RESEARCH ARTICLE

Prevalence and associated factors of active trachoma among 1–9 years old children in Deguatemben, Tigray, Ethiopia, 2018: community cross-sectional study

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Abstract

Background: Trachoma is a contagious infection of the eye. World Health Organization recommended three rounds of mass drug administration in districts where the prevalence of trachomatous follicular (TF) is ≥10% in children aged 1–9 years. Mass drug distribution was given to residents for three consecutive years with more than 90% coverage. However, the prevalence and associated factors of active trachoma in the study community after the intervention was not yet determined. Thus, this deals with the prevalence and associated factors of active trachoma among children aged 1–9 years.

Methods: We conducted a Community based cross-sectional study among 502 children aged 1–9 in March 2018 in Deguatemben. A multi-stage sampling technique was applied. Selected children were examined for trachoma using 2.5x binocular loupe and graded based on the WHO simplified grading system. Mothers were interviewed for factors associated with trachoma using a structured questionnaire. Data was entered on Epi-Info and exported to SPSS for analysis. Both descriptive and inferential analyses were done with 95% confidence intervals (CIs) at a p-value < 0.05 for the final model.

Results: The prevalence of active trachoma was found 21.5% (95% CI: 17.8–25.1%). Being 1 to 4 years old [AOR (95% CI) = 6.81(2.00–23.11)], not washing face [AOR (95% CI) = 9.31(1.13–77.66)], not using soap [AOR (95% CI) = 5.84(1.87–18.21)], unclean face [AOR(95% CI) = 18.22(4.93–69.32)] and mother’s knowledge [AOR (95% CI) = 0.06(0.02–0.19)] were found as independent predictors.

Conclusion: The prevalence declined from the baseline, but it is still a public health problem in the district. Personal-related factors were found to be associated with the disease. Health education of “Facial cleanness” and related factors is recommended to increase knowledge of the mothers on their children’s care in addition to the provision of antibiotics.

Keywords: Prevalence and associated factors, Active trachoma, Tigray, Ethiopia
Background

Trachoma is the leading cause of blindness resulted from repeated trachoma infection [1]. Infected eye secre- tions with an active infective stage of trachoma are the main source of trachoma infection and mode of trans- mission includes; direct eye to eye spread, contaminated fingers, indirect spread through sharing towels, pillows, and eye seeking flies [2].

According to World Health Organization (WHO) trachoma grading scheme trachoma is classified as Trachomatous inflammation follicular (TF), Trachomatous inflammation intense (TI), Trachomatous scarring (TS), Trachomatous trichiasis (TT) and Corneal opacity (CO) [3, 4]. Active trachoma includes WHO grades of TF and/or TI. Endemicity of trachoma is classified based on TF prevalence as non-endemic (<5%), hypo-endemic (≥5 and <10%), meso-endemic (≥10 and <30%) and hyper-endemic (≥30%) [5].

WHO Global Elimination of Trachoma (GET2020) Alliance recommends the implementation of the surgery, antibiotics, facial cleanliness and environmental improvements (SAFE) strategy which tackles the disease through surgery to correct trichiasis, antibiotics to treat chlamyd- ial infection and facial cleanliness and environmental improvements to suppress transmission of infection to eliminate the disease by 2020 [3].

Globally, about 150 million people suffer from active trachoma and 6 million people are blind due to its dev- astating complications and it is endemic in 42 countries: in Africa, in the Middle East, Central and South Amer- ica, Asia and Australia with 200 million populations at risk living in these endemic countries [6–8].

Ninety-three percent (170 million) of the worlds’ population at risk of trachoma live in Africa and Africa carries 72% of the global burden of trichiasis [9]. In Ethiopia 2.8 million people have low vision, 1.2 million lost their vision, 9 million children 1–9 years old have active trachoma and the prevalence of active trachoma is 40.1% [10].

All 34 rural woredas of Tigray had been mapped and revealed that 1.7 million (about 40%) people live in hyper-endemic districts of the region and active trach- oma prevalence among 1–9 years old children is 26.1%. Deguatemben woreda is one of the 12 woredas with the prevalence of active trachoma among children 1–9 years old ≥30% [11].

Different risk factors have been identified for trachoma from different settings which include; poor personal hy- giene, lack of sanitary facilities and lack of accessible water for washing [12–16].

The WHO recommends annual mass treatment (MDA) of entire communities with oral azithromycin for at least 3 years if the prevalence of TF in 1–9-year-olds within a district or community exceeds 10% and with coverage of at least 80% of the population [17]. After the completion of the global trachoma mapping project (GTMP) in Tigray, Light for the World (the NGO that works to eliminate trachoma in Ethiopia) began supporting the regional trachoma elimination program in 2014 using the SAFE strategy and all trachoma endemic districts of the region are covered by the surgery and antibiotics (S & A) components of SAFE strategy. The prevalence of active trachoma among 1–9 years old children was >30% and all residents of the woreda are taking Azithromycin mass drug administration starting in 2014 and it takes three rounds and will continue to five rounds. The MDA coverage of the woreda was 96% in the 1st round 2014, 95% in the 2nd round 2015, and 93% in the 3rd round 2016 [7].

The prevalence and associated factors of active trach- oma in the study area are not yet determined and the WHO recommends the assessment of active trachoma among 1–9 years old children after MDA of antibiotics. Thus, this study will contribute to the regional and district efforts of trachoma prevention and control through assessment of the level of prevalence in the study area, the implementation of MDA, and identifying factors as- sociated with active trachoma in the community. The findings of this study will also help for the planning of prevention, control and elimination efforts of the dis- ease. This study was aimed to assess the prevalence of active trachoma and associated factors among 1–9 years old children 1 year after three rounds of azithromycin mass administration in Deguatemben woreda.

Methods

Study area and period

The study was conducted in Deguatemben woreda, one of the 4 woredas in the Southeast zone of Tigray Re- gional state that has 24 kebeles (smallest administrative unit in Ethiopia) in which one of them is urban. The current population size of the woreda is estimated to be 150,254 based on the 2007 population census. The wor- eda has one primary hospital, 5 health centers, and 24 health posts according to the woreda data. There is no ophthalmic professional in any of the health facilities. The study was conducted from 1st March to 30th March 2018.

Study design and population

We conducted a community-based cross-sectional study among 1–9 years old children. All 1–9 years old children in the selected kebeles were our source of population and we include children from the age of 1–9 years old who were lived for at least 6 months in the study area. Children who are unable to undergo physical examination due to medical illness were excluded from the study.
Sample size and sample size determination
The sample size was determined for both objectives. For the first objective, we were determined using a single population proportion formula \( n = \frac{(Z^2\alpha/2)p(1-p)}{d^2} \), where \( n \) is the sample size, \( Z \) is the standard normal deviation, set at 1.96 (for 95% confidence interval [CI]), \( d \) is the desired degree of marginal error (taken as 0.05) and \( p \) is the estimated prevalence of active trachoma (18%) taken from similar community [15]. The minimum sample size is 227 and expecting a 10% nonresponse rate and a design effect of two the final sample size is 500. We also determined the second objective, using the associated factor of active trachoma from a study done on the previous time. Sampling was determined based on the double proportion formula on the software of Epi Info StatCalc version 7 after considering the following assumptions; 95% confidence interval (CI), 80% power, 1:1 ratio of exposed to non-exposed group, odds ratio (OR) of 2.2 and taking the proportion-1 of 55.2% and proportion-2 of 32.8% number of preschool children as a factor for active trachoma [13]. Finally, with an expected non-response rate of 10% and the design effect (2.0) the maximum sample size was 502. Then we took the largest sample size that is 502.

Sampling techniques and procedure
The study employed multi-stage with a stratified sampling technique. Initially, the stratification of kebeles into rural and urban strata was made. Seven kebeles (1 urban and 6 rural) were selected from the total kebeles in the district using a simple random sampling technique. Then, probability proportional to size (PPS) used to allocate children aged 1–9 years from each kebele. Finally, children aged 1–9 years old were selected by a systematic random sampling method using the existing list of households’ from the family folder as a sampling frame of health extension works in the selected kebeles. In the case of more than one child 1–9 years old in the selected household, we select one using the lottery method and if in the selected household has no child aged 1–9 years old we used the next household.

Data collection tools and procedures
Data was collected using a structured and pretested questionnaire from mothers or caregivers. Face to face interview was done with the mothers of children 1–9 years old children and direct observation was conducted to assess the availability and utilization of WASH facilities by trained data collectors. Besides, trained ophthalmic nurses who participated in the 2013 global trachoma mapping project (GTMP) who are certified for trachoma grading examined the upper tarsal conjunctiva of each child by wearing 2.5x magnifying loupe and pen torch to assess each eye for the sign of active trachoma. Grading was done according to the WHO simplified grading system [3]. Eyelid eversion (turning out) of the children was done using an aseptic technique by using cotton tip applicators and alcohol used for hand disinfection. Active trachoma was defined as the presence of Trachomatous inflammation follicles (TF) or Trachomatous inflammation (TI) in either eye.

Data quality assurance and management
The questionnaire was first prepared in English and translated to the local language Tigrigna and then it was again translated back to English. Two days Training was given for both data collectors and supervisors by principal investigator and ophthalmologist. Besides, the ophthalmic nurse has received refresher training with ophthalmologists having well experienced on the grading of trachoma using the WHO grading scheme procedures and he received practical training, PowerPoint, photographic images. One week before the actual data collection period pretest was done in 5% of the sample (25 children) from a similar population outside the study area and based on the findings of the pretest, minor modifications of questions, wordings, phrases and time required to interview respondents was made. Each questionnaire collected from the field was checked for completeness, missed values, and unlikely responses and then manually cleaned up on such indications. Then data were coded and entered into a computer using Epi-Info version 7.0.9.7 for using double-entry customizing and skip benefit, then after data cleaning, it was exported to SPSS version 20 computer software packages. Data were cross-checked for consistency and accuracy.

Data processing and analysis
Descriptions of the main findings were done using frequencies, percentages, and summary statistics. The binary logistic regression model was fitted to assess factors associated with active trachoma. The model’s fitness was evaluated using the Hosmer-Lemeshow goodness of fit test and if the \( p \)-value is > 0.05 that was 0.295, and then the model was considered as fit otherwise unfit. Factors with \( p \)-value < 0.25 in chi-square (X2) cross-tabulation/bivariate analysis were entered for multivariate logistic regression analysis. Multicollinearity was checked by a variance inflation factor (VIF) for VIF > 10 to be significant Multicollinearity but in our data, no variable was with VIF more than the threshold. Backward LR stepwise regression analysis was used for variables to be independent predictors for the outcome variable. Those variables with \( p \)-value < 0.05 in the multivariable analysis were considered as independent predictors for active trachoma and odds ratio with a 95% confidence interval was reported.
Operational definition
Clean face: a child who did not have an eye discharge or nasal discharge, fly on the face at the time of data collection [16].

Protected water source: water source protected by construction from outside contamination [18].

Active trachoma: Trachomatous inflammation follicles or Trachomatous inflammation intense [4].

Knowledge: mothers or caregivers of children 1–9 years old children were asked twelve knowledge related questions to assess their knowledge status on trachoma. Correct answers were given score 1 and incorrect answers 0. Mothers who score mean and above of the questions were labeled as “knowledgeable” and those who scored below the mean were labeled as “less knowledgeable” [19].

Results
Characteristics of participants
A total of 502 children aged 1–9 years old participated in the study making a response rate of 100%. The median age of children under study was 4 with IQR of 2–6 and more than half 266 (53%) were in the age group of 1 to 4 years old. Regarding the educational status of children, 323 (64.3%) were preschool and 172 (34.3%) were students. [Table 1].

More than one-third of 190(37.8%) of mothers had no formal education. Regarding the marital and occupational status of the caregivers, 437 (87.1%) were married and 392 (78.1%) were housewives respectively. [Table 2].

Four hundred forty-one (87.8%) mothers reported that they had heard about trachoma. Besides, more than half (53.2%) of mothers were knowledgeable about trachoma which is computed from the mean of correctly answered twelve questions asked.

Out of 502 households, the assessed latrine was available in 304(60.6%), and of those who have a latrine, 90% utilize it. More than 90% of the latrines are used by all members of the family. Only 61 and 36% of HHs had solid and liquid waste disposal system respectively. Forty-one percent (41%) of HHs had animals and only 56% had separate animal sheds. Regarding the source of energy for food cooking 314(62.5%) HHs use wood or animal dung and the rest use electric. More than 70% of HHs water source is from protected water source but more than 50% of HHs spent more than 30 min to fetch water. Only 94 (18.7%) of HHs wash their child’s face more than once per day. Three hundred seventy-two (74.1%) of mothers reported soap use for washing their child’s face but only 45.6% use always. [Table 3].

Mass drug administration (MDA) related information of study participants
Out of 502 children who participated in the study 432 (86%) self-reported from mothers to have received at least one round of azithromycin during previous MDA campaigns. Out of 432 children who received azithromycin during previous MDA 359 (83%) received three rounds. [Table 3].

The prevalence of active trachoma (TF and or TI) among study participants was 21.5% (95% CI: 17.8–25.1%) in the study community. The prevalence of TF was 18.7%, TI 2.2 and 0.6% were TF and TI co-infected. The prevalence of active trachoma was slightly higher among males (52%) than among females (48%) study participants.

Factors associated with active trachoma among 1–9 years old children
All independent variables were found statistically significant in chi-square (X2) cross-tabulation/bivariate analysis at the p-value of ≤0.25 considered for multivariate regression analysis [Table 4]. On multivariate logistic regression, the odds of having active trachoma was found five times [AOR (95% CI) = 5.01(1.79–13.96)] higher among children 1 to 4 years old than children 5 to 9 years old. The logistic analysis also revealed that the odds of having active trachoma were almost six times

| Variables | Variable category | Frequency (n = 502) | Percentage (%) |
|-----------|-------------------|--------------------|----------------|
| Sex of child | Male | 257 | 51.2 |
| | Female | 245 | 48.8 |
| Education status of child | Preschool | 323 | 64.3 |
| | Student | 172 | 34.3 |
| | not attending school | 7 | 1.4 |
| The age group of a child | 1 to 4 years old | 266 | 53 |
| | 5 to 9 years old | 236 | 47 |
| Number of < 10 children in the household | ≤2 children | 455 | 90.6 |
| | ≥3 children | 47 | 9.4 |
The prevalence of active trachoma in the district was found to be 21.5% (17.8–25.1%) 1 year after three rounds of mass drug administration. Though there is a decline in the prevalence of TF from 44.7% in the baseline to 18.7% after three rounds of MDA, it is far above the 10% treatment threshold [11]. This might be related to the effectiveness of the trachoma control program of MDA with a high coverage rate.

The prevalence of active trachoma in our study area was consistent with finding from district level studies in different parts of the country including; Baso Liben 24.1%, Gongi Kollela 23.1%, Demba 18%, Kersa 25.2%, Dera 18.6%, Cheha districts 18.6%, and Maksegnit Town 23.8% [15, 16, 19–23]. But the prevalence in our study area was lower than the district level study conducted in Ankober 53.9%, Gazegibela 52.4%, Zala 36.7% [12, 13, 24]. This might be the provision of Mass drug administration in our study area was better effective compared to those study areas.

In contrast, the prevalence of active trachoma among children in our study is higher than the study findings of Ghana 5.6 and 3.5%, and Gambia 2.8% after control activities [25, 26]. Besides, it is higher than the study findings of evaluation units of Welkait, Tsegde, Tahtay, and Laelay-Adiabo even without any intervention according to the GTMP result of Tigray region [11]. This difference could be attributed due to the difference in the study setting, study period, intervention and baseline difference in the prevalence of active trachoma in the communities. In addition to this, hyper-endemic districts may require more rounds of MDA with an even high coverage rate as suggested by West SK. et al.,2011 [27].
| Variables | Category                        | Frequency $(n = 502)^*$ | Percentage (%) |
|-----------|---------------------------------|-------------------------|----------------|
| Access to latrine | Yes                             | 304                     | 60.6           |
|            | No                              | 198                     | 39.4           |
| Latrine utilization $(n = 304)$ | Yes                             | 295                     | 97             |
|            | No                              | 9                       | 3              |
| Who use latrine $(n = 295)$ | Adults                          | 21                      | 7.1            |
|            | Children                        | 4                       | 1              |
|            | All family members              | 270                     | 91.8           |
| The solid waste disposal system | Proper pit                      | 306                     | 61             |
|            | Open field                      | 196                     | 39             |
| Liquid waste disposal | Yes                             | 182                     | 36.3           |
|            | No                              | 320                     | 63.7           |
| Food cooking | Kitchen                         | 79                      | 15.7           |
|            | Inside house                     | 423                     | 84.3           |
| Window in kitchen $(n = 79)$ | Yes                             | 75                      | 94.9           |
|            | No                              | 4                       | 5.1            |
| Presence of animals in HH | Yes                             | 207                     | 41.6           |
|            | No                              | 295                     | 58.4           |
| Animal’s living condition $(n = 207)$ | Separate animal shed         | 117                     | 56             |
|            | With humans                      | 90                      | 44             |
| Source of energy for cooking | Wood/animal dung                | 314                     | 62.5           |
|            | Electricity                      | 188                     | 37.5           |
| Water source | Pipe                            | 97                      | 19.3           |
|            | Protected spring                 | 267                     | 53             |
|            | Unprotected spring               | 105                     | 20.9           |
|            | River                            | 33                      | 6.6            |
| Time spent to fetch water | Within compound                 | 97                      | 19.3           |
|            | Less than 30 min                 | 119                     | 23.7           |
|            | 30 to 59 min                     | 188                     | 37.5           |
|            | More than 60 min                 | 98                      | 19.5           |
| Amount of water /head/day | Less than 20 l                   | 197                     | 39.2           |
|            | 20 to 60 l                       | 236                     | 47             |
|            | More than 60 l                   | 69                      | 13.7           |
| Frequency of face washing | More than one per day          | 94                      | 18.7           |
|            | Only once per day                | 384                     | 76.5           |
|            | Not daily                        | 24                      | 4.8            |
| Soap use | Yes                             | 372                     | 74.1           |
|            | No                              | 130                     | 25.9           |
| Frequency of soap use $(n = 372)$ | Always                         | 170                     | 45.7           |
|            | Some times                       | 202                     | 54.3           |

* $n = 502$ unless specified
Active trachoma was five times more likely to happen among children from 1 to 4 years old than children 5 to 9. This finding is in line with the findings of the study conducted in Ankober and southern nations and nationalities people (SNNP) [24, 28]. This may be due to young children may not able to care about themselves and play in dirty places than older children.

| Table 4 | Factors associated with active trachoma among 1–9 years old children in Deguatemben district, Tigray, Northern Ethiopia, 2018 |
|---------|---------------------------------------------------------------------------------------------------------------|
| Factors | Active Trachoma | No Active Trachoma | COR(95%CI) | AOR(95%CI) |
|---------|-----------------|-------------------|------------|------------|
| The age group of child | | | | |
| 1 to 4 years old | 78 | 188 | 2.85(1.79–4.56)* | 5.01(1.79–13.96)** |
| 5 to 9 years old | 30 | 206 | 1.00 | |
| Access to latrine | | | | |
| Yes | 55 | 249 | 1.00 | |
| No | 53 | 145 | 1.66(1.08–2.54)* | 2.21(0.82–5.98) |
| Solid waste disposal system | | | | |
| Proper waste pit | 57 | 249 | 1.00 | |
| Open field | 51 | 145 | 1.54(1.01–2.36)* | 1.02(0.33–3.18) |
| Liquid waste disposal system | | | | |
| Yes | 27 | 155 | 1.00 | |
| No | 81 | 239 | 1.95(1.20–3.15)* | 0.82(0.23–2.99) |
| Animal’s living condition | | | | |
| Separate animal shed | 26 | 91 | 1.00 | |
| No separate animal shed | 32 | 60 | 1.87(1.01–3.44)* | 2.73(0.97–7.64) |
| Child face washing frequency | | | | |
| More than once per day | 28 | 66 | 1.00 | |
| Only once per day | 64 | 320 | 0.47(0.28–0.79)* | 0.48(0.17–1.41) |
| Not daily | 16 | 8 | 4.71(1.81–12.27)* | 9.35(4.93–67.32)** |
| Soap use for face washing | | | | |
| Yes | 60 | 312 | 1.00 | |
| No | 48 | 82 | 3.04(1.94–4.78)* | 5.84(1.79–13.96)** |
| Number of MDA rounds | | | | |
| One | 10 | 37 | 1.51(0.71–3.22) | 1.93(0.26–14.54) |
| Two | 10 | 18 | 3.12(1.36–7.09)* | 0.40(0.02–9.21) |
| Three | 54 | 302 | 1.00 | |
| Clean face | | | | |
| Yes | 11 | 229 | 1.00 | |
| No | 97 | 165 | 12.24(6.36–23.56)* | 18.22(4.93–69.32)** |
| Educational status of mothers | | | | |
| No regular education | 37 | 153 | 1.98(0.91–4.34) | 0.43(0.07–2.45) |
| Grade 1 to 4th | 4 | 14 | 2.35(0.63–8.69) | 0.63(0.06–7.02) |
| Grade 5th to 8th | 22 | 64 | 2.83(1.22–6.58)* | 0.53(0.07–3.88) |
| Grade 9th to 12th | 36 | 89 | 3.33(1.51–7.35)* | 1.91(0.28–13.28) |
| College and above | 9 | 74 | 1.00 | |
| Mothers knowledge on trachoma | | | | |
| Knowledgeable | 26 | 241 | 0.20(0.12–0.33)* | 0.06(0.02–0.19)** |
| Less knowledgeable | 82 | 153 | 1.00 | |

* = significant on bivariate, ** = significant on multivariable analysis at *p*-value < 0.05

COR crude odds ratio and AOR adjusted odds ratio, 1.00 = referent.
Children who do not use soap for face washing were almost six times to have active trachoma than their counterparts. This finding was in line with the study finding conducted in Baso Liben district [19]. This might be due to the ability of soap to clear microorganisms.

Children who do not wash their faces on a daily bases were found to be more than nine times to have active trachoma compared to those who wash their faces more than once per day. This result is consistent with the study findings of Baso Liben, Gonji kollela, Gazigeabella, and Zala districts [12, 13, 19, 21]. This might be due to the habit of face washing may affect the transmission of the disease from person to person.

The finding of this study also revealed that children with unclean faces were more than eighteen times to have active trachoma than their counterparts. Other studies also reported similar findings which include; a study conducted in Dembia and Cheha districts [15, 16]. This may be due to the ability of the secretions to attract eye-seeking flies which increases the risk of transmission trachoma from one person to another [29–31].

Children from knowledgeable mothers were found to be 0.07 times less likely to have active trachoma compared to children from less knowledgeable mothers. This finding was in line with the study result from Baso Liben and Zala districts [13, 19]. The possible explanation for this difference could be the difference in access to information, education and communication media on trachoma prevention, community-based health education by trained health workers.

**Strength and limitations of the study**

As the strength of our study, Tetracycline eye ointment was provided to those who had active trachoma two tubes to apply for 6 weeks. Being community-based cross-sectional and the grading of trachoma was done by certified, having more experience in trachoma grading and participated in the pre-intervention assessment of the global trachoma mapping project in the Tigray region. However, the study might have some limitations that first; the cross-sectional nature of the study design does not confirm the definitive cause and effect relationship. For those children who are older, we have not taken into consideration their practice on face washing. The questionnaires were designed and translated into a local language and re-translated to English. This could be also a recipe for bias. Furthermore, the study may prone to reporting bias since some of the data are collected based on self-reported information.

**Conclusion**

Although the prevalence of active trachoma among 1–9 years old children indicate a decline 1 year after three rounds of MDA in the district, it is still higher than the WHO threshold prevalence of 20% which is used to determine trachoma as a severe public health problem and it is far from the elimination of trachoma as a public health problem in a community as when there is less than 5% active trachoma in children [32, 33]. Not washing the face daily, not using soap for face washing; unclean face, younger child age and mother’s knowledge on trachoma were found to be independent predictors of active trachoma in the district 1 year after 3 years of MDA with azithromycin.

The regional health bureau and woreda health office should implement all components of the SAFE strategy emphasizing personal hygiene (facial cleanness) and environmental improvement.

**Abbreviations**

TF: Trachomatous inflammation Follicular; TI: Trachomatous inflammation intense; TS: Trachomatous scarring; TT: Trachomatous Trichiasis; CO: Corneal opacity; SAFE: Surgery, antibiotics, facial cleanness, and environmental improvements; WHO: World health organization; HH: household

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**Authors’ contributions**

GR contributed to the conceptualization of the study, recruited study participants, funding acquisition and made data collection, study investigation, and data analysis. DY contributed to providing methodology, study investigation, and supervision, data analysis, validation. AG contributed to providing methodology, study investigation, and supervision, data analysis, validation, writing manuscript. In the end, all authors have read and approved the manuscript.

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**Availability of data and materials**

All the data supporting the findings is contained within the manuscript, when there is in need the data-set used for the present study is accessible from the corresponding author on reasonable request.

**Ethics approval and consent to participate**

Ethical clearance was obtained from the Health Research Ethics Review Committee (HRERC) of Mekelle University. Permission letter was also taken from the Tigray Regional Health bureau to DeguaTembien woreda health office. Then the woreda health office wrote a letter to the study kebeles. Child assent and informed verbal and then written consent were obtained from the sampled children and their parents respectively. The respondents were also informed that they have the full right to withdraw or refuse at any time from the process. Confidentiality of information given by each respondent was kept properly and anonymity was explained clearly for the participant. Tetracycline eye ointment was provided to those who had active trachoma two tubes to apply for 6 weeks.

**Consent for publication**

Not Applicable.

**Competing interests**

The authors declare that they have no competing interests.
