

PREVALENCE OF TRACHOMA AMONG CHILDREN
ATTENDING KETCHENE DEBRESELAM ELEMENTARY
SCHOOL IN ADDIS ABABA, AND A CASE-CONTROL
STUDY OF RISK FACTORS IN THEIR HOME
ENVIRONMENT.

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Prevalence of Tachoma Among Children Attending Ketchene Debre-Selam
Elementary School in Addis Ababa and a Case-Control Study of Risk
Factors in Their Home Environment

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ABSTRACT

A total of 301 randomly selected elementary school children from Ketchene Debeselam elementary school Addis Ababa, were examined for trachoma in June - July, 1986, and a matched case-control study was carried out to test the association between the occurrence of trachoma and some risk factors in the home environment of the students. Cases were all those students diagnosed to have active trachoma, matched with non-trachomatous students by age, sex, and grade. There was no significant difference in the prevalence rate of trachoma between males and females among the students. However, the prevalence rate of active trachoma among the students decreased significantly with age. Among various risk factors studied in the home environment of both cases and control groups, trachoma was significantly more prevalent among the families of cases than among those of controls.

Also, children in the control group washed their faces at least once a week significantly more often, than those children in the case group. Concerning the rest of the risk factors under this study, there was no significant association with the occurrence of trachoma.

I. INTRODUCTION

1. Global, Regional and National Situation of Trachoma.

1.1. It has been estimated that 500 million people are affected by trachoma worldwide, including 2 million people blinded by the disease (1) . The majority of these blind cases are from developing countries (1,2)

1.2. Various studies indicate that the endemic (blinding) type of trachoma has gradually disappeared from developed countries (3,4) due to numerous socioeconomic and cultural factors (5). but remains a serious public health problem of the poor nations(6). Infection with trachoma is one of the major causes of corneal scarring, which is an important factor for blindness especially in many African countries, where total blindness rate is 4% (7).

1.3. In Ethiopia, a report in 1959 (9) indicated prevalence rates of 42% , 56% and 77% among school children in the first 3 grades of elementary schools in Addis Ababa, Harar, and Gondar towns,

respectively. A subsequent report in 1961 (10) indicated prevalence rates of 62% and 83% among school children in Addis Ababa and Harar, respectively.

In a more recent study (1980) of 13 schools in small rural towns of Wollo administrative region, (11) an overall prevalence rate of 92.2% was found. Another study on a larger scale by the same authors reported that trachoma prevailed at a rate of 99.0% and 94.2% for Wollo and Shoa administrative regions, respectively.

There are an estimated 487,000 blind people in Ethiopia, an estimated 205,000 of which are blinded by trachoma. This rate is the highest among those African Countries used for Comparison(12).

2. Definition:

2.1. Trachoma, an infectious keratoconjunctivitis is caused by Chlamydia trachomatis. The meaning of the word is "rough" and "swollen" in Greek, describing the alteration of the tarsal conjunctive during the disease process(1).

2.2. Follicles, Papillary hypertrophy, and corneal vascularization characterize the appearance of the infectious and inflammatory phase of the disease, which either spontaneously resolves or progresses to various degrees of severity. These have been categorized by WHO (1) as trivial (F₁ , P₁ , and /or P₂) , mild (F₂) moderate (F₃) , and severe (P₃) (see Table 1).

The progression of the disease is promoted by repeated attacks and/or superinfection of the eye by other microbial agents.

Not only is transmission maximized during the inflammatory phases of the disease (especially during severe or blinding type), but also, serious and irreversible damage of the orbital structures takes place, leading to cicatricial trachoma (1,6) Because children are highly exposed to various types of suspected risk factors, and are less able to maintain personal hygiene, they constitute the highest risk group for this phase of the disease (13).

Table 1.

Intensity scale for Trachoma

(Source: ref:-1)

Intensity	Follicles	Papillae	Key sign
Severe	F_3 (or F_2 or F_1)	P_3	P_3
Moderate	F_2	P_2	F_3
Mild	F_2	P_0, P_1 or P_2	F_2
Trivial or Absent	F_0 or F_1	P_0, P_1 or P_2	F_0 or F_1

Key: The scores for upper tarsal follicles (^u) are:

- F₀ No follicles
- F₁ Follicles present, but no more than 5 in zones 2 and 3 together (see Fig. 1 for an illustration of the zones)
- F₂ More than 5 follicles in zones 2 and 3 together but less than 5 in zone 3.
- F₃ Five or more follicles in each of the three zones.

The scores for upper tarsal papillary hypertrophy and diffuse infiltration (p) are:

- P₀ Absent: normal appearance.
- P₁ Minimal: individual vascular tufts (papillae) prominent, but deep subconjunctival vessels on the tarsus not obscured.
- P₂ Moderate: more prominent papillae and normal vessels appear hazy, even when seen by the naked eye.
- P₃ Pronounced: conjunctiva thickened and opaque, normal vessels on the tarsus are hidden over more than half of the surface.

2.3. Conjunctival scarring, corneal ulceration, superficial corneal neovascularization (vascular pannus formation), tarsal conjunctival contracture, palpebral inversion, roughening of the marginal eye lids characterize circumscribed trachoma, graded

according to the degree of damage to the orbital structures.

These distortions are known as trichiasis (inward growing of the eyelashes), entropion (palpebral inversion), corneal scarring, and conjunctival scarring.

Due to these distortions, the eyelashes continuously abrade the cornea, leading to corneal opacity and/or to ulceration, the irregular or roughened marginal lids unevenly cover the eye ball, leading to dehydration and corneal ulceration, and vascular pannus leads to corneal opacity. Because of the malfunctioning of the structures visual loss or blindness occurs following a long process. This phase of the disease commonly begins after 20 years of age. (15)

3. Etiology

3.1. The etiologic agent, Chlamydia trachomatis, is a prokaryotic, intracellular, obligatory human parasite, characterized by the formation of inclusion bodies in the host cell, and susceptibility

to some of the antimicrobials (5).

3.2. On the basis of its surface antigens, the species Chlamydia trachomatis is classified into serotypes "A" to "L". The first three serotypes (A,B, and C,) are associated with endemic trachoma, while serotypes "D" to "K" are responsible for paratrachoma (inclusion conjunctivitis) The last serotype "L" causes Lymphogranuloma venereum. (2).

Chlamydial serotypes A,B, and C, are usually transmitted from eye to eye by direct or indirect means, and chronic and repeated infection, or superinfection leads to cicatricial trachoma, which may result in visual loss or blindness. The sexually transmitted chlamydial serotypes (D To K) cause a nonblinding type of eye infection, called paratrachoma (inclusion conjunctivitis), however, other recurrent bacterial superinfections of the eye may potentiate it into a blinding type (5,12). (25, 26)

3.3. Several attempts have been made to identify the risk factors for trachoma, especially those for the blinding type.

Among numerous risk factors suggested by a WHO expert committee in 1962 (14) the following are a few examples of the major ones: Climate, altitude, insect vectors, customs, occupation, economic level, water utilization, population movements, and educational status.

Family contact, poor environmental sanitation, poverty, poor personal hygiene, crowding, towel sharing, and presence of flies, were some of the factors identified by various authors, to be associated with the occurrence of trachoma. (4)

For example, a recent study conducted in Chiapas, Mexico, (4) indicated that face washing practice was strongly associated with the occurrence and severity of inflammatory trachoma in children. Trachoma occurred less frequently in children who washed their faces seven or more times a week than in children who washed less frequently.

4. Objectives of the study

4.1. General Objectives

4.1.1. To measure the prevalence of trachoma among

the school children attending Kechene Deereselan elementary school in Addis Ababa, Ethiopia.

4.1.2. To identify possible risk factors for trachoma in the home environments of the students.

4.2. Specific Objectives

4.2.1. To measure the point prevalence rate of trachoma among the school children.

4.2.2. To determine age and sex specific prevalence rate of the disease in the school population.

4.2.3. To determine whether or not an association exists between the following possible risk factors and the occurrence of the disease, using case control study design:

- Presence of trachoma in the family of the student
- frequency of face washing
- common towel usage
- availability of water
- daily water consumption for personal hygiene
- availability of latrine
- availability of garbage pit
- Crowding
- type of floor surface in the house
- family income

CHAPTER II : - Materials and Methods

1. Choice of study location

It was decided to select a governmental elementary school for the following reasons:

- Since governmental schools preferentially enroll students from neighbouring areas, this would facilitate the second part of the study, which involved visits to the homes of selected students.
- Governmental schools do not charge tuition, thus the students are more likely to come from low-income families and to be exposed to conditions favouring the transmission of trachoma.
- It was thought that the cooperation of school officials would be easier to secure in a government school.
- Transmission of trachoma is more prevalent in younger age groups, thus an elementary school would be more relevant than a secondary school.

Thus going to the Regional Office of the Ministry of Education for Addis Ababa schools, the investigator obtained the list of the 14 government-owned elementary schools (from a total

of 77 elementary schools located in Addis ababa, including 56 owned by urban associations, 14 by government, and 7 by private organizations).

Of the 14 government-owned schools, ~~from~~ are without a school clinic, and from those Ketchene Debresehan elementary school was chosen for for the following reason: the location of this school is in the northern extreme of the city, making the possibility of going to other alternative schools harder for these small children, because of this it is assumed that the majority of the students' families would be accessible in the school vicinity for the case-control study of risk factors in the home environment.

Ketchene Debresehan school is located in Ketena 5, Kefegne 10, Kebele 6, which is the highest area in Addis Ababa geographically.

2. Study subjects

The school, with a total student population of 1170 in 1985/86 school year, is comprized of 6 grades, each of which consists of three sections.

Table 2.

Age and sex distribution of the target population

Age	Male	Female	Total
6	1	1	2
7-9	161	215	376
10-12	283	316	599
13-15	91	110	201
16	0	1	1
TOTAL	536	643	1179

The age and sex distribution of the students is shown in Table 2.

New students are assigned to each section haphazardly as they arrive for registration, so as to fill vacancies in the various sections of each grade.

3. Sampling Method

3.1. School survey

3.1.1 To draw a representative sample from the target population, the overall sample size was determined by employing the statistical method shown below.

The prevalence rate of 14% used in this procedure was obtained from a previous survey of 284 students from grades 1-B , 2-C , 3-C , 4-A , 5-A and 6-A of the school carried out by the same investigator just prior to the main study.

$$\begin{aligned} \text{Sample size} &= Z^2 \cdot P \cdot (1 - P) \cdot (ref) \\ &= \frac{(1.96)^2 \times 0.14 \times 0.86}{0.04^2} \end{aligned}$$

$$= \frac{2^2 \times 0.14 \times 0.86}{0.04^2} = 301$$

Where: Z= 95% confidence interval

P= probability of having the disease

= the difference between the Z value

= (1.96) and 2 standard deviations

from the mean

3.2.2 Age being a determining risk factor for trachoma (4,6) an attempt was made to reduce sampling variation with respect to age by subdividing the sampling frame into strata by grade. Stratifying by grade rather than by age was done in order to simplify the sampling procedure, being a practical way of ensuring that the sample covers the range of ages found in the entire student population.

The size of the subsample in each stratum was determined by proportional allocation, using the following statistical formula:

$$n_i = \frac{N_i}{N} \times n$$

Where N = size of Population

N_i = size of stratum i

n = size of sample

n_i = size of subsample in stratum i

The subsample size for each grade is shown in Table 3 (the sampling fraction was 25 %)

The students were selected from each grade by simple random sampling, using a table of random numbers.

3.2. Case- control study

To identify possible risk factors for trachoma in the home environments of the students of Katchena Debreseien elementary school, a case-control study design was employed. The cases included all those students diagnosed as having active trachoma (i.e. excepting those trachoma cases categorized as trivial). The controls consisted of an equal number of students diagnosed as being free of trachoma, and matched to the cases by age, sex and grade.

The procedure for selecting matched controls was carried out as follows:- for each case a list

Table 3, Sample size for each grade, determined
by proportional allocation

Grade	No. of students	Sample size
1		
1	193	49
2	165	42
3	200	51
4	206	53
5	218	56
6	197	50
TOTAL	1179	301

of all negative students in the same grade and with the same age and sex was prepared and from this list a control was selected using a table of random numbers.

4. Methods of Data Collection

4.1. Preparatory Phase

The investigator was trained for a total of 5 days by the Head of the National Programme for the prevention of Blindness, including field training in Zway. A field worker from the programme was assigned to work with the investigator as a recorder.

4.2. School Survey

The list of the students selected for the study sample was given to the school director, who arranged the screening schedule for the various sections without any disruption of the ongoing teaching programme. Among the selected students, only 10 students at a time were called out from the class. After having been examined, each student returned directly to resume class attendance.

The next group to be screened was assembled while the last few of the previous group were being examined.

4.2.1. Examination Procedure

The investigator and the recorder were seated by a table. The examinee sat facing the investigator, keeping his/her head up and looking downward, to facilitate an easy eversion of the eye lids. By using his thumb and the first finger the investigator everted each eyelid in turn to detect signs of infection with trachoma.

To grade the intensity of trachoma, the tarsal plate was imaginarily divided into three Zones (Figure 1) in order to count the intensity scores according to the WHO standard procedure (1) , for the follicles (F₁ , F₂ , F₃) , papillae (P₁ P₂ , P₃) , conjunctival scars (C₁ C₂ , C₃) , corneal scar (C C₁ , C C₂ , C C₃) and trichiasis/ entropion (T / E₁ , T / E₂ , T / E₃) . These findings were recorded on the "Individual Trachoma Clinical Scoring Sheet"

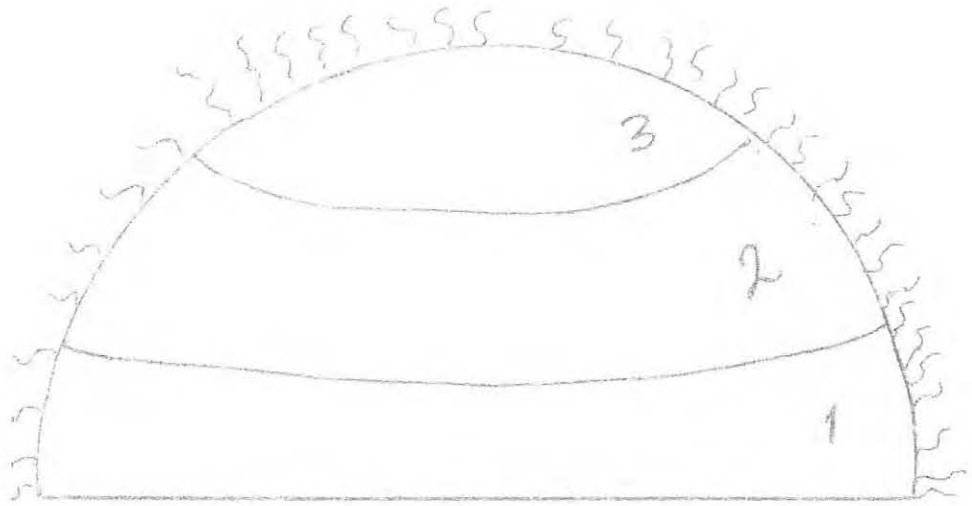


Fig. 1

Everted eyelid (tarsal plate),
divided into three imaginary zones
(Source: ref. 1)

(Appendix 1), which is the record form used by the National programme for the prevention of Blindness.

The investigators' accuracy in identifying the signs of trachoma was supervised and counter-checked by the Head of the National programme for the prevention of Blindness for the first half day of the school survey and was found to be satisfactory.

4.3. Case-control study

Data collection for the case-control study was conducted in the individual homes: of the cases and controls, for which a car with a driver was provided by the Department of community Health for 5 days to take the investigator up to each Kebele office. Most of the Kebele officials cooperated in providing a guide to the houses: in their respective areas. Some of the houses were reached by hiring a guide who investigated the exact location of the house prior to the home-visit-day. The investigator carried out the survey "blind" i.e. without knowing which home was that of a case and which home that of a control.

Ocular examination for trachoma was carried out on all the family members present during the home visit, using the same procedure and recording form as in the school survey. For the purposes of the study, a family was defined as: people living in the same house, on the same income, and sharing the same food. In order to obtain as many family members as possible, repeated visits were done on Sundays and after office hours.

A questionnaire (see Appendix 2) was completed for the other risk factors included in the study. The information was collected by interviewing an adult member of the family who could correctly answer the questions, except for questions relating to hygienic practices of the cases and controls, which were obtained by interviewing the concerned individual.

5. Data processing and analysis

The data from the school survey were cross-tabulated by age and sex for the computation of prevalence and intensity rate of trachoma.

Statistical analysis of the result of the case-control study was carried out using the χ^2 test and relative risk was estimated using the odds' ratio.

In order to determine family income, the respondents were asked by the observer about the sources of the family income, number of family members who could contribute income, how much money could be earned during a specific period of time and added up to a monthly total. The information so obtained about the income of those who were not employees on salary basis was based on the subjective estimate of the respondents.

III. RESULTS

1. School Survey

1.1. A total of 301 students were examined in the school survey, of which 134 were males and 167 females. The ages ranged between 7 and 15 years (Table 4).

Of the total sample, 80 (26 . 6%) were diagnosed as having trachoma, while those with active trachoma (i.e., excluding trachoma cases categorized as trivial), were 37 (12 . 3%) (Table 5).

The difference between males and females in the overall prevalence rate of trachoma and in the prevalence rate of active trachoma (Table 5) was not statistically significant (χ^2 c (1) = 0 . 0007 , $p > 0 . 05$ and χ^2 (1) = 0 . 000 , $p > 0 . 05$ respectively.

In relation to age, 26 of 81 students (32.1%) in the age group 7 - 9 years were diagnosed as having the disease, including 40 of 174 (23.0%) in the age

Table 4 . Age and Sex distribution of the students
examined in the school survey.

Age Group	Sex		Total
	Male	Female	
	No (%)	No (%)	No (%)

7-9	28 (20.9)	53 (31.7)	81 (26.9)
10-12	86 (64.2)	88 (52.7)	174 (57.8)
13-15	20 (14.9)	26 (15.6)	46 (15.3)

Total	134 (100)	167 (100)	301 (100)
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Table 5 . Distribution of trachoma cases
(total and active) by sex.

	Males	Females	Total
	No (%)	No (%)	No (%)
Total examined	134(100)	167(100)	301(100)
Total trachoma	36(26.9)	44(26.3)	80(26.6)
Active trachoma	16(11.9)	21(12.6)	37(12.3)

Table 6. Distribution of trachoma cases
(total and active) by age

age	7-9	10-12	13-15	Total
	No(%)	No(%)	No(%)	No(%)
Total				
examined	81(100)	174(100)	46(100)	301(100)
Total				
Trachoma	26(32.1)	40(23.0)	14(30.4)	80(26.6)
Active				
trachoma	16(19.8)	18(10.3)	3(6.5)	37(12.3)

group 10 - 12 years and 14 out of 46 (30.4%) in the age group 13 - 15 years (Table 6).

The difference in the prevalence rate of trachoma between the 3 age groups was not statistically significant $(\chi^2 (2) = 2.77 \quad P > 0.05)$.

The prevalence rate of active trachoma in the 3 age groups was 19.8%, 10.3%, and 6.5%, respectively.

(Table 6) , the difference being statistically significant $(\chi^2 (2) = 6.37 \quad , P < 0.05)$.

Table 7 and 8 show the intensity of the trachoma cases by sex and age, respectively. The overall prevalence rate of severe trachoma was 1.7% that of moderate was 3.3%, that of mild was 7.3% and that of trivial was 14.3%.

2. Case-control study

Two of the control students gave the wrong address and their houses could not be traced, so the corresponding cases matched to them were excluded from the analysis as well leaving 35 cases and 35 controls.

Table 7. Intensity of trachoma by sex among
the school children.

	Males	Females	Total
	No(%)	No(%)	No(%)
Total			
examined	134 (100)	167 (100)	301 (100)
Trivial	20 (14.9)	23 (12.8)	43 (14.3)
Mild	12 (7.5)	12 (7.2)	22 (7.3)
Moderate	3 (2.2)	7(4.2)	10 (3.3)
Severe	3 (2.2)	2 (1.2)	5 (1.7)
Total cases of trachoma	36 (26.9)	44 (26.3)	80 (26.6)

Table 8. Intensity of trachoma by age among the school children.

	7-9	10-12	13-15	Total
	No (%)	No (%)	No (%)	No (%)
Examined	81(100)	174(100)	46(100)	301(100)
Trivial	10(12.3)	22(12.6)	11(23.9)	43(14.3)
Mild	10(12.3)	10(5.7)	2(4.3)	22(7.3)
Moderate	4(4.9)	5(2.9)	1(2.7)	10(3.3)
Severe	2(2.5)	3(1.7)	0(0)	5(1.7)
Total cases of trachoma	26(32.1)	40(23.0)	14(30.4)	80(26.6)

One or more family members infected with trachoma were found in 20 of the 35 families of the cases (57%) and in 7 of the 35 control families (20%) (Table 9). The difference was statistically significant (χ^2 c (1) = 8.68, $P < 0.05$).

Out of 187 people examined in the families of the cases, 76 or 40.6% were found to have active trachoma, as compared to 14 of 172 or 8.1% in the families of the controls (Table 9). The difference in prevalence rates was statistically significant (χ^2 c (1) = 48.68, $P < 0.05$).

The age distribution of the disease among family members of the cases and controls is shown in Table 10.

Of the other risk factors studied, only the frequency of face washing was found to be statistically associated with trachoma (Table 9). The other risk factors (family income; crowding index; common towel usage with other family members; availability of latrine, garbage disposal, and a nearby source of water; daily water consumption for personal hygiene; and type of floor surface in the house, did not show a statistically significant association with trachoma.

Table 9 Association of treachens in elementary school children with selected risk factors in their home environment.

	<u>cases</u>	<u>controls</u>	<u>significance</u>	<u>eddyer</u>
	NO. (%)	NO (%)	$\chi^2_0(1)$	P
<u>Total number</u>	35 (100)	35 (100)		
<u>Number for which the</u>				
<u>following risk factor</u>				
<u>is present:</u>				
1. presence of treachens	20 (57)	7 (20)	8.86	P<0.05
2. within the family.				
2. Overall prevalence	$\frac{76}{187}$ (41)	$\frac{14}{172}$ (8)	48.61	P<0.05
rate of active				
treachens in other				
family members *				
3. Face washed				
less than once	11 (31)	5 (9)	4.38	P<0.05
a week				
4. water consumption for	10/34 (29)	3/35 (9)		P>0.05
personal hygiene less				
than 1 liter per day				
5. water not available	$\frac{16}{34}$ (47)	$\frac{9}{35}$ (26)		P>0.05
nearby				

*

Excluding the cases and controls from the numerator and denominator

Table 10 Active trachoma among family members
of the cases and controls

	Family members age groups of <u>cases</u>		Family members of <u>controls</u>	
	total ac <u>examined</u>	active <u>trachoma</u> Number(%)	total <u>examined</u>	active <u>trachoma</u> Number(%)
0-5	30	16(53.3)	23	5(20.0)
6-10	31	16(51.6)	30	5(16.7)
11-12	56	22(39.3)	53	3(5.7)
21-39	32	15(46.9)	29	0()
40-+	38	7(18.4)	35	1(2.9)
Total	187	76(40.6)	172	14(8.1)

CHAPTER IV. DISCUSSION

The age distribution of the sample (Table 4) was not significantly different from the age distribution of the entire school population (Table 2). Likewise, the sex ratio of the sample (Table 4). did not differ significantly from the sex ratio of the entire school population (Table 2). This suggests that the sampling procedure was appropriate, at least as far as age and sex are concerned.

The prevalence rate of 26.6% for trachoma found in the present study is low as compared to a previous survey conducted in elementary schools in Addis ababa in 1961 and which reported a ~~62%~~ prevalence rate of 62% (10). It would be interesting to see how the prevalence rate found for Kethhona Debreselem school compares currently with that of other elementary schools in Addis Ababa.

There was no significant difference in the prevalence rate of trachoma in males as compared to females (Table 5) , but there was a statistically significant decrease in the prevalence rate of

active trachoma with age, from 19.8% in the age group 7-9 years, to 10.3% in the age group 10-12 years, to 6.5% in the age group 13-15 (Table 6).

The case-control study of risk factors in the home environment showed that the prevalence rate of active trachoma in the family members of cases (40.6%) was significantly higher than that among the family members of controls (8.1%) (Table 10). A study conducted in Saudi Arabia (5) similarly demonstrated that the prevalence rate of trachoma among the family members of positive infants was significantly higher than that among the family members of negative infants.

The present study showed that controls washed their faces at least once a week significantly more often than cases (Table 9). This finding is in agreement with a recent study conducted in Mexico in children under age 5 (4), which established that children who washed their faces once a day or more had a significantly lower infection rate for trachoma than children who washed their faces less frequently.

In the present study, the daily amount of water consumption for personal hygiene, and the availability of a nearby source of water, were not found to be statistically associated with trachoma (Table 9). Probably a larger number of cases and controls would have been needed to establish statistical significance. A previous study conducted in Southern Morocco in Children aged 1-14 years showed a significant association between active trachoma and water availability (17).

Other potential risk factors, such as income, the crowding index, toilet and garbage disposal availability, and towel usage, were not found to be statistically associated with trachoma. This could be because the cases and controls both came from a community that is rather homogeneous with respect to socioeconomic status and sanitary conditions, therefore they could not be expected to differ much with respect to characteristics related to family income or sanitation.

The present study suggests that health education in the schools, stressing in particular the

washing of faces at least daily, may be helpful in controlling trachoma. It also indicates that screening and treatment programs for trachoma in schools may be ineffective unless the family members of positive school children are also screened and treated at the same time.

CONCLUSIONS AND RECOMMENDATIONS

Many studies have shown that blindness due to trachoma is easier to control, when compared with that of other causes of blindness, however, there are an estimated 205,000 people blinded by the disease in Ethiopia.

The present study indicates that trachoma prevails in Ketchema Debreselem elementary school at a rate of 26 . 6 % , and also it shows that among many suspected risk factors studied; infrequent face washing habit, and presence of trachoma among the family members of the students are some of the factors associated with the occurrence of trachoma among the study subjects.

Thus, since dependence due to blindness is a serious problem to the affected individuals in particular, and more over, it affects the national economic development at large.

Therefore, to control trachoma among school children the traditional approach of treating the sick students only, may not be any more

sufficient; it rather requires community based strategy in light of primary Health Care Principles,

To implement this approach the following recommendations may be considered:

1. The need of well organized health education programmes within the schools.
2. Existence of school clinic whose activities include screening students periodically and treating them, as well as treating active trachomatous cases in the positive students' families.
3. Functional intersectoral cooperation between Ministry of Health, Ministry of Education, and the Urban Dwellers Association, so as to strengthen preventive aspects through health education and provision of means of having social services necessary for personal and environmental sanitation in the home environment.
4. Encouraging research to facilitate more findings, which will help in the planning and implementing of effective control programme.

5. The need of establishing a method of evaluating and reporting the results of the coordinated control activities against trachoma in schools should be given the necessary importance.

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Awraja Woreda

Kebele Date

[illegible]

2. Questionnaire used in the Case-Control study

TRACHOMA RISK FACTORS
INDIVIDUAL FAMILY SURVEY RECORD SHEET

NAME OF STUDENT _____

NAME OF HEAD OF HOUSEHOLD _____

Address: 1. Kezana _____ 4. Zone _____
 2. Kefitegna _____ 5. House Number _____
 3. Kebele _____

1. Average Monthly Income of the Household:

Code	Birr	Code	Code
1.	10	6. 51-60	11. 101-200
2.	11-20	7. 61-70	12. 201-300
3.	21-30	8. 71-80	13. 301 - 400
4.	31-40	9. 81-90	14. 401 - 500
5.	41-50	10. 91-100	15. 500+

2. Face Washing habit of the study subject:

1. Several times a day
2. Once a day

3. every 2-6 days
4. every week
5. less than once a week

3. Towel usage of the study subject:

1. Common with other family members
2. private
3. none

4. Water consumption per day for personal hygiene by the study subject:

1. one half liter or more
2. less than $\frac{1}{4}$ liter

5. Water availability:

1. available in the compound
2. available outside the compound
3. not available nearby

6. Housing:

1. Number of household members _____
2. number of rooms _____
3. number of windows _____
4. average number of people per house _____

7. Type of floor:

1. tiles
2. wooden
3. earth
5. other

8. Toilet available

1. in the compound
2. outside the compound
3. used by more than one family
4. not available

9. Garbage disposal:

1. available a. covered b. uncovered
2. not available

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CONTENTS

APPENDIX

1. Form used in the survey of trachoma within the school and in the families of cases and controls.
2. Questionnaire used in the case - control study.

DECLARATION

I , the undersigned, declare that this thesis is my work and that all sources of material used for the thesis have been duly acknowledged.

Name Desta Grfo

Signature 

Place Addis Ababa

Date of Submission 21, October, 1986