COMPARATIVE EFFECTIVENESS OF ORIENTATION AND MOBILITY TRAINING IN CHILDREN WITH LOW VISION AS COMPARED TO UNTRAINED CHILDREN

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Ruhullah[1]
Hafiza Ummara Rasheed[2]
Ayesha Saleem[3]
Tahira Hafeez[4]
Mehwish Ali[5]

For Authors' affiliation & contribution see end of Article

Corresponding Author
Ruhullah
College of Ophthalmology and Allied Vision Sciences, KEMU/ Mayo Hospital Lahore

ABSTRACT

OBJECTIVES: *Evaluation of quality of life and performance of functional vision of children with low vision, with and without orientation and mobility training.*

METHOD: *This was a comparative cross sectional (analytical) study to evaluate the effectiveness of Orientation & Mobility (O&M) training in low vision children. A sample size of total 110 visually impaired children was taken and asked to fill the Proforma regarding orientation and mobility. This study was conducted from September to November 2018.*

RESULTS: *This study included a total of 110 subjects. 27(24.5%) were male and 83(75.5%) were females. We took two groups of low vision children of school age, group one included those children who were trained with O&M training while group two included untrained children with low vision. After filling and analysing the self-made questionnaire, we concluded that children who were trained with O&M training had better quality of life as compared to untrained children. They had better schooling; they could move independently for a short walk, they were confident and independent regarding mobility. They could do their task independently. O&M training in early age had more benefit so O&M training was necessary for low vision children. Odds ratio of difficulty while crossing a road 14.44 times have higher as compared to trained children, odd ratio greater than one indicates that the risk factors of loneliness, feeling of depression, fear of fall, indoor falls in previous six months, and outdoor falls in previous six months, are better in trained children as compared to untrained children. P-values <0.05 shows statistically significant results and we conclude that all the risk factors except use of mobility cane are better in trained children*

CONCLUSION: *This comparative cross sectional (analytical) study concluded that there is a significant difference in quality of life of trained and untrained low vision children. O&M training leads to good mobility and better quality of life, better social life and independent walking practice. This study also concluded that O&M training develops confidence.*

KEY WORDS: *Low vision, orientation Mobility, Visual impairment,*

INTRODUCTION

Low vision is a decrease of best corrected visual acuity occurring as a result of irreversible ocular pathology.[1] World Health Organization defined the low vision as "A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to perception of light, or a visual field of less than 10° from the point of fixation, who uses, or is potentially able to use, vision for the planning of a task or project" [2].

It is classified as moderate, severe and total or clinical blind. In moderate visual impairment, a person has a visual acuity of 6/18 and a visual field of 20 to 10 degree from the point of fixation. In severe visual impairment, a person has a visual acuity of 6/18 to 3/60 and the visual field of 10 to 5 degree from the point of fixation. In total or clinical blind, the visual acuity is less than 3/60 to light perception and visual field is less than 5 degrees from the point of fixation. In total blind, a person has no light perception, no light projection and no usable vision.

It is estimated that of children under the age of 15, approximately 1.4 million are blind and more than 12 million suffer from visual disorders due to uncorrected refractive

errors. Eighty-seven percent of the entire population with visual impairment resides in underdeveloped countries. It is a matter of good fortune, however, that 85% of all visual disabilities are preventable.[3] In 2004, the World Health Organization (WHO) reported a global estimate of 314 million visually impaired people, of whom 45 million were completely blind and approximately 125 million were classified as low vision.[4]

A Survey conducted by Pakistan National Blindness and Visual Impairment reported that in the year 2003 the probable number of blind individuals was 1.5 million in Pakistan. Blindness Prevalence varied throughout the country, highest in Punjab and Baluchistan and lowest in Khyber Pakhtunkhwa. Also prevalence is high in Rural areas as compare to urban areas(3.8% vs. 2.5% <0.001) Approximately million children could potentially benefit from low vision services worldwide.[5]

Visual impairment can result in occupational deterioration; therefore, patients are unable to perform daily living activities specifically older patients. Visual impairment (VI) influences the older people's capacity to do tasks important for physical maintenance, mobility and orientation; therefore, older people require help from other persons. Visual loss has got third rank after heart disease and arthritis among the most prevalent chronic pathologies which affect the capacity to perform routine life activities in old patients of 70 years of age or more. Visual impairment can result in following complications:

- Unable to perform daily life activities.
- Fall from stairs, fracture of hip and other type of accidents.
- Isolation from friends and community.
- Loss of confidence, limited activities, poor performances.
- Increases in death rate.
- Increase demand on others for health-related services and care.
- Intellectual abilities is loss and memory is also decreased.[6]

Children with low vision must face a lifetime of impairment with all the fixed emotional, social and economic expenses to the children, family and the society.[7] Children with low vision face difficulty in daily task, their growth is not normal, they face difficulty in reading and writing, orientation and mobility, and face recognizing.[8] Low vision is said to be there when you have lost a certain amount of eyesight. With low vision, it is very difficult or impossible to do daily task of life. Sometime low vision can be improved with medication, surgery, eyeglasses or with other options. If low vision cannot be improved there are other ways to adopt. You can learn new ways to make useable the most of vision you do have.[9] The mobility restriction associated with low vision is a common problem among children who go to school.[10] It is possible to result in loss of independence, greater social isolation, poor schooling, poor mental and physical health, decreased quality of life and of depression.[10,11]

Orientation and mobility (O&M) training, which may contain the use of assistive devices e.g. identification (ID) cane, may help visually impaired older persons to continue or recover independent functioning, and to improve contribution in society and quality of life.[12,13] The O&M-training is a part of the rehabilitation which help visual impaired persons in mobility and daily task, keeps the independence of travelling by training visual impairment person to walk and negotiate the environment in a safe and independent way. It can decrease limitations of mobility and increased quality of life and social contribution. O&M training is often complemented by using assistive devices.[14,15] The common assistive devices that have used in mobility for visually impaired people are the canes, such as the identification cane and the long cane.[16]

With training in the use of visual and non-visual information that includes assistive devices, people with visual disabilities gain a better understanding of their environment, which allows them to move more easily, efficiently and safely. Early diagnosis may be necessary to slow the progression of disability.[17] An identification cane is often used in situations such as street crossing and in a crowded places and to identify visual impaired persons to normal persons.[18]

The O&M training in low vision is worldwide practice now a day for older but in general the training is unstructured and different at different part regarding content and format that is why the effectiveness and usefulness of such practice is lacking.[19] It is important that school-age children with visual impairment learn new orientation and mobility techniques to overcome for the reduction of visual information, to maintain and recover independence of daily activities.[16,20] Therefore orientation and mobility training is measured a necessary part of rehabilitation for visual impaired and blind people. The main goal of this training is to help them to recover their independence by training them how to do the easy and difficult tasks of daily routine safely and effectively.[13] These daily activities include the use of stairs, crossing a street or walking in room and neighbourhood. Orientation and mobility training is often supplemented by using walking aids, e.g. long cane or white/ID cane.[14]

O&M training allows children to explore and interact safely with the world, including school, home and community, when children and infants with low vision and others multiple disabilities, understand their surroundings, they feel safe and independent, and their performances become increase their mental growth is also improved that is why early training of O& M is necessary.

Low Vision has negative effects on person's health like performing daily life activities, poor schooling, mental and physical health. Low vision specialists can improve their quality of life in low vision clinic by giving O&M training.[21]

The main purpose of mobility training is to encourage the patient who has an irreversible loss of vision to live independently and participate in social activities so that patient can get higher level of satisfaction with life.[22]

MATERIALS AND METHODS

Ethical clearance to conduct this Comparative cross sectional (analytical) study was obtained from the College of Ophthalmology and Allied Vision Sciences, King Edward Medical University, Lahore. (Patients Visiting Mayo Hospital Low Vision Clinic for examination) which was conducted in the months of September, October, November, and December of 2018, with a sample size of 55 trained low vision children on O&M training, and 55 untrained low vision children. Informed consent was also obtained. All the data was collected by using self designed questionnaire which includes informations about child's vocational, social, general health,quality of life, orientation and mobility. Dependent variable of the study was O&M training and Quality of life and the independent variable were age, gender, low vision, eye condition, distance vision, near vision

All the data were entered and analysed using Statistical Package for Social Science (SPSS Version 23.00) and Microsoft Excel 2016. In this qualitative variable was compared by applying Fisher's exact test and quantitative variables was measured by taking mean and standard deviation.

RESULTS

This study included total one hundred and ten patients in which twenty seven were males and eighty three were females.

Table 1 is the summarization of the questionnaire about quality of life being assessed in low vision children with and without O&M training.

According to table 1 it is concluded that there is a significant difference in quality of life of trained and untrained low vision children. O&M training leads to good mobility and better quality of life, better social life and independent walking practice. This study also concluded that O&M training develops confidence. Odds ratio of difficulty while crossing a road 14.44% times have higher as compared to trained children, odd ratio greater than one indicates that the risk factors of loneliness, feeling of depression, fear of fall, indoor falls in previous six months, and outdoor falls in previous six months, are better in trained children as compared to untrained children. P-values <0.05 shows statistically significant results and we conclude that all the risk factors except use of mobility cane are better in trained children.

DISCUSSION

Low vision is a decrease of best corrected visual acuity and it occurs because of irreversible ocular pathology. World Health Organization defined the low vision as "A person with low is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to perception of light, or a visual field of less than 10° from the point of fixation, who uses, or is potentially able to use, vision for the planning of a task or project".

It is classified as moderate, severe and total or clinical blind. In moderate visual impairment, a person has a visual acuity of 6/18 and a visual field of 20 to 10 degree from the point of fixation. In severe visual impairment, a person has a visual acuity of 6/18 to 3/60 and the visual field of 10 to 5 degree from the point of fixation. In total or clinical blind, the visual acuity is less than 3/60 to light perception and visual field is less than 5 degrees from the point of fixation. In total blind, a person has no light perception, no light projection and no usable vision.

It is estimated that children under the age of 15, approximately 1.4 million are blind and more than 12 million suffer from visual disorders due to uncorrected refractive errors. Eighty-seven percent of the entire population with visual impairment resides in underdeveloped countries. Providentially 85% of all visual disabilities are preventable.[3] In 2004, the World Health Organization (WHO) reported a global estimate of 314 million visually impaired people, of whom 45 million were completely blind and approximately 125 million were classified as low vision. That's why this study mainly focuses the problems faced by children with low vision regarding O&M and its main aim is to evaluate the quality of life and performance of children with low vision, with and without orientation and mobility training.[4]

Children with low vision face a lifetime of impairment with all the fixed emotional, social and economic expenses to the children, family and the society. Children with low vision face difficulty in daily task, their growth is not normal, they face difficulty in reading and writing, orientation and mobility, and face recognizing. Low vision is when you have loss a certain amount of eyesight. With low vision, it is very difficult or impossible to do daily task of life.

Orientation and mobility (O&M) training, including the use of assistive devices such as the identification (ID) cane, may help partially-sighted older persons to maintain or regain independent functioning, and to improve participation and quality of life. The orientation and mobility training (O & M-training), which is a component of the rehabilitation facilities or people with visual impairment, aims to maintain the independence of travel by teaching people with visual impairment to wander and negotiate the environment in a safe and independent way. It can reduce mobility limitations and contribute positively to social participation and quality of life. O&M training is often complemented by using assistive devices. The common mobility devices that have been used in O&M training for visually impaired people are the canes, e.g. white cane or identification cane.

With training in the use of visual and non-visual information

TABLE 1

Variable	Trained group		Untrained group		P value	Odds ratio	Confidence. Interval
	Yes (%)	No (%)	Yes (%)	No (%)			
Q1 Do you get orientation and mobility training?	51(46.37)	4(3.64)	55(50)	0	0.00		
Q2 Do you move independently within society?	49(44.55)	6(5.45)	5(4.55)	50(45.45)	0.00	0.012	0.004-0.043
Q3 Do you use cane for mobility?	21(19.09)	34(30.91)	0(0.00)	55(50)	0.00	.618	0.502-0.761
Q4 Do you live independently in a community or in a home?	46(41.82)	9(8.18)	8(7.27)	47(42.73)	0.00	0.33	0.012-0.094
Q5 Are you able to see large obstacles and go outside for a short walk?	43(39.09)	12(10.91)	20(18.18)	35(31.82)	0.00	0.159	0.069-0.371
Q6 Do you experience difficulties while crossing a street or road?	30(27.27)	25(22.72)	52(47.27)	3(2.73)	0.00	14.44	4.02-51.09
Q7 Do you use walking add permanently?	1(0.91)	54(49.09)	0(0.00)	55(50)	1.00	0.982	0.982-1.018
Q8 Do you go to school?	48(43.64)	7(6.36)	9(8.18)	46(41.82)	0.00	0.29	0.010-0.083
Q9 Do you feel loneliness?	14(12.73)	41(37.27)	39(35.45)	16(14.54)	0.00	6.500	2.831-14.923
Q10 Do you have a feeling of depression?	15(13.63)	40(36.36)	46(41.81)	9(8.18)	0.00	14.968	5.863-38.213
Q11 Do you have a fear of fall?	13(11.82)	42(38.18)	38(34.55)	17(15.45)	0.00	7.22	3.102-16.812
Q12 Indoor falls in previous 6 months?	13(11.81)	42(38.18)	45(40.90)	9(8.18)	0.00	14.538	5.762-38.681
Q13 Outdoor falls in previous six months?	26(23.63)	29(26.36)	45(40.90)	10(9.09)	0.00	5.019	2.112-11.931
Q14 Do you have hangouts with friends?	47(42.73)	8(7.27)	15(13.36)	40(36.36)	0.00	0.064	0.025-.166

that includes assistive devices, people with visual disabilities gain a better understanding of their environment, which allows them to travel more comfortably, efficiently and safely. Early intervention may be essential to slow the progression of disability. An identification cane is often used to indicate low vision of others in situations such as street crossings and crowded places.

In 2017 studies suggested that a person with visual disability who adjusts well to adverse situation have potential to handle better and his or her rehabilitation would be easier. Thus, there would be decreased burden on family and society. O&M training is a dynamic procedure to support in adjustment to disability. This study was directed to evaluate adjustment to acquired visual loss in adults. Our hypothesis was that with good O&M training will be related with better social support and independence.[23]

In 2010 studies there is some evidence on which type of O&M training is better for people with low vision who have specific characteristics and needs. Orientation and mobility instructors and scientists should plan randomized controlled trials (RCTs) to compare the effectiveness of types of O&M training. Agreement is needed on the

adoption of standard measurement instruments of mobility performance which are proven to be reliable and sensitive to the diverse mobility needs of people with low vision. In this study quality of life is assessed by a questionnaire filled by low vision children with or without mobility and orientation training.[13]

Studies of 2009 on Orientation and mobility showed the use of an identification cane also called a symbol cane for low vision people to facilitate independent participation in the community. Due to lack of O&M training the use of cane is not practice more than it should be. There is a need to developed standardized O&M training. This article presents the design of randomized controlled trial with the objective of evaluating this standardized O&M training in elderly people with low vision.[4]

According to above discussed studies and results it is concluded that there is a significant difference in quality of life of trained and untrained low vision children. O&M training leads to good mobility and better quality of life, better social life and independent walking practice. This study also concluded that O&M training develops confidence.

CONCLUSION & RECOMMENDATION

This comparative cross sectional (analytical) study concluded that there is a significant difference in quality of life of trained and untrained low vision children. O&M training leads to good mobility and better quality of life, development of confidence, better social life and independent walking practice.

After studying this it is recommended that Low vision clinic should be at DHQ level, there should be Mobility and orientations instructors at low vision clinics with teaching instructors in low vision clinics. Environmental modification (made everything in class and home accessible). Patient should be counselled well, and Regular follow up is necessary in every 6 months.

Authors' Affiliation & Contribution

[1]Ruhullah
College of Ophthalmology & Allied Vision Sciences, Lahore
Study design, Data Collection, Manuscript writing.

[2]Hafiza Ummara Rasheed
College of Ophthalmology & Allied Vision Sciences, Lahore
Study design, Data Analysis, Results.

[3]Ayesha Saleem
College of Ophthalmology & Allied Vision Sciences, Lahore
Study design, Manuscript editing, Discussion,.

[4]Tahira Hafeez
College of Ophthalmology & Allied Vision Sciences, Lahore
Proof reading, Data analysis

[5]Mehwish Ali
College of Ophthalmology & Allied Vision Sciences, Lahore
Data collection, Proof reading

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