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Original Research Article

Prevalence of visual impairment and associated vision related quality of life among older adults in an urbanized village in Delhi

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ABSTRACT

Background: Vision impairment (VI) is a public health problem, of which the greatest burden is shared by older adults. This study was done to find out the prevalence of VI among older adults and its association with sociodemographic variables and vision related quality of life.
Methods: This cross-sectional study was done in an urbanized village in east Delhi from May to December 2019. 224 participants were selected by house to house visit by simple random sampling. A pre-tested, semi-structured tool was used to collect information regarding socio-demography. Visual acuity was measured by Snellen's chart. Vision-related quality of life was assessed using Indian Vision function questionnaire-33 (IND-VFQ-33) in all three domains.
Results: About 20.1% of participants were found having VI. It was found more among those who were not working {age adjusted odds ratio (AOR)=22.3, 95% confidence interval (CI)=3.2-152.2}, and those who were past chewer (AOR=5.54, 95% CI=1.75-17.4). The mean total visual function score was found 108.40 (5.10) among visually impaired participants. The mean and median of these scores were found higher among participants with VI.
Conclusions: One out of every 5 older adults are suffering from VI. It affects quality of life significantly. Early screening, counselling and timely referral along with accessible and affordable quality eye care service should be promoted.

Keywords: Visual impairment, Older-adults, Quality of life

INTRODUCTION

According to world health organization (WHO), approximately 2.2 billion people have VI, 50% of whom have a VI that could have been prevented.[1] VI is a global public health problem with some regional differences. The estimated VI in low and middle-income regions is 4 times higher than in high-income regions.[2] The majority of people with VI are older adults i.e. aged more than 50 years.[1] Increased life expectancy has constantly led to a greater proportion of elderly population. The proportion of the world's population over 50 years is expected to increase nearly double from 15 to 30% by 2050.[3]

In India, the prevalence of VI was reported from 0.19 to 1.8%.[4,5] However, in elderly it is comparatively higher i.e., 22 to 34%.[6,7] In older adults the prevalence was reported ranging from 18.5 to 30%.[8-12]

VI also affects the quality of life among older adults. There are tools available to measure the vision related quality of life in vision function score. One such tool is Indian vision function questionnaire (IND-VFQ-33). It contains 33 items of three domains-general functioning, psychosocial impact and vision symptoms.[13] It has been reported among elderly that the vision function score was worse among elderly with VI than the elderly without VI.[14] The population aged more than 50 years shares different demography as it has

both working and non-working population. The greatest proportion of VI is also shared by this population.

We couldn't find any study which has evaluated VI and its association with vision function score among older adults. So, this study was conducted to find out the prevalence of VI among older adults. The study was also aimed to assess vision function score using IND-VFQ-33, and to find out the difference in vision function score between older adults with VI and older adults without VI.

METHODS

This population-based cross-sectional survey was done in Ghazipur, an urbanized village in east Delhi. It has a total population of approximately 80,000, including 12000 people aged above 50 years (15% proportion of total population).

The sample size was calculated based on the prevalence of VI 30% among older adults aged more than 50 years 8-12, relative precision 20%, and 95% confidence interval. Sample size came out to be 224. The sample was collected by simple random sampling from May to December 2019.

Data was collected by house to house visits during day time from 9:00 am to 1:00 pm. Participants who could not be contacted despite 3 house visits were excluded from study and were replaced by next immediate eligible participant.

Data were collected using a pre-tested, semi-structured questionnaire. It comprises of sociodemographic information, history of physical morbidity, distant visual acuity, and vision related quality of life. Distant visual acuity was tested with Snellen's chart. Presenting visual acuity irrespective of visual aid status was recorded for both eyes. VI was defined as presenting visual acuity <6/18 in the better eye, while blindness was defined as presenting visual acuity <3/60 in better eye.[15]

Vision related quality of life was assessed using IND-VFQ-33. It is pre-validated in India and contains 33 questions related to three domains. These are- general functioning, psychosocial impact, and visual symptoms. The IND-VFQ-33 scores are presented as total as well as domain-specific scores. It is 33 items questionnaire.[5,7,21] The items in general functioning are scored from 1 to 5, and those in psychosocial impact, and visual symptoms, from 1 to 4. Higher the score, poorer is the vision-related quality of life.

Age, education status and type of family were taken as reported by participant. Present employment status, living status and economic dependence were reported after a detailed discussion with participant. Home-maker was classified as currently working. Smoking status was taken in 3 heads i.e. current, past and never smoker.

Current smoker was defined as a person who had smoked tobacco product in the past one year. Past smoker was a person who used to smoke product during his/her lifetime but had not smoked in the last one year. Never smoker was a person who had not smoked tobacco in his/her lifetime.

Tobacco chewing status was also presented in three heads i.e. current chewer, past chewer, never chewer tobacco chewer was a person who had used chewable tobacco product during the last one year. Past tobacco chewer was a person who used to chew tobacco products during his/her lifetime but had not done so in the last one year. Never tobacco chewer was a person who had not chewed tobacco product in his/her lifetime.

The study was approved by the Institute Ethics Committee-HR. Written informed consent was taken from participants before starting collection of data. Those participants who needed ophthalmic consultation were referred to the nearest eye care hospital. Data were entered in Microsoft excel version 2016 and analyzed using Statistical package for social sciences (SPSS) 20.0.

Categorical variables such as visual impairment, sociodemographic characteristics are presented as proportion. Continuous variables such as IND-VFQ-33 score are presented as mean (standard deviation, standard error of mean) and median (interquartile range).

Association between visual impairment and socio-demographic variables was checked with bivariate and multivariate logistic regression. Variables with $p<0.05$ were considered in the multivariable model. IND-VFQ-33 domain scores were compared between participants with VI and participants without VI using Mann Whitney U test. IND-VFQ-33 domain scores were also compared across the sociodemographic variables by Mann Whitney U test and Kruskal Wallis H test. The $p<0.05$ was considered statistically significant.

RESULTS

Two hundred fifty-two participants were approached for the study, out of these 13 couldn't be contacted despite having three visits, 15 refused to give consent. Data were collected and analyzed from 224 participants.

The mean age of participants was 64.09 (8.79) years, and about 55% were having age above 60 years. About 53% participants were female, and about two third belonged to nuclear family.

About 70% were engaged in any occupation presently, almost all (96.9%) were living with their family members. About 40% were either partially or completely dependent economically on others. About 60% participant never smoked and chewed tobacco in their life. About half of the participants suffered from any of the selected self-reported chronic illness (Table 1). The proportion of visual impairment was found to be 20.1% (n=45). Among those visually impaired 4 were found blind, remaining were with low vision.

Table 1: Sociodemographic characteristics of participants (n=224).

Variable		Number (n)	Percent (%)
Age (Year)	51- 60	100	44.6
	61-70	69	30.8
	71and above	55	24.6
Gender	Male	105	46.9
	Female	119	53.1
Education	Up to upper primary	71	31.7
	Secondary and higher secondary	112	50.0
	Graduation and above	41	18.3
Type of family	Nuclear	141	62.9
	Joint	83	37.1
Working status	Working	160	71.4
	Not working	64	28.6
Living status	Alone	2	0.9
	With spouse	5	2.2
	With spouse and children	217	96.9
Economic dependence	Independent	137	61.2
	Partially dependent	43	19.2
	Completely dependent	44	19.6
Smoking status	Current smoker	39	17.4
	Past smoker	50	22.3
	Never smoker	135	60.3
Chewing tobacco status	Current chewer	39	17.4
	Past chewer	49	21.9
	Never chewer	136	60.7
Reported no. of chronic morbidity	None	124	55.4
	One	47	21.0
	Two	20	8.9
	Three and more	33	14.7
Visual impairment	Yes	45	20.1
	No	179	79.9

Table 2: Association of visual impairment with sociodemographic characteristics (n= 224).

Variable		Total	VI n (%)	Unadjusted OR	UOR p	Adjusted OR	AOR p
Age (Year)	51-60	100	11 (11.0)	Reference		Reference	
	61-70	69	16 (23.2)	2.44 (1.05-5.66)	0.03*	1.37 (0.35-5.35)	0.65
	71 and above	55	18 (32.7)	3.94 (1.70-9.14)	<0.01*	1.50 (0.37-6.11)	0.56
Gender	Male	105	20 (19.0)	0.89 (0.46-1.71)	0.72		
	Female	119	25 (21.0)	Reference			
Education	Up to upper primary	71	10 (14.1)	Reference			
	Secondary and higher secondary	112	26 (23.2)	1.84 (0.83-4.10)	0.13		
	Graduation and above	41	9 (22.0)	1.72 (0.63-4.65)	0.29		
Type of family	Nuclear	141	24 (17.0)	0.61 (0.31-1.17)	0.14		
	Joint	83	21 (25.3)	Reference			
Working status	Working	160	12 (7.5)	Reference		Reference	
	Not working	64	33 (51.6)	13.13	<0.01*	22.31	0.02*

Continued.

				(6.10-28.24)		(3.20- 152.2)	
Economic dependence	Independent	137	9 (6.6)	Reference		Reference	
	Partially dependent	43	12 (27.9)	5.55 (2.14-14.33)	<0.01*	0.53 (0.06-4.41)	0.59
	Completely dependent	44	24 (54.5)	17.2 (6.99- 42.27)	<0.01*	2.29 (0.61- 8.570	0.22
Smoking status	Current smoker	39	8 (20.5)	1.79 (0.71- 4.530	0.21	0.32 (0.09- 1.08)	0.07
	Past smoker	50	20 (40.0)	4.63 (2.16- 9.90)	<0.01*	2.07 (0.65- 6.51)	0.21
	Never smoker	135	17 (12.6)	Reference		Reference	
Chewing tobacco status	Current chewer	39	18 (46.2)	5.62 (2.52- 12.52)	<0.01*	3.33 (0.96- 11.53)	0.06
	Past chewer	49	9 (18.4)	1.48 (0.61- 3.54)	0.38	5.54 (1.75- 17.4)	0.03*
	Never chewer	136	18 (13.2)	Reference		Reference	
Reported no. of chronic morbidity	None	124	20 (16.1)	Reference		Reference	
	One	47	13 (27.7)	1.99 (0.89- 4.41)	0.08*	1.02 (0.28- 3.64)	0.98
	Two	20	4 (20.0)	1.3 (0.39- 4.29)	0.67	0.49 (0.12- 1.97)	0.32
	Three and more	33	8 (24.2)	1.66 (0.66- 4.21)	0.28	0.98 (0.15- 6.35)	0.98

VI- Visual impairment, CI- Confidence interval, *Statistically significant

Table 3: Average IND-VEF-33 vision function scores among participants (n=224).

Score		Participants with VI	Participants without VI	P value
Total	Mean (SE)	108.4 (5.1)	52.8 (1.9)	<0.01*
	Median (IQR)	92 (88-144.5)	40 (34-82)	<0.01*
General functioning	Mean (SE)	77.8 (3.4)	33.5 (1.4)	<0.01*
	Median (IQR)	69 (65-101)	22 (21-56)	<0.01*
Psychosocial impact	Mean (SE)	11.7 (0.7)	6.9 (0.2)	<0.01*
	Median (IQR)	10 (8-17)	5 (5-9)	<0.01*
Visual symptoms	Mean (SE)	18.9 (1)	12.4 (0.4)	<0.01*
	Median (IQR)	17 (13.5-26)	10 (7-16)	<0.01*

*Statistically significant, SE- Standard error, IQR- Inter quartile range

Table 4: Association of vision function score with sociodemographic characteristics (n=224).

Variable		Total	General functioning	Psychosocial impact	Visual symptoms
Age (Year)	51- 60 (n=100)	34 (33-36)	21 (21-22)	5 (5-5)	7 (7-8)
	61-70 (n=69)	45 (41-85)	26 (22-61.5)	6 (5-9)	14 (13-16)
	71 and above (n=55)	115 (86-143)	76 (59-101)	14 (10-16)	25 (18-26)
	P value	<0.01*	<0.01*	<0.01*	<0.01*
Gender	Male (n=105)	42 (34-85)	24 (21-59.5)	5 (5-9.5)	13 (7-16)
	Female (n=119)	43 (34-89)	24 (22-64)	6 (5-11)	13 (7-18)
	P value	0.33	0.35	0.16	0.39
Education	Up to upper primary (n=71)	34 (33-48)	22 (21-28)	5 (5-7)	8 (7-14)
	Secondary and higher sec (n=112)	43 (34-88.7)	25 (22-62.7)	5 (5-10)	14 (7-17)
	Graduation and above (n=41)	86 (41-100.5)	59 (22.5-68.5)	9 (5-12.5)	16 (13-22)
	P value	<0.01*	<0.01*	<0.01*	<0.01*
Type of family	Nuclear (n=141)	41 (34-85)	22 (21-59)	5 (5-9)	13 (7-16)
	Joint (n=83)	81 (39-90)	55 (22-66)	7 (5-10)	14 (12-18)
	P value	<0.01*	<0.01*	0.02*	0.01*

Continued.

Working status	Working (n=160)	39 (33-72)	22 (21-48.5)	5 (5-7)	11 (7-14)
	Not working (n=64)	89 (82.5-135)	65 (56-96)	10.5 (8-15.8)	16.5 (14-25)
	P value	<0.01*	<0.01*	<0.01*	<0.01*
Economic dependence	Independent (n=137)	36 (33-46)	22 (21-26)	5 (5-6.5)	8 (7-14)
	Partially dependent (n=43)	85 (41-119)	57 (24-78)	8 (5-15)	16 (12-25)
	Completely dependent (n=44)	87 (82-116.5)	64.5 (56-76.8)	10 (7-14)	16 (14-23.5)
	P value	<0.01*	<0.01*	<0.01*	<0.01*
Smoking status	Current smoker (n=39)	43 (34-92)	24 (21-68)	5 (5-11)	14 (7-18)
	Past smoker (n=50)	82.5 (40-93.3)	56 (22-60.3)	7.5 (5-10.3)	14 (11.8-18.3)
	Never smoker (n=135)	41 (34-85)	23 (21-58)	5 (5-10)	13 (7-16)
	P value	0.04*	<0.01*	0.06	0.04*
Chewing tobacco status	Current chewer (n=39)	85 (37-93)	59 (22-69)	8 (5-11)	15 (8-19)
	Past chewer (n=49)	43 (34-88.5)	25 (21.5-64)	5 (5-11)	14 (7-18)
	Never chewer (n=136)	41 (34-85)	23 (21-58)	5 (5-9)	13 (7-16.8)
	P value	<0.01*	<0.01*	<0.01*	0.04*
Reported no. of chronic morbidity	None (n=124)	39.5 (33.3-84.8)	22 (21-58)	5 (5-8.8)	12 (7-16)
	One (n=47)	81 (38-92)	56 (22-67)	8 (5-11)	15 (9-18)
	Two (n=20)	84.5 (40-108.5)	58 (23.3-73.5)	9.5 (5-13.8)	15 (13-22.5)
	Three and more (n=33)	45 (39.5-88.5)	25 (22-63.5)	5 (5-10)	14 (13-16.5)
	P value	0.64	0.37	0.37	0.80

In bivariate analysis, visual impairment was found significantly associated with age, working status, economic dependence, smoking and tobacco chewing status. VI was found more among older participants, currently not working participants, economically dependent, and current and past smokers and tobacco chewers. However, in multivariate analysis, VI was found more among those who were not working (AOR=22.3, 95% CI=3.2-152.2), and those who were past chewer (AOR=5.54, 95 % CI=1.75-17.4) (Table 2).

The mean total visual function score was found 108.40 (5.10) among visually impaired participants. Among participants with VI the mean score was found 77.80 (3.40), 11.71 (0.69), and 18.89 (1.00) for general functioning, psychosocial impact and visual symptoms respectively. The mean and median of these scores were found higher among participants with VI than participants without VI (Table 3).

The IND-VFQ-33 scores of all three domains were also found significantly associated with age, education status, type of family working status, economic dependence, smoking and tobacco chewing status. Scores of all three domains were found poorer among older participants, participants with less education, living in a joint family, currently not working, and current and past smokers and tobacco chewers (Table 4).

DISCUSSION

This study was done in older adults aged more than 50 years. About 20% were found visually impaired. Gupta et al also reported similar proportion of VI in Delhi.[9] In a study in Haryana, the prevalence was found 24.5%.[10] In Telangana and Andhra Pradesh similar prevalence was also reported.[11,12] At the national level, in rapid assessment of avoidable blindness the prevalence was found 25%.[7] The prevalence of VI in these studies is almost similar, the slight difference may be due to variations in study location, methods used to assess visual acuity and socioeconomic variations of the population studied.

VI was found significantly higher among older participants. Similar association was also reported in India and other countries.[10,16] The association of VI and age is well defined.[17] Age related visual impairment in the elderly is presbyopia, cataracts, age related macular degeneration, primary open angle glaucoma and diabetic retinopathy.[17] Gender was not found associated with VI. Similar finding was also reported from Andhra Pradesh and Gujarat.[8,12] Whereas some studies found the invariable association of VI with gender. Malhotra et al found less in women while in national rapid assessment survey it was found more in women.[7,10] Prevalence of VI in our study was not found associated with the education status of participants. While, VI was found higher among uneducated or lesser educated people in some other studies.[6,8,10,18,19]

VI was found associated with working status. Non-working participants had higher odds of VI than their counterparts. Similar results were also reported in northern India and El Salvador.[14,20] We found that visual impairment was significantly higher among the participants who are economically dependent on their care-providers, in comparison to those who are economically independent. Similar association was also reported by Vignesh et al.[14] This could be a reverse causality i.e. VI led

to a condition not favorable to work, thus to economic dependency. Tobacco chewing was found significantly associated with visual impairment among older adults. It

All values are in median (IQR), *statistically significant.

Our study found poor visual function score among participants with VI compared to those without visual impairment. Similar association was also reported in other studies. Vignesh et al reported worse scores in visually impaired participants in all three domains.[14] Similarly, Vashist et al also found higher visual function scores in persons with VI than persons without VI in all three domains.[22] Chiang et al also found worse vision functioning scores among those with visual impairment in their study done with visual function index-11 questionnaire.[23]

The IND-VFQ-33 scores were also compared across the sociodemographic variables. The score was found worse in older participants, less or not educated participants. Those who were living in joint families and not working also had worse visual function scores in all domains. Economically dependent, smoker and tobacco chewer were also had worse scores in all three domains. Similar findings were also reported in a study in Delhi by Vignesh et al. VI was also found more in all these categories, that may be the reason for poor visual function scores in all domains.

VI affects the quality of life significantly. With the increased prevalence of VI in older adults, it further deteriorates their quality of life. Primary care physicians need to screen them for visual acuity on priority, refer to higher centre accordingly. This will not only help them in arresting the further loss of vision but also improving the quality of life. The elderly population is increasing and healthy ageing is our goal. To achieve this vision related quality of life should also be addressed pragmatically.

This is a population-based study, data were collected in participant's premises making them comfortable to give socio-demographic information and for examination. However, it is a cross-sectional, so association doesn't imply causation.

CONCLUSION

About a quarter of the older adults are suffering from visual impairment. Increased age, non-working status, economic dependency, smoking and tobacco chewing were associated with increased prevalence of VI. Vision related quality scores were also found poor in visually impaired participants. Vision and eye health services should be made elderly-friendly, and provision should also be made for easy accessibility of these services to not working, economically dependent, smokers and tobacco chewers without any financial hardship and stigma.

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may be due to the reason that tobacco contains several harmful chemicals, cumulative accumulation of these chemicals causes eye damage.[21]

Ethical approval: The study was approved by the Institutional Ethics Committee

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