CHAPTER-IV

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF RESULTS

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4.1 Introduction

The previous chapters in the study deal with the conceptual and theoretical aspects of the study, a detailed review of the related literature and the methodology that has been followed in the present study. After considering the objectives and hypotheses of the present research, the data is collected. After the scoring and tabulation of data, the analysis and finally the interpretation with the help of descriptive and inferential statistics are done. The present chapter focuses on the analysis and interpretation of data that were collected for the study.

4.2 Analysis of the Data

Data is a collected form of facts for extracting factual information from the set of raw data. Analysis of data is a structured and systematic procedure of categorizing, arranging, ordering, and summarizing the data to discover facts and for getting answers related to the research purpose. The basic purpose of data analysis is to reduce data into a simple and interpretable form so that inferences may be drawn from it (Kothari, 2004). Analysis and interpretation of data is helpful in knowing the relationship between the variables and to draw appropriate conclusions. Data analysis is the process of breaking the data into smaller parts to extract useful information for forecasting the outcomes. Careful analysis with the help of appropriate statistical techniques leads to better prediction and accurate assessment. Therefore, data analysis is an important step that involves a whole composite procedure for assessing data utilizing appropriate descriptive and inferential statistics. In the present study, parametric statistics have been used. The basic assumption behind the parametric statistics is that data must be normally distributed (Sheskin, 2000; Naideem & Karen, 2007; Field, 2009; Ghasemi & Zahediasl, 2012). Keeping this viewpoint in mind the researcher checked the nature of data for the variable under study i.e., academic anxiety. In the present research, the distribution of data has been checked with the help of Normal Probability Curve (NPC), Quantile-Quantile plot (Q-Q plot), skewness (Sk), kurtosis (Ku) and z-values. The property of the normal curve is that the mean, median and mode all lie at the same midpoint of the distribution and their

values are numerically equal (Garrett, 2009). The range of z-value for checking the normality of data must be within -2.58 to +2.58 (Huck, Cross & Clark, 1986; Ghasemi & Zahediasl, 2012). According to Doane and Seward (2011) the range of z-value in normal distribution comes under -1.96 to +1.96. All the z-values given below in the tables come under the accepted range of z-values. Thus, the data for all the variables fulfilled these criteria and considered as normally distributed.

Table 4.1

Descriptive Measures to know the Normal Distribution of Academic Anxiety Scores of Senior Secondary School Students

N	*Mean*	*SD*	*Std. Error Mean*	*Sk*	*Std. Error Sk*	*Z value of Sk*	*Ku*	*Std. Error Ku*	*Z value of Ku*
241	164.21	23.77	1.53	0.122	0.157	0.777	-0.098	0.312	0.314

The table 4.1 shows the standard error of the mean (1.53) which implies that the sample mean (164.21) may deviate only 1.53 from the population mean which ensures that the sample mean is relatively close to the mean of the population. The value of standard deviation is 23.77 which depicts that the scores may deviate from the mean by 23.77 on both the sides (positive and negative) of the mean. The table 4.1 also shows the skewness and kurtosis with z-values. The positive value of skewness (0.122) suggests that data is skewed to the right and the distribution is approximately symmetrical. The kurtosis value (-0.098) suggests that it is slightly greater than zero implies that distribution is slightly leptokurtic. The z-value of skewness (0.777) and kurtosis (0.314) renders that these values are neither below of -1.96 nor the above of +1.96. The observation of table (4.1) and figures (4.1A & 4.1B) lead to conclude that the scores of academic anxiety of senior secondary school students are normally distributed.

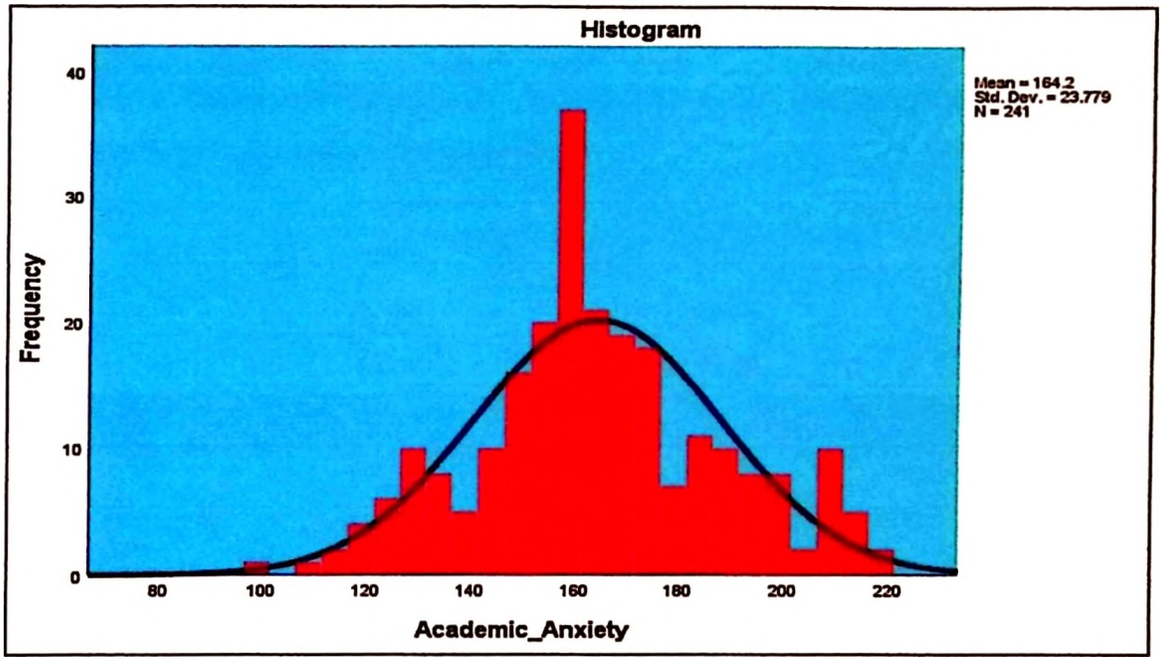

Figure 4.1A: **NPC showing academic anxiety scores of senior secondary school students**
(N= 241)

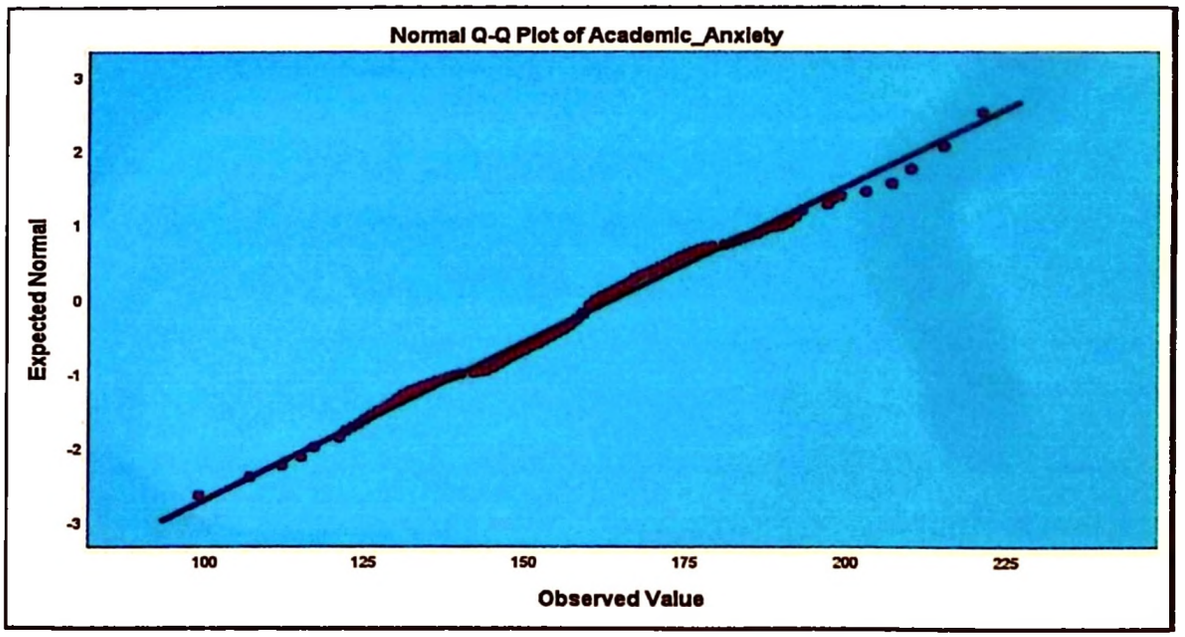

Figure 4.1B: **Q-Q Plot showing academic anxiety scores of senior secondary school students (N= 241)**

Table 4.2

Descriptive Measures to know the Normal Distribution of Academic Achievement Scores of Senior Secondary School Students

N	*Mean*	*SD*	*Std. Error Mean*	*Sk*	*Std. Error Sk*	*Z value of Sk*	*Ku*	*Std. Error Ku*	*Z value of Ku*
241	74.10	08.19	0.528	0.358	0.157	2.28	-0.088	0.312	0.282

The table 4.2 reveals the skewness and kurtosis with z-values. The positive value of skewness (0.358) suggests that data is skewed to the right and the distribution is positively skewed. The kurtosis (-0.088) implies that distribution is slightly platykurtic. Also, the z-values of skewness and kurtosis of academic achievement of senior secondary school students are 2.28 and 0.282 respectively which suggest that these values are neither below -2.58 nor the above of +2.58. It is clear from table 4.2 that the value of the standard error of mean (0.528) implies that the sample mean 74.10 may deviate only 0.528 from the population mean. The value of standard deviation is 08.19 which depicts that the scores may deviate from the mean by 08.19 on both the (positive and negative) sides of the mean. Thus, the observation of table 4.2 and figures (4.2A & 4.2B) lead to conclude that academic achievement scores of senior secondary school students are normally distributed.

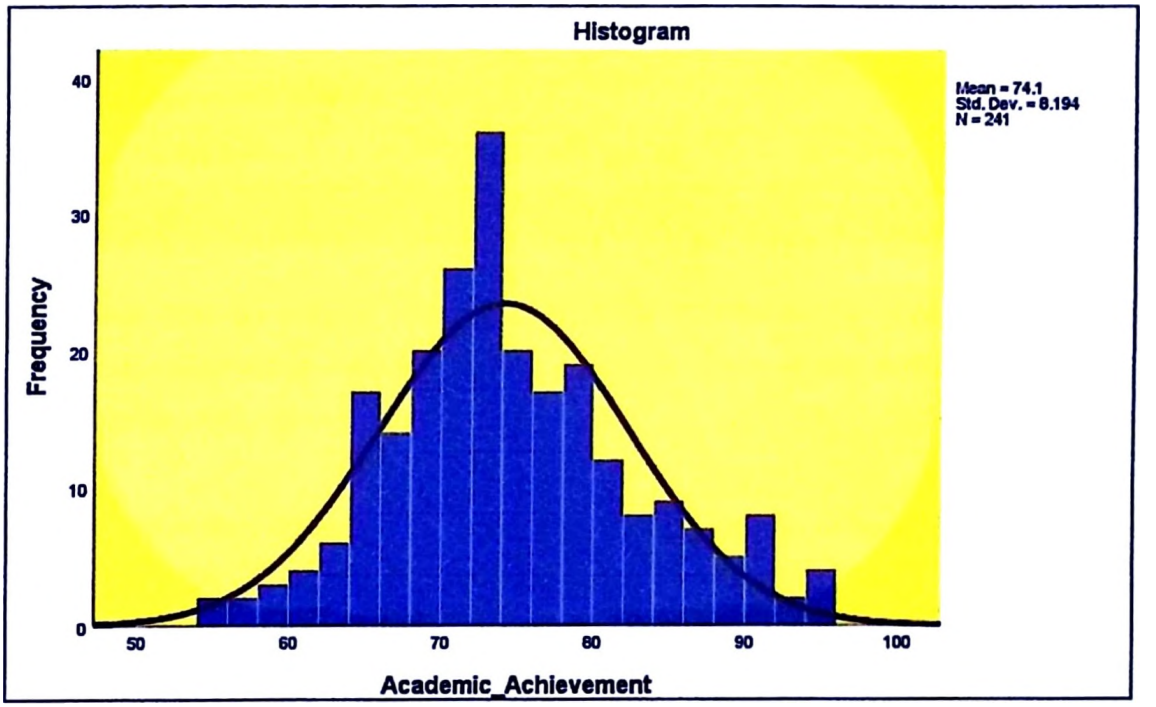

Figure 4.2A: **NPC showing academic achievement scores of senior secondary school students (N=241)**

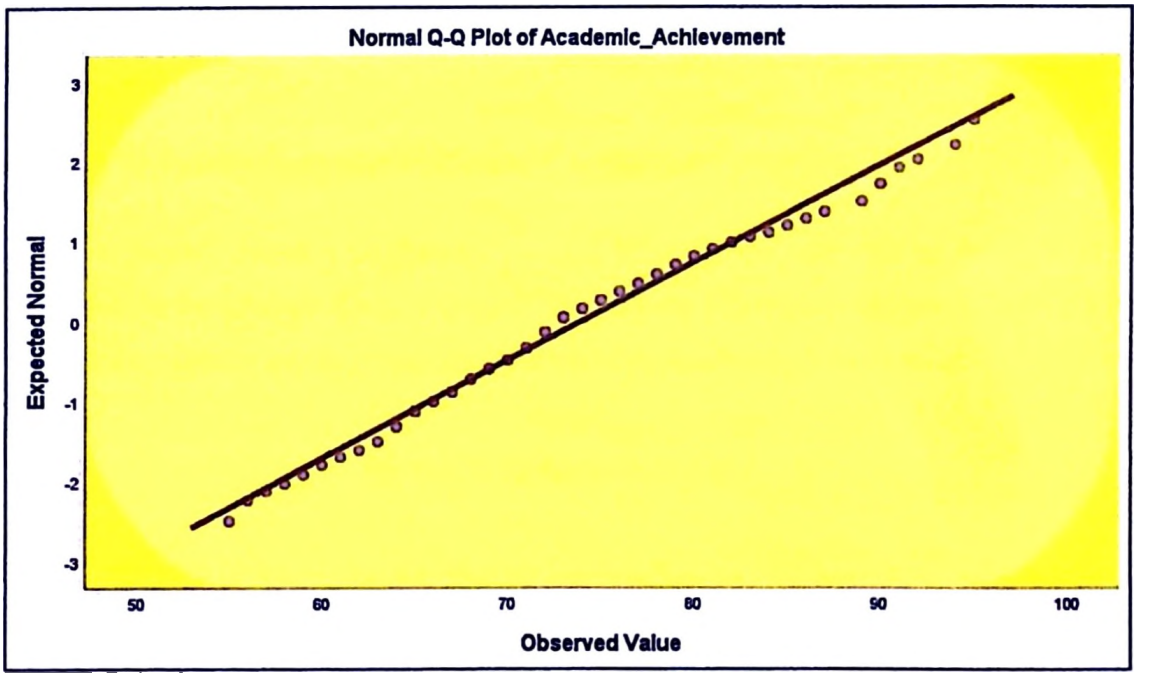

Figure 4.2B: **Q-Q plot showing academic achievement scores of senior secondary school students (N=241)**

Table 4.3

Showing Normality of Data

Variables	*Academic Anxiety*	*Academic Achievement*
Result	Normally Distributed	Normally Distributed

It is clear from the perusal of table 4.3 that the data for all the predictive variable (academic anxiety) and criterion variable (academic achievement) fulfilled the criteria to be considered as normally distributed.

4.3 Objective wise Analysis, Interpretation and Discussion of Results

To facilitate the presentation and bring clarity in it, the entire analysis is presented in two sections and the results based on it are discussed under the following sections –

Section I: Independent t-test:

Independent t-test is used to compare the means of two independent groups (Gender: Male/ Female) and (Type of School: Goverment/Private), in order to determine whether there is statistical evidence that the associated population means are significantly different.

Section II: Pearson's Product Moment Correlation

Pearson product moment correlation is used to study the relationship between the variables. In the present study, it is used to know the relationship between predictive variables (academic anxiety) and criterion variable (academic achievement).

Section I: Independent t-test

Some assumptions have to be fulfilled for using independent t-test. These assumptions are as follows:

1. Variables measured (predictive variable - academic anxiety and criterion variable - academic achievement) should be in ratio or interval scale.
2. Independent variable should consist of two categorical, independent groups. For this study, the independent variables that meet this criterion include

gender (2 groups: male or female) and type of school (2 groups: Govt. and Private).

3. Data should be normally distributed and there is no significant outlier present. For the present study, data normality has already been shown by the z-value of skewness, z-value of kurtosis, NPC graph and by Q-Q plot at the starting of the chapter.
4. There needs to be homogeneity of variances. For the present study this assumption has been tested in SPSS V.26 using Levene's test for homogeneity of variances.
5. Criterion Variable (Academic Achievement) should be approximately normally distributed for each group of the Predictive variable (Academic Anxiety). For the present study, the normality has been checked through the Shapiro-Wilk test of normality in SPSS V.26.

Objective 1

To find out the level of academic achievement of senior secondary school students.

Sub Objectives

1.1 To find out the level of academic achievement of male and female senior secondary school students.

In order to know the level of academic achievement of male senior secondary school students, fundamental statistical measures have been assessed.

Table 4.4

Showing Percentage of Male and Female Senior Secondary School Students falling under Different Levels of Academic Achievement

	N	High (80 & Above)	Average (79-60)	Low (59 & Below)
Male	116	44 (37.93%)	72 (62.06%)	0 (0%)
Female	125	11 (8.80%)	107 (85.60%)	7 (5.60%)
Total	**241**	55 (22.82%)	179 (74.27%)	7 (2.90%)

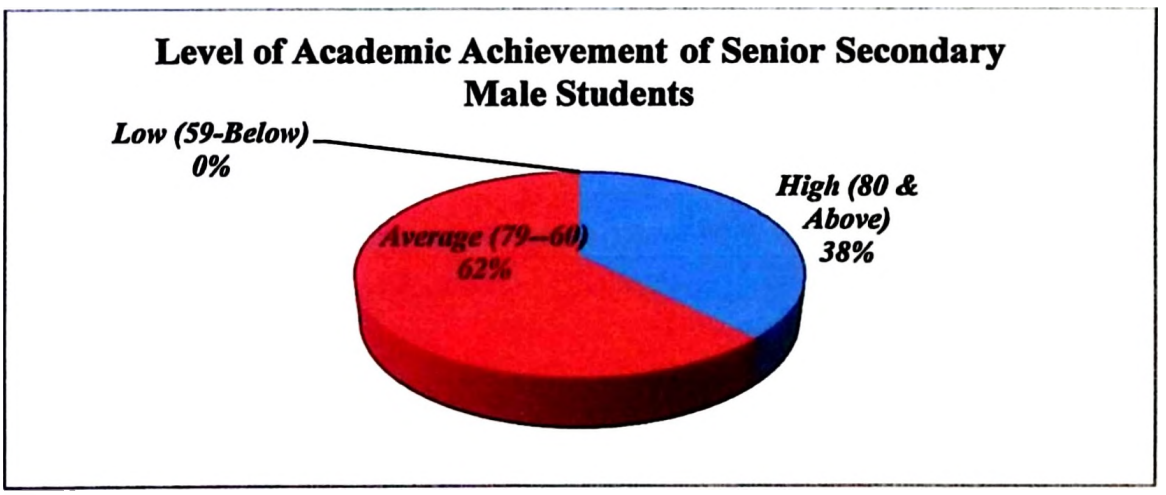

***Figure 4.3*: Level of academic achievement of senior secondary male students**

Figure 4.4 shows majority (62%) of the senior secondary male school students have average (79-60) academic achievement and a few senior secondary male school students (38%) have High (80 & Above) academic achievement.

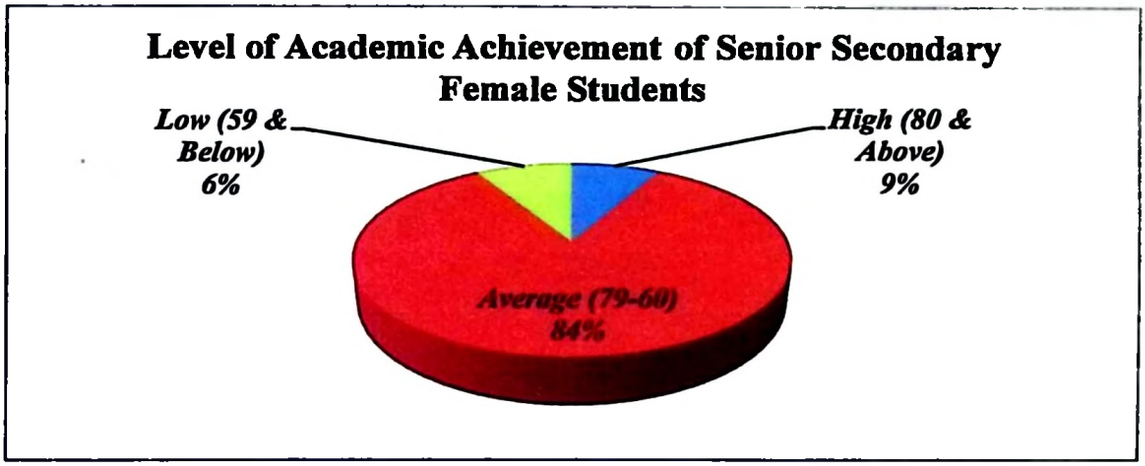

***Figure 4.4*: Level of academic achievement of senior secondary female students**

Figure 4.5 reveals where majority (84%) of the senior secondary female school students have average (79-60) academic achievement, 9% senior secondary female school students have high (80 & above) academic achievement and only 6% senior secondary female school students have low (59& below) academic achievement.

Sub Objectives

1.2 To find out the level of academic achievement of government and private senior secondary school students.

In order to know the level of academic achievement of govt. senior secondary school students, fundamental statistical measures have been assessed.

Table 4.5

Showing Percentage of Government and Private Senior Secondary School Students falling under Different Levels of Academic Achievement

	N	High (80 & Above)	Average (79-60)	Low (59 & Below)
Government	122	8 (6.55%)	108 (88.52%)	6 (4.91%)
Private	119	47 (39.49%)	71 (59.66%)	1 (0.84%)
Total	**241**	55 (22.82%)	179 (74.27%)	7 (2.90%)

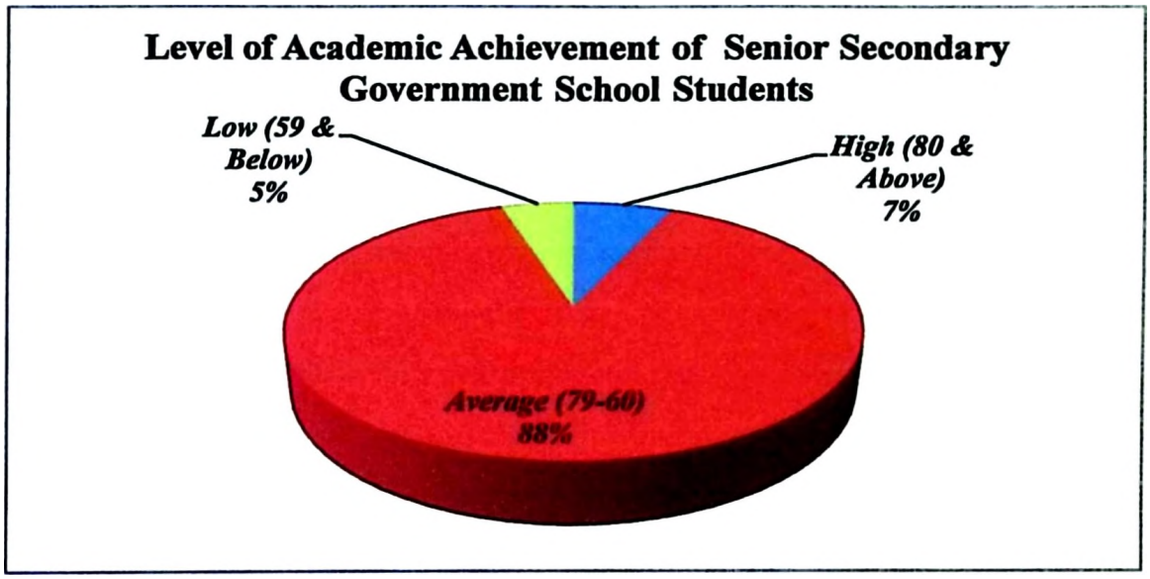

***Figure 4.5*: Level of academic achievement of senior secondary government school students**

Figure 4.6 conveys a large majority (88%) of the senior secondary government school students has average (79-60) academic achievement, only 5% government school students fall into the category of low (59 & below) academic achievement and 7% government school students have high (80 & above) academic achievement.

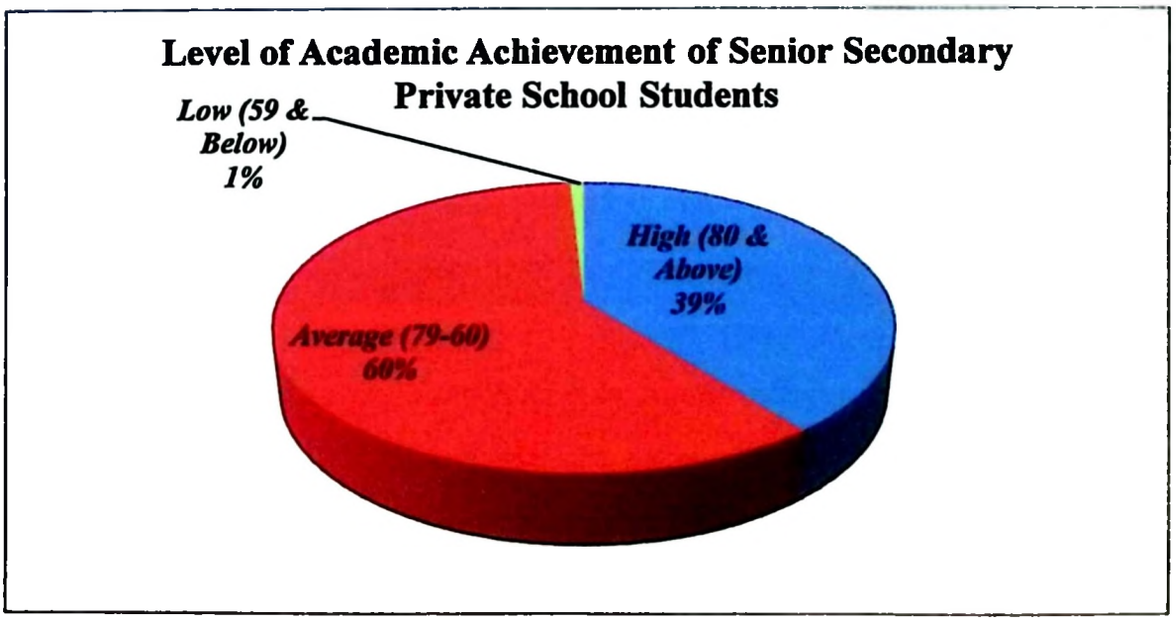

***Figure 4.6:* Level of academic achievement of senior secondary private school students**

Figure 4.7 clearly indicates that more than half (60%) of the senior secondary private school students have average (79-60) academic achievement, 39% senior secondary private school students have high (80& above) academic achievement and only 1% senior secondary private school students have low (59 & below) academic achievement.

Objective 2

To find out the level of academic anxiety of senior secondary school students.

Sub-Objectives

2.1 To find out the level of academic anxiety of male and female senior secondary school students.

In order to know the level of academic achievement of male senior secondary school students, fundamental statistical measures have been assessed.

Table 4.6

Showing Percentage of Male and Female Senior Secondary School Students falling under Different Levels of Academic Anxiety

	N	High (176 & Above)	Moderate (135-175)	Low (134 & Below)
Male	116	21 (18.10%)	71 (61.20%)	24 (20.68%)
Female	125	45 (36%)	75 (60%)	5 (4%)
Total	241	66 (27.38%)	146 (60.58%)	29 (12.03%)

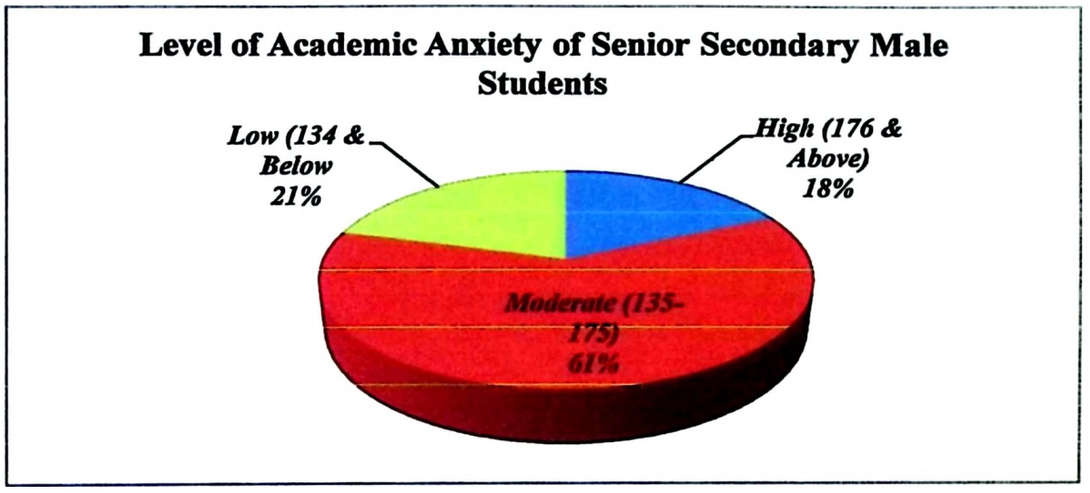

***Figure 4.7*: Level of academic anxiety of senior secondary male students**

Figure 4.9 conveys that majority (61%) of the senior secondary male students have moderate (135-175) level of academic anxiety, 18% of the senior secondary male student have high (176 & above) level of Academic anxiety and 21% of the senior secondary male students have low (134 & below) level of academic anxiety respectively.

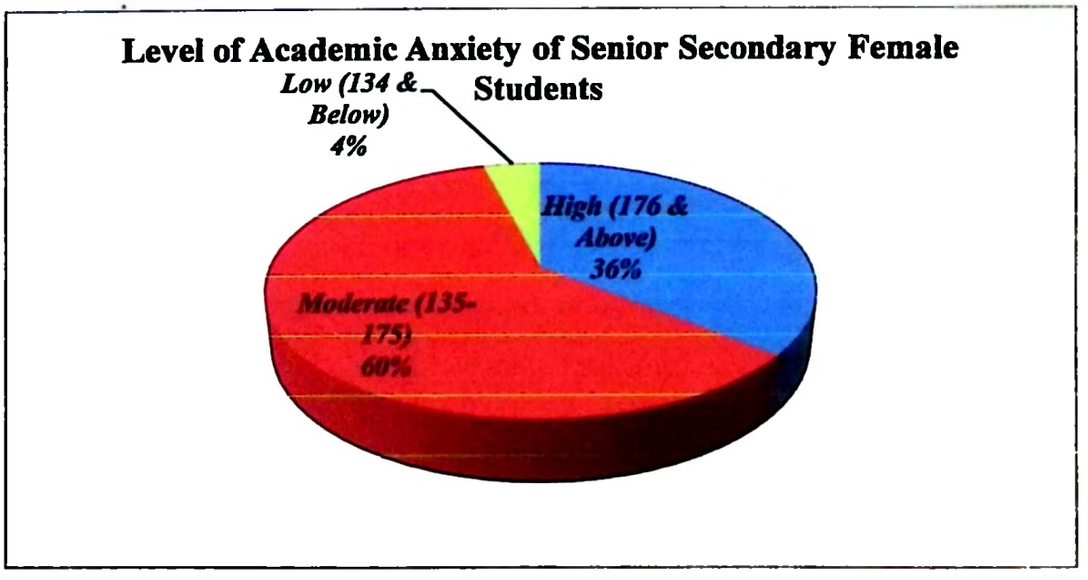

***Figure 4.8*: Level of academic anxiety of senior secondary female students**

Figure 4.10 shows majority (60%) of the senior secondary female students have moderate (135-175) level of academic anxiety, 36% senior secondary female student have High (176 & above) level and only 4% senior secondary female students have low (134 & below) level of academic anxiety.

Sub-Objectives

2.2 To find out the level of academic anxiety of government and private senior secondary school students.

In order to know the level of academic achievement of government senior secondary school students, fundamental statistical measures have been assessed.

Table 4.7

Showing Percentage of Government and Private Senior Secondary School Students falling under Different Levels of Academic Anxiety

	N	High (176 & Above)	Moderate (135-175)	Low (134 & Below)
Government	122	50 (40.98%)	65 (53.27%)	7 (5.73%)
Private	119	16 (13.44%)	81 (68.06%)	22 (18.48%)
Total	241	66 (27.68%)	146 (60.58%)	29 (12.03%)

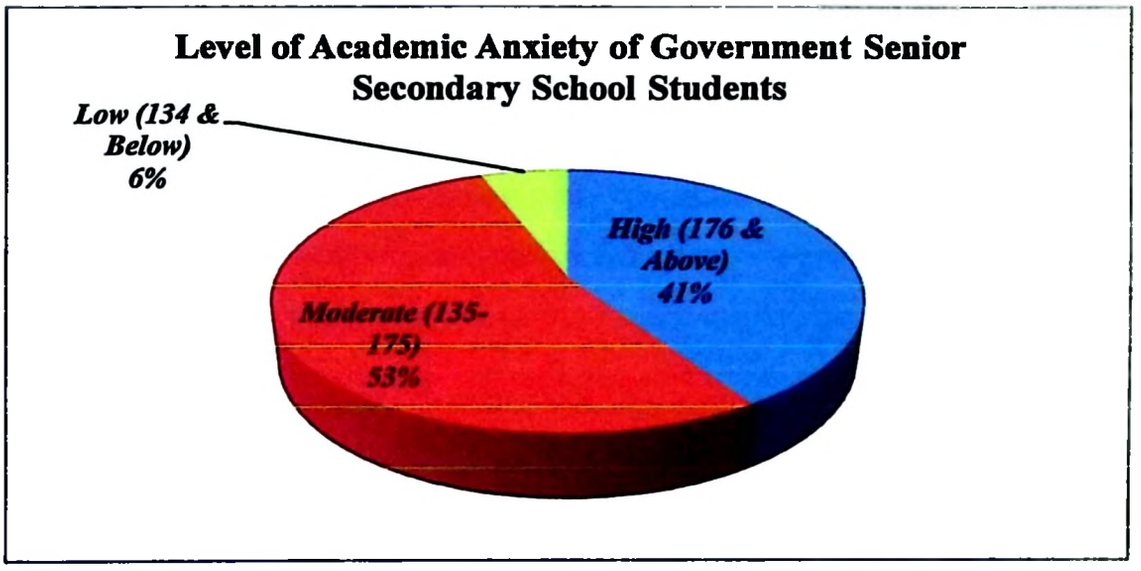

***Figure 4.9*: Level of academic anxiety of government senior secondary school students**

Figure 4.11 represents the level of academic anxiety of government senior secondary school students, where 53 % government senior secondary school students have moderate (135-175) level of academic anxiety, a good number of government senior secondary school students (41%) have high (176 & above) level of academic anxiety and only 6 % government senior secondary school students have low (134 & below) level of academic anxiety.

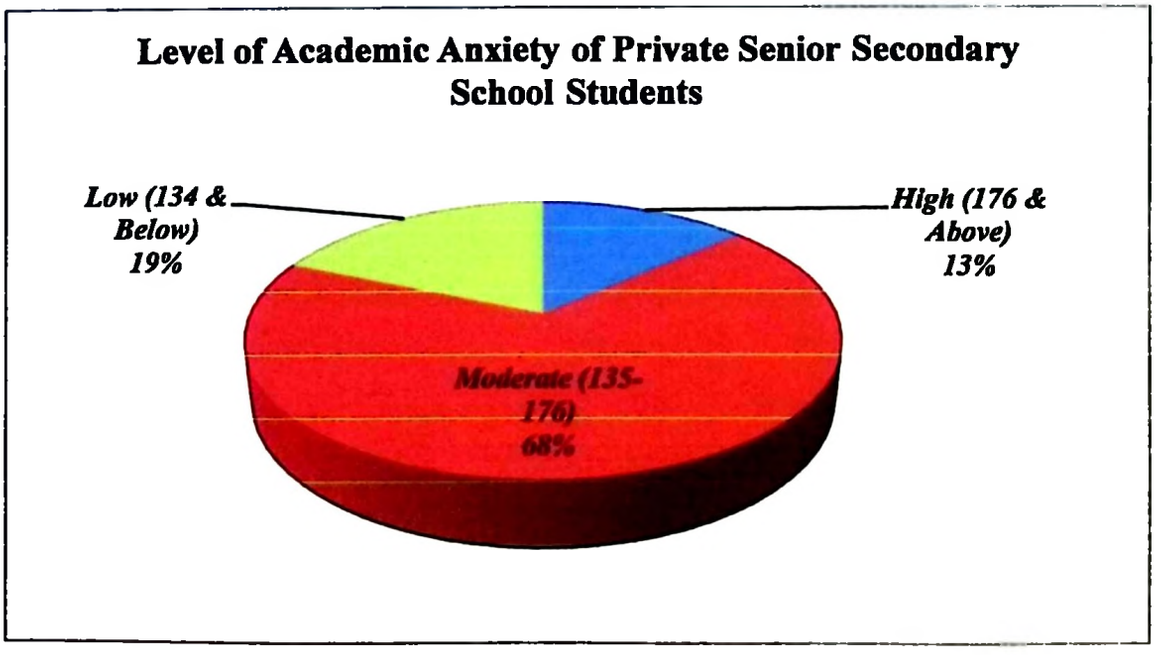

***Figure 4.10*: Level of academic anxiety of private senior secondary school students**

Figure 4.12 represents the level of academic anxiety of private senior secondary school students, where majority (68%) of the private senior secondary school students have moderate (135-175) level of academic anxiety, 13% private senior secondary school students have high (176 & above) level of academic anxiety and 19% senior secondary students have low (13 & below) level of academic anxiety.

Objective: 3

To compare the mean scores of academic achievement of senior secondary school students

Sub-Objective

3.1 To compare the mean scores of academic achievement of senior secondary male and female students.

Null Hypothesis 1 ($H_0$1)

There is no significant difference in the mean scores of academic achievement of male and female senior secondary school students.

Table 4.8

Showing difference in Academic Achievement in terms of Gender

Variable	Groups	N	Mean	SD	SEM	df	t	d	Sig
Academic Achievement	Male	116	78.47	7.625	.708	239	9.297	1.194	0.001<0.01
	Female	125	70.04	6.443	.576				

The result indicates that (table 4.10) there is a significant difference in the academic achievement of the two groups, t (239) = 9.297, p-value = 0.001<0.01 is significant at 0.01 level of significance. The present result argues that the male senior secondary school students (M = 78.47, SD = 7.625) are significantly higher in the academic achievement than the female senior secondary school students (M = 70.04, SD= 6.443). Here the value of effect size (d = 1.194) suggests that the value of d lies between 0.8 – 1.4 which indicates a large effect size. Thus, gender has a significantly large effect on academic achievement. Therefore, null hypothesis ($H_0$1) is rejected.

The present finding is in consonance with the findings reported by Jain (2012), Attri & Neelam (2013), Nandini (2013), Neelam (2013), Siddiraju (2013), Naqvi & Naqvi (2016) who revealed that there is a significant difference in the mean achievement score of secondary school students in social studies based on gender. The mean achievement score of female secondary school students were higher than the mean achievement scores of male students.

Sub-Objective

3.2 To compare the mean scores of academic achievement of government and private senior secondary school students

Null Hypothesis 2 ($H_0$2)

There is no significant difference in the mean scores of academic achievement of govt. and private senior secondary school students.

Table 4.9

Showing difference in Academic Achievement in terms of Type of School

Variable	Groups	N	Mean	SD	SEM	df	t	d	Sig
Academic Achievement	Govt.	122	68.99	6.077	.550	239	-12.624	1.626	0.001 <0.01
	Private	119	79.34	6.637	.608				

The result indicates that (table 4.11) there is a significant difference in the academic achievement of the two groups, t (239) = -12.624, p-value = 0.001<0.01 is significant at 0.01 level of significance. The present result argues that the private senior secondary school students (M = 79.34, SD= 6.637) are significantly higher in the academic achievement than the government senior secondary school students (M = 68.99, SD= 6.077). Here the value of effect size (d = 1.626) suggests that the value of d is higher than 1.4 which indicates a large effect size. Thus, type of school has a significantly large effect on academic achievement. Therefore, null hypothesis ($H_0$2) is rejected.

The present finding is in consonance with the findings reported by Cansiz, Ozbaylanli & Colakoglu (2019) who revealed that school type has comparatively larger effect on the academic achievement of the learners. Similar results were found by Okon &

Archibong (2015) which revealed that students in private secondary schools performed better in social studies than those in public schools.

Objective: 4

To compare the mean scores of academic anxiety of senior secondary school students

Sub-Objective

4.1 To compare the mean scores of academic anxiety of senior secondary male and female students.

Null Hypothesis 3 ($H_0$3)

There is no significant difference in the mean scores of academic anxiety of male and female senior secondary school students.

Table 4.10

Showing difference in Academic Anxiety in terms of Gender

Variable	Groups	N	Mean	SD	SEM	df	t	d	Sig
Academic Anxiety	Male	116	156.25	21.987	2.041	239	-5.271	0.680	0.001 <0.01
	Female	125	171.58	23.067	2.063				

The result indicates that (table 4.12) there is a significant difference in the academic anxiety of the two groups, t (239) = -5.271, p-value = 0.001<0.01 is significant at 0.01 level of significance. The present result argues that the female senior secondary school students (M = 171.58, SD = 23.067) are significantly higher in the academic anxiety than the male senior secondary school students (M = 156.25, SD= 21.987). Here the value of effect size (d = 0.680) suggests that the value of d lies between 0.5 – 0.8 which indicates a medium effect size. Thus, gender has a medium effect on academic anxiety. Therefore, null hypothesis ($H_0$3) is rejected.

The present finding is in consonance with the findings reported by Banga & Sharma, 2016; Ghosh, 2016; Kumari, 2017; KheshtMasjedi et al., 2019 who revealed that gender plays a significant role in determining the academic anxiety of school students. The mean anxiety score of female secondary school students were higher than the mean anxiety scores of male students.

Sub Objective

4.2 To compare the mean scores of academic anxiety of government and private senior secondary school students.

Null Hypothesis 4 (H_04)

There is no significant difference in the mean scores of academic anxiety between govt. senior secondary school students and private senior secondary school students.

Table 4.11

Showing difference in Academic Anxiety in terms of Type of School

Variable	Groups	N	Mean	SD	SEM	df	t	d	Sig
Academic Anxiety	Govt.	122	172.89	23.883	2.162	239	6.169	0.796	0.001< 0.01
	Private	119	155.29	20.177	1.850				

The result indicates that (table 4.13) there is a significant difference in the academic anxiety of the two groups, t (239) = 6.169, p-value = 0.001<0.01 is significant at 0.01 level of significance. The present result argues that the govt. senior secondary school students (M = 172.89, SD = 23.883) are significantly higher in the academic anxiety than the private senior secondary school students (M = 155.29, SD= 20.177). Here the value of effect size (d = 0.796) suggests that the value of d lies between 0.5 – 0.8 which indicates a medium effect size. Thus, type of school has a medium effect on academic anxiety. Therefore, null hypothesis (H_04) is rejected.

The present finding is in consonance with the findings reported by Bihari,(2014);Ghosh,(2016) who revealed that type of school plays a significant role in determining the academic anxiety of school students. The mean anxiety score of govt. senior secondary school students were higher than the mean anxiety scores of private senior secondary school students.

Section: II Pearson's Product Moment Correlation

Some assumptions have to be fulfilled for using Pearson's Product Moment Correlation. These assumptions are as follows:

1. Variables measured (predictive variable -academic anxiety and criterion variable - academic achievement) should be in ratio or interval scale.

2. There should be linear relationship between the variables (predictive and criterion) to be correlated.

3. Data should be normally distributed and there is no significant outlier present. For the present study, data normality has already been shown by the z-value of skewness, z-value of kurtosis, NPC graph and by Q-Q plot at the starting of the chapter.

4. Homoscedasticity should be there i.e., the spread of scores of the variables must be approximately the same at all levels of the variables.

All the assumptions of coefficient of correlation were fulfilled, so Pearson product moment correlation was applied in the present study.

Objective 5

To study the relationship between academic achievement and academic anxiety of senior secondary school students.

Null Hypothesis 5 ($H_0$5)

There is no significant relationship between academic achievement and academic anxiety of senior secondary school students.

To achieve the above stated objective, academic achievement was taken as the criterion variable and the predictive variable was academic anxiety. To find out the relationship between the criterion and predictive variable, the Pearson product moment correlation was applied and the value of the correlation coefficient (r) was obtained. The calculated value of correlation between the predictive variable for the senior secondary students is represented in the tabular form in the table 4.18

Table 4.12

Correlation between the Criterion Variable and Predictive Variable among Total Sample of Senior Secondary School Students

Predictive Variable	Criterion Variable (Academic Achievement)
	Total Sample (N=241)
Academic Anxiety	-0.224

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

From the above table 4.14, it is clear that all the coefficients of correlations are statistically significant at 0.01 level of significance.

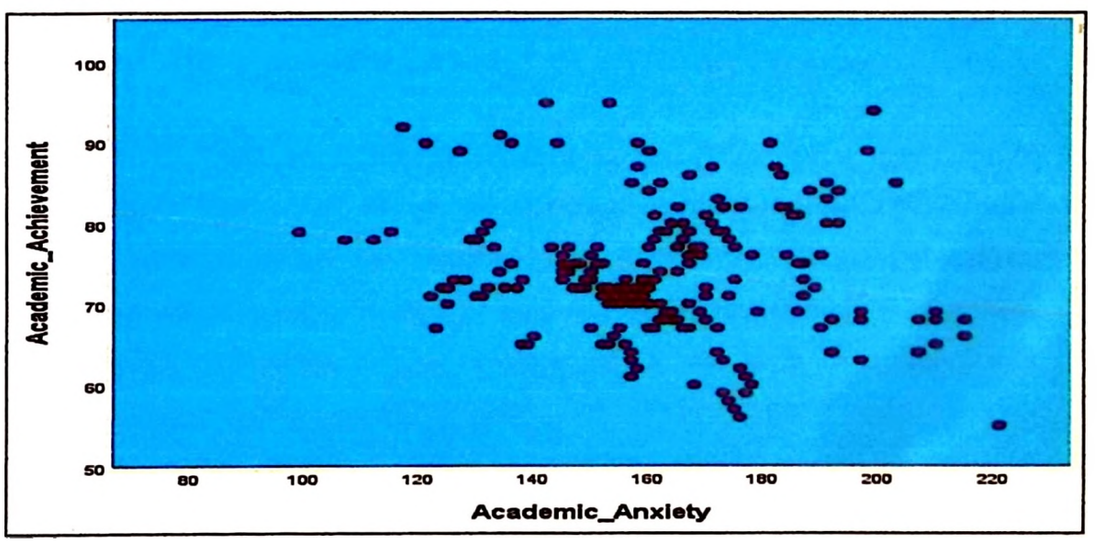

***Figure 4.11*: The Scatter plot of correlation between academic achievement and academic anxiety of total sample of senior secondary school students.**

Table 4.14 shows a statistical low negative correlation between academic anxiety and academic achievement i.e., r = -0.224, p<0.01 is significant at 0.01 level of significance. Moreover, as per Cohen's (1988) guidelines for the effect size, the value of Pearson correlation coefficient (r = -0.224) indicates a low strength of correlation between academic anxiety and academic achievement. As the data points on the scatter plot (figure 4.3) closely resemble an inverse relationship as predictor variable i.e., academic anxiety and criterion variable i.e., academic achievement, line is in

downward direction that shows they both move in the opposite direction. It can be interpreted that changes in predictor variable i.e., academic anxiety are associated with opposite changes in criterion variable i.e, academic achievement. This shows that academic anxiety is low and negatively related to the criterion variable i.e, academic achievement. The results lead to conclude that higher academic anxiety scores of senior secondary school students, the lower will be their academic achievement and vice-versa.

This finding is corroborated by (Singh & Thukral, 2009; Vitasari et al., 2010; DordiNejad et al., 2011; Jain, 2012; McCarty, 2007; Akinsola & Nwajei, 2013; Nandini, 2013; Puar, 2013; Halder & Mishra, 2014; Hasan, 2016; Parul, 2016; Alam, 2017b; Balogun, Balogun & Onyencho, 2017; Fatma & Aqil, 2017; Gulhane, 2017; Kumari, 2017; Sharma, 2017; Oluoch, Aloka & Odongo, 2018; Mirawdali et al., 2018; Weda & Sakti, 2018; Khesht-Masjedi et al., 2019) that there was a negative correlation between high academic anxiety and low academic achievement and vice-versa.

However, contradictory finding is reported by (Al-Qaisy, 2011; Dhull, 2013; Meenakshi & Singh, 2016) shows that there was a significant positive relationship between academic anxiety and academic achievement which refers that if students have high academic achievement then they will have high academic anxiety also. Singh (2015b) showed that low and moderate anxiety was positively correlated with academic achievement of students. No significant relationship exists between anxiety and academic achievement is revealed by (Ndirangu, Muola, Kithuka & Nassiuma, 2018; Das, Halder & Mishra, 2014; Kashfi, Jeihooni, Kashfi & Yazdankhah, 2014; Azila-Ghettor, Atatsi, Danku & Soglo, 2015; Shibli et al., 2015; Akpur, 2017).

Thus, the variable (academic anxiety) is negatively related to the criterion variable i.e., academic achievement for the total sample of senior secondary school students. It shows an increase or decrease in academic anxiety is bound to cause an inverse alteration in academic achievement. Therefore, the null hypothesis ($H_0 5$) i.e., 'There is no significant relationship of academic achievement with academic anxiety of senior secondary school students' is rejected.