CHAPTER 5

RESULTS AND DISCUSSION

5.1 INTRODUCTION

Today’s children are the future citizens of our country who will make developments for the growth of our country. Hence any research must contribute something to the younger generation.

Mission can be accomplished only after writing the report which is the last step in the research process. Researcher must be very careful while writing the findings and conclusion of the research. Otherwise, wrong information affects the whole purpose of the research. Type I and Type II errors must be avoided to produce a renowned research report. In this chapter the investigator explained the results along with the important findings of previous research in nutshell as Results and Discussion. Educational implications of the present study, Recommendations, Suggestions for further research and Conclusion are also explained in detail.

5.2 RESULTS AND DISCUSSION

H1-A Around 40 % of the students (exactly 38.88 %) were affected by the problem of Refractive Error. All of them were affected only by myopia. The findings of this study is consonance with the investigation of Ovenseri-Ogbomo G.O and Omnuemu V.O (2010) conducted among school children in the Cape Coast Municipality, Ghana, and also with the research work made by Hussein A. Bataineh and Ahmed E. Khatatbeh (2008).

H1-B Percentage of Refractive Error among boys is 37.03 and girls is 40.27. This result indicates that girls are prominent to the problem of Refractive
Error than boys. This may be due to the reason dwindled outdoor activities and augments in near work of girls than boys. The finding of this study is corresponding with the results of research work done by Kingo, A. U and Ndai, B. T (2009) and by Mavracanas T. A, et al., (2000).

H1-C Percentage of Refractive Error among Rural students is 36.35 and Semi-Urban area students is 41.66. This may be due to the reason, declined outdoor activities and supplements in near work of students belong to Semi-Urban area than students from Rural area.

H1-D Percentage of Refractive Error among Government School is 38.23 and Matriculation School is 39.65. Irrespective of type of School management, prevalence of Refractive Error is more or less equal.

H2-A Significant association was not found between Refractive Error and BMI Group. Hence, it can be concluded that the Refractive Error is not depending on BMI Group.

H2-B Significant association existed between Refractive Error and Mother’s Education. Children of highly educated mothers’ are not that much affected by Refractive Error when compared with the children of uneducated mothers’.

H2-C Significant association was found between Refractive Error and Father’s Education. Children from the family of educated fathers’ are not that much affected by Refractive Error when compared with the children belongs to the family of uneducated fathers’.

H2-D Significant association was found between Refractive Error and Monthly Income. Less number of children from the family with high Income are affected by Refractive Error when compared with the children belongs to the family of low Income.

H2-E Significant association was found between Refractive Error and Parental glass history. If one or both the parents are wearing glasses, their children are definitely having the problem in the vision. The other children also
encompass the problem in vision, but comparatively lesser in number. This finding supports the Biological theory.

A study conducted by Saw S M et.al (2001) states that Parents with vision problem, is related to the progression of myopia in Singapore children. Thus supporting the biological theory that heredity plays an important role in myopia progression.

H2-F1 Significant association was found between Refractive Error and Near Work. Many of the Children who are working more than two hours with computer and watching TV are affected by Refractive Error than the children who are using the same, less than two hours. This result supports the Use-abuse theory.

The results of the study conducted by Kinge B, et.al (2000) indicates that intensive near work could initiate myopia.

H2-F2 Significant inverse association was found between Refractive Error and Outdoor Activities. Only less number of the Children are affected by Refractive Error who are playing outside or doing any work in the outside more than two hours than the children who are doing the same, less than two hours.

Wu,Pei-Chang et.al (2010) found that Myopia prevalence was 31 %. Also found myopia was significantly associated with parental myopia and watching television. Inverted association was found between outdoor activity and myopia. The same view has been given by Dirani M, et.al (2009) as participants who spent more time outdoors were less likely to be myopic. Kathryn A. Rose et.al (2008) also conveyed the same message from their research as the lower prevalence of myopia in Sydney when there is an increased hours of outdoor activities. Sreeraman (2008) observed and conclusion arrived from their investigation was, the highest rate of outdoor activity were associated with, the lowest rates of myopia and the children with the worst eyesight did lots of near work and spent very little time outside.
H3-A1  Mean value of time taken by the Normal students to read the passage is 202.21 and by the vision defective students is 304.13. Time taken to read the passage by the vision defective students is higher than the normal students on Reading Ability. This result indicates that the vision defective students may lose their confidence to speedup while reading.

H3-A2  Mean value of number of mistakes made by the Normal students while reading the passage is 3.57 and by the vision defective students is 18.43.Number of mistakes made while reading the passage by the vision defective students is higher than the normal students on Reading Ability. This result indicates that perfectness in reading cannot be maintained by vision defective students.

H3-B1  Mean value of number of words written by the Normal students in the given time is 63.21 and by the vision defective students is 28.37.Number of words written by the vision defective students in the given time is lesser than the normal students on Writing Ability. This result proves that the hand-eye co-ordination of vision defective students may be deprived than normal students.

H3-B2  Mean value of number of mistakes in the words written by the Normal students is 0.82 and by the vision defective students is 6.78 .Number of mistakes in the words written by the vision defective students is higher than the normal students on Writing Ability. This may be due to the reason, poor hand-eye co-ordination of vision defective students pressurize them to assign mistakes while copying words from the chart.

H3-C1  Mean value of number of letters crossed by the Normal students 48.35 and by the vision defective students is 36.37. Number of letters crossed by the vision defective students in the given time is lesser than the normal students on Letter Identification. This result indicates that vision defective students may not be able to speed up their work.

H3-C2  Mean value of number of mistakes in the letters crossed by the Normal students is 4.39 and by the vision defective students is 8.28. Number of mistakes made in the letters crossed by the vision defective students is
higher than the normal students on Letter Identification. This may be due to the reason; they may get confused the letters p with q and b with d as per the Ophthalmologists’ view.

**H3-D** Mean value of marks scored by the Normal students is 71.90 and the scores of vision defective students is 49.65. Marks scored by the vision defective students are lesser than the normal students on Academic Achievement. This result indicates that the problem of Refractive Error may affect students’ prolonged educational process.

**CONTROL GROUP**

**H4-A1** Mean value of time taken by the Control group students to read the passage in pre-test is 316 sec and in the post-test is 321 sec. Time taken by the Control group students to read the passage in pre-test is more or less similar to the post-test on Reading Ability. This result evident that there is no progress or retrogress in their reading speed when their vision kept uncorrected.

**H4-A2** Mean value of number of mistakes made by the Control group students while reading the passage in pre-test is 18.05 and in the post-test is 17.70. Number of mistakes made by the Control group students while reading the passage in pre-test is more or less equal to the post-test on Reading Ability. This result indicates that the accuracy in reading remains constant when their vision kept uncorrected.

**H4-B1** Mean value of number of words written by the Control group students in pre-test is 28.85 and in the post-test is 27.50. Number of words written by the Control group students in the given time in pre-test is more or less equal to the post-test on Writing Ability. This result indicates that there is no change in the writing speed of vision defective students if their vision kept uncorrected.

**H4-B2** Mean value of number of mistakes in the words written by the Control group students in pre-test is 5.45 and in the post-test is 5.90. Number of
mistakes in the words written by the Control group students in pre-test is more or less equal to the post-test on Writing Ability. This result shows that the students are unable to reduce their mistakes while copying words written on the chart even after some experience, may be because of uncorrected vision problem.

**H4-C1** Mean value of number of letters crossed by the Control group students in pre-test is 34.45 and in the post-test is 33.65. Number of letters crossed by the Control group students in the given time in pre-test is more or less similar to the post-test on Letter Identification. From this result, it can be concluded that uncorrected vision problem will not make any progress in their abilities even after eight months of maturity.

**H4-C2** Mean value of number of mistakes in the words crossed by the Control group students in pre-test is 9.75 and in the post-test is 10.26. Number of mistakes in the words crossed by the Control group students in pre-test is more or less equal to the post-test on Writing Ability. From this result, it can be concluded that uncorrected vision problem will not make any progress in their writing abilities.

**H4-D** Mean value of marks scored by the Control group students in pre-test is 51.75 and in post-test is 52.50. Marks scored by the Control group students in pre-test is more or less equal to the post-test on Educational Achievement. From this result we can say that the students those who were not undergone for vision correction, their academics remain the same.

**EXPERIMENTAL GROUP**

**H5-A1** Mean value of time taken by the students to read the passage before wearing glasses is 295 sec and immediately after wearing glasses is 225 sec. Time taken by the Experimental group students to read the passage immediately after wearing glasses is lesser than before wearing glasses on Reading Ability. This result is evident that the reading speed can be improved by vision correction.
H5-A2  Mean value of number of mistakes made by the students while reading the passage before wearing glasses is 18.73 and immediately after wearing glasses is 9.15. Number of mistakes made by the Experimental group students while reading the passage immediately after wearing the glasses is lesser than before wearing glasses Reading Ability. This result is evident that the reading accuracy can be improved by vision correction.

H5-B1  Mean value of number of words written by the students in the given time before wearing the glasses is 28 and immediately after wearing glasses is 44.31. Number of words written by the Experimental students in the given time immediately after wearing the glasses is higher than before wearing glasses on Writing Ability. This result is evident that the writing speed also can be improved by vision correction.

H5-B2  Mean value of number of mistakes in the words written by the students before wearing the glasses is 7.81 and immediately wearing glasses is 2.15. Number of mistakes in the words written by the Experimental students immediately after wearing the glasses is lesser than before wearing glasses on Writing Ability. This result is evident that the accuracy in writing also can be improved by vision correction.

H5-C1  Mean value of number of letters crossed by the students in the given time before wearing the glasses is 37.45 and immediately after wearing glasses is 45.81. Number of letters crossed by the Experimental students in the given time immediately after wearing the glasses is higher than before wearing glasses on Letter Identification. This result is evident that the perfection of any work can be improved by vision correction.

H5-C2  Mean value of Number of mistakes in the letters crossed by the students before wearing glasses is 7.15 and immediately after wearing glasses is 2.88. Number of mistakes in the letters crossed by the Experimental students immediately after wearing the glasses is lesser than before wearing glasses on Letter Identification. This result is evident that the perfection of any work can be improved by vision correction.
H6-A1 Mean value of time taken by the students to read the passage before vision correction is 275 sec. and after seven months of vision correction is 226.92. Time taken by the Experimental group students to read the passage after seven months of vision correction is lesser than before vision correction on Reading Ability.

H6-A2 Mean value of number of mistakes made by the students while reading the passage before vision correction is 18.73 and after seven months of vision correction is 8.42. Number of mistakes made by the Experimental group students while reading the passage after seven months of vision correction is lesser than before vision correction on Reading Ability.

H6-B1 Mean value of number of words written by the students in the given time before vision correction is 28 and after seven months of vision correction is 46.04. Number of words written by the Experimental group students in the given time after seven months of vision correction is higher than before vision correction on Writing Ability.

H6-B2 Mean value of number of mistakes in words written by the students before vision correction is 7.81 and after seven months of vision correction is 1.96. Number of mistakes in words written by the Experimental group students after seven months of vision correction is lesser than before vision correction on Writing Ability.

H6-C1 Mean value of number of letters crossed by the students before vision correction 37.46 and after seven months of vision correction is 46.62. Number of letters crossed by the Experimental group students after seven months of vision correction is higher than before vision correction on Letter Identification.

H6-C2 Mean value of number of mistakes in the letters crossed by the students before vision correction is 7.15 and after seven months of vision correction is 2.73. Number of mistakes in the letters crossed by the Experimental group students after seven months of vision correction is lesser than before vision correction on Letter Identification.
Correction of Refractive Error appeared to improve the reading ability of those students and hence, their educational performance. This statement was given in the study conducted by Mohammed al-Jerafi et al. (2007).

H6-D Mean value of marks scored by the students before vision correction is 48.04 and after seven months of vision correction is 56.88. Marks scored by the Experimental group students after seven months of vision correction is higher than before vision correction on Educational Achievement. This result proves that the achievement marks also can be improved by vision correction.

When the parents are highly educated and when the income increases, the problem in the child’s vision is reduced. This may be due to factor that their parents may be able to provide their children with a balanced diet that ensures good vision. When the parents have vision problems, it is a certainty that their wards inherit it. From this, it can be decided that, heredity playing a vital role in transmitting the problem of refractive error through generations. Another important point is that when the children spend a lot of time in watching TV or reading books, their vision gets worse than the children who don’t. In the same way, among the children who spend a lot of time in outdoor activities the incidence of vision problems is much lower. The result of this study supports both Biological theory as well as Use abuse theory.

5.3 EDUCATIONAL IMPLICATIONS OF THE PRESENT STUDY

Many school children are wrongly called lethargic and unintelligent by their teachers and family members for their poor performance in school subjects. These problems may not be with regard to their intelligence, but maybe with their eyesight. These vision difficulties can affect the children’s reading abilities, speed of writing, identification of letters in alphabet and their educational performance on the whole. Quite a lot of eye disorders can lead to everlasting visual impairment if not identified and treated early by the ophthalmologist. This can affect the children’s learning. If both the parents are myopic, then the chances that child will be myopic
is very high. If any one of the parents is myopic, the chances are slightly lesser. An understanding of the importance of vision screening by administrators, teachers, school nurses, and parents is critical to the outcome of a student’s academic success. Vision deficits are a common problem in the preschool and school-going group. Early detection and treatment of these deficits will minimize the possibilities of any harmful long-term effects and have a direct impact on each child’s academic performance.

5.4 RECOMMENDATIONS

5.4.1 Recommendations to the educational institutions

- Emphasis must be laid on the screening to check refractive errors.
- School vision screening should be carried out on a periodic basis.
- Clarity in recognizing print should be carefully checked.
- Students need to be educated about signs and indications of refractive errors.
- Classroom teachers should analyze the differences in the child’s learning perspective.
- Regular enlightening sessions for the teachers should be conducted with regard to the abnormal behavior of students that may be related to vision.

5.4.2 Recommendations to the school teachers

School teachers have to play an imperative role in identifying the problems of children. However, they should be properly trained for this purpose and motivated to work. Teachers should concentrate on visual imperfection of children who are sitting at the last row.

There are some symptoms in children given below that should alert the teachers to seek immediate advice, from the school doctor or nearby medical officer.
- Squint eyes
- Complaints such as Headaches
- Declining academic performance
- Blurred vision
- Missing place while reading
- Avoiding close work
- Holding the reading material closer
- Rubbing their eyes
- Eyes tiring while reading
- Turning or tilting head
- Using finger to maintain place while reading or writing
- Continuously reducing potential

5.4.3 Recommendations to the Government

- Enhancing social awareness about the preventable causes of blindness, especially the refractive errors, through the mass media and other possible sources. Providing free optical services for school children. “Good Vision Scheme” may be launched by the Government like ‘Noon Meal Scheme’.
- Food items which are essential for the health of children’s vision can be provided by the government, at least to those who are under the poverty line.

5.4.4 Recommendations to the parents

- Limit TV and video gaming. Computer games need to be supervised and permitted only in moderate duration.
Parents should insist their children have as many outdoor activities as possible in the evening.

Health and hygienic habits have to be followed by the children to maintain good visual acuity.

Regular balanced diet enriched with vitamins and minerals to be provided for good eye sight.

5.5 SUGGESTIONS FOR FURTHER RESEARCH

- Similar study could be executed for students of other age groups too.

- Other than vision, some problems such as anemia, hearing impairment, etc., could be considered for similar method of research.

- Other than educational performance, some minute physical work like inserting thread into a needle, drawing and painting also could be measured to know the impact of Refractive Error.

- Similar study could be conducted for other districts in Tamil Nadu, other states in India and in foreign countries also.

- Association between consumption of food item and vision, participation in physical activities and vision could also be considered.

- Rotational method of Experimental design could be adopted (providing eye glasses to the control group students also on a rotational basis) in the future.

- Other variables such as personality, adjustment and intelligence could be measured in relation with visual acuity.
5.6 CONCLUSION

From this investigation the prevalence of Refractive Error was found to be around 40%. That is about two-fifths of the students were found to be affected by the vision problem. All the students were myopic. The prevalence was slightly higher in the girls when compared to the boys. It was also found that type of school management did not have any impact on the incidence of Refractive Error. The result illustrates that the problem of Refractive Error in students from semi-urban areas was slightly higher than in the students from rural areas. There is no association found with the Body Mass Index of students and the Refractive Error. That is being underweight or overweight has no effect on Refractive Error. This study proves that, heredity is associated with Refractive Error in children. That is, if either of the parents has problems in their vision, unquestionably it is inherited to their wards too. The result of this study also confirmed that, watching TV, working in computers and work requiring close scrutiny has a negative effect on children’s vision. Hence the result of this study supports both Biological theory as well as Use abuse theory.

The educational performance such as reading ability, writing ability letter identification and academic achievement of normal students (no problem in their vision) were better than that of vision defective students. The investigator was surprised that, after wearing glasses, the performance of vision defective students was better than before wearing glasses. At the same time, after correction of Refractive Error, the investigator realized that only two or three students showed the same performance even after wearing glasses. This could have been due to their disinterest in studies or perhaps their lower level of intelligence. But a majority of the students’ performance improved a good deal after wearing glasses. This indicates that vision is a prominent factor for educational achievement besides other physiological and psychological causes. The investigator also observed the discussion of students who remarked that “Now I can see the board clearly” and “I will copy the notes quickly.” This conversation made the investigator feel an agreeable satisfaction at the attainment of the purpose of this research.
A vast majority of the parents never take their children for an eye check up, because of the fact that they don’t attach much significance to the vital organs of their kids. They concentrate only on the fact that they send their children to a good educational institution. They also give importance to the neat appearance, unblemished teeth and perfect dress rather than vision perhaps because it is rather difficult to notice. Only a very small number of parents believe that their children’s eye sight is more important than their schooling. Most of the parents believe that their children’s eyes are fine and it is not necessary to take them for an eye checkup. Some parents who were interviewed said - “We will take them to the hospital if they can’t see clearly or if they have any ailment in the eyes.” Actually, every child should have an eye examination when they start going school. Good education is essential, but if they can’t see the black board properly, they won’t attain their complete potential at school. Eye examinations are carried out in schools now, but parents do not give it much consideration.

In India, Government and many private organizations are rendering their services to the people with regard to eye care. Sankara Nethralaya receives patients from all over the country and also renders service to international patients including people from the US and UK. The motto of Sankara Nethralaya is to “Be the center of excellence” in delivering total eye care for all and spreading knowledge through education and training and carrying India-centric research for alleviating visual morbidity. The mission of Sankara Nethralaya is to provide total eye-care solutions of the highest standards to the community through a team of competent, committed and compassionate professionals in a patient-friendly environment. Aravind Eye Care System in Anna Nagar, Madurai, Theni, Tirunelveli and Coimbatore, Dr. Agarwal’s Eye Hospitals has branches in almost all the states of India, and many other such Institutions are rendering their services to the welfare of the people. Poor parents also can make use of these facilities. Unless the problems are spotted early, it can cause significant problems at school and in future. From this investigation, after treatment, a remarkable improvement in students’ educational performance was noted. So the parents should take note and make sure that they look after their children as they are the most valuable assets of the country.