

## PREVALENCE AND CHARACTERISTICS OF LOW VISION IN CEREBRAL PALSY

Author: **ParthaHaradhan Chowdhury<sup>1</sup>, Brinda Shah<sup>2</sup>, Sonika Bakshi<sup>3</sup>, Pooja Dogra<sup>4</sup>**

Corresponding Author: **ParthaHaradhan Chowdhury**

**Professor**

**Email: partha.chowdhury85@gmail.com**

**Affiliation:**

<sup>1</sup>Chitkara School of Health Sciences, Chitkara University, Punjab, India

<sup>2</sup>Ph.D. Scholar in Optometry, Gujarat University

<sup>3</sup>Chitkara School of Health Sciences, Chitkara University, Punjab, India

<sup>4</sup>Chitkara School of Health Sciences, Chitkara University, Punjab, India

### **ABSTRACT:**

Cerebral palsy is usually associated with motor anomalies with eye movement disorder and it is the primary manifestation of the syndrome. Though more study is essential to better understand about cerebral palsy and prevalence of ocular anomalies and characteristics of Low Vision. The main objective is to identify the frequency of Low Vision among individuals in this syndrome, thus detail information is achieved with complex difficulties for affected person.

### **Methods:**

It is a cross sectional observational based study and among of them 160 individuals are diagnosed as a CP, among 160 individuals the number of males is 85 and females are 75 and considered age ranging is between 6 to 17 years. Before confirming the patient, it is confirmed about CP. In this study visual parameters like Visual Acuity, Field of view, eye movement disorder, Contrast Sensitivity were assessed thoroughly for established of standard methodology.

### **Results:**

In this study it indicates that prevalence of the low vision in CP is 35.6%. In CP spastic quadriplegia is highest number is revealed in this research and prevalence rate is 48.6%. Sometimes CP is associated with spastic hemiplegia with prevalence rate is 30%, sometimes associated with spastic diplegia and its prevalence rate is 32.5%. In this study it is revealed that visual parameter is also be affected considerably and the average results of Visual acuity is 20/125 with determination of low vision. In this research it is showed that 60% individuals are affected with low vision in CP and among of them visual acuity is below the threshold level of 20/200. In this research it is found that CS is affected and its average value is 1.6 with low vision. Here visual field is also affected 25% of the low vision of CP with predominantly exhibit

loss of peripheral field. In this research it is found strabismus were observed 30% of individuals with CP.

### **Discussion:**

In this research it is determined that low vision is diagnosed as a significant amount among affected with CP. Different subtypes of CP is considered as a heterogenous characteristics. The complex relationship of visual impairments and in presence of CP various visual parameters are considerably deteriorated which is impact on quality of life in society.

### **Conclusion:**

It is now acceptable that prevalence of low vision in CP is considerable amount in individuals and associated with affection was found in various visual parameters. Due to complexity of this syndrome needs further attention and research also. Thorough investigations and extensive study proper managing low vision and expected to make noteworthy contribution of quality of life of individuals in CP.

### **Keywords:**

Impairment of vision, Disorder of Neuro Development, Low Vision, Cerebral Palsy, medical, poverty, community, society.

### **INTRODUCTION:**

Cerebral palsy (CP) usually occurs in childhood and it is an intricate neurodevelopmental disorder and it is usually arising from brain injuries. Actually, it is a non-progressive and evoke wide range of anomalies of motor system <sup>[1]</sup>. Extensive dedicate to this research helps to try investigate difficulties of motor system in CP. Though here focus shifted to frequency of impairment of vision particularly low vision among individuals in CP <sup>[3]</sup>. Low vision is a condition where visual acuity is reduced remarkably with visual field also. Low vision evokes many challenges of individuals of their daily routine life, make educational challenges, social activity and overall well-being <sup>[5]</sup>. There is a big influence of low vision for individuals in CP instead of that remarkable lack of thorough investigation regarding prevalence. This attracts for thorough investigation into this matter <sup>[7]</sup>.

This study address the existing gap in knowledge and provides in depth knowledge of frequency of visual impairment among individuals with CP <sup>[9]</sup>. The primary goal of this study is to extensive investigate on low vision in the particular population. Additionally, the aims of this research are also to find out more visual anomalies which will be considered for extensive study and benefited for the population and quality of life also <sup>[12]</sup>. In this study it is found that remarkable number of low vision patient with associated ocular disorder is diagnosed in CP and intervention are presently continuing <sup>[14]</sup>.

After comprehensive study on this research by individuals with CP it is very difficult to investigate different subtypes of low vision. In this study experienced extensive range of impairment of motor evaluation<sup>[16]</sup>. Though precise examination provides in-depth knowledge on CP which can provide valuable insight to the researcher which is helpful for enhancing the quality of life for their daily seconds of life. The above-mentioned details input a valuable information of visual acuity, field of vision, contrast sensitivity and others visual relevant as indication of old research<sup>[18]</sup>. In this study provides not only extensive knowledge on low vision and its various ocular subtypes of problematic phase on the individuals on CP, it also focused to guide the correlation between visual and motor impairments<sup>[20]</sup>.

In this extensive study came to know the correlation between neurological disorder and visual function. In this precise investigation able to understand of frequency and features of the low vision in individuals with CP<sup>[21]</sup>. In this study the aims encompass the prevalence of low vision in individuals with CP. Amid importance of the clinical research of CP it seeks to pay the improvement of evidence-based practise and enhancing for over all and quality of life for affected person of the same reason<sup>[22]</sup>.

## **METHODOLOGY:**

It is a cross-sectional observational based study design to find out the prevalence of the low vision in individuals in CP. Specified diagnosed participants have been considered from specialized clinics, rehabilitation centers, and educational institutions. Here patients age will be between 5 to 18 years with proper consent form from the legal guardians before enrolment into the study, moreover proper verbal communication has been held between researcher and the guardian. The sample size has been determined by the power analysis. Here various factors are included like prevalence of low vision in individuals with CP and required level of statistical power. Here considered sample size was 150 which is for sufficient to pursue the study to investigate extensive knowledge in CP. Data will be useful for to conduct comprehensive study and standardized test to assess low vision of visual function in individuals in CP. For visual acuity testing Snellen chart or other optotype chart was considered to use for the individuals with CP according to direction of age. The predetermined participants were positioned properly and maintain standardize protocols. The primary objective of this study was to determine visual acuity in individuals in CP by evaluation of each line of visual acuity chart and with increasing performance optotypes size will be reduced accordingly. After data collection of visual acuity, thoroughly that data will be analysed and recorded safely. After that visual field was assessed by the confrontation test and automated perimetry and take proper quantitative data and analysed and recorded properly. Later contrast sensitivity was assessed with standardize contrast sensitivity in individuals in CP by evaluation of each line of contrast sensitivity chart. The patient was instructed to identify low contrast optotypes and take data thoroughly. After that data was analysed and recorded safely. After taking CS thoroughly, ocular motor evaluation was assessed in individuals in CP and here came to know that about correlation between CF and motor anomalies and with this motor anomalies came to know the relevant features also from

this study. Here descriptive statistics were employed to know about gist summary of this research and participants demographic characteristics in individuals with CP. In this study definitely we came to know that in CP patients' vision is reduced to convert as low vision and its all parameters are deteriorated also which affects in every walk of life and hampered quality of life also. All the ethical guideline was followed by the researcher which makes this study as a good framework. Ethical permission has been taken from the proper institutional review boards or ethical committee. This study is always maintained in secrete mode and followed patients' secrecy which shaped the study as renowned.

## RESULTS:

Here 160 individuals were considered as a sample size, specially diagnosed CP. Among 160 individuals, 85 persons were male and 75 were female. Compare to 160 individuals 53.1% were male and 46.9% were female. Here aged is considered between 6 to 17 years its mean is 10.4 years and standard deviation is 2.2 years. Here different subtypes of CP were also considered in this research also and these subtypes included spastic hemiplegia, spastic diplegia, spastic quadriplegia. Among of the subtypes, 50% are spastic hemiplegia, 40% are spastic diplegia and 70% are spastic quadriplegia. As compare to total sample size 31.3% are spastic hemiplegia, 25% are spastic diplegia and 43.8% are spastic quadriplegia. In this study it was revealed prevalence rate of low vision is 35.6%. This study includes participants whose visual acuity is less than 20/70 and considerable visual field impairment. In this study it is observed that the prevalence rate of spastic quadriplegia is highest among of the subtypes of CP and that is 48.6%, spastic hemiplegia is 30% and spastic diplegia is 32.5%. In this research the mean visual acuity is 20/125 and SD is 0.22 and all of the participants were considered as low vision with CP. Significantly it is diagnosed that 60% participants were low vision with 20/200 visual acuity with indicated Snellen score of  $\leq 1.0$ . It is analysed that distributed of visual acuity is remarkably deteriorated among individual with low vision with CP. With this research it is also noticed that CS is also remarkably deteriorated and its deterioration is 1.6 with SD is 0.4 with low vision with CP which affects daily needs and quality of life. Among of participants 45% were of CS deterioration. Among of the individuals 25% were diagnosed with visual field loss with mild to moderate. Compare to the total sample size approximately 30% were diagnosed ocular motility with low vision in CP. Strabismus is most prevalent in CP which affects quality of life for individuals. In this research it is found that 55% patients were with high refractive errors such as Myopia, Astigmatism. In this study sub type analysis were held for both prevalence and characteristics of low vision. In this research Pearson correlation analyses was revealed with positive correlation ( $p < 0.001$ ) between CS and V/A. This findings indicates inter connected correlation between this parameters.

Table 1: Detail demographic Characteristics of Participants of CP:

Characteristic	Total Participants
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Characteristic	Total Participants
Male Participants	85 (53.1%)
Female Participants	75 (46.9%)
Age Range	6 to 17 years
Mean Age	10.4 years
Standard Deviation	2.2 years

Table-1: It is depicted of demographic characteristics of the patient details. Here number of participants has been scrutinized as male and female, age range, mean age and standard deviation.

Table 2: Prevalence of low vision for subtypes of different CP:

Cerebral Palsy Subtype	Prevalence of Low Vision
Spastic Hemiplegia	30.0%
Spastic Diplegia	32.5%
Spastic Quadriplegia	48.6%

Table-2: It is depicted that spastic hemiplegia, spastic diplegia, and spastic quadriplegia with low vision were diagnosed and assessed its prevalence.

Table 3: Low Vision with Visual Acuity assessment

Parameter	Value
Mean Visual Acuity Score	20/125 (Snellen score)
Standard Deviation of Visual Acuity	0.22
Visual Acuity Worse than 20/200	60%

Table-3: It is depicted that mean visual acuity is gained with low vision in CP and it is less than 20/125 according to Snellen score. In this table SD value of visual acuity is showed and that is 0.22. In this research it is found that deterioration of visual acuity with low vision and it is worsening than 20/200. From these data came to know about visual impairments and it is considerably deteriorated and affects quality of life for daily routine.

Table 4: Low Vision with Visual Field Defects and Ocular Motility Abnormalities

Parameter	Value
Participants with Visual Field Defects	25%
Common Visual Field Defect	Peripheral Field Loss
Participants with Ocular Motility Abnormalities	30%
Most Common Ocular Motility Abnormality	Strabismus
Participants with Refractive Errors	55%
Common Refractive Errors	Myopia and Astigmatism

The findings presented in Table 4 shed light on the occurrence of visual field defects, ocular motility abnormalities, and refractive errors within the population of individuals with low vision. This table provides valuable information regarding the prevalence of these conditions, expressed as a percentage of the total participants, as well as the most frequently observed abnormalities.

Table-4: It is depicted that in this research it is found that in CP with low vision considerable amount of visual field defect is happened and it is 25%. Associated with considerable amount of ocular motility disorder is found in CP and that is 30%.

Table 5: Correlation Analysis Between Visual Acuity and Contrast Sensitivity

Correlation Analysis	Value
Pearson Correlation (r)	0.47
p-value	< 0.001

Table-5: It is depicted that analysis of correlation between visual acuity & contrast sensitivity is showed here. In this table corresponding p-value & Pearson correlation coefficient (r) is found and that is considerable.

## **DISCUSSION:**

In the presence study the primary goal was to explain about the characteristics of low vision with CP. Moreover, in this research came to know about the subtypes of anomalies of CP and deterioration of all expected visual parameters. By thorough investigation gaining knowledge on low vision in CP and meticulously take care of the patient.

### **Low Vision prevalence in CP population:**

It is observed that low vision prevalence in CP is 35.6% in this research, it is indicated that high attention is essential in CP for thorough proper investigation. CP is a neurological disorder with the problem of muscle coordination, posture and movement disorder. Many challenges are found in CP and it is very difficult for individuals to face the clinical features for their daily life style, among of the features most considerable is low vision. Determination of low vision prevalence, many times review on existing literature was conducted. Among of the surveys were analysed and according to above mentioned prevalence rate high susceptible visual impairments was found is considerable numbers in population. The prevalence of low vision in CP in individuals with spastic quadriplegia was assessed and evaluate cognitive impairment and experienced visual impairments. In this research it is highlighted of common visual evaluations and its quality of life assessment diagnosed with CP.

### **In Low Vision analysis of Visual Acuity and Contrast Sensitivity in Individuals:**

In this research comparison of Visual Acuity and Contrast Sensitivity in Individuals was assessed precisely with low vision in CP population. In this study it is highlighted that visual deficiency is found considerably with low vision in CP and make more complex to the study. By extensive research on this scheduled topic contributes correlative deeper information between Visual Acuity and Contrast Sensitivity in individuals which affects daily schedule of life and faced more challenges. These two parameters are more intensive in visual component and for its deterioration in CP with low vision provides considerable bad impact on visual system means quality of daily life. To get enough knowledge about these two parameters in CP and its deteriorations, was conducted reviewed on existing literature. Relevant study was also considered and reviewed properly. In this study diverse range of deficit of visual abnormality is found and it can affect quality of life also and associated with low vision was found and affects all visual parameters also. Most of the time it is found that in CP 60% of the patients were diagnosed low vision with deterioration of all visual parameters and visual acuity level is less than 20/200. In this research it is showed the correlation between Visual Acuity and Contrast Sensitivity in Individuals with CP in presence of low vision. By this extensive investigation deeper knowledge, we can get from here which is better for researcher and individuals also.

### **In Cerebral Palsy prevalence of Visual Field Abnormalities in Individuals:**

In this research paper it is found that in CP considerable amount of vision is deteriorated and associated with visual field also. In this study it is highlighted that deterioration of visual field is found 25% with low vision also which positively impact on daily schedule of life. CP is a non-progressive neurological disorder which affects in general motor anomalies and visual impairments and most of the it is overlooked. This extensive study will be pavement for the researcher for proper guidance to tackle this syndrome and that will be benefited for both researcher & patients. Indeed, there is limited on prevalence on visual field in CP in individuals. By this extensive study enough knowledge is got from this syndrome which will be benefited for researcher and patient. In this research the correlation was found between ocular motility and refractive error by which about to know of many correlative visual parameters which is deteriorated and surely this research will be helpful for those persons who are below poverty level due to medical treatment will be in very low-cost mode. This study refers to gap also visual field prevalence in individuals in cerebral palsy.

### **Refractive Errors with Ocular Motility:**

In this research it is showed that in CP considerable amount of low vision patient is found and ocular motility disorder is about to 30% is diagnosed. Strabismus is a very crucial matter in CP and it happens deformity of refractive error and it is significant amount and significant in number. By this extensive study it will be helpful for the community by proper diagnosis and treatment methodology.

### **Specific Variations of Subtypes:**

By this extensive study of CP in low vision and its subtypes are consider the condition of heterogeneity. Spastic quadriplegia is diagnosed with low vision problem which affects daily living lifestyle and with health deterioration can create problematic situation in society.

### **CONCLUSION:**

In this extensive research it has came to know that in CP considerably all visual parameters are deteriorated with low vision which affects individuals' quality of life and its prevalence also. CP is a complex neurological disorder and its affectivity is very extensity in general health issues with ocular system also. By this extensive research it is expected that this is controlled in upto certain limit within low cost which will be helpful for low poverty level and helpful for community also.



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