DEPARTMENT OF COMMUNITY HEALTH
MEDICAL FACULTY
ADDIS ABABA UNIVERSITY

PREVALENCE AND RISK FACTORS OF ACTIVE TRACHOMA AMONG CHILDREN OF RURAL SOUTH GONDER, ETHIOPIA

By

Endale Berta, MD

A thesis submitted to the school of graduate studies of Addis Ababa University in partial fulfillment of the requirements for the degree of master in public health.

July, 2004

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Acknowledgment

I would like to express my heartfelt gratitude to my advisors Dr.Alemayehu Worku and Dr. Muluken Melese for their advice and encouragement starting from developing research proposal to report writing.

I am very thankful to Ato Getaneh and Dr.Gedefaw Fisseha for their contribution in preparing data collection materials. I am also grateful to, Ato Tigabie Lakew, Ato Alemneh Bekalu and Ato Meseret Wale for their participation in data collection.

I am deeply indebted to Ato Ketema Alemu and Ato Asegid Tekle, for their participation in data entry and cleaning.

I gratefully acknowledge residents of the study area whose participation made possible the collection of the data sets used in this paper.

Finally, I thank the Medical Faculty of Addis Ababa University for the provision of fund for the study.

Table of contents

Page

Acknowledgement ---------- i

Table of contents ---------- ii

List of Tables and figures ---------- iii

Abstract ------- ---------- vi

1. Introduction ---------- 1

2. Significance of the study ---------- 7

3. Objectives of the study ---------- 8

4. Methodology ----------9

Study design ---------- 9

Study area ---------- 9

Study population ----------10

Sample size ----------12

Data collection ----------13

5. Variables of the study ----------16

6. Data Quality assurance ---------- 17

7. Data entry and analysis ---------- 17

8. Ethical considerations ---------- 18

9. Results ---------- 19

10. Discussion ---------- 41

11. Limitation of the study ---------- 46

12. Conclusion ---------- 47

13. References ----------48

14. Annex ---------- 51

List of tables and figures

Table 1. Distribution of study children by age, sex and residential kebele, South Gonder zone, 2004.

Table 2. Distribution of study children by altitude of residential area, demographic and economic characteristics. South Gonder zone, 2004.

Table 3. Distribution of study children by by altitude of residential area, environmental and behavioral characteristics. South Gonder, 2004.

Table 4. Distribution of study children by elevation of residential area and sex. South Gonder zone, 2004.

Table 5. Distribution of study children by age and presence of active trachoma. South Gonder zone, 2004.

Table 6. Prevalence of active trachoma in study children by demographic and economic factors. South Gonder zone, 2004.

Table 7. Prevalence of active trachoma in study children by environmental and behavioral factors. South Gonder zone, 2004.

Table 8. Distribution of study children by altitude of residential area and presence of active trachoma. South Gonder zone, 2004.

Table 9. Bivariate and multivariate logistic regression of presence of trachoma on demographic and economic factors, South Gonder zone, 2004.

Table 10. Bivariate and multivariate logistic regression of presence of trachoma on environmental and

behavioral factors, South Gonder, 2004.

Figure 1. Schematic Presentation of Sample Selection Procedure.

Figure 2. Schematic presentation of eye examination and result reporting procedure.

Figure 3. Percentage distribution of active trachoma cases by age in study children.

South Gondern zone, January 2004.

ABSTRACT

Trachoma is a chronic communicable kerato-conjunctivitis caused by chlamydia trachomatis. The disease can cause blindness if not treated. There are at least 146 million people in the world suffering from active trachoma, 4.9 million of whom were blinded due to the disease. Studies conducted in Ethiopia on school children showed that trachoma is highly prevalent and a major public health problem. Trachoma is transmitted by flies, fomites and fingers. Numerous studies have demonstrated that limited access to water supplies, low water consumption by the households, and poor personal hygiene especially with regard to facial cleanliness are all risk factors for chlamydia trachomatis. Even though their impact has not been determined, efforts have been exerted to control the transmission of trachoma by the ministry of health and other non-governmental organization. A cross-sectional community-based study was conducted on children 1- 9 years old, residing in three selected rural kebeles with different altitude, in Amhara region- Northern Ethiopia. A total of 1872 children were included in the study. The study showed that the prevalence of active trachoma was found to be 50% in highland area (2501 – 3000ms), 69.9% in medium altitude area (2001 – 2500ms) and 73.8% in low land area (1600 – 2000ms). The difference in prevalence among children residing in the three agro-ecological zones is statistically significant ($\chi^2 = 98.9$, $p < 0.0001$). The result showed that distance from water source and presence of window in cooking place, were found to be positively associated with active trachoma. Negatively associated factors were altitude of residential area, water amount consumed for domestic activities and regular use of soap. In conclusion altitude is significantly associated with, and it is one of the indicators of prevalence of active trachoma. Further detailed studies on the role of altitude on transmission of trachoma are required. Mechanisms to improve face washing habit of children and water accessibility should be considered when designing any trachoma control program.

Key words:- prevalence; active trachoma; altitude; risk factors; low land; high land; demographic & economic factors; behavioral & environmental factors; Ethiopia.

1. INTRODUCTION

I. History of trachoma

Trachoma (in Greek "rough") is communicable kerato-conjunctivitis usually of chronic evolution caused by a micro organism called chlamydia trachomatis, primarily affecting the superficial epithelium, characterized by the formation of follicles, papillary hyperplasia and pannus formation. The natural resolution is by cicatrisation, involving potentially considerable visual disability (1, 2).

The history of trachoma goes back to the earliest medical records and embraces some five millennia. It was known in China where trichiasis was treated in the 27th century B.C. It was also endemic among Sumerians of Mesopotamia (before 2000 B.C) and it was a scourge in ancient Egypt where the evidence of papyri and of forceps used for trichiasis places experience of its ravages at any rate back to the 19th century B.C. It was also common in ancient Greece and in the 5th Century B.C (1, 2); Hipocrates was well acquainted with it, while Heliodorus of Alexandria wrote a book on the subject in the 2nd century B.C (1).

The classical Romans also knew of it. The name trachoma was used by a physician called pedanius Dioscorides (AD 40-91), another physician Celsus (A.D 14) gave a good clinical description of the roughness of the lids and their treatment by rubbing and scarification (1). Some writers mentioned that trachoma was transported from its natural home in the Middle East (particularly Egypt), from time to time by travelers to be disseminated to the other parts of the world: Europe by crusaders from Palestine, to the rest of Africa, southern Europe and to Asia by the Muslim invaders and to America by the Spanish

conquistadors (1). But the disease was not particularly brought to the notice of European surgeons and medical research until practically the entire French army of 32,000 and to a less extent the British, fell victims to it during the Napoleonic campaign in Egypt in 1798-1799 and immense numbers of soldiers were sent home blind (1).

Today, in developing countries for the greatest part tropical, trachoma is one of eye diseases, which is most responsible for suffering and for the greatest incidences of blindness (1, 2, 3).

II. Global and national situation of trachoma

According to the world health organization (WHO) blindness is defined as a visual acuity of 3/60 or less (4). Currently it is estimated that 45 million individuals world wide are bilaterally blind and another 135 million have severely impaired vision (5). The fact that there are 180 million people in the world today either blind or at the verge of blindness, makes trachoma a human tragedy in our times. This number does not include millions with monocular visual impairment or blindness (6).

Rapid Industrialization and the spread of information technology have changed the nature of the work place for many people (7). Visually demanding tasks- driving, reading, interpersonal interaction and computer skills are now of greater importance particularly in countries experiencing economic development (7).

Population based research has shown that people with the best visual acuity of 6/18 can not perform visually intensive tasks effectively (7). The functional limitations of such individuals will hamper the economic growth of a country (7,8,9).The true burden of

blindness includes those who are economically blind with visual acuity of less than 6/18 and better than 3/60.

Diseases affecting the cornea usually at their end stage cause either opacification or ulceration and finally corneal blindness (10). The importance of corneal diseases as a major cause of blindness in the world today remains second only to cataract. It is clear that the epidemiology of corneal blindness is diverse and highly dependent on the ocular diseases that are endemic in each geographical area. The diseases responsible for an increase in the prevalence of corneal blindness in a population have included trachoma, onchocerciasis, leprosy, ophthalmia neonatorum and, measles and/or xerophtalmia (10).

At present trachoma is still the world's leading infectious cause of blindness and the leading cause of ocular morbidity. According to WHO, it is estimated that 10 million people are suffering from trichiasis and need surgery to prevent corneal blindness and another 4.9 million are totally blind from trachomatous corneal scaring (10). Trachoma therefore, remains the leading cause of preventable blindness in the world today particularly in developing countries especially tropical areas. A clinic based survey conducted in Cambodia in 1996 showed that trachoma was the cause of bilateral blindness in 6% of all patients who visited the clinics. In the same survey trachoma was found in 13.6% of all patients (11). According to WHO report in 1979, trachoma caused blindness in 40.6% of rural population of Uganda and in 35% of Kenyan rural population.

III. Trachoma in Ethiopia

According to the investigation carried out by Budden in 1981, the prevalence of blindness in Ethiopia is estimated to be 1.5% (12). The same survey report in Ethiopia showed that, trachoma was found to be the leading cause of blindness (42%) followed by cataract (29%). Based on this estimation currently 900,000 to 1,000,000 people are blind of which nearly 400,000 are related to trachoma (12).

The available reports indicate that the prevalence of trachoma is quite high in Ethiopia through out the country. A study by Lemma estimated the prevalence rate of trachoma to be 40.9% in children age 5 to15 years in Wollo, north eastern- Ethiopia (13). Another study in Gonder region, Northern Ethiopia, the prevalence in children 5-9 years was found to be 43% (13), while a community based survey in Jimma zone, southwestern Ethiopia showed the prevalence of active trachoma to be 25% in all age groups and 35.7% in children age less than 10 years (14).

IV. Risk Factors for Trachoma

Trachoma has always been associated with poverty, poor sanitation and low socio-economic status (14). The infection is transmitted from eye to eye by contaminated fingers, clothes, eye make up, flies and aerosolized nasopharyneal secretions. For transmission to become common place, however, certain environmental conditions must also be present. Numerous studies have demonstrated that limited access to water supplies, low water consumption by the household, the presence of flies, and poor hygiene especially with regard to facial cleanliness are all risk factors for becoming infected with chlamydia trachomatis (13, 14, and 15).

A study conducted in Ethiopia by G. De Sole on Cuscitic pastoralist groups demonstrated the importance of cattle in the transmission and severity of eye infections (15). Cattle droppings probably by serving as a good breeding media for flies might contribute to the transmission of blinding trachoma. In addition, the study showed that neither cattle ownership nor the presence of cattle in the village has a major role in the size of the fly population; instead it seems to be the way in which the cattle are kept (15).

As seen on the study in the Gambia, the control of muscid flies is believed to reduce the transmission of trachoma in children (16).

There is considerable evidence that, persons with clean faces are less likely than others to have active trachoma. A community based study conducted on children aged 1-7 years in Tanzania Showed that sustained facial cleanliness is a protective factor for both any trachoma and severe trachoma. Consequently there is an assumption that promoting hygiene may reduce trachoma. A study done in Wereilu woreda, South Wollo, documented significant association between children's face washing habit less than once per day and the prevalence of trachoma (13).

In a study done in Nepal, it was found that villages without tube-wells had a higher prevalence of trachoma while lower rates of infection were seen in families who live in cement houses with fewer people per room, and had more servants, more house- hold goods more animals and more land (10).

In south western Ethiopia, where 24.5% of the population was shown to have clinically active trachoma, Zerihun found that both, active and cicatrical trachoma were significantly

associated with females (17), living in rural areas, having illiterate parents, and not having a latrine. The fact that females seem to be especially at risk has been confirmed by studies in Kenya and the united republic of Tanzania (10). Whether this is because, they have lower status in their society, or spend more time with young children, who are the main source of clinically active infection, have not been clearly delineated. It is clear however that, individuals who are marginalized, impoverished, and at the bottom socio-economic level of society are most likely to have the disease.

In general, when economic and living conditions improve, the prevalence of trachoma declines. For example, Dolin found that from 1986 to 1996 the prevalence of blindness resulting from trachomatous corneal opacities in a study population in the Gambia fell from 0.10% to 0.02%, a relative decline of 80%. At the same time the prevalence of clinically active trachoma decreased by 54%. During this 10-14 years period, primary health care (PHC) services expanded, access to water increased, and sanitation improved, and there was a general improvement in the public health infrastructure in spite of a rapid growth in population (18).

World health organization, in cooperation with various non-governmental organizations and national health services, recently began implementing a program to eliminate blinding trachoma-Global Elimination of Trachoma by 2020 (GET 2020) (19, 20). The program has adopted a strategy called SAFE, consisting of the following control measures: S*urgery* for entropion / trichiasis, *Antibiotics* for infectious trachoma, *Facial cleanliness* to reduce transmission and *Environmental improvements* such as control of disease spreading flies and access to clean water.

Scarcity of resources will not allow nations to implement the SAFE strategy in all parts of their territories at once. Therefore, trachoma elimination campaign of a country should start from and give emphasis to areas where the disease is rampant and stage by stage can cover the rest of the nation.

This study will estimate the prevalence of active trachoma in children living in the three agro-ecological zones of south Gonder administrative zone and assess the relation of active trachoma prevalence with altitude. In a study in central Ethiopia, The prevalence of trachoma was found to be as low as 7% in highlands with elevation above 2500 ms and as high as 77% in low lands below 2000 meters above sea level (23).

2. Significance of the study

Numerous studies have been performed with regard to determining magnitude of trachoma, identifying risk factors, and on impact of intervention activities. However few studies were carried out on the association of altitude and active trachoma prevalence. This study will estimate the prevalence of active trachoma among young children residing in rural South Gonder and determine the association of the disease with potential risk factors including altitude of residential area. The result of this study, together with those of similar studies will help in designing various intervention stratetegies accordingly.

3. Objectives

I. General objectives

The objective of the study is to measure the prevalence of active trachoma among young children and to assess its relationship with variation in altitude.

II. Specific objectives

1. To measure the prevalence of active trachoma in children of age 1-9 years living in areas with different altitudes.
2. To assess the relationship between prevalence of active trachoma and variation in altitude.
3. To assess the relative importance of possible risk factors for acquiring of trachoma.

4. Research methodology

I. Study design

The study was community – based, cross-sectional descriptive study design. House to house survey to identify children with signs of active trachoma was conducted by trained health professionals.

A pre-tested quantitatively designed questionnaire was employed to collect important information about demographic, environmental and behavioral factors. Eye examination, for the presence of signs of active trachoma was performed for each study individual, 1- 9 years old.

II. Study area

The study area is located in south Gonder administrative zone of Amhara region with geographical location of 11^0 02' to 11^0 42' latitude and 37^0 25' to 38^0 43' longitude. The zonal town Debre-tabor is found 666 km north east of Addis Ababa. The zone has 10 woredas with a total population of 2,116,541 projected from 1994 census report (21). The larger proportion of the population live in the rural area and children of age below 10 yrs constitute 30.1% of the rural population. There are about 399,792 households in the rural area and the average household size is about 4.5 (21).

One zonal hospital and 10 health centers exist in the zone. There are only two ophthalmic nurses and few ophthalmic medical assistants in the zone. Less than 15% of the rural households get their water from protected wells & springs (22).

The area has three agro-climatic divisions: kolla, Woina-dega, and Dega with altitudes of <1500 ms, 1500-2500ms, >2500ms above see level respectively (22).

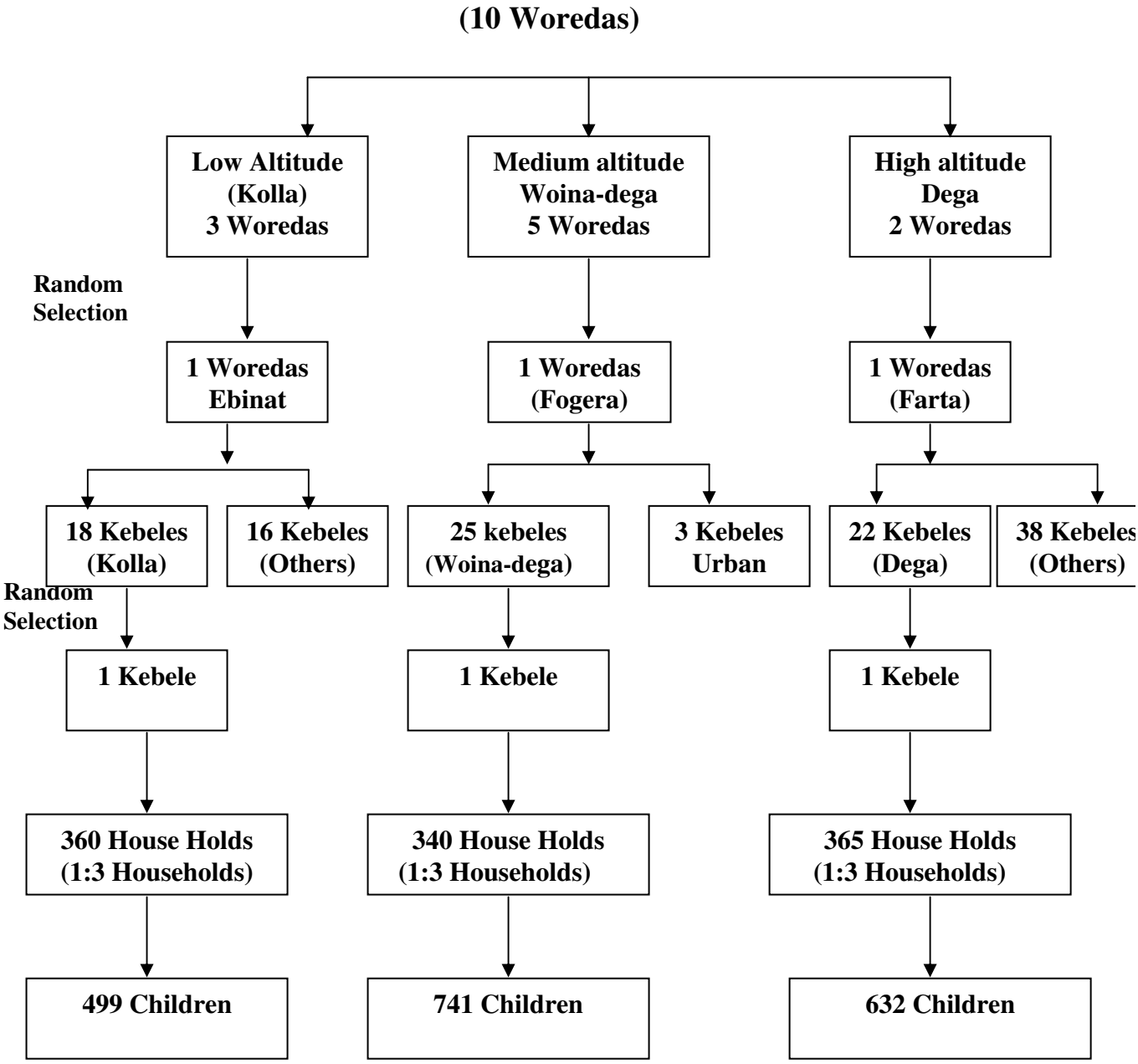
III. Study population

Children of age 1- 9 years living in the rural part of south Gonder zone were included in the source population. The ten Woredas of the zone were categorized in the three agro-climatic regions – kolla, Woina-dega and Dega. Woredas were categorized in to one of the divisions based on where the larger proportion of the area lies. One woreda was selected randomly from each agro-climatic zone.

Three peasant associations, one from each selected woreda were included in the study by random selection. A complete census of selected kebeles was conducted. List of the households was the base for identifying sample households by systematic selection. One out of three houses was included in the study (1:3households). All children of age 1-9 years residing in selected households were eligible for the study. The total of 1068 households from the selected three kebeles, were visited to get the required number of study children. Three hundred and sixty houses from kola kebele, 340 houses from Woina-dega and 365 houses from Dega kebele were study households. Those households where there were no eligible children were excluded from the study. The sample selection procedure is described schematically as follows (Figure 1).

Figure 1. Schematic Presentation of Sample Selection Procedure.

South Gonder Addm. Zone



IV. Sample size

A study conducted in central part of Ethiopia recently documented prevalence of active trachoma to be 70%,40% & 8%, in children of age less than 10 yrs, who live in areas with Kolla, Woina-dega and Dega agro-climatic divisions respectively (23).

Using the prevalence rate from the above mentioned study, and taking 95% level of significance with 0.05 degree of precision , design effect of 2,the sample size required was 492 children from kolla (Ebinat) woreda and 738 children from Woina-dega (Fogera)woreda . The sample size required from Farta woreda was calculated using estimated prevalence rate of 8%, with 95% of level of significance and 0.03 degree of precision.

A total number of children required to participate in the study from Farta woreda based on the above assumptions was 630. The formula used to calculate sample size for all three study population is:-

$$n = \frac{(Z_{\alpha/2})^2 \; P\,(1-p)}{d^2}$$

Where

n = minimum sample size required.

$Z_{\alpha/2} = 1.96$

P = estimated Prevalence (taken from previous study).

d = degree of precession.

Therefore, the minimum required number of children of age 1-9years, for the study was 1860.

V. Data collection

Four high school graduates and 9 high school students of grades 9 and 10 with previous experience of community based data collection were recruited locally. Before starting the field work, training was given on skills of data collection by the investigator for five days. These trained data collectors interviewed heads of each selected study household or adult member of the family using a pre-tested questionnaire, which was designed to collect important information. The topics for interview were about demographic characteristics of heads and eligible children of selected households. Information on environmental assessment and behavioral factors were also included.

The altitude of the environment above sea level was measured at the site of each selected household using a measuring instrument called GPS-12.

Two ophthalmic nurses and one ophthalmic medical assistant were assigned to perform eye examination. All of them were working in government health institutions in the region on eye care service. They have participated on rapid assessment of trachoma, recently conducted in the region by Carter center-Ethiopia.

Training on eye examination, grading and reporting the result was given to the graders for five days by the ophthalmologist currently working in the regional referral hospital. Agreement level on grading examination results among graders was measured taking the ophthalmologist as a gold standard and it was found to be greater than 85 %.

Immediately after the training, health professionals went to the field to perform eye examination on selected study children. Examination of right eye using magnifying loupe was done at the center of each village. The guide used for reporting examination result was the simplified trachoma grading scheme, which was developed by WHO for field work.

WHO recommends that in order to examine the eye for trachoma, the eyelids and cornea should be observed first for inturned eyelashes and any corneal opacity. The examiner then should evert the upper eyelid to examine the conjunctiva over the stiffer part of the upper eye lid (tarsal conjunctiva). The conjunctiva covering the rounded edge of the tarsal plate and corners of the everted eye lid should not be examined for this purpose.

The normal conjunctiva of the upper tarsal area is pink and is smooth, thin and transparent. Over the whole area of the tarsal conjunctiva, there are large deep- lying blood vessels that mainly run vertically from the upper and lower edges of the tarsal plate.

Based on the presence or absence of signs of trachoma, cases are graded according to the following grading criteria (24, 25).

1. Trachomatous inflammation-follicular (TF).

   The presence of five or more follicles in the upper tarsal conjunctiva. (Follicles must be at

   least 0.5 mm in diameter)

2. Trachomatous inflammation-intense (TI)

   Pronounced inflammatory thickening of the tarsal conjunctiva that obscures more than half

   of the normal deep tarsal vessels.

3. Trachomatous conjunctival scarring (TS)

   The presence of easily visible scaring in the tarsal conjunctiva.

4. Trachomatous trichiasis (TT)

At least one eyelash rubs on the eyeball. Evidence of recent removal of inturned lashes was

also graded as trichiasis.

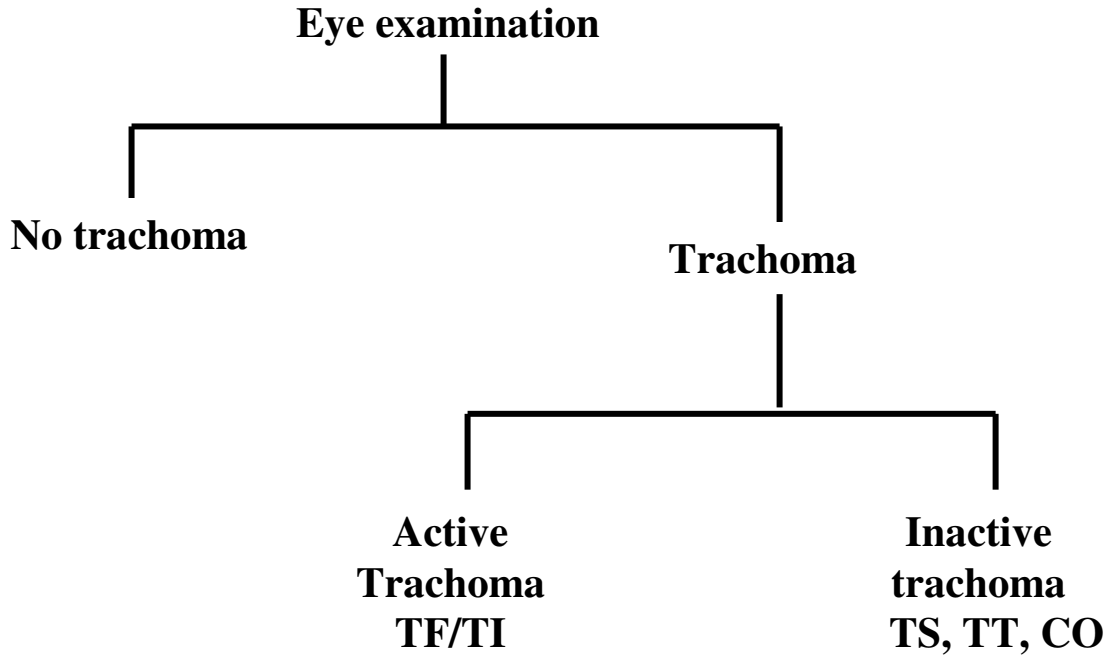
5. Corneal opacity (CO)

Easily visible corneal opacity over the pupil so dense that at least part of the pupil margin is

blurred when viewed through the opacity.

Finally, the presence or absence of each sign of trachoma was recorded on collection form for each study individual.

Figure 2. Schematic presentation of eye examination and result reporting procedure.



5. Variables of the study

In this study different demographic, environmental and behavioral factors were considered as explanatory variables for acquiring trachoma. The variables included are:

1. Dependent variable
    - Presence of signs of trachoma.
2. Independent variables are
    - Altitude of living area
    - Age of the child
    - Sex of the child
    - Educational status of the child
    - Face washing habit of the child
    - occupation of head of the household
    - educational status of head of the house hold
    - Cattle ownership of the household.
    - Presence of cattle in the living room.
    - Cooking place in the living room.
    - Presence of window in the cooking room.
    - Garbage disposal system of the household
    - Distance of garbage disposal site from living home.
    - Presence of latrine.
    - House hold water consumption.
    - Distance of water sources from living home.

6. Data quality assurance

Recruited data collectors were high school-graduates and students who were residents of the selected kebeles. All of them have participated previously in community based data collection for different purposes, therefore they have good experience. Furthermore training was given for five days on skills of data collection by the investigator. The study used pre-tested questionnaire. The questionnaire was first written in English then translated to Amharic and back to English to check the consistency of information before applying it for data collection.

Eye examination of study children was performed by ophthalmic nurses and ophthalmic medical assistant who were giving eye care service in government institution in the region. They have participated on rapid assessment of trachoma recently done in the region. Additionally, they were given 5 days training on how to diagnose and report trachoma using simplified trachoma grading scheme, by experienced ophthalmologist. Grading and reporting of examination result was based on WHO recommended grading scheme. Data cleaning was performed repeatedly to assure good quality.

7. Data entry and analysis

Collected data entered in Epi- info version 6 and transferred to SPSS version 10.0 for windows for analysis. Comparison of rates of exposure to independent variables among different groups of study populations was done. Rates, ratios with their 95% confidence intervals and chi- square statistics were calculated using Epi-info version 6 programs.

Bivariate and multivariate analyses were performed using SPSS version 10.0 to assess the association.

8. Ethical consideration

Ethical clearance was obtained from community health department - medical faculty of A.A.U, from Amhara national regional state administrative office, South Gonder zonal administrative office and from administrative offices of respective woredas. The purpose of the study was explained to responsible member of each selected household before interview and examination. Verbal consent was obtained from head of each selected household.

9. Result

I. General description

To obtain the minimum required sample of 1860 children, a total of 365 households from Ata-didim, 340 from Woj-arbamba, and 360 from Worgaja kebele were visited. A total of 1872 children of age 1-9 years residing in the selected three kebeles, were included in the study. Nine hundred fifty-six (51%) of them were male and the rest 916 (49%) were female (Table 1). Children selected from Ata-didim kebele with (altitude 2500-3000 ms) were 632 (33.8%), those from Woj-arbamba kebele (altitude 1800-2100 ms above sea level) were 741(41.6%) and those from Worgaja kebele (altitude 1600-2000 ms) were 499(26.7%). Children who were not examined because of their absence at the time of examination were 33.

Table 1. Distribution of study children by age, sex and residential kebele. South Gonder zone, January 2004.

Age of the child	Ata- Didim kebele		Woj-arbamba kebele		Worgaja kebele		Total NO (%)
	Male NO (%)	Female NO (%)	Male NO (%)	Female NO (%)	Male NO (%)	Female NO (%)	
1–3 years	112(5.98)	109(5.82)	102(5.45)	108(5.77)	80(4.27)	73(3.90)	584(31.20)
4–6 years	119(6.36)	112(5.98)	129(6.89)	127(6.78)	75(4.00)	65(3.47)	627(33.49)
7–9 years	87(4.65)	93(4.67)	139(7.43)	136(7.26)	113(6.04)	93(4.97)	661(35.31)
Total	318(16.99)	314(16.77)	370(19.76)	371(19.82)	268(14.32)	231(12.34)	1872 (100)

Out of the total study children, 584 (31.20%) are in the age group 1-3 years, 627(33.49%) in the age group 4-6 years while the rest 661(35.31%) are 7-9 years old.

The average size of the household was 6.1 in Ata-didim, 6.2 in Woj-arbamba and 4.9 in Worgaja kebele. The average household size in Worgaja was lower by one than the rest two kebeles. This difference is statistically significant (F statistic =105.11, $p < 0.001$).

On average there were 148 children of age 1-9 years in 100 households in Ata didim kebele. This value is 161 per 100 households and 136 children per 100 households in Woj-arbamba and Worgaja kebeles respectively. The mean age of children examined was 5.2 years.

II. Socio-demographic, environmental and behavioral characteristics

a. Socio-demographic and economic characteristics

In all study areas, the larger proportion of study children (92.3%) live in households headed by male. Children living in households headed by males were 895 (91.9%) in low altitude area (1500 – 2000 ms), 235(88.3%) in medium altitude (2001 – 2500 ms) and 597(94.5%) in high land areas (2501 – 3000 ms). As the study site was rural, occupation of heads of households in which 97.5% of the study children living was farming. In high land area (2500 – 3000 ms) all study children live in households where heads are farmers. Those study children who live in households headed by craftsmen or government employees were 31(3.2%) and 15(5.6%) in low land and medium altitude areas respectively.

Out of the total 1872 study children, 1496 (76.7%) have fathers who are illiterate. Seven hundred and ninety-seven (81.8%) children from low land area and 214 (80.5%) children from medium altitude area live with heads of households who are illiterate (Table 2).Those children selected from high land area and live with illiterate heads constitute 76.7% (485). This difference is statistically significant ($\chi 2 = 94.68$, $p<0.01$).

There was no statistically significant difference in cattle ownership among residents of the three study areas ($\chi^2 = 3.236$, p = 0.1.98). Families of 932 children (95.7%) in low land area, 257 children (96.6%) in medium altitude and 595 children (94.1%) in high land areas had cattle.

Families of 485(76.7%) children in high land areas rated their economic status as poor or very poor, where as families of only 292(30.0%) children in low land and 51(19.2) children in medium altitude rated their status as poor or very poor. Those who rated their economic status as average were families of 535 (54.9%) children in low land and families of 144(54.1%) children in medium altitude areas. The proportion of children in high land

whose families have average economic status was 22.8%.Heads of households of 147 children (15.1%) in low land, of 71 children (26.7%) in medium altitude area and of 3 children (0.5%) in high land area responded as rich when asked to rate their economic status in comparison with their neighbors.

In the study area 1248 children (66.7%) were living in families of six or less members, whereas 624 (33.3%) children were living in households with family size of greater than six at the time of the study.

Those children enrolled in school were 8.6% of the total. Ninety-one percent (1712) of the children were either pre-school or were not able to attend school. At the time of the study, out of the total 754 children who were old enough to go to school, only 160 (21.2%) were attending school or quitted recently. The proportion of children who do not go to school was high in all three study areas. It was 75.7%, 82.8% and 83.2% in children of low land, medium and high land areas respectively (Table 2).

Out of the total study children 1624 (86.8%) live in households with one room, 239 (12.8%) with two rooms, 9 (0.5%) more than two rooms. In low land 834 (85.6%) children reside in households with one room. Two hundred and sixteen (81.2%) and 574(90.8%) children reside in households with one room in medium altitude and high land areas, respectively.

Table 2. Distribution of study children by altitude of residential area, demographic and economic characteristics, South Gonder zone, January 2004.

Demographic and Economic factors	Low land area (1500 – 2000 ms) Number (%)	Medium altitude (2001–2500 ms) Number (%)	High land (2500-3000ms) Number (%)	Total Number (%)
Sex, head of the household				
- Male	895 (91.9)	235 (88.3)	597(94.5)	1727 (92.3)
- Female	79 (8.1)	31 (11.7)	35 (5.5)	145 (7.7)
total	974(100)	266(100)	632(100)	1872(100)
Occupation of head of the household				
-farmer	943 (96.8)	251(94.4)	632(100)	1826 (97.5)
-craftsmen	31(3.2)	12(4.5)	--	43(2.3)
-government employee	--	3(1.1)	--	3(0.2)
total	974(100)	266(100)	632(100)	1872(100)
Educational status of head				
- Illiterate	797(81.8)	214(80.5)	485(76.7)	1496 (79.9)
- can read and write only	142 (14.6)	17(6.4)	107(16.9)	266 (14.2)
- grade 1- 12	35(3.6)	135(13.2)	40(6.3)	110 (5.9)
total	974(100)	266(100)	632(100)	1872(100)
Family size of the household				
- ≤ six members	704(72.3)	158(59.4)	386(61.1)	1248 (66.7)
- > six members	270(27.7)	108(40.6)	246(38.9)	624 (33.3)
total	974(100)	266(100)	632(100)	1872(100)
Number of under 10 years Children in the household				
- ≤ two	527(54.1)	99(37.2)	365(57.8)	991 (52.9)
- > two	447(45.9)	167(62.8)	267(42.2)	881 (47.1)
total	974(100)	266(100)	632(100)	1872(100)
Cattle ownership				
- yes	932(95.7)	257(96.6)	595(94.1)	1784 (95.3)
- no	42(4.3)	9(3.4)	37(5.9)	88 (4.7)
total	974(100)	266(100)	632(100)	1872(100)
Perceived economic status				
- very poor or poor	292(30.0)	51(19.7)	485(76.7)	828 (44.2)
- average	535(54.9)	144(54.1)	144(22.8)	823 (44.0)
- rich	147(15.1)	71(26.7)	3(0.5)	221 (11.8)
total	974(100)	266(100)	632(100)	1872(100)
Age of the child				
1 – 3 years	289(29.7)	74(27.8)	221(35.0)	584 (31.2)
4 – 6 years	305(31.3)	91(34.2)	231(36.6)	627 (33.5)
7 – 9 years	380(39.0)	101(38.0)	180(28.5)	661(35.3)
total	974(100)	266(100)	632(100)	1872(100)
Sex of the child				
- Male	508(52.2)	130(48.9)	318(50.3)	956 (51.1)
- female	466(47.8)	136(51.1)	314(49.7)	916 (48.9)
total	974(100)	266(100)	632(100)	1872(100)
School enrollment of the child				
- Yes	107(24.3)	22(17.2)	31(16.8)	160 (21.2)
- no	334(75.7)	106(82.8)	154(83.2)	594 (78.8)
total	441(100)	128(100)	185(100)	754(100)
Number of rooms the family has				
- one	834(85.6)	216(81.2)	574(90.8)	1624 (86.8)
- more than one	140(14.4)	50(18.8)	58(9.2)	248 (13.2)
total	974(100)	266(100)	632(100)	1872(100)

Environmental and behavioral characteristics

Housing condition

Family members of 1591 (85 %) children cook their food in the same room where the family live where as those families of 278 (14.8%) children cook in a separate room. Only 3 (0.2%) children live with families who do not have room for cooking and cook their food out side their room. Larger proportion of children 613 (97.0%) in high land areas live in households where the family cook their food in the living room. Families of 195 (73.3%) children in medium altitude and 783 (80.4%) children in low land areas cook their food in their living room (χ^2=116, p<0.01).

Those children who live in households with cooking rooms having windows constitute 24% (449) of the total. The proportion of children who live in houses with windows was 29.5% (287) in low land areas of altitude <2000 ms, but the proportion was 48.1% (128) and 5.4% (34) in medium altitude and high land areas respectively.

Out of the total children, 1784 (95.3%) were members of the families who have cattle and 600 (33.6%) of them live in same rooms where the cattle are kept. In the study area with altitude >2500 ms, families of 595 (95.8%) children keep their cattle in the same room where the family lives, but only families of 29 (3.1%) children in areas with altitude < 2000 ms and family of 1 (0.4%) child in the area with altitude 2001 – 2500 ms pass nights with their cattle in the same room.

Water source and consumption

The common sources of water for domestic consumption in the study area were spring (for 43.5%) and river (for 36.1%) of the study children. Six hundred and twenty (98.1%) of children in high land area (altitude 2501 – 3000 ms) reside in households, who get their water for household consumption from spring. The source for 1.9% of children in the same area was from river and well. River was the source of water for 49.2% and 55.6% of children residing in medium altitude and low land areas respectively.

Seventy-two (27.1%) of children in medium altitude live in houses where the water source was well, whereas it was the source for only 24.8% of children in low altitude (<2000 ms) areas. Families of 1231(65.8%) children in all study areas get their water traveling for less than 1/2hr. For families of 641 children (34.2%), the water source was more than ½ hour away from their home.

The water source was relatively near (less than ½ hour away from their home) for larger proportion of families of children in high land area 79.9% (505). It was for families of only 100 children (37.6%) in medium altitude area that the water source was less than ½ hour away from their home. Families of 626 children (64.3%) in low land area (altitude <2000 ms) get their water after <1/2 hour travel from home. The difference in distance of water source from home among residents of the three areas with different altitudes is statistically significant (χ^2=150, p<0.01).

In all study areas, the larger proportion of children 1048 (56.0%) live in households where the average daily water consumption is 4 – 8 liters/capita. The average daily water consumption for families of 223 (35.3%) of children in high land area (>2500 ms) and of 316 (32.4%) of children in low land area ($\leq$ 2000 ms) was <4 liters/capita. The proportion

of children in medium altitude (2001 – 2500 ms) whose average daily consumption is <4 liters/capita was 58 (21.8%).

The average daily consumption for 73 (7.5%) children in low land area, for 30 (11.3%) children in medium altitude and for 124 (19.6%) children in high land area was >8 liters/capita.

Waste disposal

In the study area, only families of 82 (4.4%) children have pit latrine. The proportion is relatively higher in areas with altitude ≤ 2000 ms, which is 6.5% (63) than those who live in medium altitude and high land areas (χ^2=21, p<0.01). The prevalence was 3.0% (8) and 1.7% (11) in medium altitude and high land areas respectively.

In the study kebeles, families mostly dispose their domestic wastes in the farm land. Families of 628 (99.4%) children in high land areas, and those of 263 (98.9) in medium altitude areas dispose their garbage in the farm land. The proportion was lower 910 (93.4%) in low land areas (χ^2=41.1, p<0.01). Disposing domestic garbage by burying or by burning is not common in the study area. It was practiced by only families of 49 (5.0%) children in low land, 3(1.1%) children in medium altitude and 2 (0.3%) children in high land areas.

Most of the study children 1754(93.7%) wash their faces once per day, while those who wash their faces twice or more per day were 93 (5%) of the total. The rest 25 (1.3%) wash their faces less than 7 times per week. Six hundred and twenty-three children (98.6%) residing in high land area wash their faces once per day. In medium altitude and low land areas those who wash their faces once per day were 257 (96.6%) and 874 (89.7%)

respectively. Face washing was being practiced twice or more times per day by 77 (7.9%) in low land, by 8 (1.3%) in high land areas.

Most of study children do not use soap for face washing. Only 60 (3.2 %) children use soap and out of them 58 (96.7%) live in low land area, the rest 2 (3.3%) live in high land areas >2500 ms above sea level.

Table 3. Distribution of study children by altitude of residential area, environmental and behavioral characteristics. South Gonder zone, January 2004.

Environmental and Behavioral factors	Low land area (1500–2000 ms) Number (%)	Medium altitude (2001–2500 ms) Number (%)	High land (2500-3000ms) Number (%)	Total Number (%)
Water source for domestic consumption				
- River	542(55.6)	131(49.2)	2(0.3)	675 (36.1)
- spring	156(16.0)	39(14.7)	620(98.1)	815 (43.5)
- pond	34(3.5)	24(9.0)	---	58 (3.1)
- well	247(24.8)	72(27.1)	10(1.6)	324 (17.3)
total	974(100)	266(100)	632(100)	1872(100)
Distance of water source				
< ½ hour away	626(64.3)	100(37.6)	505(79.9)	1231 (65.8)
≥ ½ hour away	348(35.7)	166(62.4)	127(20.1)	641(34.2)
total	974(100)	266(100)	632(100)	1872(100)
Household water consumption				
<4 liters /capita/day	316(32.4)	58(21.8)	223(35.3)	597(31.9)
4 – 8 liters/capita/day	585(60.1)	178(66.9)	285(45.1)	1048(56.0)
>8 liters /capita/day	73(7.5)	30(11.3)	124(19.6)	227(12.1)
total	974(100)	266(100)	632(100)	1872(100)
Cooking place				
In living room	783(80.4)	195(73.3)	613(97.0)	1591 (85.0)
Out side living room	191(19.6)	71(26.7)	19(3.0)	281 (15.0)
Total	974(100)	266(100)	632(100)	1872(100)
Cooking place				
With window	287(29.5)	128(48.1)	34(5.4)	449 (24.0)
Without window	687(70.5)	138(51.9)	598(94.6)	1423 (76.0)
Total	974(100)	266(100)	632(100)	1872(100)
Waste disposal system				
- dispose in the farm land	910(93.4)	263(98.9)	628(99.4)	1801 (96.2)
-Burn or bury it	49(5.0)	3(1.1)	2(0.3)	54 (2.9)
- others	15(1.5)	----	2(0.3)	17 (0.9)
Total	974(100)	266(100)	632(100)	1872(100)
Households				
- with latrine	63(6.5)	8(3.0)	11(1.7)	82 (4.4)
- with out latrine	991(93.5)	258(97.0)	621(98.3)	1790 (95.6)
Total	974(100)	266(100)	632(100)	1872(100)
Cattle shelter				
In living room	29(3.1)	1(0.4)	570(95.8)	600(33.6)
Other than living room	903(96.9)	256(99.6)	25(4.2)	1184(66.4)
Total	932(100)	257(100)	595(100)	1784(100)
Face washing habit				
Twice or more times per day	77(7.9)	8(3.0)	8(1.3)	93 (5.0)
Once per day	874(89.7)	257(96.6)	623(98.6)	1754 (93.7)
Less than seven times per week	23(2.4)	1(0.4)	1(0.2)	25 (1.3)
Total	974(100)	266(100)	632(100)	1872(100)
Soap use for face washing				
Yes	58(6.0)	-----	2(0.3)	60 (3.2)
No	916(94.0)	266(100)	630(99.7)	1812 (96.8)
Total	974(100)	266(100)	632(100)	1872(100)

Altitude of the environment

The study area covers different altitudes from low land about 1600 meters to high land about 3000 meters.

Those study children from low land 1600 to 2000 ms constitute 974 (52.1%) and those from area with altitude 2501- 3000 ms were 632 (33.8%). The rest 266 (14.2%) were from altitude 2001-2500 meters (Table 3). There was an overlap in altitude between Woj-arbamba (1800-2100 ms) and Worgaja (1600-2000 ms) kebeles.

Table 4. Distribution of study children by elevation of residential area and sex. South Gonder zone, January 2004.

Altitude above sea level (in meters)	Male Number (%)	Female Number (%)	Total Number (%)
1600 – 1800	222 (54.0)	189 (46.0)	411 (100)
1801 – 2000	286 (50.8)	277 (49.2)	563 (100)
2001 – 2200	130 (48.9)	136 (51.3)	266 (100)
2201 – 2600	----	----	----
2601 – 2800	313 (50.2)	310 (49.8)	623 (100)
2801 – 3000	5 (55.6)	4 (44.4)	9 (100)
Total	956 (51.1)	916 (48.9)	1872 (100)

Magnitude of active trachoma

Signs of active trachoma were detected in 1221(65.2%) of the total study children. The prevalence varied from 50.0% in Ata-didim kebele to 80.8% in Worgaja kebele. Out of 956 boys examined 620 (64.9%) had active trachoma, while this figure was 601 (65.6%) of 916 girls. This difference in prevalence between sexes is not statistically significant ($\chi 2 = 0.12$, $p > 0.05$). The prevalence of active trachoma was 71.3 % (414) in children of 1-3 years, 70.5 % (442) in age group 4-6 years and 55.0% (365) in 7-9 years children($\chi 2 = 47.9, p < 0.01$). The magnitude increased with age up to 5-6 years and started to decline as age of the children increased to 9 years (Figure 3)

Table 5. Distribution of study children by age and presence of active trachoma. South Gonder zone, January 2004.

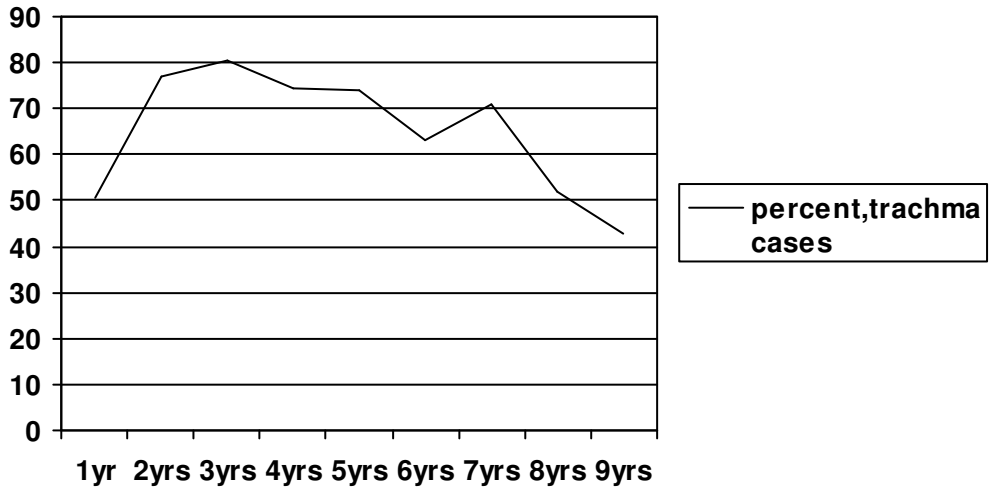
Age of children	children with active trachoma		Total examined
	present Number (%)	absent Number (%)	
1 – 3year	414(71.3)	167(28.7)	581(100)
4 – 6years	442(70.5)	185(29.5)	627(100)
7 – 9years	365(55.0)	299(45.0)	664(100)
Total	1221(65.2)	65(34.8)	1872(100)

The prevalence of active trachoma in children living in female headed households is found to be 69.7% (101) while in male headed households it is 64.9% (1120). This slightly higher prevalence in female headed households is not statistically significant ($\chi 2 = 1.36$, $p > 0.05$). The magnitude of active trachoma is higher in children of households headed by craftsmen and government employees (73.9%) than farmer headed households (65.0%). But the difference is not statistically significant ($\chi^2 = 1.57$, $p > 0.05$). Among 1496 children of households with illiterate heads, 992 (66.3%) were active trachoma cases. Out of the total children whose family heads can read and write, 60.2% (160) are with active trachoma. For those heads who have completed their high school education, the proportion of children with active trachoma is 62.7 %

(69). The result of current study showed no difference in prevalence among children due to their paternal or maternal literacy status ($\chi 2 = 4.10$, $p > 0.05$).

Fig 3. Percentage distribution of active trachoma cases by age in study children. South

Gonder zone, January 2004.



Among children living in households with family size of six or more 656(63.1%) had active trachoma and the proportion is not statistically different in children of smaller family size 565 (67.3%) ($\chi^2 = 3.83$, $p > 0.05$).

The number of children less than ten years old in the family is not associated with occurrence of active trachoma ($\chi^2 = 2.94$, $p > 0.05$). Active trachoma occurred in 664 (67.0%) children, out of the total children residing in families where the number of less than 10 years was one or two. But the prevalence was 63.2% (577) in families with the number of less than 10 years children above two. This difference is not statistically significant ($\chi^2 = 2.94$, $p>0.05$).

Out of 1624 children who live in households with one room 65.2% (1059) had active trachoma; the proportion is almost the same 65.3 % (162) in children who live in households with two or more rooms ($\chi2 = 0.001$, $p >0.05$).

In this study children's school attendance was not significantly associated with the occurrence of active trachoma. Out of the total 594 children who were old enough to go to school but did not attend school, signs of trachoma were found in 59.9% (356).The prevalence was not significantly different in those attending school, 53.1%(85), $\chi^2 = 2.41$ and $p > 0.05$. Out of 828 children whose families are poor in comparison with their neighbors 57% (472) had signs of active trachoma and the proportion increased to 69.7% (574) in children of families with average economic status. In those economically better or rich families 79.2% (175) had active trachoma ($\chi^2 = 51.07$, $p <0.001$).

Table 6. Prevalence of active trachoma in study children by demographic and economic factors, South Gonder zone, January 2004.

Determinant factors	Children with active trachoma Number (%)	Total children examined
Sex of head of the household		
Male	1120(64.9)	1727
Female	101(69.7)	145
Occupation of head of the household		
Farmer	1187(65.0)	1826
Craftsmen and government employee	34(73.9)	46
Educational status of head of the household		
Illiterate	992(66.3)	1496
Can read and write	160(60.2)	266
1 – 12 grade	69(62.7)	110
Family size		
< six	565(67.3)	839
≥ six	656(63.5)	1033
Number of children <10 years in the family		
≤ two	664(67.0)	991
> two	557(63.2)	881
Cattle ownership		
Yes	1159(65.0)	1784
No	62(70.5)	88
Perceived economic status		
Very poor or poor	472(57.0)	828
Average /moderate	574(69.7)	823
Better or rich	175(79.2)	221
Age of the child		
1 – 3 years	414(71.3)	581
4 – 6 years	442(70.5)	627
7 – 9 years	365(55.0)	664
Sex of the child		
Male	620(64.9)	956
Female	601(65.6)	916
School attendance of the child		
Attending school	85(53.1)	160
Not attending school	356(59.9)	594
Number of rooms		
One	1059(65.2)	1624
More than one	32 162(65.3)	248

As the result showed, about 85% of study households use their living room for cooking. Out of 1591 children residing in households which use their living room for cooking, 64.9% 1033 had active trachoma. The prevalence in those who cook their food in a separate room was 66.9% (188). The difference is not statistically significant ($\chi 2 = 0.411$, $p > 0.05$). Active trachoma was detected in 77.3% (347) children of households with windows. Out of 1423 children of households with no windows, 61.4% (874) were found to have signs of active trachoma. This difference is statistically significant ($\chi 2 = 37.87$, $p < 0.01$). The families of only 4.4% of the study children (82) had latrine. The prevalence of active trachoma in children of households with latrine was 64.6% (53). It was not significantly different from that of households without latrine 65.3% (1168).

There was no association detected between waste disposal system of the family and the occurrence of active trachoma ($\chi^2 = 0.34$, $p > 0.05$). Signs of active trachoma were observed in 1175 (65.2%) children of families who dispose their garbage in the farm land. The prevalence was 63% (34) and 70.6% (12) in children of families disposing in a proper manner (burying and burning) and by other methods, respectively.

In the study area, families of 1784 (95.3%) children had cattle, and the prevalence of active trachoma in the same children was 65% (1159). The proportion was 70.5% (62) in families without cattle ($\chi^2 = 1.114$, $P > 0.05$). The proportion of active trachoma cases, among children who pass the night in the same room with cattle was 51.3 %(308).But the prevalence was much higher 72.1 %(834) in children whose families keep their cattle in corral. Multiple logistic regression analysis showed that the way families keep their cattle during nights is not dependently and significantly associated with active trachoma.

Table 7. Prevalence of active trachoma in study children by environmental and

behavioral factors, South Gonder zone, January 2004.

Determinant factors	Children with active trachoma Number (%)	Total children examined
Altitude		
1500 – 2000 ms	719(73.8)	974
2001 – 2500 ms	186(69.9)	266
2501 – 3000 ms	316(50.0)	632
Water source to the household		
River	503(74.5)	675
Spring	467(57.3)	815
Pond	31(67.2)	58
Well	220(66.7)	324
Distance of water source		
Less than ½ hour away	745(60.5)	1231
≥ ½ hours away	476(74.3)	641
water consumption per day		
Less than 4 liter /capita /day	391(65.5)	597
4 – 8 liter /capita /day	699(66.7)	1048
> 8 liter /capita /day	131(57.7)	227
Cooking place		
In the living room	1033(64.9)	1591
Other than living room	188(66.9)	281
Cooking place		
With window	347(77.3)	449
Without window	874(61.4)	1423
Households		
With latrine	53(64..6)	82
Without latrine	1168(65.3)	1790
Household garbage disposal system		
in the farm land	1175(65.2)	1801
by burning or by burying	34(63.0)	54
other	12(70.6)	17
Cattle shelter		
In living room	308(51.3)	600
In separate room	17(60.7)	28
In corral	834(72.1)	1156
Face washing habit		
Twice or more times per day	57(61.3)	93
Once per day	1144(65.2)	1754
Less than seven times per week	20(80.0)	25
Soap use for face washing		
Yes	31(51.7)	60
No	1190(65.7)	1812

The result of current study showed association of active trachoma occurrence with the type of water source ($\chi 2 = 52.9$, $p<0.01$). Those children of families who get their water from river constitute 36.1% (675) of the total, and the proportion of active trachoma cases among them was found to be 74.5 %(503). The prevalence was much lower in those children of families who get their water from well and spring, with prevalence of 67.9% (220) and 57.3% (467), respectively.

As the result showed, the prevalence of active trachoma in children of families who travel more than ½ an hour to fetch water 74.3 %(476) was significantly higher than in those who travel shorter than ½ an hour 60.5 %(745). The prevalence in children of families who consume less than 4 liter /capita /day, 65.5% (391) was significantly higher than those who consume more than 8 liters /capita /day ($\chi 2 = 6.68$, $p<0.05$). Signs of active trachoma were detected in 57.7% (131) children who consume more than 8 liters per capita /day.

The prevalence of active trachoma was significantly associated with elevation of residential area of study children. The prevalence was found to be 81.5 %(335) in children residing in areas with altitude 1600-1800 meters, and it dropped to 68.2% as the altitude increased to1801-2000 ms. The lowest prevalence 50% (316) was observed in children residing in highland area of altitude above 2600 meters.

Table 8. Distribution of study children by altitude of residential area and presence of active trachoma, South Gonder zone, January 2004.

Altitude above sea level (in meters)	Active trachoma		Total Number (%)
	present Number (%)	Absent Number (%)	
1600 – 1800	335 (81.5)	76 (18.5)	411 (100)
1801 – 2000	384 (68.2)	179 (31.8)	563 (100)
2001 – 2200	186 (69.9)	80 (30.1)	266 (100)
2201 – 2400	----	---	---
2401 – 2600	----	---	---
2601 – 2800	311 (49.9)	312 (50.1)	623 (100)
2801 - 3000	5 (55.6)	4 (44.4)	9 (100)
Total	**1221 (65.2)**	**651 (34.8)**	**1872 (100)**

Active trachoma occurred in 65.2% (1144) of children washing their faces once per day, while the prevalence was 61.3 % (57) in those who wash their faces two or more times per day and 80.0% (20) in children washing less than 7 times per week. The prevalence was higher in children washing their faces less than once per day than in those who wash two or more times per day ($\chi^2 = 3.04$, $p > 0.05$). The study also showed lower prevalence of active trachoma in children who used soap for face washing than in those who did not ($\chi 2 = 5.02$, $p < 0.05$). The prevalence was 51.7 %(31) and 65.7 %(1190) in those who use soap regularly and who do not use, respectively.

Factors associated with active trachoma

The investigation on the presence of association between suspected categorical risk factors and active trachoma revealed the following results. On Bivariate analysis age of the child and economic status of the family from demographic factors and altitude, water source, distance of water source from home, household water consumption, presence of window in cooking room, cattle shelter and soap use by children for face washing- from environmental factors were found to be associated with the occurrence of active trachoma. The multivariate regression model, constructed by including the factors found to be significant in the Bivariate analysis, showed that age of the child, altitude, type of water source, distance of water source, water amount consumed by the family member, presence or absence of window in cooking room, and soap use by children were significant predictors of presence of active trachoma (Table 5 & 6). Active trachoma cases had significantly increased odds of exposure to low land living environment (1600 ms to 2000 ms). The odds for soap non-use is 2.4 times higher in trachomatous cases than non-trachomatous children. A 52% higher risk of long distance travel – for longer than 30 minutes was observed in active trachoma cases compared to non-cases ($p<0.01$). The chance of getting children of age 1-3 years is 2.4 times higher in trachomatous children than non-trachomatous, where as the chance of getting children with average daily water consumption >8 liters per capita is lower by 45% in cases than in non-cases. The risk of getting children whose water source is pond among trachomatous cases is 53% less compared to the non-trachomatous cases. Trachoma cases had significantly lower exposure to absence of window in the cooking room. The exposure to absence of window

in the cooking room is lower by 1/3rd in trachomatous children compared to non trachomatous children.

Table 9. Bivariate and multivariate logistic regression of presence of trachoma on demographic and economic factors, South Gonder zone, January 2004.

Determinant factors	Bivariate Adjusted OR(95% CI)	Multivariate Adjusted OR(95% CI)
Sex of head of the household		
Male	1.00	----
Female	1.24 (0.86, 1.80)	----
Occupation of head of the household		
Farmer	1.00	----
Government employee Or craftsmen	1.52 (0.78, 3.00)	----
Literacy status		
Illiterate	1.00	
Can read and write	0.77 (0.59, 1.00)	----
1- 12 grade	0.86 (0.58, 1.28)	----
Family size		
≤ six	1.00	
> six	0.82 (0.67, 1.00)	----
Number of children less than Ten years in the family		
≤ two	1.00	
> two	0.85 (0.70, 1.02)	----
Presence of cattle in the family		
Yes	1.00	----
No	1.29 (0.81, 2.05)	----
Economic status of the family		
Very poor or poor	1.00	1.00
Average	1.74 (1.42, 2.13) **	1.14 (0.88, 1.48)
Rich	2.87 (2.02, 4.08) **	1.22 (0.75, 1.98)
Age of the child		
7-9 years	1.00	1.00
4-6 years	1.96 (1.56, 2.47) **	2.44 (1.89, 3.13) **
1-3 years	2.03 (1.61, 2.57) **	2.50 (1.93, 3.24) **
Sex of the child		
Male	1.00	
Female	1.03 (0.86, 1.25)	----
Educational status of the child		
Enrolled at school Or discontinued	1.00	
Not enrolled at school	1.32 (0.91, 1.91)	----
Number of rooms		

One	1.00	
More than one	1.01 (0.76, 1.33)	----

Key **** p < 0.01, * p < 0.05**

Table 10. Bivariate and multivariate logistic regression of presence of trachoma on environmental and behavioral factors, South Gonder, January 2004.

Determinant factors	Bivariate Adjusted OR(95% CI)	Multivariate Adjusted OR(95% CI)
Altitude		
1500-2000 ms	2.82 (2.28, 3.48)**	4.5 (2.26, 8.96)**
2001- 2500 ms	2.33 (1.71, 3.15)**	2.98 (1.41, 6.3)**
2501- 3000 ms	1.00	1.00
Water source for domestic consumption		
River	1.00	1.00
Spring	0.46 (0.37, 0.57)**	1.19 (0.77, 1.83)
Pond	0.39 (0.23, 0.68)**	0.47 (0.27, 0.83)**
Well	0.72 (0.54, 0.97)*	0.88 (0.63, 1.23)
Distance of water source from home		
< ½ hour away	1.00	1.00
> ½ hour away	1.88 (1.52, 2.32)**	1.43 (1.05, 1.94)*
Daily average Water consumption		
< 4 litre per capita	1.39 (1.02, 1.90)*	1.45 (1.01, 2.1)*
4 – 8 litre per capita	1.47 (1.1, 1.97)*	1.24 (0.88, 1.74)
> 8 litre per capita	1.00	1.00
Cooking place		
In living room	1.00	
Out side living room	1.09 (0.83, 1.43)	-----
Cooking room		
With window	1.00	1.00
Without window	0.47 (0.37, 0.60)**	0.68 (0.49, 0.93)**
Waste disposal system		
In the farm land	1.00	
By burning or burying	0.91 (0.52, 1.59)	-----
Other	1.28 (0.45, 3.64)	-----
Households		
With latrine	1.00	
Without latrine	1.03 (0.65, 1.63)	-----
Cattle shelter		
In living room	1.00	1.00
Out side living room	2.42 (1.97, 2.96)**	0.75 (0.39, 1.44)
Face washing habit		
Twice or more times per day	1.00	
Once per day	1.18 (0.77, 1.82)	-----
Less than once per day	2.53 (0.87, 7.33)	-----
Soap use		
Yes	1.00	1.00
No	1.79 (1.07, 3.00)*	2.31 (1.28, 4.16)**

Key **** p < 0.01, * p < 0.05**

10. DISCUSSION

The average prevalence of active trachoma in the study area was found to be 65.2%. It varied from 50.0% in highland area to 81.5% in low land area. This finding agrees with many previous studies conducted in different parts of the country. Eyob lemma in his prevalence study in South Wollo, Northeast of Addis Ababa found active trachoma in 40.9% among children of age 5 to 15 years (13). Another study done in a highland population of Gonder region revealed a prevalence of 59.0% in 5-9 years old children (31).A prevalence of 40.9% was also documented from a study conducted on children of 3-7 years old in South-Gonder zone, Northern Ethiopia (22). The finding of the current study as well as most of previous studies in children indicated that active trachoma was higher than 20%, suggesting a public health problem in rural Ethiopia. The results of current study showed no difference in magnitude of active infection between males and females of age less than 10 years. This is similar to study findings from other parts of the country and from different countries in the world. The prevalence of active trachoma in children of age 1 year was 50.6% and it rose up to 73.8% at the age of 5 years then it started to decline at the age of 6 years (63.1%) and dropped to 42.7% at the age of 9 years. The magnitude of active trachoma was highest in age group of one to six years.

The finding that the prevalence of active trachoma increases with age of the child up to the age of 6, agrees with the study result in Guragie zone, South Wollo and Sidamo region in Ethiopia (13, 26, 29).Unlike the findings from Sidamo, no association was observed between educational status of children with the occurrence of active infection(29). This

finding indicated that, school attendance without behavioral change in facial cleanliness and personal hygiene was not protective factor by itself. The finding that, high prevalence of active trachoma in children, with poor face washing habit goes with that of Lemma's study (13). In the current study, low prevalence observed in soap users, than in those who do not use.

Since larger proportion of the study children 93.7% (1754) wash their faces once per day, the study could not show the association between face washing habit and prevalence of active trachoma to be significant (χ^2 =5.9, p>0.05).

It is well established fact that facial cleanliness and personal hygiene are significantly and negatively associated with occurrence of active trachoma (26, 27, 28). Active trachoma is more prevalent in rural population with low socio-economic status, without good water supplies and basic sanitation services than urban population with relatively better economy and better accessibly to water supply and sanitation (26, 27). In this study more active trachoma cases were identified in families who rated their economic status as average or rich in comparison with poor families (χ^2 =51.07, p<0.001). But on multiple logistic regression analysis, family economic status failed to explain the variation in active trachoma prevalence.

Even though high prevalence rate was observed in government employees and craftsmen than in farmers, it was not statistically significant.

In this study, the prevalence was higher in children of illiterate heads of households than those who can read and write, even though the difference was not statistically significant. This preponderance in children of illiterate heads might be due to the indirect influence of

educational status of heads on children's face washing habit or because literacy status is directly related to important socio-demographic factors such as family income.

As a large family per se is not necessarily a risk factor for trachoma (27), family size in this study, was not associated with occurrence of the infection (χ^2 =7.79,p > 0.05). The risk of acquiring the infection is related to the likelihood of contact with an infected individual rather than being a member of a large family (27).

The results of current study showed that active trachoma was found to be strongly associated with altitude of the environment, distance the family traveled to fetch water, and. The amount of water consumed per day by a family member for domestic activity was shown to be associated with the prevalence of trachoma in this study when the daily water consumption exceeds 4 liters per capita (χ^2 = 6.68, p<0.05).

From those children whose water consumption is >8 liters/capita/day, 57.7% of the children (71) had active trachoma, but this proportion rose to 65.5% (399) in families consumed less than 4litres/capita/day. Those families with larger consumption might use adequate amount of water for personal hygiene and thus reduce the risk of trachoma. The proportion of active trachoma cases among children, who use soap and water for face washing regularly, was significantly lower than among non-users. Soap use per se might not be the reason for lower prevalence of active trachoma rather it might show their considerable concern for personal hygiene.

The result of this study indicated that the risk of trachoma increases as the distance of water source from home becomes longer than half an hour. The risk of acquiring trachoma for households longer than ½ an hour away from water source was found to be almost twice that of nearest houses (χ^2 = 35.08, p < 0.001).

The association of distance to water source and increased risk of trachoma was also detected by a study conducted in Tanzania (28). The same study showed strong and negative association between distance to water source and facial cleanliness.

Even though it is difficult to be certain about the list of determinant factors, crowding is considered as a risk factor by many investigators (26). The findings of this study revealed that, the risk for infection did not vary with the number of rooms the family have or with the total family size. This could be because crowding is less important in the study area, when compared to other factors for the transmission of active infection.

Unlike the finding in Sidamo, cooking in sleeping room was not found to increase the risk of infection (χ^2 = 0.41, p> 0.05). The presence of window in the cooking room was associated with high prevalence of trachoma (χ^2 = 37.87, p <0.001). The presence of window might increase the chance of fly-eye contact. Construction of houses with windows is more common in hot kebeles than highland kebeles.

Even though the association of the presence of a functional latrine near the house with lower trachoma prevalence has been detected by many investigators, the mechanism by which it would decrease trachoma is not entirely clear. Some say that the presence of latrine may reduce eye-seeking flies in the surrounding environment (29). Other investigators explain the association in such a way that, the presence of latrine may be an indicator of good economic status of the family in a poor rural community. In the current study, there is no significant association between the presence or absence of latrine and the occurrence of active trachoma (χ^2 = 0.01, p> 0.05).

The prevalence of active infection was lower in households disposing their domestic wastes by burning or burying than in those disposing in the farmland but the difference

was not statistically significant (χ^2 = 0.36, p>0.05). The finding agrees with what was found in Sidamo. In the Sidamo study, trachoma was more common in households disposing their garbage <20 ms from their houses (30).

Cattle ownership was not determinant factor for the occurrence of trachoma, as it was observed in Sahlu's study(30).The presence of cattle doesn't necessarily affect the size of eye-seeking fly population rather the way in which cattle are kept that influence the rate of fly breeding(15). In the current study, trachoma was more prevalent in houses keeping cattle out side their sleeping room. But keeping other potential risk factors constant, the association of cattle shelter with active trachoma was not statistically significant.

In the current study, the prevalence of active trachoma in higher altitude (2800 – 3000ms) was found to be 50.8% in children of ages 1 – 9 years. Okubagzi found similar results in north western Ethiopia (Kimir-dingay, Gonder region). In Okubagzihi's study active trachoma was found in 59% of 5 – 9 years old children residing in high land community with altitude 2700ms above sea level. In the study conducted in Guragie zone, the prevalence of active trachoma was 13.1% in areas with the elevation 2800 – 3000ms above sea level and the value dropped to 5.7% when the elevation rises to above 3000ms. But it was above 50% in areas with the elevation $\geq$ 2600ms in the current study. This variation in magnitude of trachoma among areas with similar elevations might be due to the difference in the prevalence of determinant (socio- economic, demographic & behavioral) factors. Even though the magnitude differs in different regions with similar elevations, the trend of trachoma occurrence remained the same-the lower the altitude the higher is active trachoma prevalence.

11. Limitations of the study

The study could not include more kebeles, due to lack of sufficient resource, so that its out come could be more scientifically sound and generalizable to the majority of rural community.

Estimation of economic status of study households was based on respondents reply to the interviewer's question and therefore unreliable.

12. Conclusion

- Trachoma is less common in areas where water is easily accessible.
- Good face washing habit in children reduces transmission of active trachoma.
- The occurrence of active trachoma is higher in children residing in low land areas than those residing in highland areas but with similar socio-economic status, there for altitude can be considered as one of the indicators for the occurrence of active trachoma.

Recommendation

- Improving accessibility to water is one of the measures to reduce the magnitude of trachoma therefore it should be considered as one of the activities in trachoma control program.
- Efforts should be applied on improving face washing habit of children to reduce the magnitude of the disease in them as they are the reservoir of the causative agent.
- Altitude should be considered as one of important indicators to identify high prevalent areas and to allocate scarce resources appropriately.
- Further detailed studies are required to investigate the role of altitudinal change on the transmission of trachoma.

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Questionnaire to be used in a study to assess the effect of altitude on **active trachoma in children living in South Gonder, Ethiopia.**

Date dd☐☐ mm☐☐ yy☐☐

Woreda code ☐

Peasant ass, code No. ☐

Household Code No ☐☐☐☐☐

Respondent ID No ☐☐☐☐☐

Hello, I am ----------. I am here to enroll and interview eligible study participants, and fill in questionnaire forms. I am glad to inform you that, you are one of the eligible study participants and you are welcome to take part in this study. I am also delighted to tell you that I am really value your participation as your individual contribution to the study out put will definitely be very significant. However, it is up to you to decide whether to participate in this study or not. I will admire and respect what so ever your decision is. I would also like to inform you that your name will not be written anywhere in this paper. Would you be willing to participate in this research?

1. Yes _____ 2. No _____

(The interviewer's signature in either of the given spaces certifies the verbal informed consent of the respondent.)

Now, I would like to ask you some questions that may inform the principal investigator about your personal back ground, living environment and some of your and your family activities. Although I feel some of the questions are private, your honest and genuine response will highly be appreciated and credited by the principal investigator as it will enable him to make realistic analysis and to propose a very practical suggestions. If you don't understand any of the questions, please don't hesitate to ask me for clarification. If you don't want to respond to any of the questions, you have the right to skip it. You are

also entitled to quit your participation at any given moment. This interview may take about 15 minutes.

Part .I. Questions to be answered at the household level.

The following questions (from 101-120) focus on the selected household and shall be responded by the head of the household or by adult member of the household.

No	Questions	Coding Categories	Code
101	Altitude of the living area above sea level in meters.		
102	Sex of the head of the household:	1. Male 2. Female	
103	Occupation of head of the household :	1 Farmer. 2 Craftsman 3 Merchant 4 Government Employee 5 Housewife 6 Retired 7Others:specify_____	
104	Educational status of head of the household:	1. Illiterate 2. He/she can write and read 3. Attended formal school	
105	If enrolled in school, highest grade completed :		
106	Family size		
107	Number of children less than 10 yrs old :		
108	Number of rooms in the living house :		
109	From where do your family members get water for domestic consumption?	1. River 2. unprotected spring 3. Pond 4. Unprotected well 5. rain water 6. Protected spring 7. Protected well 8. Pipe 9. Others, specify (If your answer is more than one, indicate all)	
		1 .less than half an hour.	

110	For how long do you travel to get water for domestic consumption?(Two way)	2. From half an hour to two hours walk 3.From 2hr to 4hrs walk 4. Longer than 4hrs walk.	
111.	How much water do the family members consume per day for cooking, washing utensils and cloths and personal hygiene?	1. Less than one pot(20 liters 2. One to two pots(20 –40 lit 3. Three to four pots (60 –80 4. More than four pots(80 liters)	
112	Where do the family members cook?	1. In the same room wh live 2. In the Same house wh live but in a separate ro 3. In a kitchen. 4. Out side living h kitchen. 5. If others; specify	
113	Does the cooking room have window?	1. Yes 2. No	
114	What do you do with your domestically produced refuse (garbage)?	1 burn it 2 bury it 3 Dispose it in the farm 4 Simply dispose it in other place	
115	If your answer to Question 114 is option 4, where do you dispose it?	1 Near by living house 2 Far away from the livi house. 3 In the river or stream.	
116	Do you have latrine?	1. Yes 2. No	
117.	Do you own cattle?	1. Yes 2. No	
118	If your answer to Q 117 is yes, where do the cattle pass the night?	1. In the same room wher family lives. 2. In the same living hous the family lives but in a separate room 3. In a shelter constructed for them around the hous 4. If other, specify _____	
119	Relative to your neighbors how would you economic status?	1. Very Poor 2. Poor 3. Average 4. Better off than average	

		5. Rich	

Part II. Questions about the child selected for the study.

I would like to form you that, the following questions focus on individual child selected for the study and can be responded by the child him self / her self or by a family member.

Name of the selected Child ----------

No	Questions	Coding Categories	Code
201	Age of the selected child in years:		
202	Sex of the selected child :	1. Male 2. . Female.	
203	Educational status of the selected child:	1. Too young to go to school (pre school child) 2. Illiterate 3. Dropped out of school (discontinued) 4. Attending School 5. Others	
204	If the selected child is in school or drop out of school, what is the highest grad completed?		
205	How often does the selected child wash his/ her face?	1. Two or more times per day. 2. Once daily 3. Two- six times per week 4. Once weekly 5. Stays unwashed for longer than a week.	
206	Does the selected child use soap when washing his/her face?	1. Yes 2. No	

House hold code No.

Child ID No.

በደቡብ ጎንደር መስተዳድር ዞን በዓይን ማዝ (ትራኮማ) ላይ ለሚካሔደው
ጥናት የተዘጋጀ መጠይቅ

ቀን☐☐ ወር ☐☐ ዓ.ም ☐☐
የወረዳው ኮድ ቁጥር ☐
የገበሬ ማህበር ኮድ ቁጥር☐
የመንደሩ (መንግስታዊ ቡድን) ኮድ ቁጥር ☐☐
የቤት ቁጥር ☐☐☐☐
የቤተሰቡ ኃላፊ ስም _____
የቤተሰቡ ኃላፊ መለያ ቁጥር ☐☐☐☐

ጤና ይስጥልኝ! ---------- እባላለሁ፡፡ ወደ እርስዎ የመጣሁት በዓይን ማዝ (ትራኮማ) ላይ ለሚካሄደው ጥናት የተመረጡትን ሰዎች እንዲሣተፉ ለማድረግና መጠይቁን ለመሙላት ነው፡፡ እርስዎም በዚሁ ጥናት እንዲሣተፉ ከተመረጡት ሰዎች አንዱ መሆንዎን በደስታ እየገለጽን በጥናቱ እንዲሣተፉ እጋብዞታለሁ፡፡ የርስዎ ተሣትፎ ለሚካሄደው ጥናት ውጤታማነት ከፍተኛ አስተዋፅኦ እንደሚያበረክት በደስታ እየገለጽኩልዎት ነገር ግን በጥናቱ ለመሣተፍም ሆነ ላለመሣተፍ የሚያደርጉት ውሣኔ የእርስዎ ነው፡፡ ይህንንም ውሣኔዎን አከብራለሁ፡፡ በዚህ ጥናት ከተሣተፉ የርስዎ ስም በጥናት ጽሑፉ ላይ እንደማይካተት እገልጽልዎታለሁ፡፡ በዚህ ጥናት ለመሣተፍ ፍቃደኛ ነዎት?

1. ፍቃደኛ ነኝ _____ 2. ፍቃደኛ አይደለሁም _____

(ከተጠያቂው መልስ ጎን ባለው ክፍት ቦታ ላይ ፎርሙን የሚሞላው ሰው ፊርማውን በማስቀመጥ ግለሰቡ ፈቃደኛ መሆናቸውን ወይም አለመሆናቸውን ያረጋግጣል)፡፡

ከዚህ በመቀጠል የዚህ ጥናት አድራጊን የሚጠቅሙ እርስዎን ፣ ቤተሰብዎና መኖሪያ አካባቢዎን የሚመለከቱ ጥያቄዎች ይቀርብልዎታል፡፡ ምንም እንኳን ጥቂት ጥያቄዎች የግል ሕይወትዎን ወይም ቤተሰብዎን የሚመለከቱ ቢሆኑም በዚህ ጥናት ተካተዋል፡፡

ለነዚህ ጥያቄዎች የሚሰጡት የእርስዎ መልስ ትክክለኛ መሆን ለጥናት አድራጊው እጅግ ጠቃሚ እና ተግባራዊ የሚሆን የመፍትሔ ሐሳብ ለማቅረብ የሚረዱ መሆናቸውን እገልጽልዎታለሁ፡፡ ግልጽ ያለሆኑ ጥያቄዎች ካሉ እንዲብራሩልዎ ከመጠየቅ ወደ ኋላ አይበሉ፡፡ ለመመለስ ፈቃደኛ ያልሆኑባቸው ጥያቄዎች ካሉ ያለመመለስ መብትዎ የተጠበቀ ነው፡፡ በዚህ

ጥናት ላይ የሚያደርጉትን ተሳትፎ በማንኛውም ጊዜ የማቋረጥ መብት አለዎት። ይህ ቃለ መጠይቅ ከሩብ ሰዓት (15 ደቂቃ)ያልበለጠ ጊዜ ሊወስድ ይችላል፡

<u>ክፍል አንድ</u>፡- በቤተሰብ ደረጃ የሚመለሱ ጥያቄዎች

ከዚህ በታች ከተራ ቁ. 101 እስከ 120 የተዘረዘሩት ጥያቄዎች ለጥናቱ የተመረጠውን ቤተሰብ የሚመለከቱ ሲሆኑ በቤተሰብ ኃላፊ ወይም ስለቤተሰቡ በሚገባ የሚያውቅ የቤተሰቡ አባል መመለስ ይችላሉ።

ተ.ቁ	ጥያቄዎች	የመልስ ምርጫዎች	ኮድ
101	የመኖሪያ አካባቢው ከባህር ጠለል በላይ ያለው ከፍታ በሜትር፡		
102	የቤተሰብ ኃላፊ ፆታ	1. ወንድ 2. ሴት	
103	የቤተሰቡ ኃላፊ መተዳደሪያ ስራ	1. ግብርና 2. እደ ጥበብ 3. ንግድ 4. መንግስት ስራ 5. የቤት እመቤት 6. በጡረታ የተገለለ 7. ሌላ ----------	
104	የቤተሰቡ ኃላፊ የትምሕርት ደረጃ?	1. ምንም ያልተማረ /ትምህርት ቤት ያልሄደ 2. ማንበብና መጻፍ የሚችል 3. መደበኛ /ዘመናዊ/ ትምህርት ቤት ገብቶ የተማረ ወይም በመማር ላይ ያለ	
105	መደበኛ ት/ቤት ገብቶ በመማር ላይ ያለ ከሆነ ወይም ያቋረጠ ከሆነ ያጠናቀቀው ክፍል ይገለፅ		-------
106	የቤተሰቡ አባላት ብዛት ?		------
107	ዕድሜያቸው ከአስር ዓመት በታች የሆኑ የቤተሰቡ አባላት (ልጆች) ብዛት?		-------
108	የቤተሰቡ አባላት መኖሪያ ስንት ክፍሎች አሉት?		-------
109	የቤተሰቡ አባላት ለቤት ውስጥ አገልግሎት የሚጠቀሙበትን ውሃ የሚያገኙት ከየት ነው?	1. ከወራጅ ወንዝ 2. ንፅህናው ካልተጠበቀ ምንጭ 3. ከኩሬ 4. ንፅህናው ካልተጠበቀና ክዳን ከሌላው ጉድጓድ 5. ከዝናብ 6. ንፅህናው ከተጠበቀ ምንጭ 7. ንፅህናው ከተጠበቀ ጉድጓድ 8. ከውሃ ቧንቧ 9. ሌላ ---------- (መልስዎ ከአንድ በላይ ከሆነ ሁሉንም ያመልክቱ)	
		1. ደረሶ መልስ ከግማሽ ሰዓት ያነሰ	

110	ለቤትውስጥ አገልግሎት የሚጠቀሙበትን ውሃ የሚያገኙት ከመኖሪያ ቤትዎ በግምት ምን ያህል ርቀት ተጉዘው ነው?	2. ደርሶ መልስ ከግማሽ ሰዓት እስከ ሁለት ሰዓት 3. ደርሶ መልስ ከሁለት ሰዓት እስከ አራት ሰዓት 4. ደርሶ መልስ ከአራት ሰዓት በላይ	
111	የቤተሰቡ አባላት በአጠቃላይ ምግብ ለማብሰል፣ ለፊት መታጠቢያ ፣ ዕቃና ልብስ ለማጠቢያ በየቀኑ የሚጠቀሙት የውሃ መጠን ምን ያህል ይሆናል?	1. ከአንድ ማድጋ/እንስራ (20 ሊትር) ያነሰ 2. ከአንድ እስከ ሁለት ማድጋ/እንስራ (20-40ሊትር) 3. ከሦስት እስከ አራት ማድጋ/እንስራ (60-80 ሊትር) 4. ከአራት ማድጋ/እንስራ (80 ሊትር)የበለጠ	
112	ቤተሰቡ የሚመገበው ምግብ የሚበስለው የት ነው?	1. ለመኖሪያነት በሚያገለግለው ክፍል ውስጥ 2. በመኖሪያ ቤት ውስጥ ነገር ግን ለማብሰያነት በተዘጋጀ ክፍል ውስጥ 3. ከመኖሪያ ቤት ተነጥሎ ለምግብ ማብሰያ በተሰራ ቤት ውስጥ 4. ከቤት ውጭ **<u>ሜዳ</u>** ላይ 5. ሌላ ----------	
113	ምግብ የሚበስልበት ክፍል መስኮት አለው?	1. አለው 2. የለውም	
114	ከመኖሪያ ቤትና ከምግብ ማብሰያ ቤት የሚወጣውን ደረቅ ቆሻሻ ምን ያደርጉታል?	1. ይቃጠላል 2. ተቆፍሮ ይቀበራል 3. በእርሻ ቦታ ይጣላል 4. ሌላ ቦታ ይጣላል	
115	ለ114ኛው ጥያቄ መልስዎ 3ኛው ምርጫ ከሆነ ቆሻሻውን የሚጥሉት የት ነው?	1. ከመኖሪያ ቤት አጠገብ 2. ከመኖሪያ ቤት አርቆ **<u>ሜዳ</u>** ላይ 3. ወንዝ ወይም ወራጅ ውሃ ውስጥ	
116	የመፀዳጃ ቤት/ሽንት ቤት አላችሁ?	1. አዎን 2. የለንም	
117	የቀንድ ከብቶች (ላሞች/ በሬዎች) አሏችሁ?	1. አሉን 2. የለንም	
118	ለ117ኛው ጥያቄ መልስዎ አሉን ከሆነ ከብቶቹ የሚኖሩት/የሚያድሩት የት ነው?	1. ከርስዎና ከቤተሰብዎ ጋር በአንድ ክፍል ውስጥ 2. ከእርስዎና ከቤተሰብዎ ጋር በአንድ ቤት ሆኖ በተለየ ክፍል ውስጥ 3. ለከብቶች ማደሪያ ተብሎ በተሰራ መጠለያ ውስጥ 4. ሌላ ----------	
119	ከጎረቤትዎ ጋር ሲነጻጸር የገቢዎ ሁኔታን እንዴት ይገልጹታል?	1. በጣም አነስተኛ 2. አነስተኛ 3. መካከለኛ 4. የተሻለ 5. ሐብታም	

ክፍል ሁለት፡-

ለጥናቱ የተመረጠውን ልጅ አስመልክቶ የተዘጋጁ ጥያቄዎች

ከዚህ በታች የተዘረዘሩት ጥያቄዎች ኬሚመለከቱት ከቤተሰቡ አባላት ለጥናቱ የተመረጠውን ልጅ ሲሆን በልጁ በራሱ ወይም በቤተሰቡ አባል መመለስ ይችላጽ፡፡

ለጥናቱ የተመረጠው ልጅ ስም ----------

201	የልጁ ዕድሜ በዓመት፡- ☐☐		----------
202	የልጁ ፆታ	1. ወንድ 2. ሴት	
203	ለጥናቱ የተመረጠው ልጅ የትምህርት ሁኔታ?	1. ዕድሜው/ዋ/ለትምህህርት ያልደረሰ 2. ዕድሜው/ዋ/ለትምህርት የደረሰ ነገር ግን ያልተማረ/ች/ 3. ትምህርቱን/ቷን/ ያቋረጠ/ች/ 4. በመማር ላይ የሚገኝ/የምትገኝ 5. ሌላ ----------	
204	ለጥናቱ የተመረጠው ልጅ በመማር ላይ የሚገኝ ከሆነ ወይም ያቋረጠ ከሆነ የክፍሉ ደረጃው ይለገፅ?		----------
205	ለጥናቱ የተመረጠው /የተመረጠችው/ ልጁ ፊቱን /ፊትዋን/ በምን ያህል ጊዜ ይታጠባል /ትታጠባለች/?	1. በቀን ሁለት ጊዜና ከዚያ በላይ 2. በቀን አንድ ጊዜ 3. በሣምነት ከሁለት እስከ 6 ጊዜ 4. በሣምንት አንድ ጊዜ 5. ሣይታጠብ/ሣትታጠብ ከሣምንት በላይ ይቆያል /ትቆያለች	
206	ለጥናቱ የተመረጠው /ችው ልጅ ፊቱን /ፊቷን ሲታጠብ/ስትታጠብ ሣሙና ይጠቀማል/ትጠቀማለች?	1. አዎን 2. አይጠቀምም/አትጠቀምም	

የቤት ቁጥር
መለያ ቁጥር ☐☐☐☐