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ORIGINAL RESEARCH

Knowledge of Childhood Blindness and Associated Factors Among Parents or Guardians in Maksegnit Town, Northwest Ethiopia

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Natnael Lakachew Assefa
Kalkidan Getahun Tolessa
Ayanaw Tsega Ferede

Department of Optometry, School of Medicine, College of Medicine and Health Sciences and Comprehensive Specialized Hospital, University of Gondar, Gondar, Ethiopia

Introduction: Childhood blindness is defined as a group of eye diseases occurring in childhood or early adolescence. Good parental knowledge of childhood blindness is important for early detection and management of the lifelong burden.

Purpose: This study aimed to assess knowledge of childhood blindness and associated factors among parents or guardians.

Materials and Methods: A community-based cross-sectional study was conducted. Systematic random sampling was used to select the study participants. Data were collected by interview using a pre-tested semi-structured questionnaire. The collected data were analyzed by SPSS version 20. Multivariate logistic regression was used to identify the determinant factors, and *p*-values less than 0.05 were considered as statistically significant.

Results: A total of 524 participants were enrolled in the study, with a 98.49% response rate. The proportion of good knowledge of childhood blindness was 39.1% (95% CI: 34.9–-43.3%). Being male (AOR=2.32, 95% CI: 1.4–3.87), higher educational status (AOR=6.47, 95% CI: 2.4–17.3), knowing where the child eye care center is (AOR=2.68, 95% CI: 1.5–4.7) and participation in eye care campaigns (AOR=1.95, 95% CI: 1.26–3.0) had statistically significant associations with knowledge of childhood blindness.

Conclusion: Less than half of the study participants had good knowledge about childhood blindness. Being male, having higher educational status, knowing about the child eye care center and participation in eye care campaigns were positively associated with knowledge of childhood blindness.

Keywords: childhood blindness, knowledge, Maksegnit, Ethiopia

Introduction

The World Health Organization (WHO) refers to childhood blindness as

> a group of eye diseases occurring in childhood or early adolescence, which (if left untreated) may result in severe visual impairment or blindness that is likely to be untreatable later in life.[1,2]

It can also be defined as best corrected visual acuity in the better eye of less than 3/60 in those less than 16 years of age.[3] Globally, childhood blindness accounts for 4% of cases of blindness and 1% of visual impairment.[4] Based on the WHO 2017 report, childhood blindness was estimated at 1.14 million across the world, with more than 80% of these children living in developing countries.[5] The prevalence of blindness in children varies with the socio-economic level of countries, ranging

Correspondence: Natnael Lakachew Assefa
University of Gondar, PO Box 196, Gondar, Ethiopia
Tel +251-9-10-08-89-03
Email natiuog@gmail.com

from 0.3 to 1.5 per 1000 in high-income and low-income countries, respectively.[6,7] In Ethiopia, childhood blindness is estimated at 0.1–6% of the total cases of blindness.[8]

Globally, there is a wide variation in the causes of childhood blindness, based on the income level of the society, and more than 75% of these causes are avoidable.[9,10] The common causes associated with childhood blindness in the poorest countries of Africa are corneal scarring due to vitamin A deficiency, measles infection, ophthalmia neonatorum and the use of harmful traditional eye remedies, which account for 47% of cases of blindness. Retinopathy of prematurity, non-preventable hereditary eye disease and cortical blindness are common in middle- and high-income countries.[9,11] In all the WHO regions, corneal opacity, cataract and retinopathy of prematurity are the leading causes of visual impairment and childhood blindness.[6] A study conducted in Ethiopia reported that refractive error was the leading cause of childhood blindness.[12]

Childhood blindness has a great impact at the individual level, with a negative effect on personal development and educational performance, placing an economic burden on the family and the country at large.[6,13] According to the primary health care strategy of the WHO, the first aim is health promotion by providing health education targeting mothers and women of child-bearing age, teachers, and religious and community leaders.[7] Adequate early childhood interventions are essential for detecting eye health problems in children and providing timely treatment to prevent the consequence of development of amblyopia and irreversible lifelong blindness.[6,14]

In most of the initiatives aiming to prevent childhood blindness, information regarding the knowledge held by parents and care givers about childhood blindness is essential.[15] Since children, especially preverbal ones, cannot complain of poor vision, it is up to the parents and care givers to detect it and ensure that children receive the help they need.[14]

Studies conducted in developing countries report that the proportion of good knowledge of childhood blindness was 23% in Ghana,[15] 43.9% in Swaziland[16] and 28.1% in Ethiopia.[17] Studies report that many factors affect people's knowledge of childhood blindness. Higher educational status,[3,18] age,[19] media exposure and knowledge of a child eye care center[17,19] were significant factors associated with good knowledge of childhood blindness.

Even though childhood blindness is considered a priority in the WHO initiative of "VISION 2020: The Right to Sight", there have been limited studies conducted regarding childhood blindness in the study area. By considering the critical role of parents and care givers in the early detection of childhood blindness, studies should be conducted to assess the level of knowledge of childhood blindness. Therefore, the aim of this study was to estimate the level of parents' or guardians' knowledge of childhood blindness. The results may be beneficial to health authorities to enable them to plan strategies for the prevention of childhood blindness in Ethiopia.

Materials and Methods

Study Setting, Design and Sampling

A community-based cross-sectional study was conducted in Maksegnit town. Maksegnit town is located in North Gondar, Amhara Regional State, 40 km from Gondar town, Ethiopia. It has a total population of 11,444 (5544 males and 5900 females) living in 3580 households. There is only one health center in the town, but there are no allied eye care professionals (2007 unpublished data from Maksegnit town health extension workers' monthly vital statistics). All parents or guardians had lived in the town for at least 6 months and had at least one child under 16 years.

Sample size was determined with the single population proportion formula: $n = \frac{(Z_{\alpha/2})^2 P(1-P)}{d^2}$ (n=sample size, Z=value of the z statistic at 95% confidence level=1.96, P=proportion of good knowledge 28.1% =0.281[17], d=maximum tolerable error (marginal error) 4%=0.04, n=485). By adding a 10% non-response rate, the final sample size was estimated at 532. A systematic random sampling method was employed to select the households using an interval of constant (k=7, where k was calculated as the total households [3580] divided by the sample size [532]).

After selecting the first household with the lottery method among the first seven houses, the next house was selected by adding 7. If the first selected household did not have children, the next immediate household was selected, and the sampling fraction was added to find the next household. If more than one eligible parent or guardians was found in the selected household, a lottery method was used to recruit the sample.

Definition of Knowledge

Knowledge

Knowledge was assessed by asking 14 questions (five questions about the causes of childhood blindness, six-questions about prevention of childhood blindness and

Table 1 Proportion of Knowledge of Causes, Prevention and Treatment of Childhood Blindness Among Parents or Guardians in Maksegnit Town (n=524, n=Sample Size)

Variables	Frequency (n)	Percentage (%)
Causes of childhood blindness		
Cataract	165	31.5
Night blindness	170	32.4
Glaucoma	173	33
Refractive error	125	23.9
Ophthalmia neonatorum	112	21.4
Prevention of childhood blindness		
Facial cleanliness	199	38
Environmental cleanliness	197	37.6
First eye examination at 6 months	159	30.3
Eye glasses	169	32.3
Antibiotic at birth	195	37.2
Timely vaccination	199	38
Treatment of childhood blindness		
Eye glasses	141	26.9
Eye drops	151	28.8
Eye surgery	150	28.6

three questions about treatment of childhood blindness) (Table 1).Correct answers were given a score of 1 and incorrect answers a score of 0. The median was calculated from the total score, which was 12. Participants with a score on or above the median on the knowledge questions were said to have a good knowledge, while those with a score below the medianhad a poor knowledge.

Participation in Eye Care Campaign

Study participants who had participated at least once in any eye care community outreach service by either organizing or providing other services in the campaign were counted as having participated in an eye care campaign.

Data Collection Procedures

Data were collected using a pretested structured questionnaire through a face-to-face interview with the parent or guardian which contained socio-demographic factors and knowledge-related questions. The questionnaire was checked for reliability using a reliability test, with a Cronbach's alpha value of 71%.

Statistical Analysis

All the collected data were entered, coded and cleaned in Epi Info 7 and then exported to SPSS version 20 and analyzed. Descriptive results were presented as frequencies, percentages, charts, tables, graphs and summary statistics. A binary logistic regression model was used to determine associations between visual impairment and independent variables. A multivariable binary logistic regression model was used to determine the factors adjusted for potential confounders. The adjusted odds ratio (AOR) and 95% confidence interval (CI) were used to show the strength of associations. Model fitness was checked by the Hosmer and Lemeshow goodness-of-fit test. Multicollinearity was checked by the variable inflation factor (VIF), which was less than 10 (all values were less than 1.84) and the tolerance was greater than 0.1 (all values were greater than 0.54). Finally, those factors with a *p*-value of less than 0.05 were considered as statistically significant.

Results

Socio-Demographic Characteristics of the Study Population

A total of 524 participants were enrolled in the study, with a 98.49% response rate. The median age of participants was 35 years (interquartile range: 30–41 years). Among the study participants, 328 (62.6%) were female; and 130 (28.2%) of the study participants were unable to read and write (Table 2).

Ocular Examination-Related Characteristics of Study Participants

Among the study participants, 416 (79.4%) did not know where the child eye care center was and 276 (52.7%) had participated in an eye care campaign (Table 3).

Knowledge of Study Participants About Childhood Blindness

Among the study participants, 205 (39.1%; 95% CI: 34.9–43.3%) had a good knowledge of childhood blindness (Figure 1).

Furthermore, 173 (33%) knew that glaucoma is a cause of childhood blindness and 199 (38) knew that facial cleanliness prevents childhood blindness (Table 1).

Factors Associated with Knowledge of Study Participants About Childhood Blindness

In multivariable analysis, being male, educational status, knowing where the childeye care center was and participation in an eye care campaign had statistically significant associations with knowledge of childhood blindness. Males

Table 2 Socio-Demographic and Socio-Economic Characteristics of the Study Participants in Maksegnit Town, Northwest Ethiopia (n=524, n=Sample Size)

Variables	Frequency (n)	Percentage (%)
Sex		
Female	328	62.6
Male	196	37.4
Age (years)		
18–30	141	26.9
31–35	142	27.1
36–41	112	21.4
>41	129	24.6
Religion		
Orthodox	363	69.3
Muslim	150	28.6
Others*	11	2.1
Educational status		
Unable to read and write	130	24.8
Only read and write	57	10.9
Primary level	109	20.8
Secondary level	80	15.3
College and above	148	28.2
Marital status		
Single	36	6.9
Married	412	78.6
Divorced	50	9.5
Widowed	26	5.0
Occupation		
Housewife	143	27.2
Merchant	136	26.0
Government employee	123	23.5
Private employee	67	12.8
Farmer	42	8.0
Others**	13	2.5
Monthly income (US$)		
≤25.00	142	27.1
26.00–47.00	142	27.1
48.00–97.00	111	21.2
>97.00	129	24.6
Relation to child		
Parent	491	93.7
Guardian	33	6.3
Number of children		
≤2 children	272	51.9
>2 children	252	48.1
Media exposure		
Have television/radio	382	72.9
No television/radio	142	27.1

Notes: *Protestant (6), Catholic (5); ** job seekers (8), students (5).

Table 3 Ocular Examination-Related Characteristics of Study Participants in Maksegnit Town, Northwest Ethiopia (n=524, n=Sample Size)

Variables	Frequency (n)	Percentage (%)
Know child eye care center		
Yes	108	20.6
No	416	79.4
Importance of regular eye examination		
Yes	412	78.6
No	112	21.4
Participation in eye care campaign		
Yes	276	52.7
No	248	47.3
Family member with eye problem		
Yes	217	41.4
No	307	58.6
Parental eye examination		
Yes	215	41.0
No	309	59.0

were two times more likely to have a good knowledge of childhood blindness than females. Participants with an educational status of college or above were six times more likely to have a good knowledge of childhood blindness compared to those who were unable to read and write. Parents or guardians who knew where the child eye care center was three times more likely to have a good knowledge of childhood blindness than those who did not know where the child

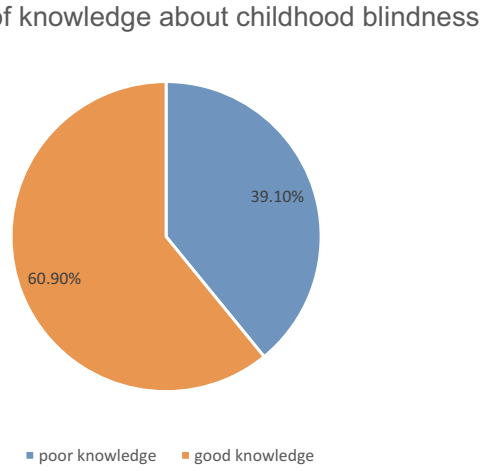

Figure 1 Knowledge of study participants of childhood blindness in Maksegnit town, northwest Ethiopia (n=524, n=sample size).

eye care center was. Participants who had participated in an eye care campaign were two times more likely to have a good knowledge of childhood blindness than those who had not participated (Table 4).

Discussion

The proportion of good knowledge of childhood blindness in this study was 39.1% (95% CI: 34.9–43.3%), which is higher than in other studies performed in Gondar rural districts (28.1%),[17] in South Darfur state of Sudan (11.9%)[20] and in rural Ghana (23%).[15] The discrepancy between these studies and the present study may be due to the study participants' educational status and residence. Half of the study participants (48.1%) in the study in Gondar rural districts were unable to read and write[17] whereas in this study only 24.8% of the study participants

Table 4 Factors Associated with Knowledge of Childhood Blindness Among Parents or Guardians in Maksegnit Town, Northwest Ethiopia (n=524, n=Sample Size)

Factors	Knowledge		COR (95% CI)	AOR (95% CI)	*p*-Value
	Good	Poor			
Age (years)					
18–30	50	91	1.00	1.00	
31–35	56	86	1.18 (0.73, 1.91)	1.25 (0.7, 2.2)	0.418
36–41	46	66	1.26 (0.76, 2.11)	1.22 (0.65, 2.3)	0.569
>41	53	76	1.26 (0.77, 2.07)	1.03 (0.54, 1.9)	0.837
Sex					
Female	109	219	1.00	1.00	
Male	96	100	1.92 (1.34, 2.77)	2.32 (1.4, 3.87)	**0.002**
Religion					
Christian	149	225	1.00	1.00	
Muslim	56	94	0.92 (0.6, 1.32)	0.9 (0.56, 1.46)	0.553
Marital status					
Single	13	23	1.00	1.00	
Married	168	244	1.22 (0.6, 2.47)	1.15 (0.46, 2.6)	0.773
Divorced	15	35	0.75 (0.30, 1.85)	0.96 (0.32, 2.9)	0.896
Widowed	9	17	0.94 (0.33, 2.69)	1.74 (0.47, 6.46)	0.408
Educational status					
Cannot read and write	23	139	1.00	1.00	
Only read and write	15	42	2.15 (1.03, 4.51)	2.1 (0.94, 4.8)	0.079
Primary education	51	68	4.53 (2.56, 8.02)	4.2 (2.13, 8.25)	**0.0001**
Secondary education	42	43	5.90 (3.19, 10.9)	3.8 (1.7, 8.76)	**0.001**
College and above	74	27	16.6 (8.88, 30.9)	6.47 (2.4, 17.3)	**0.0001**
Monthly income (US$)					
≤25.00	35	107	1.00	1.00	
26.00–47.00	40	102	1.19 (0.71, 2.03)	1.15 (0.63, 2.11)	0.653
48.00–97.00	48	63	2.32 (1.36, 3.97)	1.12 (0.58, 2.2)	0.694
>97.00	82	46	5.45 (3.22, 9.22)	1.46 (0.69, 3.10)	0.316
Occupation					
Housewife	26	117	1.00	1.00	
Government employee	86	37	10.5 (5.89, 18.6)	2.14 (0.94, 4.9)	0.089
Merchant	24	43	2.51 (1.3, 4.8)	0.92 (0.5, 2.06)	0.951
Private employee	58	78	3.34 (1.9, 5.76)	1.23 (0.62, 2.43)	0.508
Farmer	8	34	1.05 (0.43, 2.55)	0.52 (0.18, 1.49)	0.226
Others*	3	10	1.35 (0.34, 5.25)	0.41 (0.08, 1.93)	0.232

(*Continued*)

Table 4 (Continued).

Factors	Knowledge		COR (95% CI)	AOR (95% CI)	*p*-Value
	Good	Poor			
Relation to child					
Guardian	11	22	1.00	1.00	
Parent	194	297	1.31 (0.62, 2.75)	1.17 (0.48, 1.46)	0.918
Media exposure					
No	43	99	1.00	1.00	
Yes	162	220	1.69 (1.12, 2.56)	0.57 (0.32, 1.02)	0.480
Know child eye care center					
No	131	285	1.00	1.00	
Yes	74	34	4.74 (3.00, 7.46)	2.68 (1.53, 4.71)	**0.001**
Participation in eye care campaign					
No	81	167	1.00	1.00	
Yes	124	152	1.68 (1.17, 2.4)	1.95 (1.26, 3.00)	**0.002**

Notes: *Job seekers (8), students (5). Boldfigure: statistically significant.
Abbreviations: CI, confidence interval; COR, crude odds ratio; AOR, adjusted odds ratio.

were unable to read and write.[15] Participants in the studies in Gondar rural district and rural Ghana were rural residents, while the present study participants were urban residents. In both situations, urban residents may have access to better information than rural residents, which may be the reason why they had good knowledge of childhood blindness.

The proportion of good knowledge of childhood blindness in this study was lower than that reported in other studies from Ghana (76%)[3] and India (78%).[21] One possible reason for this difference may be that the study settings for the previous studies being hospital based, whereas the current study was community based. Participants who visit the hospital may have a good opportunity to access health professionals and obtain information about childhood blindness compared to participants in studies conducted at the community level.

The proportion of good knowledge of childhood blindness in this study was in line with other studies in Swaziland (43%)[16] and Honduras (43%).[22]

In this study, being male was positively associated with good knowledge of childhood blindness, which was similar to the findings of other studies carried out in Ghana,[15] Nigeria[23] and Nepal.[19] This may be due to the higher educational level observed in males and it may also be attributable to the working condition of males, which involves more social interaction. In addition, women are more likely to have less disposable income, which may result in less opportunity for visiting health services, which provide information on childhood blindness from health professionals.

Participants who had an educational status of college or above were positively associated with a good knowledge of childhood blindness, which was supported by studies conducted in Ghana,[3] Gondar rural districts[17] and Nepal.[19] This may be because of educated parents being more likely to seek health facilities, thus obtaining information regarding childhood blindness from qualified personnel.

Participants who knew where the children's eye care center was were positively associated with a good knowledge of childhood blindness, which was supported by other studies from Gondar rural districts[17] and Nigeria.[23] This may be due to those parents or guardians who know where the children's eye care is located having a better practice of taking children to the eye clinics and receiving information from eye care practitioners.

Participation in eye care campaigns was positively associated with a good knowledge of childhood blindness. This association could be attributed to the study participants receiving health information from the professionals whom they encounter at their outreach visits.

This study may have some inherent limitations due to the cross-sectional study design and information bias due to the tools that were used to collect data on participation in an eye care campaign, meaning that subjects had participated at least once in any eye care community outreach service by either organized or other direct services.

Conclusion

Less than half of the study participants had good knowledge of childhood blindness. Being male, having higher educational status, knowledge of where the child eye care center is, and having participated in an eye care campaign were positively associated with knowledge of childhood blindness.

Data Sharing Statement

All the data supporting the findings are contained within the manuscript.

Ethics Approval and Informed Consent

Ethical approval was obtained from the Institutional Review Board (IRB) of University of Gondar, College of Medicine and Health Sciences, in accordance with the Declaration of Helsinki. A written letter of permission was obtained from Maksegnit town Administrative Office. Because the data were collected only by an interviewer-administrated questionnaire, verbal informed consent was obtained from each of the study participants. All study participants were informed about the purpose of the study, and their right to refuse and withdraw from the study at any time. Confidentiality was also maintained through an anonymous questionnaire by excluding identifiers and using codes. Moreover, personal data were secured by storing data in a password-protected computer not used by others, and the questionnaires were put in a locked cabinet.

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