



Effect of Cognitive Restructuring Counselling Techniques in Managing Chemistry Anxiety Among Senior Secondary School Students in Tambuwal Local Government, Sokoto State

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Abstract

This study focused on the effect of Cognitive-Restructuring counselling techniques in managing chemistry anxiety among Senior Secondary School in Tambuwal local government area of Sokoto State. The researcher employed quasi-experimental pre-test/post-test factorial design in which selected students were assigned to experimental groups and control group. The experimental groups were treated with cognitive restructuring counselling technique while the control group didn't receive any treatment. The population of the study is 160 students with chemistry anxiety. 114 students were selected to participate in the study. Purposive sampling technique was used. The treatments were carried out within eight weeks of counselling sessions. Group counselling method was employed in the study. Each of the subjects was administered with pre-test/post-test research instrument. Validated instruments namely Derived Chemistry Anxiety Rating Scale (DCARS)) was used in generating response from the students. The researcher made use of dependent samples t-test to analysed hypothesis 1 and independent t-test was used to analysed hypothesis 2 tested at 0.05 level of significance. Results of this study shows that there was a significance differences in the effect of cognitive restructuring counselling technique on the pre-test/post-test means score on anxiety level among students with chemistry anxiety in Tambuwal local government. Equally there is no significant difference on the anxiety level between the group exposed to cognitive restructuring counselling technique and those in the control group in Tambuwal local government. Though there is difference but not significant. Based on these findings, it was recommended that counsellors could use Cognitive- Restructuring treatment as a technique to reduce anxiety in Chemistry among Secondary School Students since it has been identified as effective.

Keywords: Anxiety, Chemistry, Cognitive, Restructuring, Control Group

Introduction

The term cognitive restructuring technique was pioneered by Aaron Beck and Albert Ellis, and it is a psychotherapeutic process of learning that focused more on thoughts to identify and dispute irrational or maladaptive thoughts. Cognitive restructuring is sometimes used synonymously with reframing, re-appraisal, re-labelling and attitude adjustment (Adesemowo, 2015). It is a technique that can help people identify, challenge and alter anxiety provoking thoughts patterns and beliefs (Penner, 2013). This is the process of learning to identify and challenge irrational or maladaptive thoughts using strategies such as logical disputation. Various types of therapy utilize the process of cognitive restructuring, such as cognitive behavioural therapy and rational emotive

therapy (Hong, Sas and Sas, 2016). Students who develop false assumption that they cannot pass examination without cheating or seek help or assistance from others may not be properly motivated to study hard for examination and once a false assumption has been made, it will then often be used as a basis for prompting behaviours that end up acting in response to the false assumption as if it were true (Morgenstern, 2012).

According to Hopper, (2015). irrational thought like this and their accompanying behaviour, play a vital role in the onset of anxiety. In this study cognitive restructuring means the process of learning to dispel faulty thinking patterns and replacing them with more profitable one. In investigating cognitive behavioural techniques, Amiri (2015) compared the effect of cognitive-

behavioural therapy techniques, learning the proper ways of study skills and the mixed method in reducing test anxiety. However, results showed that all three experimental groups compared with the control group showed a significant decrease in anxiety scores, but the simultaneous application of cognitive-behavioural therapy and study skills training compared with its separate application caused a significant decrease in the score of students' chemistry anxiety.

Chemistry on the other hand is one of the core subject offered in all science secondary schools not only in Tambuwal local government but also in Sokoto state at large. Equally the result obtained by the students have shown that chemistry education has persistently been experiencing one form of problem or the other particularly in relation to students' poor performance, this include, anxiety and poor attitude towards chemistry, teachers' poor environment, non-availability of appropriate equipment and reagent, students' natural hatred to chemistry, incompetence chemistry teachers and poor method of teaching.

Anxiety can be generated on the part of the educator if he is not certain of the prospect of his line of thought. It is therefore a key factor in any endeavour because it affects one's ability to endure, concentrate and perceive. It has been observed that so many students fear chemistry and such fear is characterized by mass disenchantment among the students towards the subject.

The student's anxiety in chemistry in Sokoto state has become a source of great concern to parents, teachers, educationists, educational institutions and all stake holders in education. Chemistry is a very important subject and it has very many applications in our everyday life. It is no exaggeration therefore to assert that chemistry has become an important factor in the development of a nation. The importance of chemistry cannot be over emphasized as the knowledge is required by every facet of our daily lives. It is absolutely indispensable in the world of science and



technology and which no nation can develop without its appropriate knowledge. Despite its importance, it is disheartening that students' performance in chemistry at external examinations like WAEC, NECO and NABTEB have been consistently, persistently and unrelentingly poor, consecutively (Jegade 2013). From State level, available data has shown that in the Secondary School Certificate Examination (SSCE) of 2015, (38.81%) of the candidates failed chemistry; (36.57%) failure was recorded in 2016; while that of 2017 was (31.28%). Similarly, (38.68%) failure was recorded in 2018; and (38.5%) in 2019 (WAEC; extracted from Federal Republic of Nigeria, 2020). Education has been viewed as the tool for eradicating poverty and effecting national development and chemistry was considered to have a vital role in actualizing this purpose (Dwyer, 2013). Students experience a variety of emotional reactions after passing or failing any examination, the students find a negative emotional state when they fail and they find a positive emotional state when they succeed. To change the students' irrational beliefs and anxiety in chemistry that impede on them, there is need to restructure their cognition orientation. According to Wines, (2015), students' anxiety towards the learning of chemistry makes them to lose interest in the sciences. Chemistry occupies a central position amongst the science subjects. It is one of the core subject for the medical sciences, textile technology, agricultural science, synthetic Industry, printing technology, pharmacy, chemical engineering, to mention just a few. As important as the subject is and in spite of the effort of the governments to encourage chemistry education, students still shun the subject (Adebule, 2014). In spite of the age long fear and its effects on the subject, researchers had done little or nothing on the basic psychological factors that could generate such anxiety in Tambuwal local government. Ashcraft and Moore (2009) recognize that many students refer to

chemistry as being difficult. Moreover, students' prior negative experiences in chemistry class and at home when learning chemistry are often transferred, causing a lack of understanding of chemistry (Frost, 2014).

Statement of the Problem

The problem of this study emanated from the poor performances of students in chemistry despite the efforts of parents and teachers and the fact that other researchers have carried out studies in order to minimize this situation. When students fail chemistry, they become frustrated. Students that would have been admitted into the tertiary institutions of learning and become fully employed so that they can be useful to themselves, their family, members of the community and the nation at large may become drop outs of school due to the complex nature of chemistry and engaged themselves in small scale business. Since chemistry is a core subject to some profession in getting admission into higher institutions of learning, there is a need to identify test anxious students in chemistry so as to help them reduce their anxiety. Moreover, while acknowledging the fact that different studies have demonstrated the need for the use of cognitive-restructuring technique in reducing anxiety and other related issues or antisocial behaviours. It is based on this that the researcher sought to investigate how cognitive restructuring could be used as a technique in reducing anxiety in chemistry among senior secondary school students in Tambuwal Local Government Area of Sokoto State.

Objectives of the Study

The objectives of the study are to find out:

1. The effect of cognitive restructuring counselling technique on the means scores on chemistry anxiety level among students in Tambuwal local government.
2. The anxiety level between the groups exposed cognitive restructuring counselling technique and those in the



control group among students among students with chemistry anxiety in Tambuwal local government.

Research Questions

1. What is the effect of cognitive restructuring counselling technique on the means score on anxiety level among students in Tambuwal local government?
2. What is the anxiety level between the groups exposed to cognitive restructuring and those in the control group among students among students with chemistry anxiety in Tambuwal local government?

Research Hypotheses

The following null hypotheses were tested in the course of the study

Ho₁: There is no significant difference in the effect of cognitive restructuring counselling technique on the means scores on chemistry anxiety level among students in Tambuwal local government.

Ho₂: There is no significant difference on the anxiety level between the group exposed to cognitive restructuring counselling technique and those in the control group among students with chemistry anxiety in Tambuwal local government.

Methodology

The research design used was a quasi-experimental design involving pre-test, post-test on both experimental and control groups. Coon, (2020) opined that the quasi-experimental design involves the manipulation of one or more independent variables but there is no random assignment of subject groups. Therefore, students with chemistry anxiety were purposively selected and assigned to experimental and control groups. Students with chemistry anxiety were identified by subjecting the entire student to an anxiety inventory that identify students with different levels of chemistry anxiety (low, medium and high) but the researcher used students with medium and high

Ishaka Yahaya and Nasiru, A. Tambuwal chemistry anxiety in this study. The population of this study was (160) students with chemistry anxiety at Tambuwal local government. Out of which 114 students with chemistry anxiety were adopted as a sample size using the Raosoft sample size calculator (2022) of determining the sample size. Proportional sampling techniques was used to identify the respondent for this study. This is because the study dealt with only student with chemistry anxiety. Among the 114 samples, 60 were assigned to cognitive restructuring. While 54 students with chemistry anxiety constituted the control group.

The instrument used for this study was Beck Anxiety Inventory. The Beck Anxiety Inventory (BAI) is a standardize inventory that is used to determine the level of anxiety among individuals. It has 21 item test; it is a self-report inventory. It is also one of the most widely used scales for assessing intensity of anxiety, and each of its items describes a specific behavioural manifestation of anxiety.



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The reliability of BAI was also obtained by Beck, the original developer, using the test-retest method and Cronbach's Coefficient Alpha, for BAI: $r = 0.86$ at $p < 0.01$ and $\alpha = 0.96$ at $p < 0.01$. The test was also shown to have a high reliability index after two-weeks test-retest reliability (Pearson $r = 0.93$). The researcher made use of dependent samples t-test to analysed hypothesis 1 and independent t-test was used to analysed hypothesis 2 tested at 0.05 level of significance.

Result

The researcher employed mean and standard deviation of the groups in providing answers to the research questions.

Question One: What is the effect of cognitive restructuring counselling technique on the pre-test/post-test means score on anxiety level among students in Tambuwal local government?

Table 1: Effect of cognitive restructuring on anxiety level among students with chemistry anxiety that were exposed treatment:

Groups	Treatments	N	Mean	Std. Deviation
Pre-test anxiety	Cognitive restructuring	60	33.79	8.48
Post-test anxiety	Cognitive restructuring	60	23.14	5.08

Source: Field Data (2021)

Table 1 shows that the pre-test and post-test means score on effect of cognitive restructuring on anxiety level of subjects exposed to treatment. From the result, pre-test/post-test means score of subjects in the experimental group (33.79, 23.14). The differences in the means score on anxiety level were attributed to treatment effect. The implication of this is that cognitive

restructuring counselling technique was effective in managing students with chemistry anxiety.

Question Two: What is the anxiety level between the groups exposed to cognitive restructuring and those in the control group among students with chemistry anxiety in Tambuwal local government?

Table 2: Anxiety level among groups exposed to cognitive restructuring and those in the control group

	Treatment	N	Mean	Std. Deviation
Post-test anxiety	Cognitive Restructuring	60	23.14	5.08
Post-test Control group	Control Group	54	25.57	7.26

Source: Field Data (2021)



Table 2 shows that mean score of subjects on anxiety level in cognitive restructuring counselling technique 60(23.14) which is lower than the means score on anxiety level of subjects in the control group 54(25.57). This indicated that cognitive restructuring counselling technique is more effective in reducing the anxiety level among students with chemistry anxiety, than the control group. The difference in the means score on anxiety was attributed to effect of cognitive restructuring compared to the control who did not received any treatment in any form.

Hypotheses Testing

In this study, two null hypotheses formulated were tested at 0.05 level of significance.

H0₁ There is no significant difference on the effect of cognitive restructuring counselling technique on the pre-test/post-test means scores on anxiety level among students with chemistry anxiety that were exposed to cognitive restructuring in Tambuwal local government.

This hypothesis was tested by subjecting the pre-test and post-test scores of the respondents to t-test analysis as presented in Table 3.

Table 3: Anxiety Level of Respondents Exposed to Cognitive Restructuring Technique.

Variables	N	Mean	Std. Deviation	t-Cal	p-Value	Decision
Pre-test	60	33.79	8.478	6.930	.000	Rejected
Post-test	60	23.14	5.082			

Source: Field Data (2021)

Table 3 shows that t-test indicated scores were significantly lower for the post-test ($M = 23.14$, $SD = 5.082$) than for the pre-test ($M = 33.79$, $SD = 8.48$), $t(13) = 6.930$, $p = .000$. Thus, the respondents' anxiety level reduced significantly after being exposed to cognitive restructuring because the realized p-value was less than the .05 level of significance. This indicated that there was significant reduction in the anxiety level of the respondents' due to the effect of the intervention technique. Therefore, H0₁ which stated that, there is no significant difference on the effect of cognitive restructuring

counselling technique on the pre-test/post-test mean scores on anxiety level among students with chemistry anxiety in Tambuwal local government is rejected.

H0₂: There is no significant difference in the anxiety level between the group exposed to cognitive restructuring counselling technique and those in the control group in Tambuwal local government.

This hypothesis was tested by subjecting the post-test mean scores of the respondents to t-test analysis as presented in Table 4.



Table 4: Anxiety Level between the Respondents Exposed to Cognitive Restructuring and those in the Control Group.

Variables	N	Mean	Std. Deviation	t-Cal	p-Value	Decision
Cog. Restructuring	60	23.14	5.082	-850	.411	Not rejected
Control Group	54	25.57	7.261			

Source: Field Data (2021)

Table 4 shows that t-test indicated scores were lower for cognitive restructuring ($M = 23.14$, $SD = 5.082$) than for the control ($M = 25.57$, $SD = 7.261$), $t(13) = -850$, $p = .411$. Though the anxiety level of the respondents' exposed to cognitive restructuring reduced more than those in the control group, the difference was not significant between the two because the realized p-value is greater than the .05 level of significance. Therefore, H_0 which stated that there is no significant difference in the anxiety level between the group exposed to cognitive restructuring and those in the control group among students with chemistry anxiety Tambuwal local government is not rejected.

Summary of Findings

The following are the summary of the major findings:

1. There is a significant difference in the effect of cognitive restructuring counselling technique on the pre-test/post-test means scores on anxiety level among students with chemistry anxiety in Tambuwal local government. This was as a result of the treatments received.
2. There is no significant difference in the anxiety level between the group exposed to cognitive restructuring counselling technique and those in the control group in Tambuwal local government. Though there is difference but not significant.

Discussion of Findings

Finding revealed that there was a significance differences in the effect of cognitive restructuring counselling technique on the

pre-test/post-test means score on anxiety level among students with chemistry anxiety in Tambuwal local government. This finding agrees with the result of Akinsola, and Tella, (2017) on some of psychological disturbances associated with chemistry anxiety as being experienced by students.

They reported that chemistry anxiety is experienced as a stressful situation by some students all around the world. The report added that the consequences of chemistry anxiety are manifold such as societal repercussions and personal sufferings as well as emotional responses which include distress, loss of hope, low self-esteem, and lack of confidence results from finding by Hassan, and Okatahi, (2019) concluded that psychological interventions, such as stress management, and coping skills training have shown to have significant effects for chemistry anxiety. Result from the present study indicated that cognitive restructuring is effective in managing chemistry anxiety among students in Tambuwal local government.

Another finding also revealed that there was no significant difference in the anxiety level among students with chemistry anxiety exposed to cognitive restructuring counselling technique and those in the control group. The anxiety level of those in the experimental group reduced more than those in the control group, the difference was not significant between the groups. The result of testing this hypothesis is in line with the findings of Gire (2018) which revealed that, a significant difference exists in the effect of students exposed to cognitive restructuring

counselling technique and those in the control group who did not receive any counselling treatment. The findings revealed that there were no differences in the incidence of anxiety level between the experimental group and the control group. While it is in contrast with the findings from Passer, and Smith, (2013), that has shown that cognitive-restructuring intervening have caused a significant difference in decreasing the anxiety in students compared with the control group.

This finding agrees with the result of Wade, (2010) on some of psychological disturbances associated with chemistry anxiety as being experienced by some students. They reported that the chemistry anxiety is experienced as a stressful situation by some student around the world. The report added that the consequences of chemistry anxiety are manifold such as emotional responses which include distress, loss of control, low self-esteem, results from finding by Wade, (2010) concluded that psychological interventions, such as stress management, and coping skills training have shown to have significant effects for such students. Result from the present study indicated that cognitive restructuring is effective in managing students with chemistry anxiety.

Another finding also revealed that there was no significant difference in the anxiety level among students with chemistry anxiety exposed to cognitive restructuring counselling technique and those in the control group. The anxiety level of those in the experimental group reduced more than those in the control group, the difference was not significant between the groups. The result of testing this hypothesis is in line with the findings of Tobias, (2013) which revealed that, a significant difference exists in the effect of students exposed to cognitive restructuring counselling technique and those in the control group who did not receive any counselling treatment. The findings revealed that there were no differences in the incidence of anxiety level between the experimental



group and the control group. While it is in contrast with the findings from Jegede, (2003), that has shown that cognitive-restructuring intervening have caused a significant difference in decreasing the anxiety in secondary school students compared with the control group.

Summary

The following are the summary of the major findings:

1. There is significant difference on the effect of cognitive restructuring counselling technique on the pre-test/post-test means scores on anxiety level among students with chemistry anxiety in Tambuwal local government. This was as a result of the treatments received.
2. There is no significant difference on the anxiety level between the group exposed to cognitive restructuring counselling technique and those in the control group in Tambuwal local government. Though there is difference but not significant.

Conclusion

Based on the findings of the study the following are the conclusions drawn.

The respondents' anxiety level reduced significantly after being exposed to cognitive restructuring counselling technique. Therefore, cognitive restructuring counselling technique was effective and should be used in managing anxiety level of students in chemistry.

Furthermore, respondents exposed to cognitive restructuring had their anxiety levels reduced more than those in the control group among students therefore cognitive restructuring should be used to manage those in the control group.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Cognitive restructuring counselling techniques should be employed in managing anxiety level of students faced



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with chemistry anxiety in various local government in the state.

2. Since respondents exposed to cognitive restructuring had their anxiety levels reduced more than those in the control group, though it was not significant, the control group should be exposed to cognitive restructuring counselling techniques.



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