PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

To bring the study to its successful completion, the huge mass of data collected were critically analyzed and responded through textual discussions, tabular and graphical devices. Tables and figures were used to clear the significant relationship. They are so constructed that they are self explanatory. Textual discussions may be used to point out generalization and significant interpretation. Tables and figures are simple and point outs only one relationship.

The raw data was first organized in separate tables for each variable of the study. For computation of needed statistics and application of appropriate statistical tests, most of the data was analyzed on SPSS. A part of the data was manually treated.

One of the important uses of statistical methods is to deduce a large body of quantitative information's into a few meaningful and interpretable indices, commonly known as statistical average. The original data collected by researcher is in the form of numbers which are so large and unmanageable that no conclusions regarding their nature can be drawn. So as first step, it is worthwhile to summarize data in term of statistics that are easily understandable and interpretable. Mc Nemar (1969) has rightly mentioned that the reduction of a batch of data to a few descriptive measures is a part of statistical analysis which should lead to overall better comprehension of the data. For the purpose of data analysis codes and abbreviations were assigned to these variables to facilitate computational process in the computer system. The details of this coding system are provided in the Appendix-V.

The present chapter is devoted to presentation, analysis and interpretation of the data as per the following scheme:

1. Study of students' achievement in Science and their personal factors.
2. Study of students' achievement in Science and their environmental factors.
3. Study of students' achievement in Science and their institutional factors.

The objectives of the present study were to empirically test the assumptions regarding relationship between student achievement in Science and their personal, environmental and institutional factors. Therefore, from the very beginning the investigator is very particular to see that relevant and precise techniques are used to analyze data in this study. The nature of data required the correlation coefficient. In order to test the hypothesis t tests, F-test followed by Duncan's (Post hoc test) were employed to study the difference between the means of personal, environmental and institutional factors. If the differences approached significant level, it would prove that personal, environmental and institutional factors affect the Science achievement of students.

5.1 Relationship Between Personal Factors (Gender, Attitude Towards Science & Sports Activities) And Science Achievement of Secondary School Students.

The statistical method used in testing the hypothesis is the t test for difference between mean of achievement scores of two groups using two tailed test. The mean (M), standard deviation (SD), degree of freedom (df), correlation (r) and t-value (significant difference between the two means) of the two groups are given in tables and figures.

5.1.1 Comparison of Science Achievement on their Gender Basis.

Table 5.1 Comparison of Mean Science Achievement Scores of Male and Female Students

Gender	N	Mean	SD	df	t-value	Sig./Not sig.
Male	1080	31.20	12.34	2004	4.51**	Sig. at 0.01 level
Female	926	28.75	11.88			

** p<0.01

The total numbers of male and female students were 1080 & 926 respectively as indicated by the table 5.1. Out of 75 scores, the mean achievement scores in Science of male student is 31.20 and standard deviation (SD=12.34), in case of female students, the mean Science achievement score is 28.75 and standard deviation (SD=11.88). The statistically calculated t-value is 4.51, which is significant at 0.01 levels with 2004 df. Which is greater than table value at 0.01 level of significance. Thus the first hypothesis stating that "there is no significant difference between male and female students in Science achievement" was rejected at 0.01 level of significance. The graphical presentation of mean Science achievement scores of both genders is given in fig. 5.1

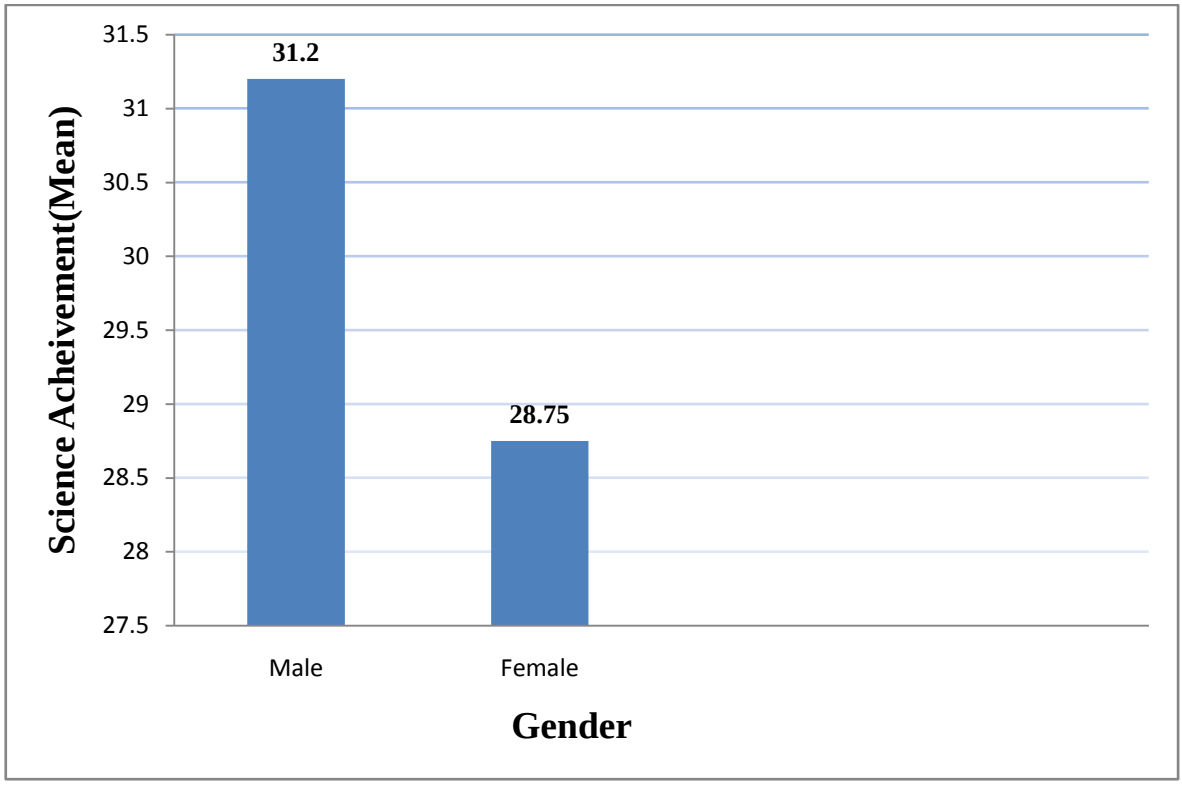

Fig. 5.1 Graphical presentation of Mean Science Achievement Score on Gender Basis

5.1.2 Relationship Between Attitude and Achievement in Science of Secondary School Students

Table 5.2 Relationship of Attitude and Mean Science Achievement Test Scores (SAT) of Secondary School Students

Variables	N	Mean	SD	Correlation Coefficient (r)
ATS	2006	41.66	13.59	0.338**
SAT	2006	30.07	12.19	

** p<0.01

The technique of correlation was employed to find out the relationship of attitude and achievement in Science. The Total Samples were 2006. The mean scores of attitude and achievement in Science of secondary schools students were found to be 41.66 and 30.07, where as the standard deviation of attitude and achievement in Science of secondary schools students were found to be 13.59 and 12.19 respectively. The estimated calculated correlation coefficient (r) is 0.338, which is significant at 0.01 level. The mean score, standard deviation (SD) and correlation coefficient (r) values are given in table 5.2.

The analysis does not confirm the prediction hypothesized in this study for the present sample. Hence, the second hypothesis stating that, "there is no significant relationship between attitude and achievement in Science of secondary school students" was rejected at 0.01 level of significance.

5.1.3 Relationship Between Sports Activities and Achievement in Science of Secondary School Students

Table 5.3 Relationship of Sports Activities (SA) and Mean Science Achievement Scores (SAT) of Secondary School Students

Variables	N	Mean	SD	Correlation Coefficient (r)
SA	2006	2.16	0.58	0.092**
SAT	2006	30.07	12.19	

** $p<0.01$

The technique of co-relation was employed to find out the relationship between sports activities and achievement in Science. The total sample was 2006 (1080 boys and 926 girls). The total samples were categorized in to three groups. i.e. never, sometimes and always on the basis of students participation in sports activities. The mean scores of sports activities and achievement in Science is 2.16 and 30.07 respectively where as the standard deviation (SD) of sport activities and achievement in Science is 0.58 and 12.19 respectively. The estimated correlation coefficient (r) is 0.092, which is significant at 0.01 level.

The mean score, standard deviation (SD) and correlation coefficient (r) values are shown in table (5.3). Hence ,the third hypothesis stating that "there is no significant relationship between sports activities and achievement in Science of secondary school students" was rejected at 0.01 level of significance.

5.2 Relationship Between Environmental Factors (Parental Education , Father's Occupation , Size of the Family , Science Resources available at Home , Exposure to Media and Time Spent at Science Home Work) And Science Achievement of Students

5.2.1 Relationship Between Parental Education and Science Achievement of Students

Parents play an important role in their children's learning. Aside from being actively involved in their children's education, parents also provide a home environment that can affect learning. Parents serve as a model for learning, determine the educational resource available in the home and hold particular attitudes and values towards education. Although, it is difficult to examine the home environment of each student, the parental education serve as an indicator of the values and resources with which parents create this environment.

5.2.1.1 Comparison of Science Achievement Scores among Three Educational Level of Father's Education of Respondents

Table 5.4 Comparison of Science Achievement Scores Among the Three Categories of Father's Education (E_1= Illiterate, E_2= Up To 12, E_3= Degree Level And Above) of Secondary School Students

Illiterate E_1 (N=262)		Up to 12 E_2 (N=1109)		Degree level and above E_3 (N=635)		Significant pairs (*)	F- value
Mean	SD	Mean	SD	Mean	SD		
24.54	10.09	27.27	10.24	37.22	12.09	E_1 Vs E_2 E_1 Vs E_3 E_2 Vs E_3	197.94**

** $p<0.01$

For studying relationship between father's education and their children's achievement in Science the data was categorised into three groups, i.e., illiterate, having received education up to class 12^{th} and degree levels & above, on the basis of their father's education. The mean Science scores of their children of these groups are 24.54, 27.27 and 37.22 respectively. The scores of these groups were put to analysis of variance. The results are given in table 5.4. Analysis of variance of the mean scores of the three groups give F value as 197.94 , which is significant at 0.01 level. This implied that there is significant overall difference in the means of these three groups. Hence F-test was found significant; therefore Duncan's post hoc test was applied for further investigation.

Further support to this conclusion, it is also provided by a test of significance of difference between Science achievement scores of three type of father's educational level as given in the table 5.4. The fig 5.2 shows the mean score of Science achievement of students of three types of father's education.

The statistical method used in testing the major hypothesis was the Duncan's post hoc test for the difference between the means of three groups of father education. The significant pairs obtained by comparing each groups mean Science achievement score with that of every other groups show that out of three possible paired comparisons all three showed significant difference.

Thus the sub hypotheses stating that "there is no significant difference among the categories of father's education and achievement in Science of secondary school students" rejected at 0.01 level of significance. The graphical presentation is given in fig. 5.2.

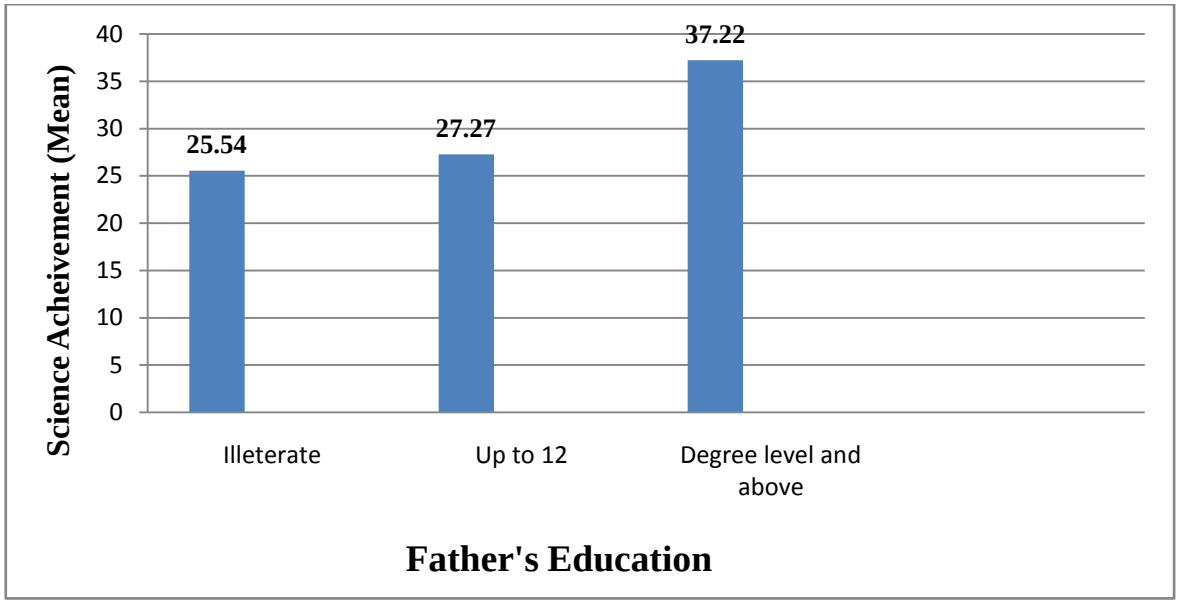

Fig. 5.2 Graphical Presentation of Mean Science Achievement Scores of Three Different Groups of Father's Education.

5.2.1.2 Comparison of Science Achievement Test Among Three Educational Level of Mother's Education of Respondents

Table 5.5 Comparison of Science Achievement Scores Among the Three Categories of Mother's Education (E_1= Illiterate, E_2= Up To 12, E_3= Degree Level and Above) of Secondary School Students

(Duncan's Mean Test)

Illiterate E_1 (N=502)		**Up to 12 E_2 (N=1122)**		**Degree level and above E_3 (N=382)**		**Significant pairs (*)**	**F- value**
Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**		
25.06	10.12	29.43	11.46	38.52	12.45	E_1 Vs E_2 E_1 Vs E_3 E_2 Vs E_3	156.90**

** $p<0.01$

For studying relationship between mothers education and their children's achievement in Science the data was categorized into three groups, i.e., illiterate, having received education up to class 12^{th}, and degree levels & above, on the basis of their mothers education. The mean Science scores of their children of these groups are 25.06, 29.43 and 38.52 respectively. The scores of these groups were put to analysis of variance. The results are given in table 5.5. Analysis of variance of the mean scores of the three groups give F-value as 156.90 , which is significant at 0.01 level. This implied that there is significant overall difference in the means of these three groups. Hence F-test was found significant, therefore Duncan's post hoc test was applied for further investigation.

Further support to this conclusion, it is also provided by a test of significance of difference between Science achievement scores of three type of mother's educational level as given in the table 5.5. The fig 5.3 shows the mean score of science achievement of students of three types of mother's education.

The statistical method used in testing the major hypothesis was the Duncan's post hoc test for the difference between the means of three groups of mother education. The significant pairs obtained by comparing each groups mean Science achievement score with that of every other groups show that out of three possible paired comparison all three showed significant difference.

Thus the sub hypotheses stating that "there is no significant difference among the categories of mother's education and achievement in Science of secondary school students" rejected at 0.01 level of significance. The graphical presentation is given in fig. 5.3.

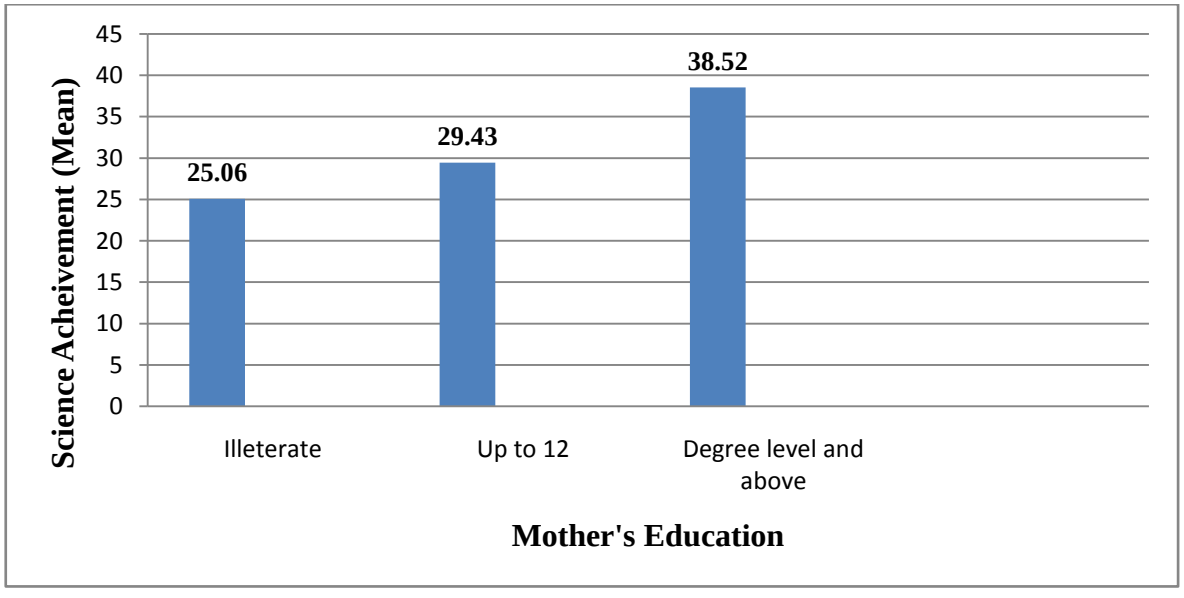

Fig. 5.3 Graphical Presentation of Mean Science Achievement Scores of Three Different Groups of Mother's Education.

Since both the sub hypotheses rejected at 0.01 level of significance. Hence, the fourth hypothesis stating that "there is no significant difference among the categories of parental education and achievement in Science of secondary schools students" was rejected at 0.01 level.

5.2.2 Relationship Between Father's Occupation and Science Achievement of the Students

Table 5.6 Comparison of Science Achievement Scores Among the Four Categories of Father's Occupation (O_1= Agriculturist, O_2= Professional, O_3= Businessman, O_4 = Others) of Secondary School Students

(Duncan's Mean Test)

Agriculturist O_1 (N=788)		**Professional O_2 (N=659)**		**Businessman O_3 (N=237)**		**Others O_4(N=322)**		**Sig. pairs (*)**	**F-value**
Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**		
26.26	10.49	34.74	12.88	34.44	11.63	26.60	10.59	O_1 Vs O_2 O_1 Vs O_3 O_2 Vs O_4 O_3 Vs O_4	86.77**

** p<0.01

Father's occupation may influence student performance in various ways for example, occupation related to income may determine access to learning opportunities and resources and so play a role in learning outcomes. The education and types of skills associated with different occupations and modelled by parents may motivate students to

develop their own skills in particular ways. Father's occupation may also influence how students perceive the value of Science learning, their beliefs about the usefulness of Science and the learning environment at home. If occupation is considered as an indicator of parental skill, it appears that students whose parents worked in occupation with greater skill requirements also performed better in Science. However, the large overlap between groups also indicate that there are still large differences within occupational categories.

To find out the relationship between father's occupation and achievement in Science of their children, the total sample of the students was categorized into four groups on the basis of fathers occupation i.e. agriculturist, professionals, businessman and others. Analysis of variance was employed to determine the significance of difference in science achievement scores of the children of their four groups of father's occupation. The F- ratio came out to be 86.77 and found to be significant at 0.01 level of significance. This means that there were significant difference in the means of Science achievement of the children of agriculturist, professional, businessman and others (table 5.6).

A glance at the table 5.6 denotes that the mean achievement scores of children of agriculturist, professional, businessman and others fathers were 26.26, 34.74, 34.44 and 26.60 respectively.

Hence, F-test was found significant therefore Duncan's post test was applied for further investigation. Further support to this conclusion it is also provided by a test of significance of difference between the mean Science achievement scores of the four groups of father occupation as given in the table 5.6.

The statistical method used in testing the major hypothesis was the Duncan's post hoc test for the difference between the means of four groups of father's occupation. The

significant pairs obtained by comparing each groups mean Science achievement scores with that of every other groups show that out of four possible parried compressions all fours showed significant difference.

From the trend it is quite clear that children's of professional groups have highest score in Science than other three groups and on the other hand children of low occupational status. Agriculturists have lowest scores in Science than other three groups. Children of businessman have more achievement in Science than the children of others and agriculturist and less achievement than the professional groups. Children of others group have less achievement than professional and businessman and more than agriculturist groups. The tendency that becomes clear from the study that father's occupation effects the achievement of their children's in Science. The graphical representation of mean Science achievement scores of four different groups of father's occupation is given in fig. 5.4.

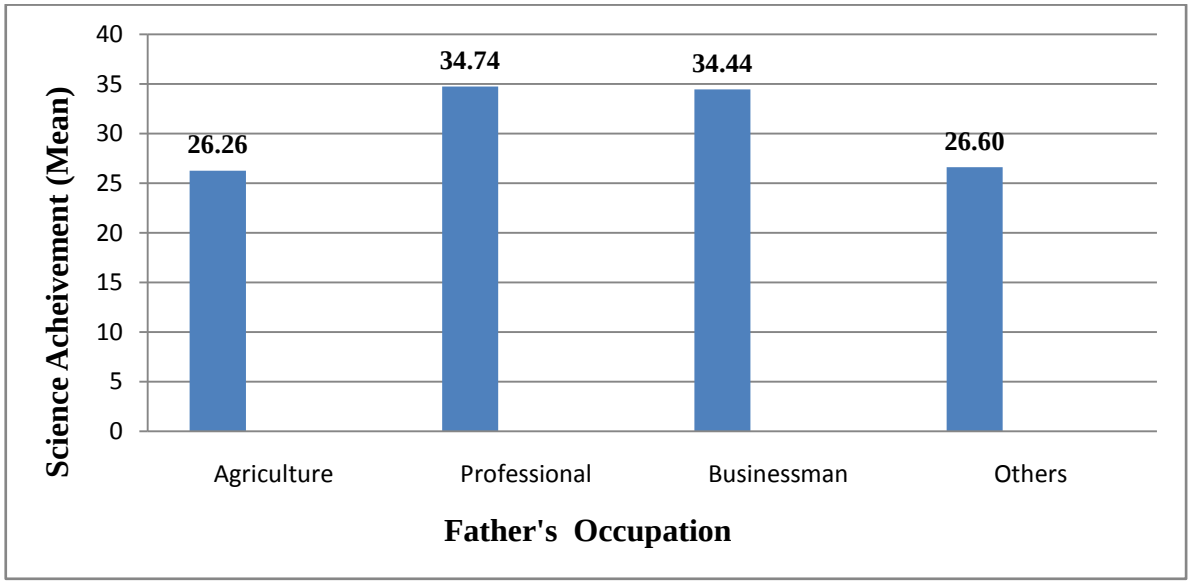

Fig. 5.4 Graphical Presentation of Mean Science Achievement Scores of Children of Four Different Groups of Father's Occupation .

Hence, the fifth hypothesis stating that "there is no significant difference among the categories of father's occupation and achievement in Science of secondary schools students" was rejected at 0.01 level.

5.2.3 Comparison of Science Achievement of Students on the basis of their Family Size

Table 5.7 Comparison of Science Achievement of Students According to their Family Size

Family Size	N	Mean	SD	df	t	Sig./Not sig.
Small	433	34.07	13.08	2004	7.842**	Sig at .01 level
Large	1573	28.96	11.70			

** p<0.01

The total sample were divided in to two groups on the basis of their family size i.e. small family (up to 4 members) large size (more than 4 members). Out of total sample (2006), (433) students belong small size family and (1573) belong to large size family. The number of students belong to small size and large size were 433& 1573 respectively as indicated by this table 5.7. The mean achievement of students of large family is 28.96 and SD=11.70. In case of small family, the mean achievement score of the students is 34.07 and SD=13.08. The graphical presentation of these mean scores is given in fig 5.5. The statistically calculated t value is 7.842 which is significant at 0.01 level with 2004 df. The result clearly indicates that Science achievement of students of small size of family have greater achievement than the students of large family size.

The analysis do not confirms the prediction hypothesized in this study for the present sample. The family size of the students is significantly related to the Science achievement of students . Hence, the sixth hypothesis stating that "there is no significant difference between family size and achievement in Science of secondary school students" was rejected at 0.01 level. The graphical representation of mean Science achievement score of two different groups of family size is given in figure 5.5.

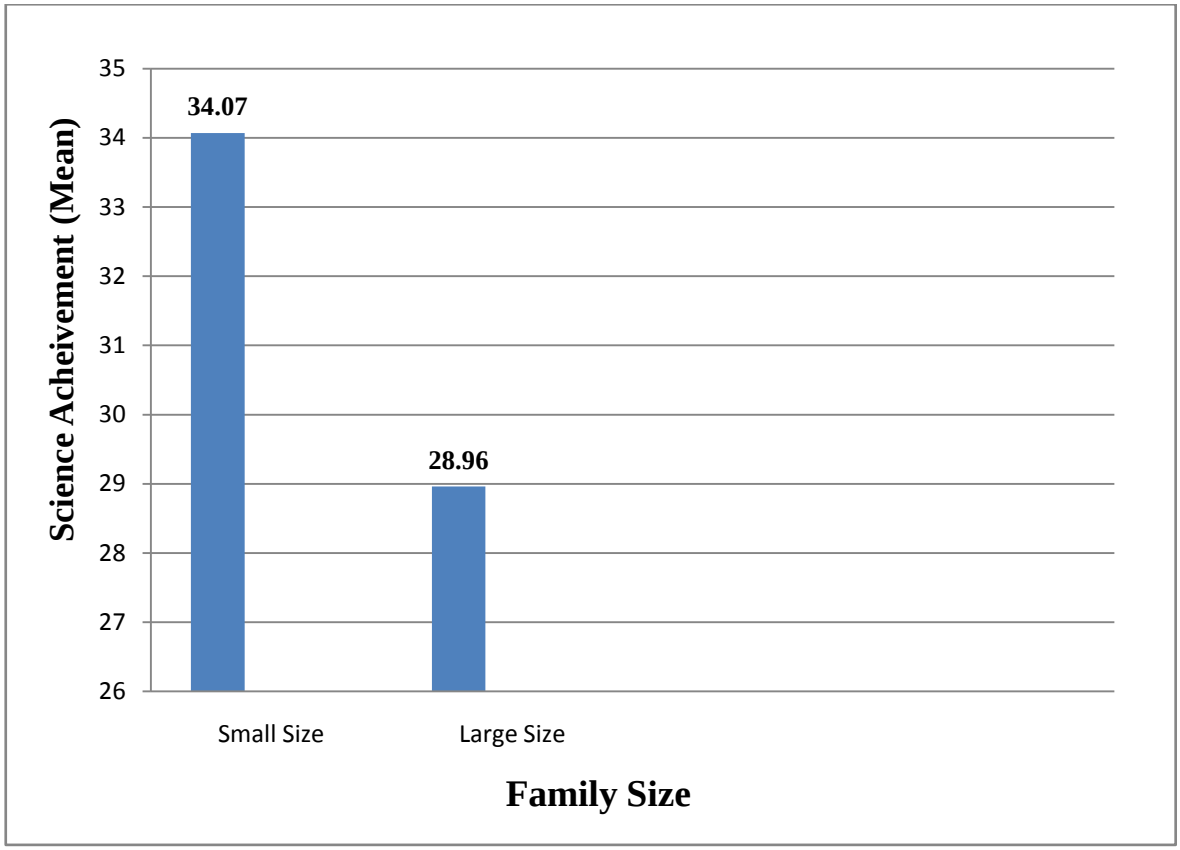

Fig. 5.5 Graphical Presentation of Mean Science Achievement Score of two Different Groups of Family Size.

5.2.4 Relationship Between Science Resources Available at Home and Achievement in Science of Secondary School Students

5.2.4.1 Relationship Between Science Books Available at Home and Achievement in Science of Secondary School Students

Table 5.8 Relationship of Science Book Available at Home (SB) and Mean Science Achievement Scores (SAT) of Secondary School Students

Variables	N	Mean	SD	Correlation Coefficient (r)
SB	2006	0.90	0.30	0.111**
SAT	2006	30.07	12.19	

** $p<0.01$

The technique of correlation is employed to find out the relationship between Science books available at home and achievement in Science. The total samples were 2006 (1080 Boys and 926 Girls). The total samples were categorized in to two groups i.e. yes and no on the basic of Science books available at home. The mean scores of Science book and achievement score in Science is 0.90 and 30.07 respectively, where as the SD of Science books and achieving in Science is 0.30 and 12.19 respectively. The employed correlation coefficient (r) is 0.111, which is significant at 0.01 level . The mean score, standard deviation (SD) and 'r' values are given in table 5.8.

Thus the sub hypotheses stating that "there is no significant relationship between Science books available at home and achievement in Science of secondary school students" rejected at 0.01 level of significance.

5.2.4.2 Relationship Between Science Magazines Available at Home and Achievement in Science of Secondary School Students

Table 5.9 Relationship of Science Magazines Available at Home (SM) and Mean Science Achievement Scores (SAT) of Secondary School Students

Variables	N	Mean	SD	Correlation Coefficient (r)
SM	2006	0.80	0.40	0.075**
SAT	2006	30.07	12.19	

** $p<0.01$

The total sample was categorized in to two groups that is yes and no on the basis of Science magazines available at home. The mean score of Science magazines and achievement in Science is 0.80 and 30.07 respectively. Whereas the SD of Science magazines and achievement in Science is 0.40 and 12.19 respectively. The employed correlation coefficient (r) is 0.075, which is significant at 0.01 level. The mean score, standard deviation (SD) and 'r' values are given in table 5.9.

Thus the sub hypotheses stating that "there is no significant relationship between Science magazines available at home and achievement in Science of secondary school students" rejected at 0.01 level of significance.

Hence, the overall results clearly indicated that Science resources available at home were strongly related to Science achievement of students. Hence, the seventh hypothesis stating that "there is no significant relationship between Science resources available at home and achievement in Science of secondary school students" was rejected at 0.01 level of significance.

5.2.5 Relationship Between Exposure to Media and Achievement in Science of Secondary School Students

The total students were divided into three groups that is never, sometimes and always on the basis of using internet. The scores assign to them are 1, 2 and 3 respectively. Out of total sample (2006) there were 618, 1213 and 175 students in the group never, sometimes and always with reference to using internet and the total students were divided into two groups that is yes and no on the basis of reading news paper. The scores assign to them are 1, and 2 respectively. Out of total sample (2006), there were 1327 and 679 students in the group yes and no with reference to reading news paper.

5.2.5.1 Relationship Between Internet Use and Achievement in Science of Secondary School Students

Table 5.10 Relationship of Internet (INTERNET) And Mean Science Achievement Scores (SAT) of Secondary School Students

Variables	N	Mean	SD	Correlation Coefficient (r)
INTERNET USE	2006	1.78	0.59	0.114**
SAT	2006	30.07	12.19	

** $p<0.01$

The technique of correlation is employed to find out the relationship between internet use and achievement in Science. The total samples were 2006 (1080 Boys and

926 Girls). The total samples were categorized in to three groups i.e. never , sometimes and always on the basic of internet. The mean scores of internet and achievement in Science is 1.78 and 30.07 respectively, where as the standard deviation of internet and achieving in Science is 0.59 and 12.19 respectively. The employed correlation coefficient (r) is 0.114, which is significant at 0.01 level .The mean score, standard deviation (SD) and 'r' values are given in table 5.10.

Thus the sub hypotheses stating that "there is no significant relationship between internet and achievement in Science of secondary school students." rejected at 0.01 level of significance.

5.2.5.2. Relationship Between Reading News Paper Daily and Achievement in Science of Secondary School Students

Table 5.11 Relationship of News Paper Reading (NEWS PAPER) And Mean Science Achievement Scores (SAT) of Secondary School Students

Variables	N	Mean	SD	Correlation Coefficient (r)
NEWS PAPER	2006	0.66	0.47	0.143**
SAT	2006	30.07	12.19	

** p<0.01

The total sample was categorized in to two groups that is yes and no on the basis of reading news paper daily. The mean score of news paper reading and achievement in Science is 0.66 and 30.07 respectively. Whereas the standard deviation of news paper

reading and achievement in Science is 0.47 and 12.19 respectively. The employed correlation coefficient (r) is 0.143, which in significant at 0.01 level. The mean score, standard deviation (SD) and 'r' values are given in table 5.11.

Thus the sub hypotheses stating that "there is no significant relationship between reading news paper daily and achievement in Science of secondary school students." rejected at 0.01 level of significance.

Hence, the overall results clearly indicated a strong relationship between exposure to media and achievement in Science of students. Hence the eight hypothesis stating that "there is no significant relationship between exposure to media and achievement in Science of secondary school students" was rejected at 0.01 level of significance.

5.2.6 Relationship Between Time Spent on Science Homework and Achievement in Science of Secondary School Students

Table 5.12 Relationship of Time Spent at Science Home Work (SHW) and Mean Science Achievement Scores (SAT) of Secondary School Students

Variables	N	Mean	SD	Correlation Coefficient (r)
SHW	2006	1.92	0.66	0.058**
SAT	2006	30.07	12.19	

** p<0.01

The total students were divided in to three groups that is less than one hours,1-2 hours and more than two hours on the basis of time spent on Science homework. The scores assign are 1, 2 and 3 respectively. Out of total sample (2006) there were 527, 1115 and 364 students in each groups that is less than one hours, 1-2 hours and more than two hours respectively.

The technique of co-relation is employed to find out the relationship between time spent on Science home work and achievement in Science. The total samples were 2006 (1080 boys and 926 girls). The total samples were categorized in to three groups. i.e. less than one hours,1-2 hours and more than two hours on the basis of time spent on Science home work. The mean scores of time spent on Science home work and achievement in Science is 1.92 and 30.07 respectively where as the standard divination (SD) of time spent on Science home work and achievement in Science is 0.66 and 12.19 respectively. The estimated correlation coefficient (r) is 0.058, which is significant at 0.01 level.

The mean score, standard deviation (SD) and correlation coefficient (r) values are shown in table 5.12.

Hence, the ninth hypothesis stating that "there is no significant relationship between time spent on Science home work and achievement in Science of secondary school students" was rejected at 0.01 level of significance.

5.3 Relationship Between Institutional Factors (Types of Management, Medium of Instructions and School Resources) and Science Achievement of Students

5.3.1 Comparison of Science Achievement of the Students on the basis of School Types

Table 5.13 Comparison of Science Achievement Scores of Students on the Basis of Types of Management

School Type	Number of Students	N	Mean	SD	t-value	Sig./Not sig.
Govt. School	713	7	26.12	6.28	1.60	Not Sig.
Private School	1293	14	31.35	7.42		

To find out the influence of school types and Science achievement of students, the total sample was categorized into two groups on the basis of management of the school, that is Government and private.

The total number of government and private students were 713 and 1293 respectively , whereas the total no of school were 7 and 14 respectively, as indicated in the table 5.13.The mean achievement scores of Government school is 26.12 and standard deviation is 6.28, in case of private school the mean achievement score is 31.35 and standard deviation is 7.42. The statistically calculated t value is 1.60, which is not significant.

Hence, the tenth hypothesis stating that "there is no significant difference among the categories of types of management and Science achievement" was accepted. The graphical presentation of mean Science achievement scores of both types of management is given in figure 5.6.

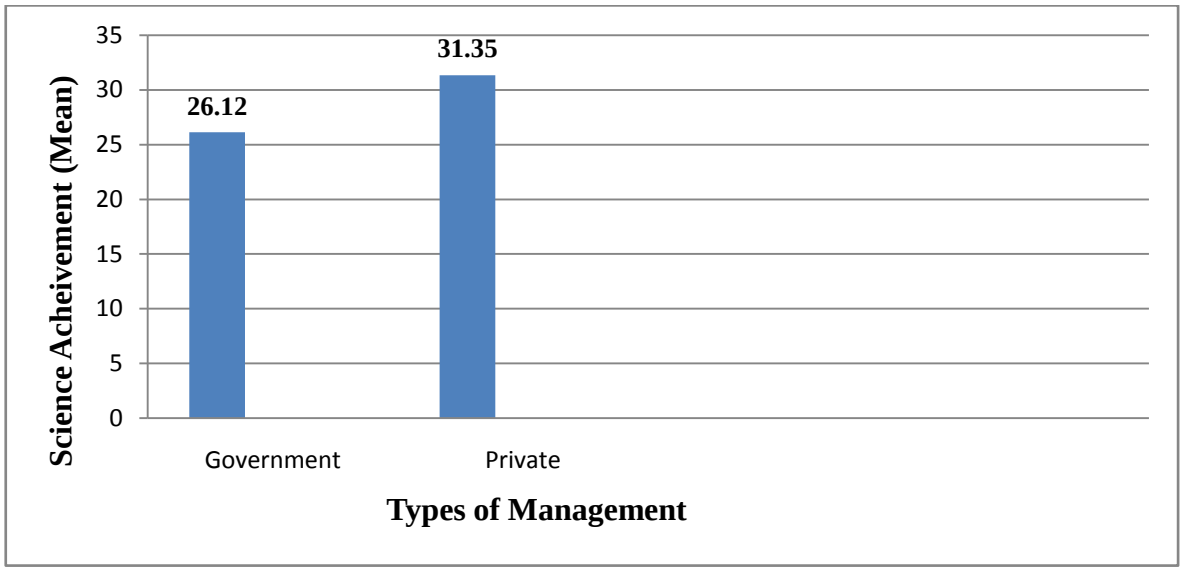

Fig. 5.6 Graphical Presentation of Mean Science Achievement Score of Students of Different Type of Schools

5.3.2 Comparison of Science Achievement of Students on the basis of their Medium of Instructions

Table 5.14 Comparison of Science Achievement Scores of Students on the Basis their of Medium of Instructions

Medium of Instructions	Number of Students	N	Mean	SD	t-value	Sig./Not sig.
Hindi	1306	14	27.94	5.99	1.52	Not Sig.
English	700	7	32.94	9.10		

The technique t-test was employed to find out the influence of medium of instructions on Science achievement of students .To find out the influence of medium of instructions and Science achievement of the students, the total sample was categorized into two groups on the basis of medium of instructions, that is Hindi and English.

The total number of Hindi and English medium students were 1306 and 706 respectively, whereas the total no of school were 14 and 7 respectively, as indicated in the table 5.14, The mean achievement scores of Hindi medium school is 27.94 and standard deviation is 5.99, in case of English medium school the mean achievement score is 32.94 and standard deviation is 9.10. The statistically calculated t-value is 1.52, which is not significant.

Hence, the eleventh hypothesis stating that "there is no significant difference among the categories of medium of instructions and achievement in Science of secondary school students" was accepted. The graphical presentation of mean Science achievement scores of their medium of instructions is given in figure 5.7.

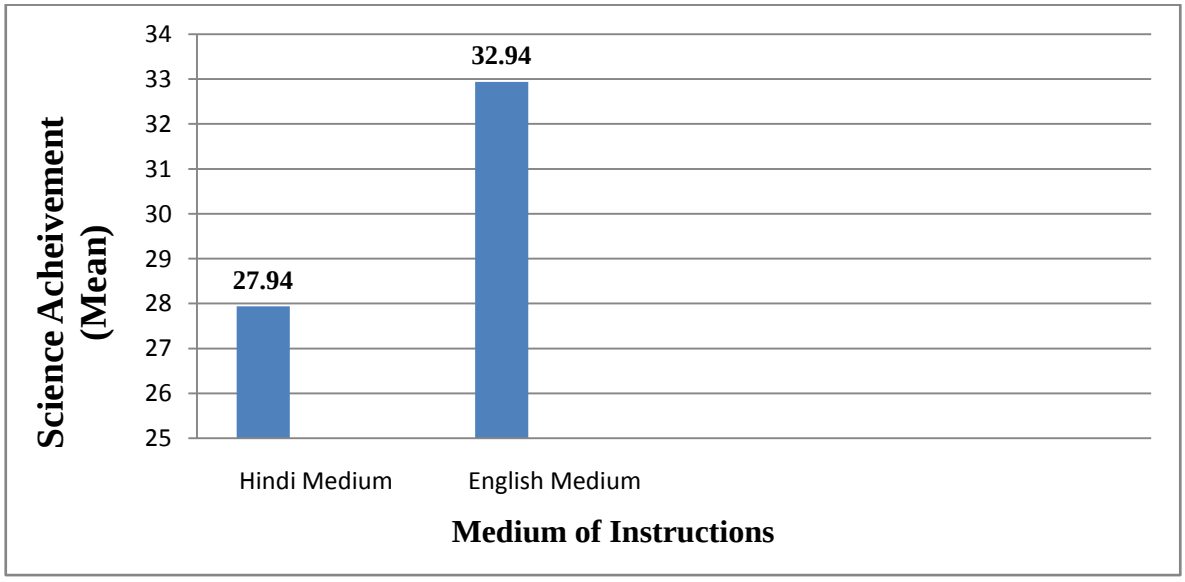

Fig. 5.7 Graphical Presentation of Mean Science Achievement Score of Students of Different Medium of Instructions

5.3.3 Comparison of Science Achievement of Students on the available School Resources

Table 5.15 Comparison of Science Achievement Scores of Students on the Basis of School Resources

School Resources	No of Schools	Mean	SD	t-value	Sig./Not sig
Good	15	31.26	7.86	1.70	Not Sig.
Poor	6	25.48	3.78		

The resources in schools were categorized as good and poor. It is clear that good resources School have good physical facilities as like as playground, School material, Science kit, laboratory, first aid kit and school building etc.

The techniques of t-test was employed to find out the difference among the categories of School resources and Science achievement of students .The total sample was categorized into two groups on the basis of School resources, that is good and poor. At first the mean Science achievement scores are computed according to school wise then this mean Science achievement scores are estimated as the scores of that particular school and further analysis for t-value is done. The mean Science achievement scores and SD of students of good and poor schools resources were 31.26 ,25.48 and 7.86 , 3.78 respectively. The statistically calculated t-value is 1.70 which is not significant.

Hence, the twelfth hypothesis stating that "there is no significant difference among the categories of School resources and achievement in Science of secondary School students" was accepted. The graphical presentation of mean Science achievement scores on the basis of their school resources were given is given in figure 5.8.

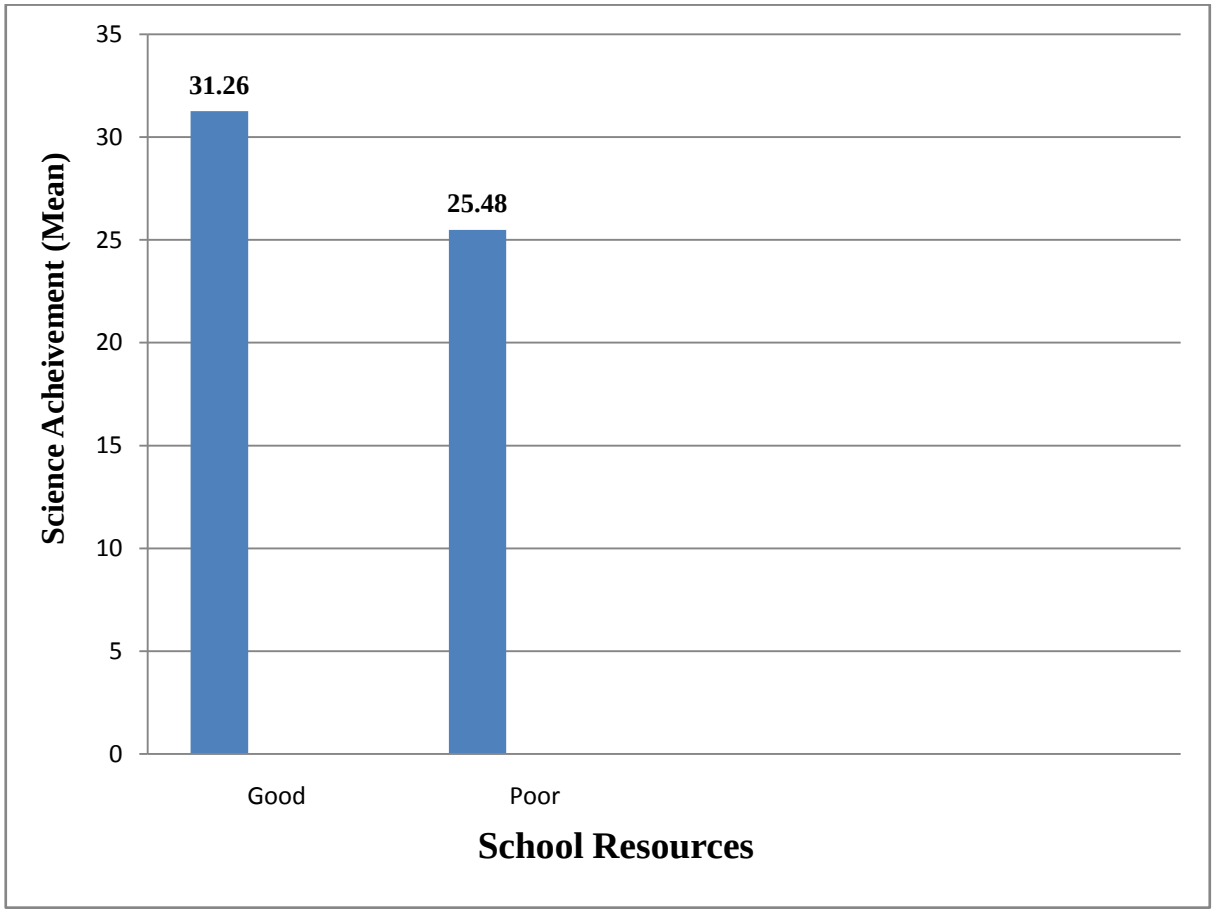

Fig. 5.8 Graphical Presentation of Mean Science Achievement Score of Students of Different School Resources

5.3.4 Relationship Between Science Achievement of Students and Their Types of School, Teacher and Student Ratio, Teacher's Qualification, Teacher's Training and Experience and Medium of Instructions

Table 5.16 Percentage Table of Teachers and Students Ratio of The Class in Various Types of Schools and Mean Science Achievement of The Students of Respective Schools

School type	Number of School	Mean	SD	Minimum	Maximum	Teachers		Students		Teacher Student Ratio
						N	%	N	%	
Government School	7	26.12	6.28	2	54	208	30.68	7502	33.44	1:36
Private School	14	31.35	7.42	2	67	470	69.32	14935	66.56	1:32
Total	21	30.07	12.19	2	67	678	100	22437	100	1:34

As regard to the teacher pupil ratio, the same was calculated in two types of schools and then compared with each other. These types of school, Government school and private schools were found to differ on teacher pupil ratio. The teacher pupil ratio in Government schools was found to be 1:36 and in private schools the ratio was 1:32. This shows that there is a difference among these two groups. The mean scores make it clear that the student of low teacher pupil ratio achieved higher scores than the high teacher pupil ratio.

Table 5.17: Table of Teachers Qualifications, Teachers and Students Ratio, Training of Teachers, Teaching Experience and Medium of Instruction in Respective Schools.

School Type	Teachers Qualification			Teacher Students Ratio		Training of Teachers		Teaching Experience				Medium of Instruction
	Graduate	Post Graduate	PhDs	Students	Teachers	Trained	Untrained	0 – 5 Years	6 – 10 Years	11 – 20 Years	More than 20 Years	Hindi/English
Government School	1	45	2	1500	46	3	43	9	0	29	8	Hindi
Private School	12	8	0	500	20	5	15	4	8	5	3	Hindi
Private School	5	12	0	315	17	8	12	10	5	2	0	English
Government School	29	7	1	800	36	29	7	0	8	16	12	Hindi
Private School	18	23	0	1517	41	32	9	26	15	0	0	English
Private School	36	10	2	1300	46	30	16	15	25	6	0	English
Government School	0	26	1	500	26	15	11	5	3	8	10	Hindi
Government School	0	37	1	1400	37	37	0	0	5	12	20	Hindi
Government School	1	22	0	639	23	22	1	3	3	2	15	Hindi
Private School	0	25	0	700	25	21	4	9	4	12	0	English
Private School	16	5	0	700	21	10	11	11	5	5	0	Hindi
Private School	0	27	1	700	27	22	5	2	0	20	5	Hindi
Government School	3	8	1	1800	11	9	2	0	4	4	3	Hindi
Private School	17	5	0	860	22	15	7	9	10	3	0	Hindi
Private School	0	38	1	831	38	38	0	3	20	15	0	English
Private School	10	12	0	550	22	12	10	2	15	2	3	Hindi
Private School	3	15	0	1112	18	5	13	5	5	5	3	Hindi
Government School	0	29	1	863	29	29	0	6	4	5	14	Hindi
Private School	20	58	0	2400	78	48	30	8	20	50	0	Hindi
Private School	12	38	2	1800	50	38	12	15	20	7	8	English
Private School	20	25	2	1650	45	13	32	16	11	13	5	English

5.3.5 Relationship Between Independent Variables and Science Achievement of Students

Table 5.18 Relationship (Correlation Coefficient) of Independent Variables with Dependent Variable (Science Achievement Score)

Independent Variables		Dependent Variable (N=2006) (SAT)
Attitude towards Science		r=0.338**
Participation in sports activities		r=0.092**
Science resources available at home	SB	r=0.111**
	SM	r=0.075**
Exposure to media	INTERNET	r=0.114**
	NEWS PAPER	r=0.143**
Time spent at Science home work		r=0.58**

**p<0.01

The table 5.18 shows that achievement in Science is positively and significantly related with the five independent variables under study it relates r=0.338** with attitude towards Science, r=.092** with participation in sports activities , r=0.111** and r=0.75** with Science resources available at home, r=0.114** and r=0.143** with exposure to media and r=0.58** with time spent on Science homework, at 0.01 level of significance. Hence it can be concluded that achievement in Science is positively and significantly correlated with the five independent variables.

5.4 Discussion of the results

The purpose of the present research was to determine the effects of personal, environmental and institutional factors on academic achievement in Science. These three variables were chosen for analysis because they are manipulable variable that have been identified as important influences on achievement in previous researches. Data from a large contemporary sample of IX class students were analyzed. F- test followed by Duncan's mean test, correlation coefficient and t-test were used to determine the effects of these variables on Science achievement, while controlling for other relevant background influences.

The results of the analysis of data show that the personal factors indices gender, attitude and participation in sports activities, environmental factors as parental education, father occupation, family size, time spent on Science home work and Science resources available at home, all had significant effect on Science achievement scores in expected direction expect institutional factors indices, type of school, medium of instructions and school resources.

There was significant difference in Science achievement scores between boy and girls in the present study. The finding of this study is supported by Linn (1989). He found that male have greater access to Science and technical fields and greater earning power than females. Clementine & Barber (1987) investigated that boys consistently scored lower than girls. Sarkar (1983), Singh (1984) also reported that male scored higher than boys. Wong & Staver (1997) found that boy scored higher than girls. Melkonion (1997) found that generally female student attained significantly higher grades than their male. Lee (1998) and Tamir (1998) supported that boys like to study Math and Science than female and achieve higher scored in Science. Tamir (1998) found that boys achieve better than girls in physics and in earth Science, but their achievement in biology and

chemistry is similar to that of girls. Nagaraju et al. (2003) reported that the performance of girls was better than that of the boys in academic achievement and the performance of urban students was significantly higher than rural students in academic achievement. According to same findings like Tzuriel (2010) found that gender difference in girls special abilities emerges very early in development. In that the two groups' one is training program and other is controlled group, after eight weeks he found there are gender difference in the first group. Oludipe & Daniel (2012) revealed that there was no significant difference in academic achievement of male and female students at the pre-test, post-test and delayed post-test levels respectively. Bezci & Vural (2013) showed a negative relationship between academic procrastination and achievement. additionally, girls appeared have higher science achievement compared to boys.

It is generally believed that students attitude towards a subject determines their success in that subject. In other words, favourable attitude results to good achievement in a subject. A Student's constant failure in a school subject and Science in particular can make him to believe that he can never do well on the subject, thus accepting defeat. On the other hand, his successful experience can make him to develop a positive attitude towards learning the subject. This suggests that students attitude towards Science could be enhanced through effective teaching strategies. It has in fact been confirmed that effective teaching strategies can create positive attitude on the students towards school subjects.

It becomes quite clear that attitude towards Science and achievement in it are positively related in this study. The result of this study is supported by Lowery (1967). He found that girls generally have significantly more positive attitudes towards Science than boys. Sood (1977) reported that Sex difference was not significantly related to attitude towards Science. Bandopdhyay (1984) found that pupils having a

high positive attitude towards and a negative attitude towards Science were different with respect to the independent variables either in isolation or in interaction. Thnhikom (1989) found that boys had more positive ATS than girls, girls attitude declined and boys attitude improved when grade level increased. Marie (1996) revealed that males showed more positive attitude towards careers in Science and were more open-minded than females but females had more positive attitudes about the normality of scientist. Khatoon (1998) found that the mean percentage of marks of Hindu & Muslims male students show both differ significantly in their achievement. Derek (2009) found that both males and females were just marginally positive about chemistry lesson during the years of secondary schooling. Ahmad & Ashar (2011) reported that there was no significant difference between girls and boys in attitude towards biology, although girls had better achievements in biology in comparison with boys. Narmadha & Chanundeswari (2013) also reported that a positive correlation was found to exist between attitude towards learning Science and academic achievement in Science among the students

Knowledge of how students spend their non school hour can help predict their performance in school. The results presented support the idea that participating in sports activity brings some benefits for students. Reith (1989) found that the students who participate in sports were found to be more likely to score well on achievement tests. He also found that female high school athletes were found to have fewer special benefits from sport participation. They reported higher popularity than non-athletes and were more involved in extracurricular activates. But the urban black female students who participated in sports and went directly into work force after high school actually fared worse in their carriers than the non- athletes did. Ailshie (1996) reported that as involvement in co-curricular activities increased, school attendance and academic

achievement improved. Fleenor (1997) found that there is no negative/positive effects on achievement for student's participation in sports. Jordan (1999) found that sport participation improved school engagement and academic self-confidence of all students athletes. Din, et al. (2003) found that sports participation was generally unrelated to grades and standardized test scores. Din (2005) found that participation in school-sponsored sports activities did not affect the academic achievement for the participating rural high school students. Daniayl, et al. (2012) found that co-curricular activities affect academic achievements of the students and this impact also depends upon those activities in which the students are keenly involved. Martinez & Mickey (2013) revealed that positive association between participation in interscholastic sports and mathematics scores for Latino students, and also a larger gain in mathematics scores in comparison to White students. Singh (2014) found significant difference between the academic achievement of boys and girls in various subjects as well as significant difference between the levels of participation in different co-curricular activities in boys and girls.

In this study parental education is found to be an important factor of children achievement in Science. Children from highly educated parents are likely to have significantly higher Science achievement scores as compared to the children of less educated parents. The study supported by Chatterji, et al. (1971) found that parent's education level was directly related to the achievement of their children. Caldis & Bankstone. (1997) found that social status have significant and substantive independent effect in individual academic achievement. Begum & Phukan (2000) found that type of family, number of siblings, education of parents and family income had significant impact on academic achievement of the students. Jabor, et al. (2011) revealed that there were statistically significant differences in Science GPA scores between parent educational statuses, however, the effect size was small. Rafiq, et al. (2013) found that parental

involvement has significant effect in better academic performance of their children, that is parental involvement enhanced the academic achievements of their children.

In this study father's occupation was significantly related to academic achievement in Science. The nature of father's occupation is important for their children in Science achievement. Children of professional groups (Engineer, Doctor, Businessman etc) fathers have got highest Science scores than all other groups. Children of business man groups have got more Science achievement than other two groups, but less than the children of professional groups. The children of other groups (Peon, Coli, Daily and Wagers etc) have got more achievement than the children of agriculturist. The result clearly shows, children of professional groups have got highest achievement and on the other hand children of agriculturist have got lowest achievement in Science.

The results supported by White (1982) found that SES is correlated with academic achievement. Ibrahim (1996) found that there is a negative relationship between SES (Mother income, occupation and education) and academic achievement. Suleman, et al. (2012) found that parental socio-economic status, parent's educational level, parental occupational level and parental income level affect the academic achievement of secondary school students. Ghazi, et al. (2013) reported a positive and significant relationship of total family income, father's job grade with the academic performance of the students.

This study also explored the relationship between student's achievement in Science and their size of the family. Children of smaller family have got significantly higher achievement in Science than the children of larger family. Results indicated a negative correlation between size of the family and achievement in Science and as the family size increases the achievement decreases accordingly. The study is supported by, Chatterji, et al. (1971). They found that size of the family was not related to the

academic achievement. Ojha (1973) found that mother's love father's permissiveness and love were, positively related where as with high achievement mother's rejections parental restrictions, rejections and protections were negatively related. Krishnan, et al. (1994) found that smaller family size has led to higher educational status. Pong (1997) reported that students from single-parent families and stepfamilies negatively affect their student's achievement, even after individual demographic characteristics and family background are controlled .Joseph (2002) found that family size and birth order have no influence on academic performance of pre-degree students. Jabbar, et al. (2011) found that family size affected the achievement of the students.

Science resources available at home play an important role in the learning and achievement of students. In this study the Science resources available at home were significantly related to Science achievement of students. Pamela & Davis-kean (2005) found that socio-economic status specifically parents education and income, indirectly related to children's academic achievement. Hofferth (2010) found that the students who spent time on playing video games, using the computer and watching T.V. at home were positively related to students academic achievement. Jebsosn & Moses (2012) found that there was no difference in the academic of schools with adequate laboratory equipment and those without them.

Exposure to media like reading news paper, using internet by the children play an important role in the Science achievement of the students. The findings of this study is supported by Young, et al. (1996) found that exposure to mass media were significant individual influence on Science achievement. Dina (2005) found the media influence that academic achievement of the students. Young, et al. (2006), found that exposure to mass media were also significant individual level influence on Science achievement. Ahmad & Yousef (2008) found that there was no significant difference

in achievement based on the number of hours spent using the intranet; also, there is no significant difference in self-confidence or achievement between male and female students in the control group. Kirkorian, et al. (2008) found that having a bedroom television set was significantly and negatively associated with students test scores, while home computer access and use were positively associated with the scores. Absence of a bedroom television combined with access to a home computer was consistently associated with the highest standardized test score. Delen, et al. (2011) reported that students familiarity with ICT and their exposure to technology helped to explain Math and Science achievement gaps between individuals and schools. Adegoke (2013) found that internet browsing and students' achievement in Agricultural Science through positive is not significant. Shahram & Azadeh (2014) reported that unlimited use of internet has a devastating negative influence on both social skills and communications and educational achievements.

This study revealed that the student spent some times on their Science home work are related to their achievement in Science. The study supported by Singh (2002) found the positive effects of the motivation factors, attitude and academic time on mathematics and Science achievement. The strongest effects were those of academic time spent on homework. Michael (2002) found that there is a strong relationship of time spent on Science home work and achievement. There seem to be a positive effect of homework an average. However, not all pupils seem to benefit from homework. The pupils from lower socio-economic background actually perform better if less homework's assigned. Matltese, et al. (2012) found that there is no consistent significant relationship between time spent on homework and grades, but a consistently positive significant relationship between homework and performance on standardized exams.

Now coming to different type of schools another important variable of this study found that there was no significant relationship has been found to exist between this variable and Science achievement of the students. The study supported by White (1992) found that once public and private schools are statistically equated they appear be produce similar gain in achievement. Reeta (1986) found that pass percentage of government students setting were 45.8% as compared to the 87.5% of the boys belonging to private institutions, the highest marks percentage was 81 in case of private schools and 76 in case of government school. Murthy and Kulstrestha (1999) found that government and private school students differ significantly in their achievement. Geeta (1994) found that students in private unaided junior school performed significantly better than students in government and private aided schools. Verghese (1994) found that schools managed by private sector show marginally better performance than government schools. Aderonke, et al. (2013) found that school type made no significant relative contributions to students' achievement in Chemistry.

There was no significant difference between medium of instructions and Science achievement in the present study. Anand (1933) found the students studying through Kannada Medium achieved significantly better mean score than those studying through English medium. Ravendranathan (1983) found that Science achievement, Science interest and mental health status of pupils of English medium classes were higher than those of pupils of Malayalam medium classes. Ansari (1984) found that as Hindi medium schools students boy students perform better than the girls students, Begum & Phokan (2000) found that type of family number of siblings education of parents and family income had significant impact on academic achievement of the students. Mirza (2014) reported that learning in English language does not only rely on the English language knowledge, but other factors such as students' ability and talent,

communication skills, supportive teacher and supportive home environment, motivation and the right attitude towards language also affect the learning and academic achievement both directly and indirectly.

When data was analyzed to see the significant difference in achievement scores on the basis of resources of the schools found that there was no significant difference between school resources and Science achievement. Suttan & Soderstorm (1990) found that school resources significantly related to achievement scores. Sajitha (1994) reported that pupil in school with physical facilities score higher in Science achievement. Singh & Saxena (1995) found that the teachers of educational and physical facilities in school have positive association with school mean achievement in mathematics and Science. Owoeye, et al. (2011) found facilities are potent to high academic achievement of students. Sevasci, et al. (2013) reported that there is a relationship between the educational resources and academic achievement.

It has been found that teacher pupil ratio was related to the achievement in Science. This can be explained as, when the teacher pupil ratio is low (small class), the acheivement is high and on the other hand, when the teacher pupil ratio is high (larger class) that is, ratio of students with respect to teacher is high, the achievement in Science of students is significantly low such findings corporate with the results of Geo (2002), Thum (2003) , Nye, et al. (2004), Carr (2006), Noell (2006) and Agah, et al. (2013).These studies recommends that the appropriate pupil teacher ratio may be helpful in improving the Science achievement.