

Role of visual correction by spectacles in improvement of academic performance of students

Faisal Rashid,¹ Umme Habiba,² Sajjad Muhammad Haider,¹ Usman Akhtar,¹ Muhammad Siddique,¹ Salah ud Din Arbi¹

Abstract

Background: Refractive error is a failure of the eye to focus light from an object on to the retina to form a clear image. It is frequent cause of reduced visual function and may affect academic performance of students.

Objective: To compare the academic performance, grades and extra curriculum activities of students with and without spectacles.

Methodology: This was a cross sectional study conducted at College of Ophthalmology and Allied Vision Sciences in the main OPD of Eye Department, Mayo Hospital, Lahore, during the months of September to November 2018. Total of 100 patients of both genders aged between 5-15 years, were included in the study by using non-probability convenient sampling technique. The questionnaire were filled with the help of data collector, containing questions regarding academic performance with and without spectacles.

Results: The results exhibited that grades of students were 45% poor and 39% better before spectacle use but afterwards when the students started to wear spectacles the grades were 45% better and 5% poor. The impact on extra-curricular activities was 72% active whereas earlier on it was only 29% active. The confidence level after the use of glasses can be rated as; satisfactory 87%, unsatisfactory 8%. A notable difference appeared when a comparison for comfort level of students was made; before the use of glasses the extent of comfort was 1% and discomfort as 54% whereas afterwards comfort level was raised to 49%.

Conclusion: The results concluded that students with refractive error, before using spectacles were not comfortable with their studies, but afterwards the same group of students when provided with spectacle aid showed better progress and found themselves quite at ease with their studies.

Keywords: Spectacles, Academic Performance, Refractive Error, Comfort.

Introduction

Emmetropia (optically normal eye) can be described as a state of refraction wherein the parallel rays of light coming from infinity are focused at the sensitive layer of retina with the accommodation being at rest.¹ Refractive error is a failure of the eye to focus light from an object onto the retina to form a clear image.² It is frequent cause of reduced visual function. If there is refractive error when viewing a distant object then eye is described as ametropic. Ametropia can be divided into Myopia, hyperopia and astigmatism.² Myopia (shortsightedness) is the refractive state of the eye in which with normal tonic accommodation, the parallel rays of light are brought to a focus on a point in front of the retinal plane when the eye is at rest.³ When refractive correction is given to the students then the comfort level of student is checked as if he / she is satisfied with his / her refractive treatment or there is need to under or overcorrect this. Comfort level is defined as the set of physical or psychological circumstances in which somebody feels most at ease and free from physical discomfort or stress.⁴

Uncorrected refractive error is a leading cause of visual impairment and blindness both internationally and nationally.⁵ A significant percentage of visual impairment and blindness is attributable to refractive errors, mostly in developing countries.⁶ Refractive error is one of the most common cause of visual impairment which causes poor academic response.⁷ School screening for refractive error and spectacle provision are a possible solution outlined in the World Health Organization Vision 2020 targets for control of blindness in children.⁶

Evidence showed that students using spectacles regularly during study have improved grades as well as academic performance in school as compared to those not using regularly.^{8,9}

Uncorrected refractive errors in students cause impairment of vision as well as impact on health, wellbeing and study performance of students when optically corrected with spectacles, showed good performance and betterment in their studies and life.¹⁰ Number of researches have shown that considerable amount of people having uncorrected refractive error may benefit from appropriate visual correction; specifically among particular groups like

1. Department of Ophthalmology, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, University of Health Sciences, Lahore, Pakistan.

2. College of Ophthalmology & Allied Vision Sciences, KEMU Lahore.

Correspondence: Dr. Faisal Rashid (Optometrist), Ophthalmology Department, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, Pakistan.

Email: faisal_cj@yahoo.com Phone: +92-321-6686384

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in students and elderly people, as this problem is well considered in developed countries.¹¹ Several studies have documented that in many conditions only a small portion of children with significant refractive errors are actually wearing corrective spectacles.¹² Approximately 80% of preschool kids do not get ocular examination. Many “before the start of school” in physical exam don't test for vision problems, so untreated refractive error and ocular problem may disturb life experiences, which cause problems in normal life tasks. Prevalence of non-perceived refractive errors or vision problems in school age students are estimated about 5% to 10 %. So undetected vision problems earlier may cause a long lasting effect on vision outcomes of students, failure of children's in education achievements and even self-respect. Different professional organization, including American Academy of Pediatrics (AAP), suggest that preschool screening is very important to find and treat the refractive error and other ocular problems of students before school entry.¹³

The main objective of this study was to evaluate the study improvement in student with and without spectacles, and to check the academic performance of student after visual correction and to compare the grades of students in their studies before and after using spectacles.

Methodology

This was a cross sectional study conducted at College of Ophthalmology and Allied Vision Sciences in the main OPD of Eye Department, Mayo Hospital, Lahore, during the months of September to November 2018. It included selection of research type, target population, sample size, study design of survey, proforma, questionnaire, dummy tables, sampling method, research methodology, organizational issues, pilots study and work plan.

Total of 100 patients of both genders aged between 5-15 years, were included in the study by using non-probability convenient sampling technique. All the patients/parents/teachers were asked to fill the questionnaire containing questions regarding academic performance, grades, comfort level and extracurricular activities with and without spectacles. The data was analyzed by using SPSS version 20.

Results

Out of 100 patients, 9 (9%) were in age group of 5-8 years, 17 (17%) were in 9-11 years, 32 (32%) were in 12-14 years and 42 (42%) were in 15 years.

Table I: Grades of student before and after spectacles use

Grades Before Spectacle Use	No	Percent	Grades After Spectacle Use	No.	Percent
Best	2	2	Best	14	14
Good	10	10	Good	35	35
Better	39	39	Better	45	45
Poor	45	45	Poor	5	5
Do not know	4	4	No improvement	1	1
Total	100	100	Total	100	100

Table II: Student's extracurricular activities before and after spectacle use

Performance Before Spectacle Use	No	Percent	Performance After Spectacle Use	No	Percent
Active	29	29	Active	72	72
Inactive	31	31	Inactive	12	12
Poor	37	37	Poor	16	16
Do not know	3	3	Do not know	0	0
Total	100	100	Total	100	100

Table II shows that out of total 100 students, 29 (29%) were active in extracurricular activities before using spectacles, 31 (31%) were inactive, 37 (37%) were poor in extracurricular activities while 3 (3%) were unaware as compared to performance after using spectacles where out of total of 100 students 72 (72%) were more active in extracurricular activities after using spectacles, 12 (12%) were inactive and 16 (16%) were showing poor improvement. The result suggest that glasses effects the extra-curricular activities of students, so statistical analysis is highly significant. (p=0.00)

Table III: Level of confidence in students before and after spectacle use

Confidence Level before spectacle use	No (%)	Confidence Level after spectacle use	No (%)
Satisfactory	44 (44%)	Satisfactory	87 (87%)
Un-satisfactory	36 (36%)	Un-satisfactory	8 (8%)
Poor	15 (15%)	Poor	5 (5%)
Don't know	(5%)	Don't know	
Total	100 (100)	Total	100 (100%)

Table III shows that out of total 100 students, 44

(44%) had satisfactory level of confidence, 36(36%) unsatisfactory, 15(15%) had poor while 5(5%) were unaware of their confidence level in comparison to level of confidence after spectacle use where out of total 100 students, 87(87%) had satisfactory confidence level, 8 (8%) had unsatisfactory while 5 (5%) had poor confidence level. The results suggest that spectacles really effects the confidence level of students, so statistical analysis is highly significant. ($p=0.00$).

Table IV: Comfort level of students before and after spectacle use

Comfort level before spectacle use	No (%)	Comfort level after spectacle use	No (%)
Comfortable	1 (1%)	Comfortable	49 (49%)
Uncomfortable	54 (54%)	Uncomfortable	(2%)
Satisfactory	31 (31%)	Satisfactory	43 (43%)
Poor	10 (10%)	Poor	(5%)
Don't Know	4 (4%)	No Improvement	(1%)
Total	100 (100%)	Total	100 (100%)

Table IV shows that out of total 100 students, 1(1%) student was comfortable without use of spectacles, 54 (54%) were uncomfortable, 31 (31%) were satisfied, 10 (10%) were poorly satisfied while 4(4%) were unaware in comparison to confidence level after spectacle use where out of total 100 students, 49 (49%) were feeling comfortable with spectacles, 2 (2%) were uncomfortable, 43 (43%) were satisfactory, 5 (5%) were poorly satisfied while 1 (1%) had no improvements. The result suggest that glasses really effects the comfort level of students, so statistical analysis is highly significant. ($p=0.00$)

Discussion

Vision is an ability to perceive with the help of eyes. Any limitation to this visual capacity can be corrected by several means including both optical and surgical intervention. Optical means include glasses, contact lens. Spectacles are lens bearing frames worn in front of eyes usually for the sake of vision correction and in some instance for mere eye protection. For myopia concave lenses use, for hyperopia convex lenses use.¹ Visual system plays a significant part in the process of learning as it aids perception and comprehensive of for an object.

Throughout school life, the demands which are

placed on children in class room are tremendously high, vision or eyesight plays a key role in learning process. Sometimes we come across very bright students who are never able to give full of their potential seeming lazy even when provided with extra attention, care and coaching.⁷ Despite this maneuver the child becomes more and more frustrated and end-up in losing his self-confidence. So such students should be considered for vision related problems. In a study it was concluded that, children who were interviewed tended to be younger than non-interviewed children, $p<0.001$), but there was no difference regarding gender ($p=0.09$) or race ($p=0.98$). 72 (75.8%) of their parents and teacher's questionnaires were returned. Seventy children (73.7%) reported to be wearing the prescribed spectacles and 66 (94.3%) of them reported improved performance in school related activities. In general, students seemed happy with the appearance of their spectacles and beneficial impact on their vision.¹³

Students who lack in good visual capacity, often struggle and suffer in school quite un-necessarily, their undiagnosed vision problems keeps them off from working up to their full potential.^{6,7} Here comes the role of teachers and parents; their negligent behavior towards the children plays ads up to the misery of child. Several students have documented that, in many setting only a small portion of children with significant refractive errors are actually wearing corrective spectacles. So both parents and teachers must increase their concern for child health. This study was based on "Role of visual correction by spectacles in improvement of academic performance of students" for that purpose; a sample of 100 students including both males and females was taken, already provided with visual correction. Influence of gender on this study was almost nil. Age seemed to have notable impact on this study, as most observable age group was 11-15 years.

In this study, of all 100 students by making comparison between academic performance of students before and after spectacles use, the results exhibited that grades of students were 45% poor and 39% better other were good before spectacle use but afterwards when the students started to wear spectacles the grades were 45% better and 5% poor and other were best and no improvement. The performance of students before spectacles use was 31% inactive and 29% active other was poor and not know in co-curricular activities whereas it came out

as 52% active and 16% inactive after the use of glasses. The use of spectacle left positive effect on the personality of student as well. The confidence level after the use of glasses can be rated as; satisfactory 87%, unsatisfactory 8%. The results are similar to the study conducted in India, there was a study to evaluate the effect of spectacles on the grades of student. It was concluded that students with refractive error treated optically, provided with glasses and check the impact of glasses on their studies, students performed well in studies.¹⁴ A notable difference appeared when a comparison for comfort level of students was made; before the use of glasses the extent of comfort was 1% and discomfort as 54% whereas afterwards comfort level was raised to 49%.

Conclusion

The results suggest that most of children did not had difficulty during indoor and outdoor activities with spectacles and gender has no impact on all these factors, so use of spectacles really effects academic performance of students. In this study statistical analysis shows that there is association between spectacles and its good impact on academic performance of students. This study “Role of visual correction by spectacles in improvement of academic performance of students” revealed that those students who were diagnosed with refractive error when given the proper optical aid and started to use spectacles regularly, gained remarkable grades in their studies. So, after studying this it is recommended that students, once detected with visual impairment, the use of spectacles must be made compulsory in order to facilitate the child and enhance his learning capacity, a strong consideration must be given to the confidence and comfort level of the student using glasses, there must be awareness both on the part of parents and the teachers regarding early detection and correction of refractive errors and visual care of children, adequate preschool examination of the children is made mandatory and part of the admission policy of all schools in Pakistan, there should be periodic examination of school children at least on annual basis, government should organize school screening camps and provide the students with quality optical aid and improve public awareness and generate demand for

services through community-based initiatives, primary eye care and school eye-health programs.

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