

Awareness of Eye Health and Diseases among the Population of the Hilly Region of Nepal

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Abstract

Purpose: To collect information regarding awareness and knowledge of eye health and diseases among the population of the hilly region of Nepal.

Methods: In a population-based survey, 1834 participants were enrolled in to the study. Field procedures included the development of a survey questionnaire, field orientation, pretesting, and household data collection. Association between knowledge of eye diseases was derived using the Chi-square test and odds ratios with a 95% confidence interval. A *P* value of ≤ 0.05 was considered significant.

Results: Most participants were 31–40 years old (33.4%), female (51.1%), of upper caste (43.4%), Hindus (83.3%), received secondary level of education (34.4%), and involved in agriculture (48.6%). Awareness of cataract, night blindness, glaucoma, strabismus, and systemic diseases was 74.6%, 53.4%, 17.4%, 70.8%, and 46.5%, respectively. Knowledge regarding these diseases among those aware was 39.1%, 72.2%, 50.9%, and 92.3%, respectively. Awareness of cataract was significantly higher (88.4%) among higher caste groups ($P < 0.001$; OR, 4.29; 95% CI, 3.34–5.54), followed by business as an occupation (88.2%; $P = 0.001$; OR, 2.65; 95% CI, 1.44–4.9). Awareness of night blindness was significantly higher among students (72.6%; $P < 0.001$; OR, 2.46; 95% CI, 1.65–3.67).

Conclusion: There was a general lack of awareness and knowledge of common eye diseases. Improved awareness and knowledge are required for the prevention, early treatment, and access to eye care.

Keywords: Awareness; Cataract; Glaucoma; Knowledge; Night Blindness; Strabismus

J Ophthalmic Vis Res 2018; 13 (4): 461-469

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Received: 19-02-2017

Accepted: 12-12-2017

INTRODUCTION

Blindness and visual impairment are more prevalent in low-income countries such as Nepal, with cataract remaining the major cause of blindness.^[1] There is a

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How to cite this article: Shrestha GS, Sigdel R, Shrestha JB, Sharma AK, Shrestha R, Mishra SK, *et al.* Awareness of eye health and diseases among the population of the hilly region of Nepal. *J Ophthalmic Vis Res* 2018;13:461-9.

Access this article online

Quick Response Code:



Website:
www.jovr.org

DOI:
10.4103/jovr.jovr_41_17

network of more than 20 eye hospitals, 18 ophthalmology departments in medical colleges and general hospitals, 63 primary and secondary eye care centers and over 100 private eye clinics in Nepal. Eye care service providers currently include more than 150 ophthalmologists, 68 optometrists, and 350 ophthalmic assistants. National programs exist for control of vitamin A deficiency, trachoma and for the provision of low-vision services; some are integrated with the existing health infrastructure, while others function independently. Several Non-Governmental Organizations (NGOs) and International Non-Governmental Organizations (INGOs) are working in the country bringing in technology and resources. However, most of them are located in Kathmandu and close to the cities of Nepal.^[2]

Though the prevalence of blindness has reduced from 0.8% to 0.4% between 1981–2010 in Nepal, the number of blind people has increased from 117,634 among a population of 14 million people in 1981 to 210,000 among 28 million in 2008.^[2-4] Most of the studies so far conducted in Nepal are based on the prevalence of blindness related to cataract.^[5-7]

The reasons for the paradoxical increase in blindness are unclear and remain speculative. This may include a lack of expansion of services to meet the growth in population, gender inequity in service utilization, inequitable distribution of service centers impairing service coverage, inadequate eye care facilities and accessibility in ecologically challenging zones,^[8] and poor service utilization based on geographical and ecological region.^[5-7] Moreover, illiteracy, poverty, ignorance,^[7] and cultural beliefs have been reported to be major reasons for not seeking services.^[9] There are several secondary factors including demographic, personal, socio-economic, psychosocial factors, and needs which may act as barriers to utilizing available, accessible, and affordable eye care services.^[10]

Awareness of eye diseases and their treatment can play an important role in seeking and accessing available services. Eye-related symptoms are often ignored, leading to delayed presentation, which may culminate in ocular and visual disorders leading to temporary or permanent visual impairment and even blindness in some cases. Increased community awareness and knowledge of common eye diseases and their treatment options are important in promoting preventive ophthalmic care.^[11] Hence, apart from human resources and infrastructural development, community programs are necessary to ensure utilization of eye care services.^[10]

The main aim of this study was to collect information related to awareness and knowledge of eye health and common diseases that affect the eye among the people of the hilly region of Nepal.

METHODS

Study Design and Sample Size

A population-based cross-sectional study was conducted between 2008 and 2016 in eight village development committees (VDC) of eight districts. This comprised of four clusters in the central development region, two in the western development region, and one each in the midwestern and the eastern development regions. A proportionate stratified systematic sampling technique was employed in each cluster. Target population of each selected VDC and the unit of analysis were the individuals and the household, respectively. The sample frame of all households was obtained from each VDC office for this purpose. The households were listed serially, and each household was assigned a unique number. These households were again stratified based on their location within the wards of each VDC; the household sample was drawn based on the ethnic distribution in a proportionate manner within each ward of the VDC. The minimum number of households in a cluster was 648, with a maximum of 2642 households. The sample size was calculated based on the sample formula of proportion for an infinite population [$S = Z^{2*}p*(1-p)/c^2$] considering $Z = 1.96$ with 95% confidence interval, $P =$ percentage expressed as decimal (taken as 0.5 when it is not known) and $c =$ margin of error of 0.05. Using this method, we calculated a sample size of 372 households. This number was upgraded by a factor of 2.0 to account for cluster sampling design effects and adjusted for 20% non-response error. The sample size was estimated to be 1116. The final sample size arrived at was larger by a factor of 1.64 and included 1843 (16.0%) of a total of 11465 households.

Verbal informed consent was obtained from all study subjects prior to the survey. The study protocol was approved by the Ethics Committee of the Institute of Medicine and was in accordance with the Declaration of Helsinki.

Field Procedures

The survey questionnaire was developed by a team of ophthalmologists and optometrists. A week-long field orientation program was conducted by the faculties of Community Medicine and Public Health, Maharajgunj Medical Campus for preparation of the survey questionnaire and checklist of observations, data collection, and familiarization with the form and the situation on the field. A pre-testing of instrument and pre-pilot studies were conducted in a small village that was not included in the sample cluster.

Household data were collected from the head of the household or any other family member above 18 years of age, using a structured questionnaire. The eye diseases

for which awareness was assessed included cataract, glaucoma, night blindness, strabismus, and the effect of systemic diseases on the eye. The questionnaire was developed exclusively in the Nepali language. Colloquial terms for eye diseases in the local language were obtained from eye care personnel, patients, and experts in questionnaire formulation. All the questions were semi-structured. Those subjects who said they knew about any particular eye disease, were asked to describe the disease in their own words. The questionnaire included a list of possible responses. The response given by the subject was marked by field investigators (final year optometry students) against the closest match on the list of responses in the questionnaire.

Analysis

All data were entered into the statistical package of social sciences (SPSS). "Awareness" was defined as having previously heard of the specific eye disease; "knowledge" was defined as having some understanding of the disease. The association between knowledge of various eye diseases (cataract, strabismus, glaucoma, night blindness, and effect of systemic diseases on eye) was derived by the Chi-square test. The odds ratio was calculated for awareness of cataract and night blindness with 95% confidence interval. A *P* value ≤ 0.05 was considered as statistically significant.

RESULTS

Demographic distribution of subjects who participated in the survey is presented in Table 1. Most participants (33.4%) were between 31–40 years of age, followed by participants between 41–50 years of age (25.9%). There were more female (51.1%) compared to male (48.9%) participants. Regarding ethnic distribution, 796 (43.4%) participants belonged to the Upper Caste Group (Brahmin, Chhetry, Thakuri, and Yogi) followed by 236 (12.9%) in the Disadvantaged Janajatis group (Magar, Tamang, Rai, Limbu, Bhujel, Danuwar, and Mukhiya), and 227 (12.4%) in the Relatively Advantaged Janajatis group (Newar and Gurung). The majority of the participants (83.3%) were Hindus. Most of the participants had a secondary level of education (34.4%) and were involved in agriculture as occupation (48.6%).

Awareness about Eye-related Symptoms

Among the 1619 participants surveyed [Table 2], the most common eye-related symptoms included "burning, itching, foreign body sensation, or grittiness" in 526 (32.5%) participants. "Blurring of vision" was experienced by 460 (28.4%) participants while "pain or soreness in the eye" was experienced by 398 (24.6%) participants. The major causes of eye-related symptoms

Table 1. Demographic distribution of study population

Characteristics	n (%)
Age (years)	
18-30	360 (19.6)
31-40	613 (33.4)
41-50	474 (25.9)
51-60	284 (15.5)
>60	103 (5.6)
Sex	
Males	898 (48.9)
Females	936 (51.1)
Ethnicity	
Dalit (Group 1)	187 (10.2)
Disadvantaged janajatis (Group 2)	568 (31.0)
Religious minorities (Group 4)	56 (3.0)
Relatively advantaged janajatis (Group 5)	227 (12.4)
Upper caste group (Group 6)	796 (43.4)
Religion	
Hindu	1528 (83.3)
Buddhist	224 (12.2)
Christian	51 (2.8)
Muslim	31 (1.7)
Education	
Illiterate	310 (16.9)
Literate no formal education	236 (12.9)
Primary	347 (18.9)
Secondary	630 (34.4)
Higher secondary	193 (10.5)
Bachelor and above	118 (6.4)
Occupation	
Agriculture	892 (48.6)
Service	102 (5.6)
Business	102 (5.6)
Labors	221 (12.0)
Student	128 (7.0)
Others	389 (21.2)

were attributed to environmental pollution (24.5%), infection/germs (23.9%), and water pollution (21.0%). Most of the participants believed that eye hygiene (41.3%) and eating green vegetables and fruits (20.4%) could prevent eye illnesses.

Awareness and Knowledge of Cataract

A total of 1369 (74.6%) participants were aware of cataract [Table 3]. Knowledge about cataract was present in only 535 (39.1%) participants. Most of the participants had knowledge about the onset of cataract (49.8%), its treatment (64%) and location where treatment was available (82.8%). Most of the participants knew about cataract through eye camps, brochures, and pamphlets (58.7%) and from local health care professionals (21.3%). Awareness of cataract was significantly higher in the 31–40 year age

Table 2. Responses among those who were aware of eye illnesses (n=1619)

Response	Number of responses (%)
What are the eye illnesses?	
Vision blurring	460 (28.4)
Red eye	143 (8.8)
Pain/sore in eye	398 (24.6)
Burning/itching/foreign body sensation/grittiness	526 (32.5)
Watering/discharge	53 (3.3)
Others	39 (2.4)
What are the causes of eye illnesses?	
Infection/germs	387 (23.9)
Environmental pollution	397 (24.5)
Water borne/pollution	340 (21.0)
Genetic/congenital	93 (5.7)
Evil/god/supernatural	61 (3.8)
Aging/nutrition	32 (2.0)
Others	132 (8.2)
Don't know	177 (10.9)
What should you do to prevent eye illnesses?	
Visit in health centers	189 (11.7)
Eye hygiene	669 (41.3)
Visit in traditional healers	94 (5.8)
Eat green vegetables/fruits	330 (20.4)
Eye protection/glasses	128 (7.9)
Don't know	68 (4.2)
Others/nothing	141 (8.7)

group (81.1%; $P < 0.001$; OR, 1.73; 95% CI, 1.35–2.17) and the 51-60 year age group (81.0%; $P = 0.007$; OR, 1.54; 95% CI, 1.12–2.11) [Table 4]. Awareness was also significantly higher among higher caste groups (Brahmin and Chettry) (88.4%; $P < 0.001$; OR, 4.29; 95% CI, 3.34–5.54), among Hindus (75.9%; $P = 0.005$; OR, 1.46; 95% CI, 1.12–1.91), among groups with all levels of education, except the illiterate and the literate with no formal education. Awareness was also high among subjects involved in all occupations except laborers and others.

Awareness and Knowledge of Night Blindness

A total of 979 (53.4%) participants were aware of night blindness [Table 5]. Knowledge about night blindness was present in only 707 (72.2%) participants. Most of the participants had knowledge about the cause (52.1%) and prevention (41.4%) of night blindness. The majority of participants had knowledge of the source of vitamin A (80.2%). Demographic distribution [Table 4] showed a significantly higher level of awareness among higher ethnic groups (61.2%; $P < 0.001$; OR, 1.75; 95% CI, 1.45–2.11), Hindus (55.9%; $P < 0.001$; OR, 1.83; 95% CI, 1.43–2.35), those who had secondary level education (64.6%; $P < 0.001$; OR, 2.02; 95% CI, 1.65–2.49),

Table 3. Responses among those who were aware of cataract (n=1369)

Response	Number of responses (%)
What is cataract?	
A white spot in the eye	556 (40.6)
A white opacity in the lens*	102 (7.5)
A white opacity over the cornea	242 (17.7)
A white spot seen through the pupil*	433 (31.6)
Others	36 (2.6)
When does cataract develop/occur?	
Since birth	56 (4.1)
During childhood	47 (3.4)
Old age	682 (49.8)
Any age	272 (19.9)
Don't know	312 (22.8)
What is the cause of cataract?	
Age	356 (26.0)
Trauma	59 (4.3)
Congenital	118 (8.6)
Malnutrition	275 (20.1)
Don't know	486 (35.5)
Others	75 (5.5)
How did you know about cataract?	
Doctors/FCHV/paramedics/medicals	292 (21.3)
Eye camp/pamphlets/brochures	803 (58.7)
Friends/relatives/neighbors	171 (12.5)
Media-TV, radio, newspapers	71 (5.2)
Others	32 (2.3)
What is the treatment for cataract?	
Medicine	246 (18.0)
Surgery	876 (64.0)
Don't know	207 (15.1)
Others	40 (2.9)
Where should you go for treatment?	
Hospital/health facility	1133 (82.8)
Faith healer/traditional healer	32 (2.3)
No idea	171 (12.5)
Others	33 (2.4)

*Considered as knowledge. FCHV, female community health volunteer

bachelor level education (68.4%; $P < 0.001$; OR, 2.0; 95% CI, 1.34–2.98) and students (72.6%; $P < 0.001$; OR, 2.46; 95% CI, 1.65–3.67).

Awareness and Knowledge of Glaucoma, Strabismus, and Systemic Diseases

A total of 285 participants (17.4%) were aware of glaucoma [Table 6]. However, only 50.9% had knowledge of glaucoma. Awareness of strabismus was present in 1257 of 1776 participants (70.8%) [Table 7]. The majority of participants who were aware of glaucoma also had knowledge about it (92.3%). Most of them were aware of the cause of strabismus as congenital or

Table 4. Demographic distribution of awareness on cataract and night blindness

Characteristics	Cataract (n=1369/1834)				Night blindness (n=979/1834)			
	Yes, n (%)	No, n (%)	P	OR (95% CI)	Yes, n (%)	No, n (%)	P	OR (95% CI)
Age (years)								
18-30	253 (70.3)	107 (29.7)	0.033	0.75 (0.59-0.98)	208 (57.8)	152 (42.2)	0.062	1.25 (0.99-1.57)
31-40	497 (81.1)	116 (18.9)	<0.001	1.73 (1.35-2.17)	334 (54.5)	279 (45.5)	0.006	0.75 (0.61-0.92)
41-50	327 (67.0)	147 (33.0)	0.001	0.67 (0.53-0.85)	242 (51.1)	232 (48.9)	0.23	0.88 (0.71-1.08)
51-60	230 (81.0)	54 (19.0)	0.007	1.54 (1.12-2.11)	150 (52.8)	134 (47.2)	0.83	0.97 (0.75-1.25)
>60	63 (61.2)	40 (18.8)	<0.001	0.49 (0.32-0.73)	45 (43.7)	58 (56.3)	0.042	0.66 (0.44-0.98)
Sex								
Male	639 (71.2)	259 (18.8)	0.061	0.81 (0.66-1.01)	518 (57.7)	380 (42.3)	<0.001	1.17 (0.97-1.41)
Female	731 (78.1)	225 (11.9)	0.061	1.22 (0.99-1.50)	461 (48.2)	495 (51.8)	<0.001	0.85 (0.71-1.03)
Ethnicity								
G1	93 (49.7)	94 (50.3)	<0.001	0.28 (0.21-0.38)	67 (35.8)	120 (64.2)	<0.001	0.45 (0.32-0.61)
G2	358 (63.0)	210 (37.0)	<0.001	0.43 (0.34-0.53)	269 (47.4)	299 (52.6)	<0.001	0.70 (0.58-0.85)
G4	38 (67.9)	18 (32.1)	0.234	0.71 (0.40-1.25)	26 (46.4)	30 (54.6)	0.289	0.75 (0.44-1.28)
G5	176 (77.5)	51 (22.5)	0.218	1.23 (0.88-1.72)	130 (57.3)	97 (42.7)	0.20	1.19 (0.90-1.58)
G6	704 (88.4)	92 (11.6)	<0.001	4.29 (3.34-5.54)	487 (61.2)	309 (38.8)	<0.001	1.75 (1.45-2.11)
Religion								
Hindu	1160 (75.9)	368 (24.1)	0.005	1.46 (1.12-1.91)	854 (55.9)	674 (44.1)	<0.001	1.83 (1.43-2.35)
Buddhist	158 (70.5)	66 (29.5)	0.131	0.79 (0.58-1.07)	91 (40.6)	133 (59.4)	<0.001	0.55 (0.42-0.74)
Christian	39 (76.5)	12 (23.5)	0.761	1.11 (0.57-2.13)	22 (43.1)	29 (56.9)	0.13	0.65 (0.37-1.15)
Muslim	12 (38.7)	19 (61.3)	<0.001	0.21 (0.10-0.43)	12 (38.7)	19 (61.3)	0.098	0.54 (0.26-1.13)
Education								
Illiterate	143 (46.1)	167 (53.9)	<0.001	0.21 (0.16-0.27)	110 (35.5)	200 (64.5)	<0.001	0.41 (0.32-0.53)
Literate no formal education	130 (55.1)	106 (44.9)	<0.001	0.35 (0.27-0.47)	105 (44.5)	131 (55.5)	0.003	0.66 (0.50-0.87)
Primary	312 (89.9)	35 (10.1)	<0.001	3.6 (2.51-5.23)	164 (47.3)	183 (52.7)	0.011	0.74 (0.58-0.93)
Secondary	504 (80.0)	126 (20.0)	<0.001	1.56 (1.24-1.97)	407 (64.6)	223 (35.4)	<0.001	2.02 (1.65-2.49)
Higher secondary	174 (90.2)	19 (9.8)	<0.001	3.4 (2.1-5.55)	112 (58.0)	81 (42.0)	0.17	1.23 (0.91-1.67)
Bachelor and above	106 (89.8)	12 (10.2)	<0.001	3.17 (1.72-5.81)	81 (68.4)	37 (31.6)	<0.001	2.0 (1.34-2.98)
Occupation								
Agriculture	689 (77.2)	203 (22.8)	0.013	1.3 (1.06-1.61)	478 (53.6)	414 (46.4)	0.86	1.01 (0.84-1.22)
Service	94 (92.2)	8 (7.8)	<0.001	4.2 (2.03-8.73)	65 (63.7)	37 (36.3)	0.031	1.57 (1.03-2.37)
Business	90 (88.2)	12 (11.8)	0.001	2.65 (1.44-4.9)	59 (57.8)	43 (42.2)	0.35	1.21 (1.81-1.81)
Labors	154 (69.7)	67 (31.3)	<0.001	0.75 (0.55-1.02)	100 (45.2)	121 (54.8)	0.009	0.69 (0.52-0.91)
Student	109 (85.1)	19 (14.9)	0.004	2.0 (1.23-3.34)	93 (72.6)	35 (27.4)	<0.001	2.46 (1.65-3.67)
Others	233 (59.9)	156 (41.1)	<0.001	0.4 (0.32-0.51)	184 (47.3)	205 (42.7)	0.006	0.73 (0.58-0.91)

Ethnicity: Dalit (G1), Disadvantaged janajatis (G2), Religious minorities (G4), Relatively advantaged janajatis (G5), Upper caste group (G6). OR, Odds ratio; CI, Confidence interval

hereditary (39.8%) and its treatment (42.5%). Impairment of vision (37.7%) and cosmetic distortion (27.3%) were reported to be the major drawbacks of strabismus. Among 960 participants, systemic illnesses were reported in 180 (18.7%). Hypertension (52.2%) and asthma (22.9%) were the most common systemic illnesses [Table 8]. Only 34 participants (18.9%) had undergone an eye checkup for systemic illnesses. Awareness about systemic illnesses was noted in 446 (46.5%) participants. Most of them were aware of systemic illnesses from their own personal affliction (28.9%), or from health care professionals (23.3%).

DISCUSSION

The findings of the present study represent population-based data. The Rapid Assessment of Avoidable Blindness (RAAB) Survey had previously reported the prevalence of blindness in 0.39% of the population in Nepal^[3] with cataract as the major etiological factor. The present study was the report of the community eye health project of BP Koirala Lions Centre for Ophthalmic Studies, Institute of Medicine. The findings of this study may be useful in planning health education in the study population and to

Table 5. Responses among those who were aware of night blindness (n=979)

Response	Number of response (%)
Difficulty to see in low light/night	707 (72.2)
What is the cause of night blindness in children?	
Vitamin A deficiency*	487 (49.7)
Malnutrition*	23 (2.3)
Don't know	369 (37.7)
Others	100 (10.3)
How can we prevent night blindness?	
Food-green leafy vegetables, yellow fruits, meat and fish*	405 (41.4)
Hospital	63 (6.4)
Others	65 (6.6)
Don't know	446 (45.6)
What are the sources of vitamin A?	
Food-green leafy vegetables, yellow fruits*	630 (64.3)
Food-mean and fish*	73 (7.5)
Vitamin A capsule*	82 (8.4)
Don't know	162 (16.5)
Others	32 (3.3)

*Considered as knowledge

Table 6. Responses among those who were aware of glaucoma (n=285*)

Response	Number of response (%)
What is glaucoma?	
High pressure inside eye*	97 (34.1)
Damage to the nerve of eye due to high pressure*	48 (16.8)
Age related decrease in vision	36 (12.6)
Don't know	86 (30.2)
Others	18 (6.3)
Is vision loss in glaucoma reversible or permanent?	
Reversible	59 (20.7)
Permanent*	48 (16.8)
Don't know	178 (62.5)

*Considered as knowledge, #Awareness derived from 1634 participants

increase awareness and knowledge about common eye diseases.

Among the study population, awareness of cataract (74.6%) was higher than expected, but the knowledge was poor (29.2%). Eye camps, brochures, pamphlets, and information from medical professionals had a major role in creating awareness about cataract. Similar findings were reported by Dandona et al,^[12] Sapkota et al,^[13] and Attebo et al.^[11] In contrast to our findings, the source of awareness was mostly from family members, friends, and relatives suffering from cataract in

the study by Dandona et al. The same authors also reported that awareness of cataract was higher among Muslims and increased with age and educational status. Similarly, Sapkota et al reported that a significant proportion of participants had awareness about cataract (72%) and eye camps (63.2%) were the major source of information,^[13] similar to our findings. Attebo et al reported that 98% of subjects were aware of cataract; however, only 20% had some knowledge about it.^[11] A study of cataract surgery in south India and different zones of Nepal reported that individuals who were likely to be more aware of cataract surgery tended to be male, literate, and more affluent than those who were unaware.^[14,15] In our study, awareness of cataract was significantly related to the level of education [Table 3]. The majority of subjects were aware that the treatment for cataract was surgical (64%). Awareness regarding treatment of cataract was higher in the Dandona et al study (82.8%).^[12] However, awareness was less compared to our findings in a study conducted at the Takeo Province in Cambodia (18.6%).^[16]

Awareness of glaucoma among participants was poor in our study (17.4%); it was even less in the Dandona et al study (2.4%).^[12] A reasonable level of awareness (70%) was reported by Livingston et al and Attebo et al, (93%) in Australia.^[11,17] A higher level of awareness (90%) was reported in the 2005 KAP (knowledge, attitudes, and practice) study, conducted by National Eye Institute.^[18] Knowledge of glaucoma was even less in our study (8.9%) and other studies by Livingstone et al (22%) and Attebo et al (29%). It is important to improve awareness of glaucoma in this population particularly because it is difficult to detect because of its silent nature. It is slowly progressive and leads to irreversible loss of vision. Early detection and treatment could prevent progression. Hence, education on the importance of periodic eye examination should be imparted to prevent glaucoma-related loss of vision.

We found a moderate level of awareness regarding night blindness (53.4%); 72.2% of those who were aware had knowledge of this illness. However, knowledge regarding night blindness was higher than for cataract (OR, 1.5; CI, 1.33–1.75; $P < 0.001$) and glaucoma (OR, 6.4; CI, 5.30–7.82; $P < 0.001$). Our findings on awareness were similar to the previous report by Dandona et al (55.8%). Knowledge regarding night blindness was less (33.4%) in that study.^[12] In the present study, knowledge regarding the cause of night blindness was also moderate (52%), and most of the participants did not know about the method to prevent night blindness (45.6%). However, most participants (80.2%) had knowledge of the source of vitamin A. Dandona et al reported that lack of awareness regarding night blindness was related to female gender, low socio-economic status, and ethnic minority groups.^[12] In our study, night blindness was significantly related to the level of education [Table 3].

Table 7. Responses among those who were aware of strabismus/crossed eye (n=1257*)

Responses	Number of response (%)
What is strabismus (n=1257)?	
Deviation of eyes*	973 (77.4)
Squeezing of eyes in bright light	60 (4.8)
Looking sideway	37 (2.9)
Nonparallel alignment of eyes*	187 (14.9)
What can cause strabismus (n=1135)?	
Congenital/hereditary	452 (39.8)
Trauma to eye	79 (7.0)
Blessings/curse/luck	91 (8.0)
Diseases of eye	112 (9.9)
Gazing at intense light	97 (8.5)
Others	53 (4.7)
Don't know	251 (22.1)
Is there any remedy for strabismus (n=881)?	
Yes	374 (42.5)
No	459 (52.1)
Don't know	48 (5.4)
What could be the problem with strabismus (n=881)?	
Cosmetic distortion	241 (27.3)
Loss of confidence	56 (6.4)
Psychological trauma	112 (12.7)
Problem with marriage	104 (11.8)
Decrease vision	332 (37.7)
Others	36 (4.1)

*Considered as knowledge, #Awareness derived from 1776

Knowledge of night blindness should be increased to prevent childhood blindness. Childhood blindness due to vitamin A deficiency is still a major public health issue in India^[19] and Nepal.^[20] Coverage of the national vitamin A program was reported to be excellent and successful in Nepal.^[21] The awareness campaign along with the vitamin A distribution program could be a boon to increase awareness and prevent preventable blindness.

Unlike the Geta and Bejiga study (100%)^[22] and Takeo Province study (94%),^[16] we noted that 1257 participants (70.8%) were aware of strabismus and the majority of participants (92.3%) had knowledge about it. However, we noted that knowledge of strabismus among the participants was higher [Table 8] than knowledge of cataract (OR, 4.6; CI, 3.97–5.26; $P < 0.001$), glaucoma (OR, 19.9; CI, 16.30–4.25; $P < 0.001$), and night blindness (OR, 3.0; CI, 2.62–3.44; $P < 0.001$). Only 374 participants (42.5%) were aware of the treatment of strabismus. Awareness about treatment was even less in a previous study (32.1%).^[22] Participants reported that the potential problems with strabismus were loss of vision (37.7%) and cosmetic distortion (27.3%).

Table 8. Responses among those who were aware of systemic diseases

Response	Number of responses (%)
Do you have any systemic illness? (n=960)	
Yes	180 (18.7)
No	671 (69.9)
Don't know	109 (11.4)
What are they (n=180)?	
Hypertension	94 (52.2)
Diabetes	24 (13.3)
Arthritis	21 (11.7)
Asthma	41 (22.8)
Did you undergo eye check-up for systemic illness (n=180)?	
Yes	34 (18.9)
No	146 (81.1)
Could systemic illness affect eye? (n=960)	
Yes*	446 (46.5)
No	196 (20.4)
Don't know	318 (33.1)
How did you come to know about effect of systemic illness in eye (n=446)?#	
Doctors/FCHV/paramedics/medicals	104 (23.3)
Eye camp/pamphlets/brochures	44 (9.9)
Friends/relatives/neighbors	96 (21.5)
Sufferings from systemic diseases	129 (28.9)
Media-TV, radio, newspapers	52 (11.7)
Others	21 (4.7)

*Considered as knowledge, #For the participants who were aware about effect of systemic diseases on eye. FCHV, female community health volunteer

Psychological trauma (12.7%) and difficulty in finding a marriage partner (11.8%) were also noted. Similar findings were also noted in the Geta and Bejiga study (2011). The source of information was seen to be neighbors and relatives in the above study.^[22] Strabismus is a treatable condition that requires identification and treatment at an early age. Usually, poor knowledge, misconception, and misinformation adversely affect the time of presentation and management of strabismus.^[23] Strabismus is one of the common causes of amblyopia. Prevalence of strabismus was reported to be between 0.4% to 2.5% among school children in Nepal.^[24-27] Though this may seem low, there is growing evidence of the psychological impact, loss of opportunities, and deteriorating interpersonal relationship.^[28-31]

We found that only 446 participants (46.5%) were aware of the effect of systemic diseases on the eye. Only 34 participants (18.9%) with systemic illnesses had undergone an eye checkup. Hypertension (52.2%) was the most common systemic illness reported. Most had heard about it from their own personal experience (28.9%),

medical professionals (23.3%), and friends, relatives, or neighbors (21.5%). Most published articles have reported knowledge on the effect of diabetes on the eye. In the National Eye Institute 2005 survey, 51% subjects had awareness on diabetes-related eye diseases.^[18] Dandona et al reported that awareness of the possibility of diabetes causing impaired vision was low (28.6%); awareness was higher in subjects belonging to the upper and middle socioeconomic strata. In the above report, subjects heard about diabetic eye diseases mostly from family members, friends, or relatives suffering from it.^[12] Awareness of diabetes-related eye diseases was less (8%) in the Takeo province study.^[16] In the Pikayi et al (2013) study, 25 subjects (100%) having diabetes and attending diabetes clinics had knowledge of the effect of diabetes on the eye and stated that blindness and diabetic retinopathy were the major complications of diabetes.^[32]

Though we noted that knowledge of common eye diseases is generally lacking, this finding cannot be generalized because the study did not include subjects from the urban area and the population from the far western, the Terai and the mountainous regions of Nepal. In conclusion, there is a need to increase awareness and knowledge of common eye diseases for the prevention, early treatment, and regarding access to available eye care services in these regions. This may enable minimization of visual impairment and cost of eye care.

Financial Support and Sponsorship

Nil.

Conflicts of Interest

There are no conflicts of interest.

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