



# Impact of visual impairment on day-to-day visual functioning: A cross-sectional study among geriatric population in a rural area of West Bengal

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## Abstract

**Background:** Visual impairment is a phenomenon which plagues many a human being be it of any age. It occurs all the more when the concern is the geriatric population. They seem to face many difficulties in their day-to-day life when they suffer from visual ailments and when they go undiagnosed and undetected.

**Aim:** The objectives of the study were to determine the socio-demographic characteristics, to assess the visual impairment of geriatric population and its association with various task-oriented domains of daily visual functioning, emotional well-being and social functioning in a rural area of West Bengal.

**Material and methods:** An analytical cross-sectional study was done by measurement of visual acuity by Snellen's chart (for distance vision), Jaeger's chart (for near vision), torch light examination, interview by visual function questionnaire and determination of socio-demographic and economic characteristics on 110 geriatric people equal to or greater than 60 years of age.

**Observations:** 42 (38.2%) people had visual impairment. The number of females was higher than that of males. Most of the visual impairment was found in people over 70 years of age. Visual impairment was significantly associated with gender (4.765, 95% CI 1.614-14.067) and religion (4.031, 95% CI 1.011-16.075). It was also significantly associated with difficulty in near vision activities (0.280, 95% CI 0.112-0.700), limitations in social functioning (2.700, 95% CI 2.111-3.453),



mental health symptoms (0.273, 95% CI 0.092-0.106) and role limitations (0.266, 95% CI 0.075-0.946).

**Conclusion:** Visual impairment is quite prevalent in the geriatric population and it significantly impacts the daily visual functioning of the elderly population which demands further concern.

### Key words

Visual impairment, Geriatric, Rural, VFQ-25, Domains.

### Introduction

Visual Impairment (VI) is defined as vision loss to such a degree so as to qualify as an additional support need through a significant limitation of visual capability resulting from disease, trauma or congenital, degenerative conditions. Thus visual impairment is a consequence of functional loss of vision rather than the eye disorder itself [1]. According to WHO 2011 data, 285 million people are visually impaired globally of whom 39 million people are blind and 246 million people have moderate to severe visual impairment. It is also estimated that people aged 50 years and older comprise 65% and 82% of the total visually impaired and blind respectively. South East Asia and Western Pacific account for 73% of moderate to severe visual impairment and 58% of blindness [2]. Out of the 285 million visually impaired in the world, 62 million reside in India. India also contributes 8 million blind people to the global blind population [3].

Again with the increase of life-span the world witnesses the "graying of the population" with its characteristic and colossal social, economic, physical, mental and psychological problems and issues. With greater numbers of older people in the population, there is an associated rise in chronic disease entailing in spiraling cost of health care and the enormous problems of daily functioning [4]. Research both from India and other parts of the world has revealed that VI increases with increasing age. Also globally, about 85% of all visual impairment and 75% of

blindness could be prevented or cured worldwide [3].

India is also not far off since it is observed that older adults are the fastest growing segment of the Indian population; it is foretold that by 2020, more than 22% of the population will be 60 years of age and older. With its large population very soon India will boast of carrying the largest number of persons aged 60 years and above [3].

It is a well-known fact that among all the morbidities of old age, visual impairment is one of the commonest predictors of poor daily functioning and it increases with age [5]. The irony however lies in the fact that most of the causes of visual impairment are preventable with the disheartening truth that it still remains a neglected issue in this country especially among the rural geriatric population with its poor health infrastructure, inadequate information education and communication and pitiable level of awareness among the general mass. Till now very few studies especially in this part of the country have been conducted which has assessed the prevalence of visual impairment and its impact on the daily functioning, emotional well-being and social functioning of the geriatric population. It is strongly felt that such a study is the need of the hour since it will help the policy makers and health administrators to comprehend the real situation of visual impairment among our aged population and its impact on their day-to-day life which on the other hand will help them to organize and execute a high quality, appropriate



and effective program for the mitigation of the suffering of the old people at large.

through 2 union health centers, 4 sub-centers and 12 health units.

With the above backdrop a study was planned, approved by the Institute Ethics Committee and then conducted among a population aged 60 years and above in a rural area of West Bengal with the following objectives.

- To assess the magnitude of visual impairment and its association with the socio-demographic characteristics of a geriatric population in a rural area of West Bengal.
- To determine the influence of visual impairment on the task-oriented domains of daily visual functioning, emotional well being and social-functioning.

### **Sampling design**

Nasibpur Union Health Center is one of the 2 union health centers which cater to beneficiaries of 12 villages. Dearah village was selected randomly for this study out of the 12 villages. The total population of the village is 2405, line listing of all persons aged 60 years and above was done and 132 such individuals were identified. All of them were included in the study but some were not available while some were too moribund to respond to the researcher's queries and few more refused to participate in the study. Thus 22 such persons were excluded from the study so that ultimately the sample size was 110 persons aged 60 years and above.

## **Material and methods**

### **Study design**

The study was descriptive in nature and cross-sectional in mode of data collection through interview and clinical examination.

### **Study setting**

The study was conducted in Singur block of Hooghly district, West Bengal; the rural field practice area of All India Institute of Hygiene and Public Health, Kolkata. All India Institute of Hygiene and Public Health (AIIPH); established on 30<sup>th</sup> December, 1932 with a generous assistance from the Rockefeller Foundation; is devoted to teaching and research in various disciplines of public health and to develop health manpower by providing post-graduate training facilities of the highest order. The rural field practice area of the institute (Rural Health Unit and Training Center- RHUTC) caters to the 64 villages of Hooghly district with a total population of 89,672 (census 2001). It provides comprehensive health care services to a population residing around 64 square km area

### **Study period**

The study was conducted for a period of 2 months.

### **Tools and techniques**

The interview was conducted with a pre-designed and pre-tested schedule after obtaining informed consent from each participant. The schedule was designed keeping in mind the objectives of the study. To ascertain reliability, objectivity, simplicity and to remove any ambiguity, necessary modifications were done. This questionnaire was judged by a group of experts of the institute where necessary corrections were made to enhance the face validity and content validity. Pretesting of the schedule was done by administering the questions to a small number of representative samples. Necessary modifications were made following their response. The questionnaire was then translated to Bengali. It was again translated back into English. The questions in retranslated English version were matched with the originally developed English questionnaire and again necessary modifications were made.



This English questionnaire was then translated again into Bengali. Thus the final Bengali questionnaire was so constructed that it had semantic equivalence with the original English questionnaire. Also utmost care was taken to make the language as simple as possible so that the respondents, even if illiterate, could understand the questions easily. The schedule had 3 parts.

- **Part 1:** To elicit the socio-demographic characteristics of the sample population.
- **Part 2:** To elicit visual functioning that is determine the influence of visual disability and visual symptoms on generic health domains such as emotional well-being and social functioning in addition to task oriented domains related to daily visual functioning with the help of visual function questionnaire (VFQ-25).
- **Part 3:** Clinical examination consisting of assessment of visual acuity in both eyes using Snellen's chart, Jaeger's chart, torch light examination.

#### Visual function questionnaire scoring

The National Eye Institute (NEI) sponsored the development of the visual function questionnaire (VFQ-25) with the goal of creating a survey that would measure the dimensions of self-reported vision-targeted health status [6]. Because of this goal, the survey measures the influence of visual disability and visual symptoms on generic health domains such as emotional well-being and social functioning in addition to task oriented domains related to daily visual functioning. It contains 25 vision targeted questions representing 11 vision related constructs and takes approximately 10 minutes to be administered in an interviewer format. The visual constructs used in the study are - Difficulty with near vision activities, Difficulty with distance vision activities, Limitations in social functioning due to vision,

Mental health symptoms due to vision, Role limitations due to vision, Dependency on others due to vision, Overall health rating, Global vision rating. The procedure followed in the study was

- Each of the 25 questions contained responses numbered from 1 to 5 or from 1 to 6. The answers given by the respondents were marked as per the number.
- The options were then assigned scores from 100, 75, 50, 25, 0 for option 1, 2, 3, 4, 5. For some questions the order was reversed. 100 was the best possible score, 50 was the average score and 0 was the worst possible score.
- The questions were then grouped into the concerned visual constructs with varying number of questions in each construct.
- Finally for each construct or visual sub-scale the score was averaged and then compared whether it was  $>$ ,  $=$  or  $<50$ .

Clinical examination was done with - a) a torch for external eye examination, b) Snellen's chart and Jaeger's chart for refraction.

#### Operational definition

The operational definition used for this study was that visual impairment (VI) was defined as presenting visual acuity (VA)  $<6/18$  in the better eye. It encompasses both moderate VI (presenting VA  $<6/18$  to  $6/60$  in the better eye) and blindness (presenting VA  $<6/60$  in the better eye).

#### Data analysis

Data were entered, compiled and analyzed with the help of SPSS Version 18 software.

#### Results

Our study was conducted on 110 individuals aged 60 years and above. Of these individuals,

62 (56.4%) were female (F) and 48 (43.6%) were male (M), the M:F ratio being 0.774: 1. The age range was 60-83 years with the mean age of 66.27 years (95% CI 65.17-67.37), median of 65 years. 50% of the study population was in the age range of 60-65 years, 28.2% in the age group of 66-70 years and 5.5% was above 81 years of age. Among the study population, 91 (82.7%) were Hindus and 19 (17.3%) were Muslims. Out of 110, 38 (34.5%) were illiterate which included both male and female, majority of the population 39 (35.5%) was primarily educated. The population even contained 2 (1.8%) graduate persons. The most common occupation was of household workers 48 (43.6%) as most of the respondents available at the time of survey were housewives. Farming was the next most common occupation with 22 (20%) of them being farmers. 18 (16.4%) people were unable to work. Joint families continue to dominate the Indian society as was seen here also with 70 (63.6%) of the population belonging to joint families. Most of the study population 48 (43.6%) resided in pucca houses as contrary to the predominant rural infrastructure. The per capita-income range was Rs. 400-2500 with the mean income of Rs. 1195.1 (95% CI 1084.3-1305.9), median income of Rs. 1000. 52 (47.3%) of them belonged to the lower-middle class with an income slab of Rs. 585-1169 as per the modified BG Prasad's socioeconomic status scale of 2012. 42 (38.2%) were visually impaired with a vision of lesser than or equal to 6/18. Majority of the visually impaired belonged to the age group of 61-65 years 16 (38.1%), were females 32 (76.2%), were married 29 (69.0%), were Hindus 32 (76.2%), were illiterate 17 (40.5%), did a household job 23 (54.7%) and were of the lower-middle socio-economic class, 17 (40.5%) with an income between Rs. 585-1169 as per **Table - 1**. The  $X^2$  values showed that gender, marital status and occupation had some kind of an association with visual impairment as per **Table - 2**. When these findings were

corroborated with the logistic regression findings, it was seen that the odds of visual impairment increasing with male gender were high (4.765). It was also noticed that Hindu religion had significant odds of visual impairment (4.031) with education following suit (3.533). Naegelkerke R-Square for the model was 0.270. None of the different visual constructs were correlated except overall health status (0.145) and global vision rating (0.082) which also was not very strong. When the odds ratio was computed, significant association was found out only for limitations in social functioning (2.700, 95% CI 2.111-3.453) and overall health status and global vision rating were not significant as was suggested by the correlation table although their odds were high as per **Table - 3** and **Table - 4**.

## Discussion

Our study findings could not be matched with previous studies as there were very few studies done previously in this aspect. Our study findings suggested that the prevalence of visual impairment in the geriatric population was 38.2%. In a cross-sectional study conducted on 385 residents of over 60 years or older in several residential care centers of Kathmandu valley, the prevalence of blindness and visual impairment was 43.7%, but the study was done in an environs of residential care centers and not in rural areas [6]. In a similar study in Sydney on 128 residents greater than 50 years of age, the prevalence of blindness was found out to be 11% bilateral and 21% unilateral, but we could not find any completely blind persons in our population [7]. In two more studies done on 76 elderly people from residential houses in Australia and 1362 NDNS participants aged 65 years and above in Great Britain, 46.4% had visual impairment and 16% had both visual impairment and depression but visual impairment was not associated with depression;



and prevalence of visual impairment increased with age and it was more common among nursing home residents and in women [8, 9]. Our study also had similar findings on matters concerning age and gender but depression and nursing home residential status were not our matters of concern.

From our study it was clearly evident that visual impairment is quite prevalent in rural settings in specially the elderly people but they are not quite aware of the fact how it affects their daily lives. We found out that age, gender, marital status, religion, per-capita income, occupation and education were associated with visual impairment. Females were more visually impaired compared to males. This can well be attributed to the fact that Indian society still remains a patriarchal society where female health problems continue to be neglected. Muslims were more visually impaired compared to Hindus. One striking fact was that people with moderate per-capita income were more visually impaired compared to those with low income but as their number was low so this can be reasoned out. Also visual impairment was more in those people who were unable to work. The elderly people were quite ignorant about the way in which visual impairment affects the emotional and social domains of a person as it is evident from the findings that most of the visual constructs were not significant and also were not so attentively answered by many respondents [10]. This may be due to the fact that minor details regarding the emotional and social domains of visual impairment are not so deeply thought of and pursued by a vastly ignorant elderly population and they have adjusted their lives accordingly to the surroundings.

Our study had certain strengths that it was a very unique attempt to elicit the associations and effects of visual impairment and different

socio-demographic and economic parameters and various visual constructs based on the visual function questionnaire. Also our study entered the geriatric population in a rural area of Bengal which very few previous studies have done.

There were also certain limitations in our study.

- Resource constraint was the primary limitation as we were restricted in time, money and manpower. There was no source of any external financing.
- It was also done in a rural area where the findings may be different from that of an urban area.
- Those persons who were immobile had to be excluded from the study population as there was no scope of their visual assessment by the Snellen's or Jaeger's chart.
- Ophthalmic referral was also not available to us so any remedial measures could not be suggested to the ailing people.
- Many examinations for the detailed study of the eye pathology could not be performed as the researchers are not trained in ophthalmology.

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**Table – 1:** Distribution of visual impairment among different socio-demographic variables.

Parameters	No. of visually normal N=68/110 (61.8%)	No. of visually impaired N=42/110 (38.2%)	Pearson's coefficient value	X <sup>2</sup> (p-value)
<b>AGE</b>				
≤60	3/8 (37.5%)	5/8 (62.5%)	<0.05	
61-65	39/55 (70.9%)	16/55 (29.1%)		
66-70	17/31 (54.7%)	14/31 (45.3%)		
71-75	3/6 (50%)	3/6 (50%)		
76-80	2/4 (50%)	2/4 (50%)		
≥81	4/6 (66.7%)	2/6 (33.3%)		
<b>GENDER</b>				
Male	38/48 (79.2%)	10/48 (20.8%)	>0.05*	
Female	30/62 (48.4%)	32/62 (51.6%)		
<b>MARITAL STATUS</b>				
Married	64/93 (68.8%)	29/93 (31.2%)	>0.05*	
Widowed	4/17 (23.5%)	13/17 (76.5%)		
<b>PER-CAPITA INCOME</b>				
<585	6/10 (60%)	4/10 (40%)	<0.05	
585-1169	35/52 (67.3%)	17/52 (32.7%)		
1170-1949	18/30 (60%)	12/30 (40%)		
1950-3899	9/18 (50%)	9/18 (50%)		
<b>EDUCATION</b>				
Illiterate	21/38 (55.3%)	17/38 (44.7%)	<0.05	
Non-formal education	4/9 (44.4%)	5/9 (55.6%)		
Primary	27/39 (69.2%)	12/39 (30.8%)		
Middle	12/16 (75%)	4/16 (25%)		
Matriculation	4/6 (66.7%)	2/6 (33.3%)		
Graduate	0	2/2 (100%)		
<b>OCCUPATION</b>				
Household work	25/48 (52.1%)	23/48 (47.9%)	>0.05*	
Service	0	2/2 (100%)		
Labourer	9/9 (100%)	0		
Business	8/10 (80%)	2/10 (20%)		
Farmer	18/22 (81.8%)	4/22 (18.2%)		
Retired	1/1 (100%)	0		
Unable to work	7/18 (38.9%)	11/18 (61.1%)		
<b>RELIGION</b>				
Hindu	59/91 (64.8%)	32/91 (35.2%)	<0.05	
Muslim	9/19 (47.4%)	10/19 (52.6%)		

\* = significant association at p=0.05, X<sup>2</sup>>=3.84.

**Table – 2:** Strength of associations between different socio-demographic variables and visual impairment.

Characteristics	Visual impairment N=42 (%)	Adjusted Odds ratio	95% Confidence interval	Naegelkerke R square
<b>AGE</b>				
<=65 years	21 (50)	0.860	0.261-2.828	
>65 years	21 (50)	1		
<b>GENDER</b>				
male	10 (23.8)	4.765*	1.614-14.067	
female	32 (76.2)	1		
<b>RELIGION</b>				
Hindu	32 (76.2)	4.031*	1.011-16.075	
Muslim	10 (23.8)	1		
<b>EDUCATION</b>				
illiterate	17 (40.4)	3.533	0.986-12.660	0.270
literate	25 (59.6)	1		
<b>PER-CAPITA INCOME</b>				
<=1000	21 (50)	1.459	0.582-3.655	
>1000	21 (50)	1		
<b>OCCUPATION</b>				
Still working	31 (73.8)	4.613	0.686-30.999	
Unable to work	11 (26.2)	1		
<b>MARITAL STATUS</b>				
married	29 (31.2)	2.781	0.653-11.838	
widowed	13 (68.8)	1		

\* = significantly strong odds with confidence intervals

**Table – 3:** Correlation Matrix between visual impairment and different visual constructs.

	Visual impairment	Difficulty in near vision	Difficulty in distance vision	Limitations in social functioning	Mental health symptoms	Role limitations	Overall health status	Dependency on others	Global vision
Visual impairment	1								
Difficulty in near vision	-0.267	1							
Difficulty in distance vision	-0.085	0.492	1						
Limitations in social functioning	-0.173	0.245	0.389	1					
Mental health symptoms	-0.233	0.768	0.496	0.318	1				
Role limitations	-0.205	0.629	0.626	0.389	0.818	1			
Overall health status	0.145*	-0.245	-0.214	-0.083	-0.149	-0.214	1		
Dependency on others	-0.142	0.568	0.498	0.430	0.740	0.904	-0.194	1	
Global vision	0.082*	-0.415	-0.397	-0.203	-0.367	-0.397	0.233	-0.336	1

\* = significant correlation

**Table – 4:** Strengths of association of various visual constructs with visual impairment (N=110)

Characteristics	Difficulty in near vision activities	Difficulty in distance vision activities	Limitations in social functioning	Mental health symptoms	Role limitations	Overall health status	Dependency on others	Global vision
Visual impairment n (%)	16/42 (38.1)	6/42 (14.3)	2/42 (4.8)	11/42 (26.2)	8/42 (19)	34/42 (81)	6/42 (14.3)	15/42 (35.7)
Odds ratio (95% CI)	0.280* (0.112-0.700)	0.581 (0.174-1.935)	2.700* (2.111-3.453)	0.273* (0.092-0.106)	0.266* (0.075-0.946)	2.033 (0.808-5.114)	0.375 (0.099-1.417)	1.433 (0.629-3.266)

\* = significant odds with confidence intervals