

Prevalence and risk factors of active trachoma among primary school children of Amhara Region, Northwest Ethiopia

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Purpose: Trachoma is the leading infectious cause of blindness in the world. It is caused by conjunctival infection with the bacterium *Chlamydia trachomatis*. The objective of this study was to determine the prevalence and risk factors of active trachoma among primary school children in Amhara region, Ethiopia. **Methods:** A cross-sectional study was conducted from April to May 2018. Data on sociodemographic and health characteristics of a child were collected using a structured questionnaire and eye examination for this study. Bivariate and multiple logistic regression statistical analyses were used to determine the prevalence and risk factors of active trachoma among primary school children living in Amhara region, Northwest Ethiopia. **Results:** The prevalence of active trachoma among primary school children living in Amhara region was 10.3% in this study. The results of multiple logistic regression analysis revealed that children who wash their face at least two times per day (AOR = 0.37, 95% CI: 0.14–0.97), children with no flies on their face (AOR = 0.12, 95% CI: 0.10–0.30) had significantly lower risk of being infected by trachoma and children of households who spend 30 min to 1 h to fetch water (AOR = 10.02, 95% CI: 1.10–93.53) had significantly higher risk of being infected by trachoma in the study area. **Conclusion:** The result of this study showed that risk factors: frequency of face washing per day, presence of flies on child's face during interview, and time required to fetch water for the household were found to be significantly associated with trachoma. Therefore, the study recommends that any concerned bodies directed at prevention and control of trachoma among primary school children living in Amhara region should give special attention to these factors. Implementing the World Health Organization (WHO) endorsed SAFE (Surgery, Antibiotics, Facial cleanliness, Environmental improvement) strategy was recommended for the effective prevention and control of trachoma in the study area since the prevalence of active trachoma, 10.3% was higher than the WHO recommended thresholds (>10% prevalence).

Key words: Active trachoma, logistic regression, prevalence, primary school, risk factor

Trachoma, a neglected tropical disease, is the world's leading infectious cause of blindness.^[1,2] It is caused by conjunctival infection with the bacterium *Chlamydia trachomatis*. The infection spreads through personal contact (via hands, clothes, or bedding) and by flies that have been in contact with discharge from the eyes or nose of an infected person. Trachoma is the disease of poverty that affects over one billion of the world's poorest people.^[3,4] It affects 37 countries in Africa, Asia, Central and South America, Australia, and the Middle East. High burden of trachoma disease is found in Africa especially sub-Saharan Africa.^[5,6] Eighteen million cases of active trachoma (85% of all cases globally) and 3.2 million cases of trichiasis (44% of all cases globally) are thought to exist in 29 of the 47 countries in World Health Organization's (WHO) African Region. Ethiopia and South Sudan have the highest prevalence of active trachoma: In some areas of these countries, active disease is present in more than 50% of children aged 1–9 years and trichiasis affects more than 10% of adults.^[5]

According to the recent WHO weekly epidemiological record, trachoma is estimated to be responsible for the visual

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impairment of about 1.9 million people, of whom 1.2 million are irreversibly blind. Approximately 158 million people worldwide were living in trachoma-endemic districts and were at risk of trachoma blindness.^[7] The burden of trachoma on affected individuals and communities is enormous. According to the WHO factsheets, the economic cost in terms of lost productivity from blindness and visual impairment is estimated at US\$2.9– US\$5.3 billion annually, increasing to US\$8 billion when trichiasis is included. While children are the most susceptible to infection, the blinding effects of repeated infection do not usually develop until adulthood. Women are up to four times more likely as men to develop trichiasis, in part because of repeated exposure to their children's infections.^[7] The disabling effects of vision loss further compounds other common challenges faced by poor and marginalized people.

The Global Alliance for the Elimination of Trachoma by 2020 (GET-2020) was established by WHO in 1997 and endorsed

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by the World Health Assembly (WHA) in 1998 through WHA Resolution 51:11 for the purpose of coordinating and providing technical and logistical support for member states in the process of implementing the SAFE (Surgery, Antibiotics, Facial cleanliness, Environmental improvement) strategy.^[8] It was stated that the goal of the GET 2020 Alliance is to achieve the global elimination of blinding trachoma as a public health problem by mobilizing resources with the cooperation of a worldwide partnership of member states, nongovernmental organizations, and the private sector.

Number of studies have been done in the Amhara regional state previously.^[9-11] But, there is no or limited number of studies on prevalence and determinants of active trachoma among primary school children in the study area. Therefore, this study was intended to determine the prevalence and risk factors of active trachoma among primary school children living in Amhara region, Northwest Ethiopia.

Methods

Data source

Data on sociodemographic and health characteristics of a child were collected using a structured questionnaire and eye examination in this study. Information about a child was collected by interviewing household head. Child's eye examination was done by ophthalmic nurses.

Ethical clearance

The ethical clearance to conduct this research was obtained from science college post graduate, research, and community service office (number RCS/097/2010). The informed consent of each study participants was obtained from the family of students.

Study design and study population

A cross-sectional study was conducted from April to May 2018. Regular primary school children of age 5–9 years old living in Amhara region were included in this study.

Sampling procedure

Simple random sampling technique was applied to select study participants. A total of 312 primary school children were randomly selected from some primary schools in Amhara region.

Study variables

The response variable of this study was presence of sign of active trachoma (TF/TI) in either eyes of the child which can be recorded as follows:

$$y = \begin{cases} 1, & \text{TF or is present} \\ 0, & \text{otherwise} \end{cases}$$

The independent variables or the risk factors of this study were: sex of the child, age of the child, frequency of face washing per day, using soap when washing face, face cleanness, presence of flies on child's face, occupation of household head, education level of household head, family size, household's main energy source, time required to fetch water for the household, water lasts all the year, latrine availability, availability of solid waste disposal facility, and keeping animals in living house.

Statistical analysis

Binary logistic regression model was used to determine the prevalence and risk factors of active trachoma among

Table 1: Background characteristics of study participants, 2018

Variables	Frequency	Percentage
Sex		
Male	154	49.4
Female	158	50.6
Age of child (year)		
≤ 6	18	5.8
7-9	294	94.2
Frequency of face washing per day		
<2	47	15.1
≥2	265	84.9
Use of soap when washing face		
Yes	281	90.1
No	31	9.9
Face condition		
Clean*	253	81.1
Unclean	59	18.9
Flies present on child's face during interview		
Yes	49	15.7
No	263	84.3
Occupation of household head		
Farmer	83	26.6
Government employee	46	14.7
Daily laborer	58	18.6
Merchant	57	18.3
House wife	27	8.7
Others	41	13.1
Education level of household head		
No education	59	18.9
Primary	143	45.8
Secondary and above	110	35.3
Family size		
<4	72	22.8
4-6	161	51.6
>6	80	25.6
Main energy source		
Wood	262	84.0
Electric	34	1.9
Animal dung	16	5.1
Time required to fetch water		
In the yard	102	32.7
<30 min	205	65.7
30 min-1 h	5	1.6
Water lasts all the year		
Yes	94	30.1
No	218	69.9
Latrine availability		
Yes	261	83.7
No	51	16.3
Availability of solid waste disposal facility		

Contd...

Table 1: Contd..

Variables	Frequency	Percentage
Yes	196	62.8
No	116	37.2
Keeping animals in living house		
Yes	136	43.6
No	176	56.4

*No nasal discharge/eye discharge

primary school children living in Amhara region, Northwest Ethiopia.

Results

The gender distribution of study participants was almost the same, male (49.4%) and female (50.6%). Majority of the study participants were in age group 7–9 (94.2%). About 84.9% of children washed their face at least two times per day. About 90.1% of the children used soap to wash their

Table 2: Factors associated with active trachoma (TF or TI) among primary school children living in Amhara region, 2018

Variables	COR	95%CI	AOR	95%CI
Sex				
Male	1			
Female	1.82	(0.86-3.86)		
Age of child (year)				
≤6	1			
7-9	0.56	(0.15-2.0)		
Frequency of face washing per day				
<2	1		1	
≥2	0.82	(0.13-0.63)*	0.37	(0.14-0.97)*
Use of soap when washing face				
Yes	1			
No	0.34	(0.13-0.85)*		
Face condition				
Clean				
Unclean	2.97	(1.36-6.50)*		
Flies present on child's face during interview				
Yes	1		1	
No	0.09	(0.04-0.21)*	0.12	(0.10-0.30)*
Occupation of household head				
Farmer	1			
Government employee	0.71	(0.41-3.71)		
Daily laborer	0.67	(0.25-2.45)		
Merchant	0.57	(0.49-3.72)		
House wife	0.61	(0.13-0.25)		
Others	0.28	(0.09-2.05)		
Education level of household head				
No education	1			
Primary	0.81	(0.31-2.11)		
Secondary and above	0.83	(0.30-2.26)		
Family size				
<4	1			
4-6	1.28	(0.48-3.39)		
>6	1.37	(0.46-4.07)		
Main energy source				
Wood	1			
Electric	1.21	(0.39-3.71)		
Animal dung	1.29	(0.28-6.02)		
Time required to fetch water				
In the yard	1			
<30 min	1.34	(0.57-3.14)	1	(0.40-2.60)
30 min-1 h	17.63	(2.56-121.35)*	10.02	(1.10-93.52)*

Contd...

Table 2: Contd...

Variables	COR	95%CI	AOR	95%CI
Water lasts all the year				
Yes	1			
No	1.06	(0.84-2.34)		
Latrine availability				
Yes	1			
No	0.45	(0.20-1.04)		
Availability of solid waste disposal facility				
Yes	1			
No	1.56	(0.75-3.26)		
Keeping animals in living house				
Yes	1			
No	0.86	(0.41-1.80)		

*Significant at $P < 0.05$. COR=Crude Odds Ratio. AOR=Adjusted Odds Ratio. CI=Confidence Interval

face and 253 (81.1%) of the children had clean face during the interview. There were flies on the face of 49 (15.7%) children during interview. Majority of the children were born to farmer household (26.6%). Most of the households (45.8%) had primary education and used wood as their main energy source (84%). Majority of the family of the child had family size of 4–6 (51.6%). About 205 (65.7%) households spend less than 30 min to fetch water. About 16.3% of children's family had no latrine and 37.2% had no solid waste disposal facility [Table 1].

Prevalence of active trachoma and associated factors

The prevalence of active trachoma (TF or TI) among primary school children of 5–9 years old living in Amhara region was 10.3% [95% CI: 6.9–13.6].

The results of multiple logistic regression analysis revealed that risk factors: frequency of face washing per day, presence of flies on child's face, and time required to fetch water for the household were significantly associated with active trachoma at 5% level of significance. Table 2 presents the unadjusted (crude odds ratio) and adjusted odds ratio including the 95% CI.

Children who washed their face at least two times per day were 63% (AOR = 0.37; CI: 0.14–0.97) less likely to be infected by active trachoma compared to children who washed their face less than two times per day. Children with no flies on their face during interview were 88% (AOR = 0.12; CI: 0.1–0.3) less likely to be infected by trachoma compared to children with flies on their face during interview. The odds of having active trachoma was almost 10 times higher among children of households who spend 30 min to 1 h to fetch water for the household (AOR = 10.02, 95% CI: 0.33–0.78) compared to children of households who had piped water in their compound [Table 2].

Discussion

The objective of this study was to determine the prevalence and risk factors of active trachoma among primary school children between 5–9 years of age living in Amhara region, Northwest Ethiopia. The prevalence of active trachoma (TF or TI) was 10.3% in this study, which was lower compared to other studies conducted in Ethiopia.^[9,11,12]

The result of this study showed that frequency of washing face per day was significantly associated with active trachoma. Children who wash their face at least two times per day were less likely to be infected by active trachoma. This is due the fact that as the number of face washing increases, the facial cleanliness of the child improves. This minimizes the chance of the child to be infected by trachoma. The result was consistent with other studies.^[9,12]

Presence of flies on the face of children was another important risk factor of active trachoma in this study. Children with no flies on their face were less likely to be infected by trachoma compared to children with flies on their face. This is due to the fact that flies act as spreading agent of trachoma, transferring *Chlamydia trachomatis* from the eyes of infected children to the eyes of uninfected children. This result was consistent with previous studies^[11,13-16] which showed that the presence of flies on the face had increased the chance of the child being infected by trachoma.

This study revealed that children of households who spend 30 min to 1 h to fetch water were 10 times more likely to be infected by active trachoma compared to children of households who had piped water in their compound. This might be due to the importance of water for facial cleanliness and for hygiene. One of the components of SAFE strategy is facial cleanliness. To implement this strategy, availability of water is crucial to reduce the transmission of trachoma. This result was in line with other studies.^[9,17,18]

Conclusion

The results of this study showed that risk factors: frequency of face washing per day, presence of flies on child's face during interview and time required to fetch water for the household were significantly associated with trachoma. Therefore, study recommends that any concerned bodies directed at prevention and control of trachoma among primary school children living in Amhara region should give special attention to these factors. Implementing the WHO endorsed SAFE strategy was recommended for the effective prevention and control of trachoma in the study area since the prevalence of active trachoma, 10.3% was higher than the WHO recommended thresholds (>10% prevalence).

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Conflicts of interest

There are no conflicts of interest.

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