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

According to the recent WHO weekly epidemiological record, trachoma is estimated to be responsible for the visual 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. The burden of trachoma on affected individuals and communities is enormous. According 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. 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...
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. 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. 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 cleanliness, 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 primary school children in the study area.

| 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       |

Table 1: Background characteristics of study participants, 2018

Contd...
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    |                |      |                |
| ≥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                                        | 2.97 | (1.36-6.50)*   |      |                |
| Unclean                                      |      |                |      |                |
| Flies present on child’s face during interview|      |                |      |                |
| Yes                                          | 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)* |

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...
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 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.\[9,12\]

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 to 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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