



Ocular Morbidities among the Elderly Attending Outreach Eye Care Clinics in Gandaki Zone, Nepal

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Abstract

Purpose: To determine the causes of visual impairment in patients attending outreach services in Gandaki, Nepal.

Methods: This was a prospective cross sectional study conducted within two districts of Gandaki Zone Nepal. The patients forty years and above and attending the screening outreaches conducted by Himalaya Eye Hospital (HEH) were taken for the study. The patients attending the screening outreach underwent a thorough eye examination by an Ophthalmologist and an ophthalmic assistant. For the purpose of the study we only considered the distance and near visual acuity and the diagnoses. Distance visual impairment (DVI) was categorized as the presenting visual acuity of worse than 6/18 to 3/60 in the better eye. Blindness was categorized as the visual acuity of worse than 3/60 in the better eye. For all subjects the near visual impairment (NVI) was categorized as the presenting near vision of worse than N8 at patient's preferred reading distance. The main cause of distance visual impairment or blindness was considered the main diagnosis.

Results: Eight hundred sixty two subjects within age group forty and above were taken for the study. The mean age of the study subjects was 64.75 ± 10.65 . The odds ratio of having DVI in persons aged 60 years and older compared to those aged less than 60 years was 4.79 (CI: 2.94 to 7.83; $p < 0.0001$). The odds ratio of having DVI among illiterates compared to those who were literates was 2.77 (CI: 1.96 to 3.92; $p < 0.0001$). The odds ratio of having DVI among widowed individuals compared to married or single individuals was 2.86 (CI: 1.44 to 5.63; $p = 0.002$). 818 (94.9%) of the study population had NVI. The proportion of subjects who had NVI differed significantly between the occupations $\chi^2 (3, N = 861) = 14.37, p = .006$. Cataract was the main cause of DVI (56.47%) followed by Age Related Macular Degeneration (ARMD) (15.29%), refractive error (12.35%), and others (7.06%).

Conclusion: These data indicate that DVI and NVI is common in elderly population in Gandaki zone. The DVI and NVI are specifically dependent on the age, education level, occupation and marital status of the elderly people. Considering these factors as the determinants of vision loss, more focus on eye care services need to be provided to the population within these categories.

Keywords: Elderly; Outreach; Visual Impairment; Blindness; Morbidities

Abbreviations

HEH: Himalaya Eye Hospital; VI: Visual Impairment; DVI: Distance Visual Impairment; NVI: Near Visual Impairment; SPSS: Statistical Package for the Social Sciences; VA: Visual Acuity; ARMD: Age Related Macular Degeneration; CI: Confidence Interval

Introduction

Globally, an estimated 36 million people have blindness and 216.6 million people have moderate or severe visual impairment. Majority (81.2%) of the visual impairment (VI) is either preventable or treatable. Among the visually impaired, the number of adults with visual impairment is higher than the young population [1].

The epidemiology of blindness in Nepal shows a prevalence of 0.35% bilateral blindness (best corrected visual acuity of < 3/60 in better eye). Majority of the blindness (52.9%) is caused by cataract followed by posterior segment conditions including diabetic retinopathy (17%) and corneal scars due to varying reasons (16%) [2]. Out of 14 zones in Nepal, the Gandaki zone has the prevalence of 2.6% bilateral blindness (presenting visual acuity of < 6/60 in better eye). The major cause of bilateral blindness in Gandaki zone is cataract (64.5%) followed by refractive error (13.2%), macular degeneration (10.9%), corneal opacity (3.1%), globe disorder (2.3%), amblyopia (2%), posterior capsular opacification after cataract surgery (0.8%), retinal detachment (0.8%), optic atrophy (0.8%), glaucoma (0.4%), vascular retinopathy (0.4%) and others [3].

Different personal and social reasons have been quoted as barriers to uptake eye care services. The most common reasons quoted are old age and need not felt, affordability (cost of treatment and transport), geographical distance (services being too far) and no one to accompany to the eye clinic [4]. Himalaya Eye Hospital (HEH), a community eye hospital established in 1993 provides services to over 2 million people residing in Gandaki, Dhaulagiri and Karnali zones of Nepal. In order to cater for the population who may not always have access to eye care services provided through the eye hospital HEH also provides services through outreaches (both surgical and screening outreaches). Through this study we aimed to identify the most common ocular disorders seen in the elderly population attending outreach settings. The results will inform further development of appropriate strategies for providing universal access to comprehensive eye care services [5].

Materials and Methods

This was a prospective cross sectional study conducted in the HEH, Nepal. The aim of the study was to infer the types of ocular conditions and disorders seen in the outreach settings. From the already scheduled screening outreach locations in Gandaki zone four locations were randomized for the study purpose: two locations in Kaski and the other two locations in Tanahun districts.

Subjects

Among the patients attending the outreach eye clinics only those aged forty years and above were taken for this study. The exclusion criteria included patients who were younger than forty years of age.

Informed verbal consent was obtained from all subjects. For subjects with communication difficulties consent was obtained from the guardians.

Patient examination

The patients were examined by an ophthalmologist with the help of an ophthalmic assistant. The examination of patients included a detailed history, visual acuity measurement for both distance and near, refraction, slit lamp examination of anterior segment, pupils examination and ocular funduscopy using direct ophthalmoscope. Distance visual acuity was measured using a six metre Tumbling E Snellen's acuity chart and near vision was measured using Rosenbaum near card. Diagnoses that could be managed in the outreach settings were managed accordingly while others that needed referral to the base hospital were provided referral for further investigation and needful. For the purpose of this study we only considered details of the presenting visual acuity measurements for both distance and near and the diagnoses.

Definitions

Distance visual impairment (DVI) was categorized as the presenting visual acuity of worse than 6/18 to 3/60 in the better eye. Blindness was categorized as the visual acuity of worse than 3/60 in the better eye. For all subjects the near visual impairment (NVI) was categorized as the presenting near vision of worse than N8 at patient's preferred reading distance. The main cause of DVI or blindness was considered the main diagnosis.

Data collection and Statistical analysis

The data collection was initially done in the standard form developed for the study. The form included variables for patients' demographic details including marital status, family size, education and occupation. The data collected in the forms was then entered in the Microsoft Excel 2013. The data was analyzed through Statistical Package for the Social Sciences (SPSS), version 21.

Results

Eight hundred sixty two subjects within age group forty and above were taken for the study. There were 378 males and 484 females in the study. The mean age of the study subjects was 64.75 ± 10.65. The minimum age was 40 and the maximum age of the subjects was 100. The details of education and occupation for one subject was missing. 258 (29.97%) subjects were illiterate and 767 (89.08%) had agriculture as their main occupation.

The odds ratio of having DVI in persons aged 60 years and older compared to those aged less than 60 years was 4.79 (CI: 2.94 to 7.83; $p < 0.0001$). The odds ratio of having DVI among illiterates compared to those who were literates was 2.77 (CI: 1.96 to 3.92; $p < 0.0001$). The odds ratio of having DVI among widowed individuals compared to married or single individuals was 2.86 (CI: 1.44 to 5.63; $p = 0.002$). 818 (94.9%) of the study population had NVI. The

proportion of subjects who had NVI differed significantly between the occupations $\chi^2 (3, N = 861) = 14.37, p = .006$.

The diagnosis for 5 subjects were missing. Cataract was the main cause of DVI (56.47%) followed by Age Related Macular De-

generation (ARMD) (15.29%), refractive error (12.35%), and others (7.06%). Only 4 out of 857 subjects had blindness with cataract being the cause for 2, ARMD for 1 and others for 1 subject.

Category	No distance VI, n (%)	Distance VI, n (%)	Blindness, n (%)	Total, n	Adjusted odds ratio (95% CI)
Gender					
Male	293 (77.51)	82 (21.69)	3 (0.8)	378	OR Female Versus Male
Female	395 (81.62)	88 (18.18)	1 (0.2)	484	0.7767 (0.5564 to 1.0841)
Total	688 (79.82)	170 (19.72)	4 (0.46)	862	p = 0.1374
Age groups					
40 - 49	19 (100)	0 (0)	0 (0)	19	
50 - 59	245 (92.45)	20 (7.55)	0 (0)	265	
60 - 69	229 (89.8)	26 (10.2)	0 (0)	255	OR > = 60 versus < 60
70 - 79	155 (67.1)	74 (32.03)	2 (0.87)	231	4.7943 (2.9355 to 7.8302)
> 80	40 (43.48)	50 (54.35)	2 (2.17)	92	p < 0.0001*
Total	688 (79.82)	170 (19.72)	4 (0.46)	862	
Education					
Illiterate	173 (67.06)	82 (31.78)	3 (1.16)	258	
Literate/Primary	422 (83.23)	84 (16.57)	1 (0.2)	507	
High School	68 (97.14)	2 (2.86)	0 (0)	70	OR Illiterate versus rest of Others
University	24 (92.31)	2 (7.69)	0 (0)	26	2.7685 (1.9574 to 3.9157)
Total	687 (79.79)	170 (19.74)	4 (0.47)	861	p < 0.0001*
Occupation					
Service	25 (96.15)	1 (3.85)	0 (0)	26	
Self Employed	15 (88.24)	2 (11.76)	0 (0)	17	OR Agriculture versus rest of Others
Retired	37 (80.44)	8 (17.39)	1 (2.17)	46	1.8298 (0.9744 to 3.4360)
Agriculture	605 (78.88)	159 (20.73)	3 (0.39)	767	p = 0.0602
Others	5 (100)	0 (0)	0 (0)	5	
Total	687 (79.79)	170 (19.74)	4 (0.47)	861	
Family Size					
< 4	169 (74.78)	55 (24.34)	2 (0.88)	226	OR Family size < = 9 versus > = 10
4 - 6	332 (83)	67 (16.75)	1 (0.25)	400	1.5079 (0.9145 to 2.4862)
7 - 9	121 (82.88)	24 (16.44)	1 (0.68)	146	p = 0.1074
≥ 10	66 (73.33)	24 (26.67)	0 (0)	90	
Total	688 (79.82)	170 (19.72)	4 (0.46)	862	
Marital Status					
Married	626 (82.15)	132 (17.32)	4 (0.53)	762	OR Widowed versus Others
Unmarried	40 (63.5)	23 (36.5)	0 (0)	63	2.8559 (1.4487 to 5.6300)
Widowed	22 (59.46)	15 (40.54)	0 (0)	37	p = 0.0024*
Total	688 (79.82)	170 (19.72)	4 (0.46)	862	

Table 1: Characteristics of study population by distance visual impairment.

VI: Visual Impairment; CI: Confidence Interval; OR: Odds Ratio; Distance VI, presenting distance visual acuity in the better eye worse than 6/18 to 3/60; Blindness, presenting visual acuity in the better eye worse than 3/60; * p value significant at 0.05.

Category	No near VI, n (%)	Near VI, n (%)	Total, n	Chi square statistic and p value
Gender				
Male	20 (5.29)	358 (94.71)	378	χ^2 0.048
Female	24 (4.96)	460 (95.04)	484	p .825
Total	44 (5.1)	818 (94.9)	862	
Age groups				
40 - 49	3 (15.79)	16 (84.21)	19	χ^2 8.328
50 - 59	16 (6.04)	249 (93.96)	265	p .080
60 - 69	9 (3.53)	246 (96.47)	255	
70 - 79	14 (6.06)	217 (93.94)	231	
> 80	2 (2.17)	90 (97.83)	92	
Total	44 (5.1)	818 (94.9)	862	
Education				
Illiterate	13 (5.04)	245 (94.96)	258	χ^2 0.1414
Literate/Primary	26 (5.13)	481 (94.87)	507	p .986
High School	4 (5.71)	66 (94.29)	70	
University	1 (3.85)	25 (96.15)	26	
Total	44 (5.11)	817 (94.89)	861	
Occupation				
Service	1 (3.85)	25 (96.15)	26	χ^2 14.37
Self Employed	2 (11.76)	15 (88.24)	17	p .006*
Retired	2 (4.35)	44 (95.65)	46	
Agriculture	37 (4.82)	730 (95.18)	767	
Others	2 (4.0)	3 (6.0)	5	
Total	44 (5.11)	817 (94.89)	861	
Family Size				
< 4	10 (4.42)	216 (95.58)	226	χ^2 0.468
4 - 6	22 (5.5)	378 (94.5)	400	p .926
7 - 9	8 (5.48)	138 (94.52)	146	
> 10	4 (4.44)	86 (95.56)	90	
Total	44 (5.1)	818 (94.9)	862	
Marital Status				
Married	39 (5.12)	723 (94.88)	762	χ^2 0.642
Unmarried	4 (6.35)	59 (93.65)	63	p .725
Widowed	1 (2.7)	36 (97.3)	37	
Total	44 (5.1)	818 (94.9)	862	

Table 2: Characteristics of study population aged 40 years and above by near visual impairment.

VI: Visual Impairment; Near VI, near presenting visual acuity worse than N8 at the participants preferred reading distance;

* p value significant at 0.05.

Diagnosis	No distance VI, n (%)	Distance VI, n (%)	Blindness, n (%)	Total, n
Cataract	149 (60.32)	96 (38.87)	2 (0.81)	247
ARMD	20 (42.55)	26 (55.32)	1 (2.13)	47
Refractive Error	97 (82.2)	21 (17.80)	0 (0)	118
Glaucoma	8 (100)	0 (0)	0 (0)	8
Corneal Opacity	4 (100)	0 (0)	0 (0)	4
Pterygium	40 (93.02)	3 (6.98)	0 (0)	43
Pseudophakia	18 (69.23)	8 (30.77)	0 (0)	26
Diabetic Retinopathy	2 (100)	0 (0)	0 (0)	2
Dry eye	36 (100)	0 (0)	0 (0)	36
Red eye	60 (96.77)	2 (3.23)	0 (0)	62
Presbyopia	215 (99.08)	2 (3.92)	0 (0)	217
Others	34 (72.34)	12 (25.53)	1 (2.13)	47
Total	683 (79.7)	170 (19.84)	4 (0.46)	857

Table 3: Diagnosis of the study population by distance visual impairment.

VI: Visual Impairment; Distance VI, presenting distance visual acuity in the better eye worse than 6/18 to 3/60; Blindness, presenting visual acuity in the better eye worse than 3/60.

Discussions

This is one of its first kind of study from Nepal that reports the social determinants of health and associated visual impairment and blindness in adult population. In this study we assessed the ocular conditions of patients 40 years and older attending screening outreaches in Gandaki zone, Nepal. We also studied the characteristics of study population by distance and near visual impairment. The main cause of distance visual impairment in our study population was cataract followed by ARMD and refractive error. According to the epidemiology of blindness in Nepal published by Nepal Netra Jyoti Sangh, the main cause of bilateral severe visual impairment and blindness (VA < 6/60) is cataract followed by posterior segment conditions and uncorrected refractive error [2]. This is different from the cause of DVI reported by Flaxman, *et al.* in South Asia [1].

It has been widely mentioned, compared to the younger population VI is higher among the elderly [6,7]. Our study showed the higher odds of VI among the individuals who are sixty years and older. The major cause of VI in elderly population is un-operated cataract. There were more females (56.15%) and 43.85% males in our study. Although studies around the world have mentioned higher prevalence of age adjusted blindness and visual impairment

in women compared to male [6,8,9], we did not find any significant variation in visual impairment and blindness between males and females.

The level of education, as one of the determinants of health has been associated with visual impairment and blindness. Our study findings show higher odds of having DVI among illiterates. Several studies around the world show a significant higher prevalence rates of blindness and VI in people with no schooling or lower education levels [10-12].

Occupation has been proposed as one of the determinants of health. People with a lower occupational position are more disadvantaged than expected, based on the effects of occupation as a socioeconomic status [13]. Various occupation related eye health conditions such as dry eye disease in visual display terminal workers have been highlighted [14]. We studied if visual impairment and blindness in our study population was associated with their occupation. Considering agricultural activities in Nepal as one of the occupation paying in the lower scale [15] we compared the odds of having VI with other groups of occupation. The odds of having VI was higher among people involved in agricultural activities. However, it was not found significant.

People who are widowed are prone to worse health outcomes, more so for widowed women compared to males who are widowed [16]. Studies have reported widowhood as the risk factor for poor self-rated health, psychological distress and reduced cognitive abilities [16]. The widowhood has also been associated with poor access to cataract surgical services. Compared to the best-off groups of individuals in Nigeria and Srilanka the widowed women have poor cataract surgical coverage rates and those who received services had comparably poor quality services [17]. In our study we did not differentiate between widowed males and females. Combined, both widowed men and women had higher odds of having DVI. The uptake of eye care services among the older people in low and middle income countries is quite low [18]. The lower uptake of services among elderly may add on to the widowhood to possibly increase DVI among widowed people in Nepal.

People with NVI are likely to have inadequate correction if they live in rural areas, especially if countries with lower health expenditure and higher inequalities [19]. We considered the presenting near visual acuity in defining the NVI for all subjects. The NVI among our study population was quite high at 94.9%. This is a huge burden of NVI in Nepalese society. The NVI was found to be significantly associated with the occupation of the elderly people. Most of the NVI from our study was found in people who had agriculture as their main occupation. The previous presbyopia study done by Sapkota, *et al.* in Kaski district showed similar results of no access to near vision glasses in over 90% of people with NVI [20].

Our study has some potential limitation. We did not study the causes of NVI, if they were associated with presbyopia alone or also included refractive errors: myopia, hyperopia and other ocular conditions. Our reasons were the lack of data on refraction results for subjects with no DVI.

Conclusion

These data indicate that DVI and NVI is common in elderly population in Gandaki zone. The DVI and NVI are specifically dependent on the age, education level, occupation and marital status of the elderly people. Considering these factors as the determinants of vision loss, more focus on eye care services need to be provided to the population within these categories.

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Conflict of Interest

None.

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