ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

A Prevalence Study of Visual Impairment and Blindness among Elderly in an Urban Slum Community of Pune Cantonment, India.

R Harnagle[1]* and PS Chawla[2]

[1]EX PROFESSOR COMMUNITY MEDICINE, AFMC, PUNE
[2]PROFESSOR COMMUNITY MEDICINE KASHI BAI NAVLE MEDICAL COLLEGE SINGHGAD, PUNE, INDIA

ABSTRACT

AIM: A cross sectional study was carried out to study prevalence of visual impairment and blindness among elderly people of an urban slum community of Pune cantonment, India.
OBJECTIVES: (a) to carry out an ophthalmological survey amongst elderly population. (b) To determine causes of Visual impairment and blindness. (c) To suggest suitable recommendations
METHODS: An ophthalmological survey amongst available elderly population was carried out including recording of history, clinical examination, testing of visual acuity followed by detailed ophthalmological exam by the eye specialist at hospital.
RESULTS: Out of total 506 elderly persons in 4538 total population, 3.95% (20) were found to blind and 23.12% (117) were visually impaired giving a prevalence rate of 0.44% blind and 2.57% visually impaired. Significant difference was found with respect to visual impairment and blindness was found with respect to different age group, sex, religion, occupation, use of separate towel/linen for wiping face. Overall, females were affected more. Buddhists were most affected followed by Hindu, Muslim and Christian. Majority of visually impaired and blind were unemployed.
CONLUSION: 4% blind and 23% were visually impaired in a total population (4538) with elderly above 40 years were 506.As the age advances, visual impairment and blindness increases. Females were more affected than males. Cataract (77) and Glaucoma (4) account for 81% blindness.68% blindness were observed in Unemployed, Unskilled workers & Semi-skilled workers.
Key Words: Visual Impairment, Blindness, Prevalence, Elderly, Slum

Corresponding author

ISSN: 0975-8585

INTRODUCTION

The blind was considered for the centuries together, useless to themselves and to the society [1]. In the world, as per WHO estimate in 2010, a total of 285 Million were visually impaired and 39 million blind (visual acuity of less than 3/60) .While 246 Million were having low vision, in elder people (i.e. 50 years & above) 65% of people are visually impaired and 82% are blind [2]. In India, the estimated number of blind persons is about 9 million and 45 million are visually impaired. The prevalence of blindness in India is estimated to be1.5% for the whole country [3, 4]. As per ICD-10, visually impairment comprises of categories 1 to 5 and blindness categories 3 to 5. Low vision includes moderate and severe visual impairment.

The important causes of blindness in India are Cataract, Refractive Error, Glaucoma, Corneal lesion, Posterior Segment pathology, and other causes [4]. The WHO criteria for visual impairment and blindness is taken in this study which is 6/18 to 3/60 for visual impairment and 3/60 to no perception of light for blindness in the better eye with the best possible correction. Prevalence of visual impairment and blindness is more in elderly about the age of forty years [5, 6].

The prevalence of non-refractive visual impairment in the U.S. has increased significantly in recent years, which may be partly related to a higher prevalence of diabetes, an associated risk factor, according to a study in the December 12 issue of *JAMA.* It is estimated that more than 14 million individuals in the United States aged 12 years and older are visually impaired (<20/40). Of these cases, 11 million are attributable to refractive error. In the United States, the most common causes of non-refractive visual impairment are age-related macular degeneration, cataract, diabetic retinopathy, glaucoma, and other retinal disorders [7].

MATERIALS AND METHODS

Place of study

In an urban slum of Modhikhana area of Pune cantonment India which a typical representation of a slum area.

Type of study

It was a cross – sectional study

Study population

Total population of Modhikhana area is 4538. Out of 518 elderly persons, only 506 were actually examined.

ISSN: 0975-8585

Statistical Method and level of significance

The complete population of elderly above 40 years (506) were covered; hence Sampling was not done in this study. With 5% level of significance,80% power & two tailed test as well as 10% level of significance,80% power & two tailed tests, the total subject covered were 506 elderly population which is much more than the maximum sample size calculated retrospectively for visual impairment and blindness .

Instruments used

- Snellan 'E' test type Chart for testing acuity of vision for distant vision as recommended by WHO.
- A torch
- A Measuring tape.

Approach to the cases

Local Leader's cooperation was sought before hand in carrying out survey.

Conduct of survey

Households were visited where elderly persons were interviewed and examined. The findings were recorded in a "pretested schedule"; the data so collected from 137 elderly persons were compiled and analyzed.

FINDINGS

Out of 506 elderly people among total population, 3.95% (20) were blind and 23.42% (117) were visually impaired giving a Prevalence Rate of 0.44% blind and 2.5% visually impaired. As the age advances, the visual impairment and blindness increases which is statistically highly significant. Correspondingly, Odds ratio increases with age. This is in agreement with other studies [6, 8, 9, 10, and 11]. The details are as given in Table No. 1.

TABLE 1: Prevalence of Visual Impairment and Blindness as per the age group

AGE GROUPS	VISUALLY IMPAIRED AND BLINDNESS			NORMAL	ODD'S RATION
	Visually impaired	Blind	Total		
40-44	5 (4.27)	-	5 (3.64)	79 (21.40)	1.00
45-49	10 (8.54)	-	10 (7.29)	78(21.13)	2.02
50-54	14(11.96)	2(2.46)	16(11.67)	65(17.61)	3.88
55-59	15(12.82)	1(5.00)	16(11.67)	57(15.44)	4.43
60-64	28(23.93)	2(10.00)	30(21.89)	42(11.38)	11.28
More than 65	45(38.46)	15(75.00)	60(43.70)	48(13.00)	19.75
TOTAL	117(100%)	20(100%)	137(100%)	369(100%)	

$X^2 = 85.18$, df=5, P<0.001

ISSN: 0975-8585

NOTE: - 1. Figures in parenthesis indicate percentages Odds Ratio of other age group is calculated with reference to age group 40 to 44 years.
As the age advances the visual impairment and blindness increases which is statistically highly significant. Correspondingly, Odds ratio increases with age.

Prevalence of visual impairment and blindness as per the sex

Females were more affected than males by visual Impairment and blindness. The difference is highly statistically significant which is similar in most other studies [4,9,11,12,13] the reasons attributed that females are more prone to certain blinding eye diseases like Cataract, Glaucoma, Trachoma, purulent opthalmia along with smoke explosive & Kajal Surma etc. The details are as given in Table No. 2.

Table 2: Prevalence of visual impairment and blindness as per the sex

SEX	VISUAL IMPARIMENT & BLINDNESS			NORMAL
	VISUAL IMPAIRED	BLIND	TOTAL	
Females	85(72.64)	13(65.00)	98(71.53)	195(52.84)
Males	32(27.35)	7(35.00)	39(28.46)	174(47.15)
Total	117(100%)	20(100%)	137(100%)	369(100%)

Odds Ratio= 2.24, X^2= 14.31, df= 1 P<0.001

Females were more affected than males by visual Impairment and blindness. The difference is highly statistically significant, the females are more prone to certain blinding eye diseases like Cataract, Glaucoma, Trachoma, Purulent Opthalmia along with smoke explosive & Kajal Surma etc.

Prevalence of visual impairment and blindness as per the religion

Buddhists were most affected (29.03%) followed by Hindus (27.70%), Muslims (26.92%), and Christians (25%). The difference of affection by religion is statistically significant. However, variable results are obtained in different studies with regional variation with preponderances among Hindus. The details are as given in Table No. 3.

Table3: Prevalence of visual impairment and blindness as per the religion

RELIGION	VISUAL IMPARIMENT & BLINDNESS			NORMAL	% WISE AFFECTION
	VISUAL IMPAIRED	BLIND	TOTAL		
Hindu	70(59.82)	12(00.00)	82(59.85)	214(57.99)	27.70%
Muslim	25(21.36)	3(15.00)	28(20.43)	76(20.54)	26.92%
Christian	14(11.96)	4(20.00)	18(13.13)	54(14.63)	25.00%
Buddhist	8(6.83)	1(5.00)	9(6.56)	25(6.77)	29.03%
Total	117(100%)	20(100)	137(100)	369(100)	

X^2= 29.88, df= 3, P<0.001

Buddhists were most affected (29.03%) followed by Hindus (27.70%) Muslims (26.92%) and Christians (25%). The difference of affection by religion is statistically significant.

ISSN: 0975-8585

Prevalence of visual impairment and blindness as per the occupation

Skilled workers, semi-professional, professional, shop owners and others have been clubbed together as their frequency is less than five. (They also form the basis for calculation of odds ratio for other types of occupation)

It is seen that visual impairment and blindness is reduced as the type of occupation became more skilled. Unemployment is because of age as well as blindness than otherwise. Factory worker, Garbage worker and Welders were found to be more affected. The details are as given in Table No. 4.

Table 4: Prevalence of visual impairment and blindness as per the occupation

SR.NO	TYPE OF OCCUPATION	VISUAL IMPAIRMENT & BLINDNESS			NORMAL	ODDS RATIO
		VISUAL IMPAIRED	BLIND	TOTAL		
1	UNEMPLOYED	91(77.77)	19(95.00)	110(80.29)	170(46.00)	16.00
2	UNSKILLED WORKERS	12(10.25)	-	12(8.75)	127(34.41)	23.00
3	SEMI-SKILLED WORKERS	5(4.27)	-	5(3.64)	47(12.73)	29.00
4	SKILLED WORKERS	1(0.85)		1(0.72)	2(0.54)	1.00
5	SEMI-PROFESSIONAL					1.00
6	PROFESSTION-AL					1.00
7	SHOP OWNERS	2(1.70)	1(5.00)	3(2.18)	2(0.54)	1.00
8	OTHERS	6(5.12)		6(4.37)	21(5.69)	1.00
	TOTAL	117(100)	20(100)	137(100)	369(100)	

X^2= 41.05, df= 3, P<0.001

NOTE: - Skilled workers, semi-professional, professional, shop owners and others have been clubbed together as their frequency is less than fire. (They also form the basis for calculation of odds ratio for other types of occupation)

Prevalence of visual impairment and blindness by use of separate towel/linen for wiping face

Maximum person were not using either a separate towel or linen for wiping of face including those affected by visual impairment and blindness and is in conformity with many other studies [14, 15]. The details are as given in Table No. 5.

Table 5: Prevalence of visual impairment and blindness as per the use of separate towel/linen

USE OF SEPARATE TOWEL/LINEN	VISUAL IMPARIMENT & BLINDNESS			NORMAL	% OF VISUALLY IMPAIRED & BLIND
	VISUAL IMPAIRED	BLIND	TOTAL		
Using separate towel/linen	2(1.70)	NIL	2(1.45)	7(1.89)	22.22
Not using separate towel/linen	115(38.29)	20(100)	135(98.54)	362(98.10)	27.16
Total	117(100%)	20(100%)	137(100)	369(100%)	

X^2= 9.14, df=1, P<0.01

ISSN: 0975-8585

Maximum person were not using either a separate towel or linen for wiping of face including those affected by visual impairment and blindness

Prevalence of visual impairment and blindness as per the causes:-

The causes of visual important and blindness are more or less the same as the most other studies conducted in the country. No statistical significance of affection of visual impairment and blindness was observed with relation to marital status, education, and socio-economic status, duration of symptoms, dietary habits and application of Kajal / Surma. The details are as given in Table No. 6.

Table 6: Prevalence of visual impairment and blindness as per the causes

CAUSES	VISUAL IMPAIRMENT	BLINDNESS	TOTAL
CATARACT	92(78.63)	13(65.00)	105(76.64)
GLAUCOMA	5(4.27)	1(5.00)	6(4.37)
TRACHOMA	2(1.70)	-	2(1.45)
INFECTION OF EYE/S	4(3.41)	-	4(2.91)
INJURIES OF THE EYE/S	4(3.41)	2(10.00)	6(4.37)
SMALL POX OLD EFFECTS	1(0.85)	-	1(0.72)
OTHERS	9(7.69)	4(20.00)	13(9.48)

DISCUSSIONS

The present study is based on 506 elderly persons aged 40 years and above residing in a semi-urban slum community in Pune Cantonment. They were examined for visual impairment and blindness and demographic characteristics, socio-economic factors and its association with visual impairment and blindness, along with its causations were studied.

Population characteristics: The study has brought out that there were 20 (4%) blind and 117 (24%) with visual impairment and rest 369 (72%) were found to be normal out of 506 elderly persons examined, aged 40 years and above, of the study area. The total population of the study area is 4538 and out of which 518 were elderly aged 40 years and above However, only 506 (97.8%) were actually examined since remaining 12 (2.31%) were not available for the study due to various reasons. 4 percent were found to be b1ind and 24 percent to have visual impairment. The remaining 72 percent were either not affected at all or the diminution of vision was better than 6/18 in the better eye with best possible correction i.e. category zero which includes 6/6, 6/9 and 6/18 [6]

As per the WHO estimate, maximum incidence is found at 40 years [15].Various workers have found similar findings of about 10 to 30 percent in elderly persons [2, 16, 21, and 24] where visual impairment and blindness were 19.75 times than those persons aged 40 to 44 years.

In the 1931 Census, 84 percent of total blind population was above 50 years of age. In a study on blindness in Banki block Barabanki district (U.P.) 5.22 percent of cases of blindness had their onset later than 40 years of age [9]. Whereas, other workers have found blindness above 40 years which agrees well with the present of 28 percent [10, 11, 12, 16, 17, 19, 20, 21].

Prevalence of visual impairment and blindness as per the sex:-The females outnumbered males in visual impairment and blindness in study population. Females contributed 72.64 percent of all visually impaired, and 65 percent of all blind, when combined together represents 71.53 percent of all visually impaired and blind. Only 52.84 percent were normal females. On the other hand, the males constitute 27.35 percent of all visually impaired and blind. The different studies have shown varying relation with the marital status. Chatterjee et al found cataract to be more associated with widows/ widowers (18). As per WHO, Trachoma is found to be more associated with mothers who have to look after children, therefore Trachoma and super infection were found to be more common in married with children. Suri et al also found prevalence of visual impairment and blindness to be more in married, which they ascribe to the fact that marriage is a universal phenomenon [22].

Prevalence of visual impairment and blindness as per the religion Buddhist were most affected (29.03%) followed by Hindus (27.70%) and Muslims (26.92%), Christians were least affected (25%) and this is found to be statistically highly significant. This is not in conformity with Sharma and Prasad's study; they have found no difference with religion [10].

Prevalence of visual impairment and blindness as per the occupation: Maximum numbers of visual impairment and blindness observed in those unemployed (80.29%) followed by unskilled worker (8.75%). The visual impairment and blindness is observed less as the type of occupation becomes skilled. This is found to be statistically highly significant. This may be, perhaps, because of the loss of eye sight resulting into loss of employment rather than otherwise. However, higher numbers of visual impairment and blindness was also found in a study of ocular diseases in slum, in those who were unemployed.

Causes of visual impairment and blindness: The maximum number of visually impaired and the blind were due to Cataract and when combined together they were responsible for 76.64 percent of visual impairment and blindness. Glaucoma and injury to the eyes were each responsible for 4.37 percent of visual impairment and blindness. Infection of eyes (2.91%) and Trachoma (1.45%) were the next common causes. 9.48 percent were other causes. The finding corroborates well with the findings of others [1, 5, 13, and 31].The findings also corroborates with others [3, 6, 24]. In this study, senile macular degeneration was either not found or found to be associated with other major blinding causes. In a sample analysis of statistics of the blind population of England and Wales, showed that 60 percent aged 70 years and above were totally blind and the, main causes were Cataract and Glaucoma [30]. Suri et al also found Cataract to be the main cause responsible for 71.74 percent of blindness. Glaucoma (5.69%) injuries to the eyes and Trachoma (5.38%) [22] were the other causes. In a study in a Scandinavian country the commonest cause of visual impairment and blindness among elderly was

found to be Cataract [26].

Prevalence of visual impairment and blindness as per the WHO classification: The maximum number of visual disability is in category 1 (81.75%) followed by category 4 (7.29%) and category 3 *(5 10%).* Considering visual impairment separately, 95.72 percent were in category 1 and rest in category of the total blind, **i.e.** category 3, 4 and 5, 50 percent which is in category 4 and 35 percent in category 3. In category 5 only 15 percent of all blind were found.

Suri et al found average age of partial blindness and blindness was 63.21 years and 61.26 years. They found 2.2 percent of total population survey to be in category 3, 4 and 5 [22]. Shashi Mehta observed 93 percent blind belonging to category 5, 4 percent in category and the remaining 3 percent in 1, 2 and 3 [31] .

Prevalence of visual impairment and blindness by' injuries of the eyes:

Injuries were responsible for 4.37 percent of visual impairment and blindness (out of total 137). All affected i.e. 4 by injuries were females Finding of many other studies are in between these two extremes [5, 13, 23].

Prevalence of visual impairment and blindness by infection of Eyes:

Infection of the eye was responsible for 2.91 percent of total visually impaired and blind under study, out of which 75 percent were males and rest 25 percent were females. While in visual impairment and blindness due to other causes, females (72.93%) have outnumbered males (27.06%). The eye infection had resulted in Purulent Ophthalmia followed by Panophthalmitis in most cases. 1976 survey it was found to be responsible for 7.2 percent (10). In 1984, Suri et al found it to be responsible for 4.36 percent of blindness [22].

Prevalence of visual impairment and blindness by Trachoma:

Trachoma was responsible for only 2 (1.45%) cases of visual impairment and blindness out of 137 cases. Both the cases were in females. Higher prevalence in females may be due to fact that they are more exposed to smoke, infection from children and from use of kajal/Surma as cosmetic [22]. Our finding agrees with that of Ghosh et al, who found Trachoma to be 0.1 percent in a semi-urban community [19]. Various studies have found between 4.38 percent to 22.93 percent [10, 27, 28, and 29].

Recommendations:

The following recommendations are made:

a) Early detection of eye disease, an outreach programme to be instituted with the collaboration of various agencies.

b) Early Institutionalization for treatment for Cataract, Glaucoma etc.
c) Periodical ophthalmological examinations and follow up.
d) Health education campaign involving the community.
    i. Eye camp approach to be initiated to reduce the burden of Cataract in community.
    ii. Motivation of visually impaired along with their relative as many were found to be ignorant of their symptoms or were not accepting that they are having visual disability or that it warrants any treatment.
e) Finally, Rehabilitation of incurable blind in the society by providing appropriate employment with ultimate aim of integration in society.
f) In research published in the journal Acta Biomaterialia, the team describes a new method for producing membranes to help in the grafting of stem cells onto the eye, mimicking structural features of the eye itself. The technology has been designed to treat damage to the cornea, the transparent layer on the front of the eye, which is one of the major causes of blindness in the world.
g) Using a combination of techniques known as Micro-stereo lithography and Electro-spinning, the researchers are able to make a disc of biodegradable material which can be fixed over the cornea. The disc is loaded with stem cells which then multiply, allowing the body to heal the eye naturally [32].

CONCLUSIONS

A cross sectional study was carried out to study prevalence of visual impairment and blindness among elderly people of an urban slum community of Pune cantonment, India. An ophthalmological survey amongst elderly population was carried out .The Causes of Visual impairment and blindness prevailing in a community has been determined, so that Promotive, Preventive, Curative and Rehabilitative care be provided.

Based on this study as well as current problem of alarming increase in visual impairment and blindness as being faced by USA, Suitable recommendations have been made to concerned local authorities.

It is envisaged that an out programme is likely to check the problem of visual impairment and blindness of a community.

REFERENCES

[1] Roy IS. Indian J Public Health 1984; 28: 221-610.
[2] WHO/NMH/PBD/1201,Global data on visual impairment, 2010, WHO Monograph, Geneva, 2010
[3] World Health Organization, Visual impairment and blindness, fact sheet, WHO Media Centre, No252, updated 2013.
[4] New WHO Estimate reveal downward trend in blindness and visual impairment worldwide; IAPB, London School of hygiene and Tropical Medicine.

[5] NSSO, Visual Disability in India, Evidence from National Sample Survey,2001
[6] Park JE, Park K. Textbook of Preventive and Social Medicine. 22nd Edition, M/s Banarsidas Bhanot Publishers, Jabalpur, 2013.
[7] Fang Ko et al. *JAMA* 2012; 308(22): 2361.
[8] World Health Organization, Preventive of xeropthalmia. WHO Chron, Geneva, 27: 1973, 28-34
[9] Vyas RT. The visually handicapped in India, Bombay, Somaiya Publications 1983, 19-290.
[10] Sharma KL, Prasad BG. Indian J Med Research 1962; 50: 842-65.
[11] Srivastava RN, Verma BL. Journal of Epidemiology and Community Health 1978; 32: 1315.
[12] Chakrabrti J, Garg AC, Siddu CN. Indian J Ophthalmol 1974; 23(3): 4-8.
[13] Gupta KK, Jain AM, Mahesh chand. Indian J Ophthalmol 1982; 30: 295-98..
[14] World Health Organization. The prevention of blindness - Report of a study group. WHO Tech Rep Ser No 513, 1973.
[15] Agarwal LP. Indian J Ophthalmol 1978; 26(41): 1-5.
[16] World Health Organisation. Prevention of blindness.WHO Chron, Geneva, 1973; 22: 21-27.
[17] Gardiner PA. Br Med J (6157) 1979: 180-81.
[18] Chatterjee At Milton RC. Br J Ophthalmol 1982; 66: 35-43.
[19] Ghosh et al. Orient Arch Ophthalmol 1969; 7: 16-24.
[20] Venkatswamy et al. Rapid epidemiological assessment of Cataract blindness Joint study Aravind Eye Hospital Madurai and Survey Research Centre, University of Michigan, USA, 1980.
[21] Brillant G, Ed Chelesea. The epidemiology of blindness in Nepal, the final report of Nepal Blindness Survey, Michigan, Seva Foundation, 1988.
[22] Suri et al. Indian J Prey Soc Medicine 1984; 15: 38-41.
[23] Mehrotra SK, Maheshwari BB. Indian J Ophthalmol 1975;23 (4): 17-70.
[24] Jonasson F, Thordarson K. Acta Ophthalmol (Suppl) Copenh 1987; 182: 40-3.
[25] Stephen JH, Miller. The causes and prevention of blind. Parsons diseases of the eye, 17th edition, 1084, 357-8.
[26] Hakkinen l. Sc and J Soc Med (Suppl) 1984; 35: 108-10.
[27] WHO, Trachoma, 3rd Report of a WHO expert Committee, WHO Tech Ser No.234, 1962.
[28] Sehgal et al. Indian J Pub Health, vol XXVII, No.4, 1984.
[29] Kyat et al. Bull WHO 1978; 56: 945-55.
[30] Ahmed J. A study of Ocular diseases in Pune, A Dissertation submitted to Poona University, 1975.
[31] Mehta Sashi, A study of Institutionalized blind in Maharashtra, 1977.
[32] New technique to deliver stem cell therapy may help damaged eyes regain their sight, The University of Sheffield News,05 Dec12,published in article “Prevalence of Visual Impairment in U.S. Increases”, Review of Ophthalmology, 17 Jan 2013.