level.

Results

RQ 1: What are the pre-test mean test anxiety scores of pupils exposed to music-based CBT and those exposed to conventional counseling?

Table 1: Independent sample *t*-test of the difference in the mean test anxiety scores of the experimental and control groups participants at pre-test

Treatment	Time	N	Mean	SD	df	<i>t</i>	<i>p</i>
Experimental	Pre-test	29	38.14	4.66	56	.345	.731
Control		29	37.72	4.46			

Table 1 shows that the participants in the experimental group had mean test anxiety score of 38.14 with standard deviation of 4.66 while those of the control group had mean text anxiety score of 37.72 with standard deviation of 4.46. This means that the mean text anxiety score of the experimental group was slightly higher than those of the control group at pre-test.

H₀1: There is no significant difference in test anxiety pre-test scores of pupils exposed to music-based CBT and those exposed to conventional counseling.

Table 1 equally showed that there is no significant difference in the pre-test mean test anxiety scores of pupils exposed to music-based CBT and those exposed to conventional counseling, $t(56) = 0.345$, $p > 0.731$. Since the probability value of 0.731 is greater than the 0.05 level of significance set for the analysis, the null hypothesis is retained.

RQ 2: What are the post-test mean test anxiety scores of pupils exposed to music-based CBT and those exposed to conventional counseling?

Table 2: Independent sample *t*-test of the difference in the mean test anxiety scores of the experimental and control groups participants at post-test

Treatment	Time	N	Mean	SD	df	<i>t</i>	<i>p</i>
Experimental	Post-test	29	12.24	1.62	56	-11.362	.000
Control		29	34.31	10.33			

Table 2 shows that at the post-test, the mean text anxiety score of the participants of the experimental group is 12.24 with standard deviation of 1.62 while that of the control group is 34.31 with standard deviation of 10.33. This means that the mean text anxiety score of the experimental group was less than that of the control group at the post-test.

H₀2: There is no significant difference in test anxiety post-test scores of pupils exposed to music-based CBT and those exposed to conventional counseling.

Table 2 equally revealed that there is significant difference in post-test mean test anxiety scores of the pupils exposed to music-based CBT and those exposed to conventional counseling in favour of those exposed to music-based CBT, $t(56) = -11.362, p < 0.050$. Thus, the null hypothesis is thus rejected since the probability value of 0.000 is less than the 0.05 level of significance. This implies that music-based CBT intervention programme had significant effect in reducing pupils' test anxiety in basic science.

RQ 3: What are the follow-up mean test anxiety scores of pupils exposed to music-based CBT and those exposed to conventional counseling?

Table 3: Independent sample *t*-test of the difference in the mean test anxiety scores of the experimental and control groups participants at follow-up

Treatment	Time	N	Mean	SD	df	<i>t</i>	<i>p</i>
Experimental	Follow-	29	12.52	2.28	56	-11.090	.000
Control	up	29	34.32	10.33			

Table 3 showed that at the follow-up measure, the mean test anxiety score of the participants in the experimental group is 12.52 with standard deviation of 2.28 while that of the control group participants is 34.32 with standard deviation of 10.33. This means that the mean text anxiety score of the experimental group was less than that of the control group at the follow-up measure.

H₀₃: There is no significant difference in test anxiety follow-up mean scores of pupils exposed to music-based CBT and those exposed to conventional counseling.

Table 3 equally revealed that there is significant difference in the follow-up mean test anxiety scores of pupils exposed to music-based CBT and those exposed to conventional counseling in favour of those exposed to music-based CBT, $t(56) = -11.090, p < 0.050$. Thus, the null hypothesis is rejected since the probability value of 0.000 is less than the 0.05 level of significance. This implies that music-based CBT intervention programme had significant effect in reducing pupils' test anxiety in basic science.

Discussion

The findings of the study showed that music-based CBT intervention programme was significantly effective in reducing test anxiety among primary school pupils in basic science. It was found that the pupils in the CBT intervention group had significant reduction in their test anxiety scores at both post-test and follow-up assessments as a result of their exposure to 12 weeks intervention programme with music-based CBT. This result goes to validate the efficacy of the CBT-music programme which has in the past proved effective when used on secondary school and university students. Perhaps, the music component of the programme stimulated the attention of the pupils as children have an attachment to music. Buttressing this finding are the findings of Yoosefi, Fatehzade, Etmadi, Ahmadi and Isanazhad (2003), Trimmer, Tyo and Naeem (2016), Trimmer, Tyo, Pikard, McKenna and Naeem (2017), Egenti et al. (2019), Ugwuanyi et al. (2020). Other studies with similar findings include Yoosefi, Fatehzade, Etmadi, Ahmadi and Isanazhad (2003) in depression, aggression and anxiety reduction among students; Trimmer, Tyo and Naeem (2016) in the use of music-based CBT for reducing individuals with mild-to-moderate

symptoms of anxiety and/or depression; Egenti et al. (2019) in decreasing social anxiety symptoms; Trimmer, Tyo, Pikard, McKenna and Naeem (2017) in reducing disability with negligible effect on symptoms of anxiety and depression; Ugwuanyi et al. (2020) in the use of music-based CBT for test anxiety reduction among secondary school students.

Conclusion

The efficacy of music-based CBT on the reduction of pupils' test anxiety has been proven to be significant. The intervention programme which lasted for 12 weeks produced significant effect in the reduction of test anxiety among the participants. Thus, test anxiety among primary school pupils can be reduced using the music-based CBT intervention programme.

This present study has serious contribution to knowledge in that no such study has been carried out in Nigeria. To effectively use this therapy on pupils, the teachers should note the following roles: always work with pupils and groups to improve their mental health, encourage pupils to discuss emotions and experiences, help pupils define goals, plan actions and gain insight, develop therapeutic processes, refer pupils to psychologists and other services, and take a holistic (mind and body) approach to mental health care.

The researchers, therefore, concluded that music-based CBT has demonstrated significant efficacy in the reduction of test anxiety among primary school pupils in basic science.

Recommendations

The researchers made the following recommendations based on the findings of the study:

1. Music-based CBT should be applied in basic science classrooms for possible reduction of test anxiety among primary school pupils.
2. Music-based CBT should also be adopted by guidance counselors for the treatment of text anxiety related problems among primary school pupils learning basic science.

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