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Research Article

Prevalence of Active Trachoma among Primary School Children in Yigalem Town, Ethiopia

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Abstract

Introduction: Trachoma is chronic infectious eye disease for which Chlamydia trachomitis has been the cause. It was estimated that trachoma is responsible for 3% of all blindness globally. If left untreated it leads to vision loss. Trachoma is the second leading cause of blindness in Ethiopia. But, the magnitude of active trachoma was not well determined in the current study area. Therefore, this study was aimed to assess the prevalence of active trachoma among primary school children in Yirgalem town, Ethiopia.

Materials and Methods: An institution-based cross-sectional study was conducted among 600 primary school children using a multistage systematic random sampling technique. Data were collected using a pretested and structured questionnaire followed by ocular examination using binocular 2.5x magnifying loupe to differentiate active trachoma based on World Health Organization's simplified classification scheme. Ethical clearance was obtained from the ethical review committee of College of Medicine and Health Science, Hawassa University. All statistical analysis was carried out using SPSS software version 20.

Results: A total of 600 primary school children were included in this study with 100% response-rate. The mean age of the participants was 11.5 (± 1.267) years. Of them, 325 (54.2%) were females. The majority of participants were protestant Christians 264 (44%) followed by Orthodox Christians 210 (35%). In this study, the overall prevalence of active trachoma among primary school children was 12% (95% CI: 10.7%, 14.2%).

Conclusion: In this study, the prevalence of active trachoma among primary school children in Yirgalem town was higher than the World Health Organization criteria for elimination of trachoma and it is still a public health problem among primary school children. So, an appropriate intervention plans for regular screening of active trachoma among primary school children for early detection and treatment is recommended.

Keywords: *School Children; Active Trachoma; Prevalence; Ethiopia*

Abbreviations

CI: Confidence Interval; KM: Kilo Meter; NGOs: Non-governmental organizations; TF: Trachomatous Inflammation Follicular; TI: Trachomatous Inflammation Intense; WHO: World Health Organization

Introduction

Trachoma is a chronic infectious eye disease for which *Chlamydia trachomitis* has been the cause [1]. It is transmitted through discharge from infected person eyes and passed on by hands (fingers), on clothes, or by flies (*Musca sorbens*) that land on the eyes of non-infected [2]. Trachomatous inflammation follicular (TF) and trachomatous inflammation intense (TI) are classified as active trachoma by World Health Organization (WHO) simplified grading system of trachoma [3]. It was estimated that trachoma is responsible for 3% of all blindness globally [4] and over 5 million are blind or have serious visual loss from trachoma and 100 million children are assumed to be in need of intervention [5]. Forty eight point five percentages (48.5%) of the global burden of active trachoma is highly distributed in five countries: Ethiopia, India, Nigeria, Sudan and Guinea [6]. In Ethiopia, the prevalence of active trachoma (either TF or TI) was 40.14% and trachoma is the seconding leading cause of blindness in Ethiopia [7]. If left untreated it leads to vision loss [8].

WHO recommends SAFE for trachoma control: Surgery for trachomatous trichiasis, Antibiotics distribution to treat chlamydia trachomatis infection, Facial cleanliness and Environmental improvement to reduce transmission of chlamydia trachomatis [9]. Trachoma remains as one of public health issue in Ethiopia regardless of underway efforts of Ministry of Health of Ethiopian and Non-Governmental Organizations' (NGOs) [10]. Therefore, the current study was intended to provide recent figure on the prevalence of active trachoma to take information based drastic measure to prevent unaware blindness. In addition, this study was the first school-based study in the proposed specific area.

Materials and Methods

Study setting, design and population

An institution-based cross-sectional study was conducted among primary school children in Yirgalem town, Ethiopia from 25 April to 28 May 2017. Yirgalem town is located in area previously called Dale. The town was established by Ras Desta Damtew in1933. It is located 323 KM south of Addis Ababa and 47 KM south of Hawassa city. At a time, the town had the total population of 43,359 (22,111 male and 21,248 female). The expected population growth of the town per year was 4.8% [11]. There were 27 primary schools in the town with the total number of 19,994 primary school children [12]. All randomly selected primary school children presented during the study period were included in the study.

Sample size determination

The sample size was determined by using a single population proportion formula by considering 22.9% prevalence of active trachoma among elementary school students in Dawro Zone, Ethiopia [13], 95% confidence interval, 5% margin of error, 10% non-response rate and design effect. Based on these assumptions, the final sample size calculated for this study was 600.

Sampling procedure

Of 27 primary schools, 5 were selected using simple random sampling technique. The total number of students in 5 selected schools was 2626. The sampling interval (k) was obtained by dividing the total number of children in 5 selected schools (2626) to the sample size (600). The sampling interval was found to be 4. Then, a random start was 3, selected using lottery method. Then, every fourth units were selected from the student registration books till the total sample size (600) was attained. In the procedure, we tied to the same sampling interval, in our shift from class to class as well as from school to school by taking the remaining portion into consideration in the next class and/or school. In the absence of selected participants at a time, two repeated visits were made and that was 100% successive.

Variables

- **Dependent variable**: Active trachoma (TF, TI).
- **Socio-demographic variables**: Sex, age, grade level, religion.

Operational definition

- Primary school children: Those children aged from 6 to 17 years.
- Active trachoma: Either trachomatous inflammation follicular or trachomatous inflammation intense.
- Trachomatous inflammation follicular: Five or more follicles, at least 0.5mm in size, on the surface of upper tarsal conjunctiva.
- Trachomatous inflammation intense: An inflammatory thickening of the upper tarsal conjunctiva with more than half of the normal deep tarsal blood vessels obscured.

Data collection tools and procedure

Questionnaire, pen torch, cotton tip applicators, 2.5x magnifying binocular loupe, alcohol, and glove were tools used during data collection. A pretested and structured interviewer-administered questionnaire was used to collect the socio-demographic variables. Then, eye lids eversion was made using cotton tipped applicator and observed by using 2.5x magnifying loupe and pen torch for presence or absence active trachoma. Three BSc optometrists performed ocular examination of each selected participants with strict compliance with a standard methods and procedures. Aseptic technique was approached during data collection by using gloves and alcohol to avoid cross contamination. The inter-examiner inconsistency of eye examination was solved by expert trachoma graders. Data collection was made using local language. In process the language experts translated questionnaire into Amharic and Sidamegna language and then translated back to English to ensure consistency.

Data quality management

Before the commencement of actual data collection, a pre-test was conducted on 5% of sample size. Consistency, clarity and completeness of the collected data were checked on daily base and appropriate correction was made. Permanent supervision was made by one MSc holder Optometrist.

Statistical analysis

The Epi-info 3.1 was used to enter data. Then, exported and analysed using SPSS 2020. The prevalence of active trachoma, and descriptive statistics were computed and summarized in tables, figures and text with frequencies, mean, or standard deviations where appropriate.

Ethical consideration

Ethical clearance was obtained from the ethical review committee of College of Medicine and Health Science, Hawassa University. Letter of cooperation was obtained from Educational bureau of Yirgalem town administration. Ethical clearance and a letter from Educational bureau were provided to Director of each selected school. In addition, explanation of the purpose of the study made and their willingness confirmed. Oral assent was obtained from participant students. The head of the household or child caregiver were attained and an informed written consent was taken from them. The reason for the eye examination and what the examination will involve was

explained to caregivers. To ensure confidentiality, their names, and other personal identifiers were not registered in the survey tool. Their participation was voluntary. The research team provided health education on prevention and treatment measures of trachoma by rotating each class during the data collection. Children with active trachoma were linked with nearby primary eye care unit. The study was conducted in accordance with the Declaration of Helsinki.

Results

Socio-demographic characteristics

A total of 600 primary school children were included in this study with 100% response-rate. Of them, 325 (54.2%) were females while 275 (45.8%) were males students. Four hundred twenty three (423) participants were from first cycle primary schools (i.e. grade 1st - 4th) whereas 177 were from second cycle primary schools (i.e. grade 5th - 8th). The mean age of the participants was 11.5 (± 1.267) years. The majority of participants were protestant Christians 264 (44%) followed by Orthodox Christians 210 (35%). For more information, the participants' socio-demographic characteristics were presented in the table 1.

Variables		Frequency	Percentage (%)
Sex	Male	275	54.2%
	Female	325	45.8%
Age	6 - 11 years	351	58.5%
	12 - 17 years	249	41.5%
Grade	1st cycle (grade 1st - 4th)	423	70.5%
	2nd cycle (grade 5th - 8th)	177	29.5%
Religion	Protestant	264	44%
	Orthodox	210	35%
	Muslim	95	15.8%
	Others*	31	5.2%

Table 1: *Socio-demographic characteristics in the study of the prevalence of active trachoma among school children in Yirgalem town, Ethiopia, 2017*

**: Others: Catholic, Apostle.*

In this study, the overall prevalence of active trachoma among primary school children in Yirgalem town was 12% (95% CI: 10.7%, 14.2%) (TF: 7%; TI: 5%). Of them, 47 (7.8%) were females while 25 (4.2%) were males. About 9.7% of the study participants were within age group 6 - 11 years and the remaining 2.3% were within the age group 12 - 17 years. Around 8.8% were first cycle children (Figure 1).

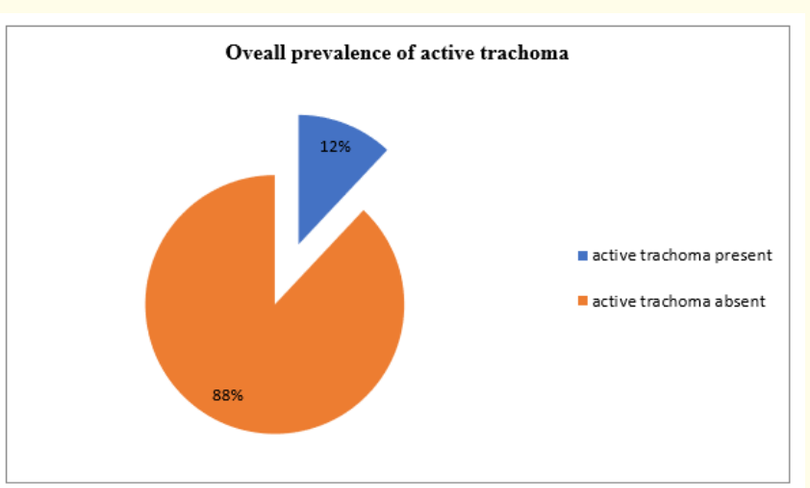

Figure 1: *Prevalence of active trachoma among primary school children in Yirgalem town, Ethiopia, 2017.*

Discussion

This study was tried to study the prevalence of active trachoma among primary school children in Yirgalem town, Ethiopia. The finding revealed that the overall prevalence of active trachoma among school children in Yirgalem town was 12% (95% CI: 10.7%, 14.2%). This result is consistent with that of M Gedefaw., *et al* [14]. However, the result is greater than the WHO criteria for the elimination of trachoma as a public health problem, the prevalence of TF to a level < 5% [15]; in East Jerusalem [16] and a study finding by Assefa., *et al* [17]. But, in this study, the prevalence of active trachoma is lower as compared to the result from the rural primary school in China [8]; Daro Zone, Ethiopia [13]; Goro district, Ethiopia [18] and South Wollo Zone, Ethiopia [19]. The difference may be attributed to disparity in study period, geographic variations, infrastructures, eye care service utilization, and health-care facilities. The outcome implies that an adequate attention was not yet given for this specific population. So, interventions targeted primary school children has been utmost essential. In this study, the prevalence active trachoma is higher among children aged 6 - 11 years. We hypothesize that this could be happened because those children aged 6 - 11 years were less likely to take care of themselves as compared to those aged 12 - 17 years especially in executing trachoma control strategy (F: Face cleanliness) [9]. This study was limited that it did not reveal the risk factors of active trachoma in current study area.

Conclusion

This study revealed that the prevalence of active trachoma among primary school children in Yirgalem town was higher than the WHO criteria for elimination of trachoma [15]. Active trachoma is still a public health problem among school children in Yirgalem town, Ethiopia. So, an appropriate intervention plans for regular screening of active trachoma among primary school children for early detection and treatment is recommended.

Ethics and Consent to Participate

Not applicable.

Consent for Publication

Not applicable.

Availability of Data and Materials

All relevant data are within the manuscripts and its supporting information files.

Competing Interests

The authors declare that they have no competing interests.

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We have not obtained any fund for this study.

Authors' Contributions

MML: Conception of the research, Investigation, Methodology, Formal analysis, Writing-original draft, Writing review and editing.

BG: Methodology, Supervision, Writing review and editing.

ED: Investigation, Methodology, Writing review and editing.

MMT: Investigation, Methodology, Formal analysis, Writing review and editing.

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