Prevalence and Determinants of Low Vision among Adult Population in a Coastal Area of Villupuram District, Tamil Nadu.

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Abstract: Background: *Low vision affects around three fourths of the people globally and about half the population nationally. In order to set policies and priorities and to evaluate global eye health, it is essential to have up to date information on prevalence and causes of visual impairment.* **Objective:** *To study the prevalence and determinants of low vision among Adult Population in a Coastal Area of Villupuram District, Tamil Nadu.* **Materials and Methods**: *A community based cross sectional study was conducted between February 2013 to March 2013 among the 1034 adult individuals (>18 years old), selected by multistage cluster sampling method, who were residents of Marakkanam block, Villupuram District, Tamil Nadu. The Data was collected using a predesigned structured and validated questionnaire by interview/examination method through house to house visit by trained Post Graduates, Interns, MBBS (final year part 1 students) under the supervision of faculties from the department of Community Medicine, PIMS. Informed Consent was obtained from all the study participants.* **Results:** *Prevalence of low vision was 12.8% (CI: 10.72 -14.88) and 1% of the study population were economically blind. Low vision was more prevalent (37.3%) among > 59 yrs age group in the study population (p value=0.001).16.8% of the study population who worked in dim light were found to have low vision (p=0.032). Study respondent with diabetes mellitus and hypertension had significant low vision (p value 0.024) compared to others. Similarly dim light work, frequent travelling without helmet, watching TV/Computer in dark background found to be significant determinants of low vision among study population.* **Conclusion:** *Our study found that the Low vision is a public health problem to be noted and there is an urgent need to strengthen the existing strategies and formulate innovative strategies to halt and reduce the burden of low vision.*

Key words:- *Low vision, rural area, determinants,*

I.   Introduction:

In order to set policies and priorities and to evaluate global eye health, it is essential to have up to date information on prevalence and on causes of visual impairment. According to World Health Organisation "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 light perception or a visual field of less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task[1]

Low vision affects around three fourths of the people globally and about half the population nationally[2]. Globally the number of people of all ages visually impaired is estimated to be 285 million, of whom more than 39 million (13.6) were blind and 246 million (86.5%) were having low vision and People who were 50 years and older represented 65% and 82% of visual

y impaired and blind, respectively. The major causes of visual impairment were uncorrected refractive errors (43%) followed by cataract (33%); the first cause of blindness is cataract (51%). Worldwide for each blind person, an average of 3.4 people has low vision, with country and regional variation ranging from 2.4 to 5.5.[3]

Similarly in India, low vision and blindness is a very serious and ever increasing problem. Recent data shows that the number of people of all ages visually impaired is estimated to be 62 million of whom 54 million were having low vision and 8 million people were blind. The causes of low vision are cataract (62.6%), refractive errors (19.7%), glaucoma (5.8%), corneal pathologies (0.9%).[4] the burden of low vision is so dramatic that it disables one's daily activities.

It has been observed that almost 90% of the so-called blind population do not have total loss of visual function, but retain a degree of useable residual vision. Given this situation, there is a great need for comprehensive low-vision rehabilitation services in India and other developing countries.[5]

To eliminate avoidable blindness, appropriate national planning is necessary. India was the first country in the world to launch a 100% public funded programme for the control of blindness. This programme has the distinction of emphasizing evidence based practice for planning and policy formulation from its very inception.[6]

Thus, Sensory impairment that is vision and hearing impairment is one of the most common conditions encountered by the people of this generation. There is urgent need of the reliable data regarding the burden and determinants of these problems in the community.[7] So, our study is to determine the prevalence and risk factors of impaired vision and hard of hearing among adult population of Tamil Nadu.

II. Methodology:

A community based cross sectional study was conducted during February 2013 to March 2013 among the Coastal areas of Villupuram District among the adult population who were more than 18 years old and residents of Marakkanam block, Villupuram District, Tamil Nadu. The following study tools were used, pre-designed & pre-tested Performa, Stadiometer, Weighing machine, Sphygmomanometer, Snellen's Chart. After refining the study tool, a pilot study was done among 70 individuals and necessary changes were made. Sample size was calculated based on Prevalence of low vision 20% , Precision -4, 95% CI, design effect-2.8 and estimated the sample size was 980, however we studied 1034 individuals. Marakkanam town Panchayath was divided in to four blocks out of which one block was selected randomly. Within the selected block, out of 12 villages four were selected randomly. In each village 250 individuals were selected. Recruitment of study respondents was by selection of first house hold randomly followed by continuous selection from consecutive households till the required sample size was achieved. The Data was collected by trained Post graduate student, interns, final year MBBS students, under the supervision of faculties from the Department of Community Medicine, Pondicherry Institute of Medical Sciences as a part of the ROME training. For standardization of examination skills the students and interns were trained by the faculty of Ophthalmology department. Operational definitions: Low vision: Person having Visual acuity < 6/18 (measured by Snellen's chart) in the best eye. The questionnaire was pretested and modified accordingly. Statistical analysis:-Descriptive statistics such as Mean, Median and percentages were used appropriately. Chi Square test was performed to determine the level of significance of the association between the determinants and low vision/hard of hearing. P value < 0.05 is considered as the level of significance. Ethical issues involved in the study: - minimal, informed Consent was obtained from all the study participants. All those who were detected with Low vision with any co-morbid condition were referred to Pondicherry Institute of Medical Sciences.

III. Results:

Socio demographic profile and determinants

In the present study, a total of 1034 adult respondents were studied out of which majority were females (n=638) and remaining were males(n=396). Maximum (26%) respondents were between the age group of 28-39years and 39% of the study population were illiterates and the rest were literates and majority of the study respondent's were home makers. With respect to socioeconomic status majority (69%) belonged to low socio-economic status. Low vision is more prevalent among > =59 yrs age group in the study population (37.3%) and it is found to be statistically significant (p Value=0.001). It is also found that low vision is more among males (14.1%) than females (11.9%) although it is not statistically significant. Data from our study found that working in dim light (OR=1.515 (1.05, 2.2), p=0.032), watching television in the dark background (OR=1.58 (1.1,2.2), p=0.013), frequent travelling without helmet (OR=1.79 (1.1,2.8), p=0.012), Diabetes (OR=2.15 (1.15,4.04), p=0.024), Hypertension (OR=2.09 (1.14,3.84), p=0.024) were significantly associated with low vision. Out of 1034 individuals studied, 57.4% and 58.8% of them were having normal vision in right and left eye respectively. Total of 16.6% and 16.2% of the study respondents having 6/9 vision in right eye and left eye respectively. One percent of the respondents were suffering from economic blindness (<6/60-≥3/60 in the best eye).

Table-1 Association between Low vision and socio-demographic profile

Variables	Low vision			p Value
	Present N=132 n (%)	Absent N=902 n (%)	Total N=1034 Row total	
Age group in years				
18-28	12 (4.6)	251 (95.4)	263(100)	
29-38	25 (9.2)	246 (90.8)	271(100)	0.001
39-48	36 (15.7)	193 (84.3)	229(100)	
49-58	23 (19.2)	97 (80.8)	120(100)	

	Present n(%)	Absent n(%)	Total n(100)	p Value
>=59	36(23.8)	115(76.2)	151(100)	
Gender				
Male	56 (14.1)	340 (85.9)	396(100)	
Female	76 (11.9)	562 (88.1)	638(100)	.342
Education				
Illiterate	51 (12.2)	367 (87.8)	418 (100)	
Primary	15 (10.9)	122 (89.1)	137 (100)	
Middle	28 (12.6)	195 (87.4)	223 (100)	
High	25 (15.7)	134 (84.3)	159 (100)	.507
Intermediate	2 (5.4)	35 (94.6)	37 (100)	
Graduate	9 (18.8)	39 (81.2)	48 (100)	
Professional degree	2 (16.7)	10 (83.3)	12 (100)	
Occupation				
Home makers	67 (12.5)	471 (87.5)	538 (100)	
Unskilled	24 (12.4)	169 (87.6)	193 (100)	
Semiskilled	23 (13.6)	146 (86.4)	169 (100)	
Skilled	11 (13.4)	71 (86.6)	82 (100)	0.524
Clerical / Shop / Farm	2 (8)	23 (92)	25 (100)	
Semi Professional	4 (23.5)	13 (76.5)	17 (100)	
Professional	1 (10)	9 (90)	10 (100)	
Socio class				
Upper	1 (25)	3 (75)	4(100)	
Upper middle	4 (13.3)	26 (86.7)	30(100)	
Lower middle	14 (16.7)	70 (83.3)	84(100)	.284
Upper lower	90 (12.6)	625 (87.4)	715(100)	
Lower	23 (11.4)	178 (88.6)	201(100)	

Table 2: Determinants of Low Vision:

Determinants	Present n (%) 132	Absent n (%) 902	Total 1034	Odds ratio (95% CI)	p Value
Dim Light work					
Yes	47(16.5)	237 (83.5)	284 (100)	1.515 (1.05,2.2)	0.032
No	85 (11.3)	665 (88.7)	750 (100)		
Close reading					
Yes	36 (12.9)	243 (87.1)	279(100)	1.01 (0.67,1.53)	.100
No	96 (12.7)	659 (87.3)	755(100)		
Watching TV/computer in the dark					
Yes	70 (17.1)	339(82.9)	409(100)	1.58 (1.1,2.2)	0.013
No	72 (11.5)	553 (88.5)	625(100)		
frequent traveller without helmet					
Yes	29 (19.7)	118 (80.3)	147(100)	1.79 (1.1,2.8)	0.012
No	107 (12.1)	780 (87.9)	887(100)		
History of ocular injuries and low vision					
Yes	12 (14.5)	71 (85.5)	83(100)	1.17 (0.61,2.3)	0.630
No	120 (12.6)	831 (87.4)	951(100)		
Diabetes Mellitus					
Yes	14 (23)	47 (77)	61(100)	2.15 (1.15,4.04)	0.024
No	118 (12.1)	855 (87.9)	973(100)		
Hypertension					
Yes	15 (22.7)	51 (77.3)	66(100)	2.09 (1.14,3.84)	0.024
No	119 (12.3)	849 (87.7)	968(100)		

Table 3: status of the distant vision score in Study population

Distant vision	Right Eye		Left Eye	
	Frequency	Percentage	Frequency	Percentage
6/6	594	57.4	608	58.8
6/9	172	16.6	167	16.2
6/12	117	11.3	128	12.4
6/18	56	5.4	39	3.8
6/24	41	4.0	37	3.6
6/36	28	2.7	26	2.5
6/60	4	0.4	5	0.5
<6/60>=3/60	8	0.8	8	0.8
<3/60	5	0.5	6	0.6
Perception of Light	9	0.9	10	1.0

IV. Discussion:

Low Vision is one of the most common ailments encountered by the people of this generation. Prevalence of low vision shows an increase with age and this leads to poor quality of life. Our study found that, the prevalence of low vision was 132(12.8%) in the study population. A similar type of study done by Rajiv Khandekar et al found that prevalence of low vision was very high 720 (36%) and similarly a study done by Abbas Ali Yekta et al also found that 37.5%. This difference might be due to later two studies were done among elderly population[8],[9] In our study we found that there was a higher predominance(37.3%) of low vision in people above the age of 60 years. Tien Yin Wong et al in their study concluded that Prevalance and Risk Factors for Refractive Errors in Adult Chinese in Singapore in 2000, was seen in the age group 40 to 49 years and 70 to 81 years.[10] In the same way in a study by H et al showed that increasing age was an independent predictor of visual impairment in an urban Scandinavian population .[11] This predominance might be due to the increased prevalence of cataract in old age.

In our study the prevalence of low vision with respect to sex was not statistically significant (P value=0.343). Also in a study done by Wen-Ming Hsu et al Prevalence and causes of visual impairment in an elderly Chinese population in 2004 there was no difference found in the prevalence of blindness or low vision with respect to gender.[12] In our study the association between low vision and socioeconomic status was statistically insignificant (P value is 0.283). But according to our study there is a lesser incidence of low vision (n=1) among the upper socioeconomic class and the lower middle class people were mainly affected. Whereas in a study done by Steven D et al there was a clear variation in the prevalence of vision loss between different socioeconomic groups with the highest prevalence among people with lowest socioeconomic status.[13] There was no such variation observed in our study as almost all the individuals belonging to different socioeconomic groups are exposed to the same risk factors. Our study also concluded that the major significant determinants of low vision were working in dim light (P value 0.032), Watching television in dark background (P value 0.013), frequent travelling in two wheeler without helmet (P value 0.012), individuals with Diabetes mellitus (P value 0.024) and hypertension (P value 0.024). Though the other determinants were not statistically significant, there is still a good percentage of people affected by ocular injuries had low vision (14%). The insignificant statistical results was believed to be because of the deficit of the representative population who were at work during the morning hours. Similarly study done by Munoz B et al, also found that the main determinants of low vision were Diabetes mellitus and Hypertension.[14]

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Contributions:-

- **Venkatachalam J**: Conception and design of the study; planning and conducting the study; analysis and interpretation of data; and drafting the paper.
- **Madhanraj K**: Planning and conducting the study; analysis, drafting the paper and revising the draft critically for substantial intellectual content.
- **Zile Singh:** Design of the study; planning and coordinating the study; Analysis and interpretation of data; drafting the paper and revising the draft critically for substantial intellectual content.
- **Jayaramachandiran:-** Analysis and interpretation of data; drafting the paper and revising the draft critically for substantial intellectual content.
- **Anil J Purty:** Planning and Coordinating the study and manuscript revision.
- **Karuppusamy :**- Coordinating Ophthalmology Departments with Community Medicine, for providing manpower training Final year MBBS students.
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