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Research Article

Correlation Between Test Anxiety and Academic Achievement of Secondary School Students in Biology in Wukari Local Government area of Taraba State

[1]Ekunke Thomas Odo and [2]Bileya Samuel Garpiya

[1-2]**Department of Science Education, Faculty of Education, Federal University, Wukari, Taraba** State,Nigeria
[1]**ekunka@fuwukari.edu.ng 09126780037**[2]**bileya@fuwukari.edu.ng07030104564**

Abstract

This study investigated test anxiety among secondary school Biology students and its correlation with their academic achievement in Biology in Wukari L.G.A, Taraba State. Employing a correlational survey research design, data were collected from 200 public secondary school students using the Test Anxiety Questionnaire (TAQ) and Biology Students' Score Proforma (BSSP). The TAQ, adopted from Abbasi and Ghosh (2020), consisted of 20 items on a 4-point Likert scale, with a Cronbach Alpha reliability of 0.74. Academic achievement was measured by students' cumulative Biology scores for the 2024/2025 academic session. Frequency, percentages, Pearson Product Moment Correlation (r), and simple linear regression were used for data analysis. Findings revealed that an overwhelming majority (95.0%) of students experienced moderate test anxiety in Biology, while 3.5% had low anxiety and 1.5% exhibited high anxiety. A strong, negative, and statistically significant correlation was found between test anxiety and academic achievement in Biology ($R = -0.872$, $p = 0.000$). This indicates that higher test anxiety is associated with lower academic achievement in the subject. The study concludes that test anxiety is a significant barrier to academic success in Biology, potentially limiting students' future career prospects in science. Recommendations include implementing comprehensive test anxiety management programs (e.g., CBT techniques), diversifying assessment methods, fostering collaboration between teachers and counselors, educating parents on test anxiety, and conducting further research into specific anxiety components.

Keywords: Test Anxiety, Academic Achievement, Biology, Secondary School Students.

INTRODUCTION

Anxiety is one of the common phenomena among students which affect their performance in different situations. Students are not immune to anxiety especially for a test or examination. Although, low level test anxiety could motivate students to work hard and attain good academic achievements, high level of debilitating test anxiety could be so complicating as to limit the students' achievement. Test anxiety is a psychological condition in which people experience extreme distress in testing situations (Olisaememeka and Solarin, 2019). Laryea et al., (2014), describes it as a combination of physiological over-arousal, tension and somatic symptoms, along with worry, dread, fear of failure and catastrophic, which occur before or during test and exams situations. Many students experience some degree of stress and anxiety before and during examinations and test anxiety can actually impair learning and reduce test achievement (Lafata, 2015).

Anxiety is a significant concern within educational psychology, impacting students across various age groups and academic levels. It is characterized by excessive worry, nervousness, and fear before or during test situations, which can negatively influence students' performance (Khairunisa, et al., 2018). Test anxiety involves a complex interplay of cognitive, emotional, and physiological components that collectively impair a student's ability to perform to their optimal potentials. The phenomenon has been particularly scrutinized in secondary school settings where academic evaluations play a crucial role in determining students' future educational and career paths. This situation plays out even more for Biology students aspiring to study medical science courses like medicine and surgery and pharmacy in the University.

Biology is the study of life. The study of Biology has so many branches and cut across so many science disciplines such as biophysics, biochemistry, atomic and molecular Biology, biotechnology, pathology, micro-biology, parasitology, virology etc. Biology, as a core science subject possesses substantial challenges due to its extensive content and the need for understanding intricate concepts and processes. It requires students to master a wide array of topics, including cellular structures, genetics, ecosystems, and human anatomy, which can be daunting, and overwhelming (Kaur, & Jayaraman, 2016). Consequently, the pressure to excel in Biology can exacerbate test anxiety, leading to a detrimental cycle where anxiety impairs performance, further increasing anxiety for subsequent assessments (Johnson et al., 2019).

Research indicates that test anxiety is prevalent among high school students, with studies suggesting that a significant proportion of them experience moderate to severe levels of anxiety during examinations (John, & Kawu, 2015; Jerry et al. 2019). This anxiety can manifest through various symptoms, such as physical signs like sweating and an increased heart rate, emotional symptoms like fear and apprehension, and cognitive disruptions, including negative self-talk and difficulties in concentration. In the context of Biology, these symptoms can severely affect students' performance, given the subject's complexity and the high level of detail required for understanding and retention.

The correlation between test anxiety and academic achievement has been a focal point of educational research. Numerous studies have established that high levels of test anxiety are generally associated with lower academic achievement, as anxiety can interfere with critical cognitive functions such as attention, working memory, and information processing during examinations (Ihekwoaba, 2019). Specifically, in Biology, this relationship is crucial because poor performance in this subject can limit students' opportunities in science-related fields, affecting their career trajectories and future educational pursuits.

Effective management of test anxiety is imperative for educators and policymakers. Interventions like cognitive-behavioral techniques, relaxation training, and development of test-taking skills have been proven to reduce anxiety and enhance academic performance (Mohamed et al., 2019). Additionally, creating a supportive learning environment and providing resources for stress management can help students to cope with the pressures of high-stakes examinations better (Geven et al., 2017). Despite the existing interventions, there is a significant gap in the literature regarding the specific impact of test anxiety on Biology achievement among senior secondary school students. This gap underscores the need for targeted research to develop more effective strategies for mitigating anxiety and improving performance in Biology.

Statement of the Problem

Despite the crucial role of Biology in fostering students' scientific literacy among students and shaping their career paths and future opportunities. However, many secondary school students experience significant levels of test anxiety, which can severely impair their ability to perform well in Biology exams. This anxiety-driven impairment may trigger a cycle of poor performance and heightened anxiety, leading to further declines in academic achievement and limiting students' career prospects. In particular, science students, most especially Biology, often perceive the subject as overly broad and complex, lacking the necessary skills for scientific inquiry and struggling to grasp key concepts. Such academic difficulties, as noted by Ali and Khan (2020), frequently result in poor achievement and intensifying anxiety among students. While the relationship between test anxiety and academic achievement among students is well-documented, there is a noticeable lack of research specifically addressing how test anxiety impacts academic achievements in Biology among senior secondary school students.

This study seeks to address the specific issue of test anxiety within the context of Biology education, exploring its impact on academic outcomes among senior secondary school students. By identifying and understanding the sources and effects of test anxiety in Biology, this research aims to provide insights that may help mitigate its impact, ultimately contributing to improved academic success and better future prospects for Biology students specifically and sciences generally.

Purpose of the Study

The purpose of this study is to explore the correlation between test anxiety and academic achievement among senior secondary school Biology students in Wukari L.G.A, Taraba State.

Specifically, the study intends to:

1. Determine the levels of secondary school students' test anxiety in Biology.

2. Examine the relationship between secondary school students' test anxiety and their academic achievement in Biology.

Research Questions

The following research questions were raised for the study:

1. What are the levels of secondary school students' test anxiety in Biology?
2. Is there any relationship between secondary school students' test anxiety and their academic achievement in Biology?

Research hypothesis

$H0_1$: There is no significant relationship between secondary school students' test anxiety and their academic achievement in Biology.

METHODOLOGY

The study employed a correlational survey research design. The design was chosen for this study so as to ascertain the relationship between the independent variable (Test Anxiety) and the dependent variable (Students' Academic Achievement). The population of the study consisted of 1,268 public secondary school students offering Biology in Wukari Local Government Area, Taraba state. The sample size for the study, comprised of two hundred (200) students drawn using purposive sampling technique. The instrument for data collection was tagged "Test Anxiety Questionnaire (TAQ)" adopted from Abbasi and Ghosh (2020) and Biology Students' Score Proforma (BSSP) from the secondary schools covered the Academic achievement. TAQ consisted of 20 items rated on a 4 point Likert scale, Strongly Agree (SA) 4; Agree (A) 3; Disagree (D) 2; and Strongly Disagree (SD) 1 for positively worded questions, and the reverse is the case for negatively worded questions respectively. BSP is a record spreadsheet of SS1 Biology students' scores obtained from the cumulative average for their 1st, 2nd and 3rd term Biology examinations for the 2024/2025 academic session. Students' anxiety levels were identified as follows: Low Test Anxiety: Scores from 10-19; Moderate Test Anxiety: Scores from 20-35 (healthy level of anxiety) and High Test Anxiety: Scores over 35 (unhealthy level). The TAQ was validated by two experts, with a reliability coefficient of 0.74 established using Cronbach Alpha. Data collected were analyzed using frequenvy, percentages and Pearson Product Moment coefficient (r) to answer the research questions and simple linear regression to test the null hypotheses at 0.05 alpha level.

RESULTS

Research Question 1: What are the levels of secondary school students' test anxiety in Biology?

Table1: Level of Test Anxiety experienced by secondary school students' test anxiety in Biology

Level of Anxiety	Frequency	Percentage	Cumulative percentage

Low Anxiety	7	3.5	3.5
Moderate Anxiety	190	95.0	98.5
High Anxiety	3	1.5	100
Total	200	100	

Table 1 show that 3.5% of the respondents' exhibit low test anxiety during Biology test, 95% of the respondents' exhibit moderate text anxiety while 1.5% of the respondents exhibit high test anxiety. The result shows that the majority of the respondents experience moderate level of test anxiety during Biology test.

Research Question 2: Is there any relationship between secondary school students' test anxiety and their academic achievement in Biology?

Table 2: Pearson Correlation for Test Anxiety and Academic Achievement

	Achievement	**Test Anxiety**	**Sig.**
Achievement	1	-0.872**	0.000
Test Anxiety	-0.872**	1	0.000

**. Correlation is significant at the 0.01 level (2-tailed).

From table 2, Students' Test anxieties mean score ranges from 15.0 to 31.0 with a mean of 20.79. High test anxiety score mean high anxiety and low test anxiety score mean low test anxiety during Biology test. The mean achievement score in Biology is 50.08. Table 4 shows that there is a high negative correlation between test anxiety and students' achievement in Biology ($R = -0.872, p = 0.000$). It means the higher the test anxiety, the lower the achievement in Biology and vice versa. The relationship is very high and significant.

Hypotheses

Hypothesis I: There is no significant relationship between test anxiety and students' academic achievement in Biology.

Table 3: ANOVA Table on Regression of Test Anxiety of Academic Achievement

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	14870.98	1	14870.98	626.63	.000[b]
	Residual	4698.90	198	23.732		
	Total	19569.88	199			

Simple linear regression analysis in Table 3 revealed a statistically significant relationship between secondary school students' test anxiety and their academic achievement in Biology since the p-value (0.00) is less than the alpha level (0.05). Thus, the hypothesis which state that t here is no significant relationship between test anxiety and students' academic achievement in Biology is rejected.

Discussion of Findings

The present study aimed to investigate the levels of test anxiety among secondary school Biology students and to determine the relationship between their test anxiety and academic achievement in Biology. The findings revealed that 1.5% of students experiencing high test anxiety are a significant concern. For these individuals, as highlighted by Olisaememeka and Solarin (2019) and Lafata (2015), such debilitating levels of anxiety can profoundly complicate and limit academic achievement, leading to substantial psychological distress and academic impairment. Conversely, the 3.5% with low anxiety might also face disadvantages if their lack of apprehension translates into insufficient motivation or preparation, though the study's definition does not explicitly categorize this as "unhealthy." The dominance of moderate anxiety in this sample could further be interpreted in light of Biology's perceived complexity and extensive content, as noted by Kaur and Jayaraman (2016), suggesting that the inherent demands of the subject may naturally induce a level of apprehension that, for most, falls into this potentially adaptive range.

The results from the Pearson Correlation analysis (Table 2) revealed a strong, negative, and statistically significant correlation between test anxiety and students' achievement in Biology ($R = -0.872$, $p = 0.000$). This finding was further substantiated by the simple linear regression analysis (Table 3), which indicated a statistically significant relationship ($p = 0.000 < 0.05$), leading to the rejection of the null hypothesis (H01). The remarkably high correlation coefficient of -0.872 signifies a very strong inverse relationship. This indicates that as test anxiety levels increase, academic achievement in Biology tends to decrease, and conversely, lower test anxiety is associated with higher achievement. This finding strongly corroborates the existing body of literature that consistently links elevated test anxiety with diminished academic performance (Ihekwoaba, 2019). The pronounced strength of this negative correlation, specifically within the context of Biology, underscores the profound impact that anxiety can exert on students' ability to perform in a subject characterized by extensive content and intricate conceptual demands.

Conclusion

This study investigated the levels of test anxiety among secondary school Biology students and its correlation with their academic achievement. The findings reveal a strong, negative, and statistically significant correlation ($R = -0.872$, $p = 0.000$) between test anxiety and academic achievement in Biology is profound. Without a doubt, this strong inverse

relationship shows that students' performance in biology tends to decline as test anxiety rises, and that higher achievement is linked to lower test anxiety, regardless of whether the students' anxiety is classified as moderate or high. This study offers vital empirical support, emphasizing the pressing need for focused interventions to help biology students in secondary school.

Recommendations

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

i. Provide interventions such as cognitive-behavioral therapy (CBT) techniques to be carried out by school counselors or trained educational psychologists. These interventions should help students reframe negative thoughts, develop coping mechanisms, and build self-efficacy in test situations.
ii. Incorporate a variety of assessment methods that allow students to demonstrate their understanding in different ways, such as projects, presentations, practical assessments, portfolios, and frequent low-stakes quizzes.
iii. Biology teachers should collaborate closely with school counselors to identify students exhibiting signs of high-test anxiety. Counselors can then provide specialized support, while teachers can adapt classroom strategies to create a less anxiety-provoking learning environment.
iv. Educate parents about test anxiety and its potential impact on academic performance. Provide them with resources and strategies to support their children in managing anxiety at home, fostering a supportive environment that complements school-based interventions.
v. Future research should delve deeper into the specific components of test anxiety (e.g., worry, emotionality, interference) that most significantly impact Biology achievement.

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