POST-TRAUMATIC STRESS DISORDER AS PREDICTOR OF POST BASIC SCHOOL STUDENTS' ACADEMIC ACHIEVEMENT IN MATHEMATICS IN ADAMAWA STATE, NIGERIA

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Abstract

This study investigated whether Post-Traumatic Stress Disorder is a predictor of Post Basic School Students Academic Achievement in Mathematics in Adamawa State, Nigeria. One research question and one hypothesis were formulated for the study. A correlation research design (predictive) was adopted. The population comprised 3,314 SS II mathematics students using 10%. Multistage sampling was used to select 336 students. Mathematics Students' Post-Traumatic Stress Disorder Questionnaire (PTSDQ)" and a student's pro forma result were used for data collection. The PTSDQ was validated by three experts. Cronbach's alpha method was used to determine the reliability of the instrument and a reliability of 0.74 was obtained. Descriptive statistics of mean and standard deviation were used to answer the research question while the hypothesis was tested at a 0.05 level of significance using linear regression analysis. The findings of the study showed an average mean score of 3.38, indicating that these students were moderately stressed when it comes to Post Traumatic Stress Disorder, Hypothetically, Post-traumatic stress disorder predicts Post Basic schools' students' academic achievement in Mathematics (r =0.85; β = 0.67; t = -1.27, p < 0.05). In conclusion, the study found that Post-Traumatic Stress Disorder positively predicts Post Basic School Students Academic Achievement in Mathematics in Adamawa State. Therefore, it was recommended that the government should create concern for a supportive and inclusive school environment, implementing trauma-informed practices, establishing counselling services, providing academic support, encouraging parental involvement, and monitoring progress are crucial steps for educators and school administrators to consider.

Notes: Post-Traumatic Stress Disorder, Mathematics, Academic Achievement

INTRODUCTION

The greatest tool for the economic, social, technological, and scientific development of a nation is education. That probably explains why the Federal Republic of Nigeria (2023) calls education an instrument par excellence for national development. The success or failure of investment by the government and the public in education is measured through the academic achievement of the students who go through the education programmes of the nation. This accounts for why a lot of premiums is placed on the academic achievement of students at all levels of education. Academic achievement refers to a person's achievement in each academic area (e.g. Biology), chemistry, physics, language arts, mathematics, and other areas of human learning. Academic achievement also refers to excellence in all academic disciplines, in a class as well as in extracurricular activities. It includes excellence in sports, behaviour, confidence, and communication skills. Meini, Gutierrez-Colosía, Salvador-Carulla, Salinas-Pérez, and Rezaei (2020) noted that academic achievement is a complex, multidimensional construct, influenced by various behavioural and psychological factors over time. Their study underscores that achievement is not isolated to single instances but evolves through continuous interaction between a student's abilities and their educational environment

It is believed that examination is not the true test of knowledge. One of the reasons for this assertion is that students who appear to be active in the classroom situation suddenly may not display such capabilities in a test or examination they are made to undertake. This study, nonetheless, focuses Post post-traumatic stress disorder as a probable factor that may lead to students' underachievement in post-basic schools in Adamawa State.

Post-Traumatic Stress Disorder (PTSD) as one of the anxiety disorders is the type that occurs after a frightening event or situation. The term post-traumatic stress disorder appears after the Vietnam War specifically for mental and emotional disorders (American Psychiatric Association, APA, 2013). PTSD is characterized by the emergence of core symptoms following exposure to an extreme traumatic experience. It includes a range of symptoms such as intrusive memories, avoidance behaviors, changes in cognition and mood, and alterations in arousal and reactivity (Cleveland, 2020; AAFP, 2020). Recent studies continue to support the understanding that traumatic events such as serious accidents, violent assaults, physical abuse, or natural disasters can lead to the development of post-traumatic stress disorder (PTSD). For instance, research has shown

that these events can have profound and lasting impacts on mental health, resulting in symptoms such as flashbacks, nightmares, and severe anxiety (NAMI, 2020; Defense Health Agency, 2020). Children with PTSD often re-experience the trauma of the event through nightmares or flashbacks or re-create them through play. They can have difficulty sleeping or concentrating (ADAA, 2020). Traumatic event can negatively impact a student's ability to be academically successful. This is so because they will be enduring symptoms such as intrusion or re-experiencing the traumatic event, avoiding trauma-associated stimuli, negative alterations in cognition and mood, and alterations in arousal and reactivity following the traumatic event (APA, 2013). PTSD can significantly impact students' academic performance. These negative cognitions can lead to psychological problems affecting students' understanding of content learned in class and recall during examinations. Students with PTSD may have difficulties suppressing intrusive memories, such as flashbacks or nightmares, which can impact their ability to shift attention in the classroom (Verywell, 2020). The authors explained that Students with PTSD might also experience a reduction in cerebella volume, which affects the regulation of emotion and attention. The symptoms of PSTD therefore will affect students' learning in the class, which ultimately could affect their academic achievement.

There is a significant body of empirical literature on the relationship between post-traumatic stress disorder (PTSD) and academic achievement, including in the context of mathematics education. Felba (2020) observed that university students who exhibited higher levels of PTSD symptoms tended to achieve lower academic performance, both in mathematics and across other subjects. However, the study also found that resilience played a moderating role in this relationship, suggesting that students with higher levels of resilience may be better able to overcome the negative effects of PTSD symptoms on academic achievement. Glover, Albers and Mehta, (2019) investigated on the academic outcomes of students with PTSD symptoms and found significant correlations between PTSD severity and lower academic performance in various subjects, including mathematics. Barnes, Anthony, Karatekin, Klimes-Dougan, and Popma (2019) investigated the psychophysiological responses of adolescents with posttraumatic stress disorder (PTSD) to social evaluative threat. The researchers examined how adolescents with PTSD react to situations where they feel socially evaluated, measuring physiological indicators such as heart rate, skin conductance, and cortisol levels. The findings highlighted heightened stress responses in

adolescents with PTSD compared to their peers without PTSD, indicating a dysregulated stress response system in these individuals. Thompson, Thrasher, and Evans, (2021) explored the association between PTSD symptoms and academic achievement among middle and high school students. It highlighted that higher levels of PTSD symptoms were linked to poorer performance in mathematics and other academic subjects. Ribeiro, Santos, and Tavares (2019) found that children with PTSD symptoms had lower school performance in several subjects, including mathematics. The study suggests that PTSD symptoms can have a significant negative impact on academic achievement, particularly among vulnerable populations such as low-income children.

Duan, Liu and Liao (2019) examined the influence of PTSD and depression on academic achievement among college students and found that both PTSD and depression were significantly associated with lower academic achievement, including in mathematics. The study suggests that mental health factors such as PTSD can hurt academic functioning and highlights the importance of addressing these factors to promote academic success. Duan, Liu, and Liao (2019) found that both PTSD and depression were significantly associated with lower academic achievement, including in mathematics. The study suggests that mental health factors such as PTSD can hurt academic functioning and highlights the importance of addressing these factors to promote academic success.

Further investigation is imperative to comprehend PTSD as a predictor of academic achievement, especially among Post-Basic School Students in Adamawa State because it was observed by (Musa, 2020) that most of Post post-basic school Students in Adamawa State are experiencing PTSD. Furthermore, there is a need to develop effective intervention strategies tailored to mitigate the impact of PTSD on academic performance, particularly in the domain of mathematics. Moreover, subject-specific analysis and exploration are necessary to gain a comprehensive understanding and inform the provision of support services for affected students.

PURPOSE OF THE STUDY

The purpose of this study is to investigate whether Post-Traumatic Stress Disorder predicts Post Basic Students' Academic Achievement in Mathematics in Adamawa State, Nigeria. Specifically, the study seeks to determine whether Post-Traumatic Stress Disorder predicts post basic school students' academic achievement in Mathematics.

RESEARCH QUESTIONS

The following research question was raised to guide the study.

1. What is the level of Post-Traumatic Stress Disorder among Post Basic school students' Academic Achievement in mathematics in Adamawa State, Nigeria?

HYPOTHESIS

The null hypothesis was formulated and tested at 0.05 level of significance.

Ho1: Post-Traumatic Stress Disorder does not significantly predict Post-Basic school students' Academic Achievement in Mathematics in Adamawa State, Nigeria.

METHODOLOGY

In this research study, a correlational research design was utilized, which aims to identify the relationship between variables by using a correlation coefficient, as described by Fraenkel and Wallen (2009). This approach involves collecting data to determine the extent to which two or more variables are related, as noted by Whitley and Kite (2013). This design allows for the collection of data from the same group on multiple variables, and correlation coefficients are then calculated to assess the degree of relationship between each variable. The reason for selecting this research design was to determine whether a relationship exists between the independent variable (Post Trauma Stress Disorder) and Post Basic Students' academic achievement in Mathematics. Specifically, the current study will employ the predictive correlational survey design type, which as described by Sousa, Driessnack, and Mendes (2007), is a method that forecasts the variation of one or more variables by considering the variation of another variable(s). The authors further explain that the variables involved in the study are categorized as either independent (predictor) or dependent (outcome). This study includes the population of 3,314 Post Basic Students in Adamawa state, Nigeria who are studying Mathematics, comprising 1219 male and 2095 female students between the ages of 12-20 years. All Post Basic Schools who are studying mathematics under the Adamawa State Post Primary School Management Board (PPSMB, 2019).

For this study, a sample size of 360 post-basic School students who are studying Mathematics in Adamawa State was selected. These samples represent 10% of the entire population, as recommended by Gall, Gall, and Borg (2007). According to Gall, Gall, and Borg (2007), if the population size is up to 10,000, a 5% sample should be used, while a 10% sample should be used when the population is between 2000 and 5000. If the population is between 1000 and 2000, a

20% sample should be used, and a 50% sample should be selected when the population size is in the hundreds. When dealing with population sizes in tenths, the whole population may be used. However, a multi-stage sampling procedure was employed for this study through cluster sampling for selecting the three Education zones out of five zones, while a simple random sampling technique was used for selecting schools and students for the study.

To collect information based on the study variable, the "Post Traumatic Stress Disorder Questionnaire (PTSDQ)" was adapted from Baumeister's (2010), Emmanuel, Oyedele, Gimba, Gaji, and Kevin's (2015), and Mahmoud, Staten, Lennie and Hall's (2015) studies. The questionnaire consists of two sections, with Section A providing instructions on how to answer the items, and Section B containing different sets of items designed to address the research question related to Post Traumatic Stress Disorder, for Mathematics students. The (PTSDQ) questionnaire has a total of 10 items and uses a five-point scale, where "Very High Level" (VHL) is rated as 5, "High Level" (HL) as 4, "Moderate Level" (ML) as 3, "Low Level" (LL) as 2, and "Very Low Level" (VLL) as 1. In addition, the academic achievement of post-basic schools' mathematics students in Adamawa state was determined using the 2022/2023 academic results pro-forma obtained from various schools.

Content validity was employed to establish the validity of the instrument used in the study, and three experts in the field of Test and Measurement from Bayero University, Kano were given copies of the "Post Traumatic Stress Disorder Questionnaire (PTSDQ)" to assess its validity. The observation was made by the experts and corrections were effected before administering the questionnaire to the respondents. After the pilot study, Cronbach's Alpha was used to determine the internal consistency of the instrument. A reliability co-efficient of 0.74 was obtained which meant that the instrument was reliable. The internal consistency of the instrument was assessed using Cronbach's alpha and the reliability coefficient was to be 0.74, indicating that the instrument was reliable.

The data were analysed using mean (X) and standard deviation (SD) to answer the research questions. Linear regression was used for testing the hypothesis at a 0.05 level of significance. The Statistical Product and Service Solutions (SPSS) version 23 was used. The decision rule for the research question was based on the real limit of numbers as shown below; 4.50 – 5.00 as Very

High Level; 3.50 – 4.49 as High Level; 2.50 – 3.49 as Moderate Level; 1.50 – 2.49 as Low Level and 0 – 1.49 as Very Low Level. The decision rule for the null hypotheses will be; if p-value $\leq$ 0.05 the hypothesis is rejected, or if p-value $\geq$ 0.05 then we do not reject the hypotheses. Hence, if r = +1 or -1; it will show a positive or negative relationship respectively.

Results

Research Question One: What is the level of post-traumatic stress disorder among Post Basic Schools students' Academic Achievement in mathematics in Adamawa State, Nigeria?

Table 1: Mean and Standard Deviation of Post-Traumatic Stress Disorder

S/N	n = 360	Mean	S.td	Remark
1.	Thinking less about what the future holds for you	3.46	1.40	ML
2.	Having recurrent distressing dreams of an event	3.42	1.49	ML
3.	Feeling that something bad is about to happen	3.50	1.40	HL
4.	Feeling emotionally upset when reminded of a traumatic experience	3.41	1.40	ML
5.	Having trouble feeling intense positive emotions (such as love or excitement)	3.38	1.50	ML
6.	Having constant hallucinations	3.37	1.47	ML
7.	Having constant outbursts of anger	3.33	1.47	ML
8.	Being hyper vigilance in and out of school	3.35	2.09	ML
9.	Feeling that something bad is about to happen	3.27	1.45	ML
10.	Repeatedly bothered by memories of stressful experience	3.29	1.46	ML
	Average Mean	**3.38**	**1.51**	**ML**

Table 1 illustrates that out of Post Basic school students who were surveyed for Post-Traumatic Stress Disorder in Mathematics academic achievement, only item 3 showed a high level of stress. The remaining items which are 1,2,4,5,6,7,8,9 and 10, exhibited moderate levels of stress. The overall average score, which is 3.38, indicates that these students were moderately stressed when it comes to Post Traumatic Stress Disorder.

Hypothesis

Ho1: Post-Traumatic Stress Disorder does not significantly predict Post Basic Schools students' Academic Achievement in mathematics in Adamawa State, Nigeria

Table 2a: Model summary of Regression Analysis of Post-Traumatic Stress Disorder on Students' Academic Achievement in Mathematics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.85	0.86	0.85	1.326

Table 2a shows the model summary of Post-Traumatic Stress Disorder on Post Basic Schools students' Academic Achievement in mathematics. The model indicated that R value of 0.85, R^2 value of 0.86, and an adjusted R^2 of 0.85. Post-Traumatic Stress Disorder of mathematics students in post-basic schools in Adamawa state had $R^2 = 86.00\%$. This implies that the fitted regression model left was 14.00% unexplained in the total variation of the Post Basic school students' Academic Achievement in mathematics as a result of Post-Traumatic Stress Disorder. This R^2 is moderate which suggests that Post-Traumatic Stress Disorder of mathematics students in Adamawa state predicts Post Basic Schools students' Academic Achievement in mathematics.

Table 2b: Summary of Analysis of Variance (ANOVA) of Regression of Post-Traumatic Stress Disorder on Post Basic Schools students' Academic Achievement in Mathematics

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	58.21	4	14.55		
				91.35	0.00*
Residual	748.61	391	1.91		
Total	**923.52**	**392**			

Table 2b showed that there was a significant predict the various R values, F = 91.35 (df 5), p < 0.05. Since the computed p-value (0.00) is less than 0.05 level of significance, therefore the null hypothesis of no significance is rejected. That means Post-Traumatic Stress Disorder predicts Post Basic school students' Academic Achievement in mathematics.

Table 2c: Summary of Regression Coefficient of Post-Traumatic Stress Disorder on Post Basic Schools students' Academic Achievement in mathematics

Model	Unstandardized coefficient	Standardized coefficient

	B	Std. Error	Beta	T	Sig
Constant	-0.56	0.41		-1.40	0.161
Post trauma stress disorder	-0.14	0.11	0.67	-1.27	0.002

Not Sig. $p < 0.05$

Table 3c showed the Post-Traumatic Stress Disorder had predictive strength of $B = 0.75$. The result showed that there was an inverse significant prediction of Post-Traumatic Stress Disorder on students' Post Basic Schools Academic Achievement in mathematics ($\beta = 0.67$; $t = -1.27$, $p < 0.05$).

DISCUSSION OF THE FINDINGS

The overall average score of 3.38 indicates that the students experienced moderate levels of stress related to Post-Traumatic Stress Disorder (PTSD), suggesting a predictive link between PTSD and academic achievement among Post-Basic School students, particularly in mathematics. This finding aligns with previous research. Felba (2020) observed that university students with higher PTSD symptoms tended to perform poorly academically, across various subjects including mathematics. Moreover, resilience was found to moderate this relationship, suggesting that higher resilience levels may mitigate the negative impact of PTSD symptoms on academic performance. Similarly, Glover, Albers, and Mehta (2019) investigated academic outcomes among students with PTSD symptoms, revealing significant correlations between PTSD severity and lower performance in mathematics and other subjects. Additionally, Karatekin, Klimes-Dougan, and Popma (2019) highlighted heightened stress responses in adolescents with PTSD, indicating dysregulated stress systems in these individuals. Further research by Duan, Liu, and Liao (2019) also underscored the impact of PTSD and depression on academic achievement among college students, emphasizing their association with lower performance in subjects like mathematics.

CONCLUSION

In conclusion, the study highlights the significance of post-traumatic stress disorder (PTSD) counseling in predicting post-basic school students' academic achievement in mathematics. The finding showed that Post-Traumatic Stress Disorder predicts Post Basic Schools students' Academic Achievement in mathematics. The implication of the study is to create evident for supportive and inclusive school environment, implementing trauma-informed practices,

establishing counseling services, providing academic support, encouraging parental involvement, and monitoring progress are crucial steps for educators and school administrators to consider.

RECOMMENDATIONS

1. The school management should develop a counseling programme that addresses the specific needs of students with PTSD.

2. The school management should collaborate with external organizations or agencies that specialize in trauma counseling to enhance support services.

3. The school management should employ trained mental health professionals who can provide individual and group counseling.

4. Both Federal and state government should incorporate trauma-informed practices into teaching strategies and classroom management.

5. Both Federal and state government should train teachers and staff to recognize signs of trauma and provide appropriate support.

6. The school management should encourage open communication and create safe spaces for students to share their experiences.

7. The school management should offer tutoring or extra support in mathematics for students struggling with the subject.

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