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**RISK FACTORS FOR TRACHOMA: A CASE  
CONTROL STUDY AT YAALA SUB-DISTRICT,  
WA DISTRICT, UPPER WEST REGION**

**BY**

**DR. JOSEPH KWAME AMOABENG**

**DISSERTATION SUBMITTED TO THE SCHOOL  
OF PUBLIC HEALTH, UNIVERSITY OF GHANA  
LEGON**

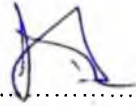


**IN PARTIAL FULFILMENT OF THE REQUIREMENT  
FOR THE AWARD OF DEGREE OF MASTER OF  
PUBLIC HEALTH**

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## DECLARATION

I hereby declare that, this is an original work based on my own research and that it has not been submitted towards any other degree.



DR. JOSEPH KWAME AMOABENG

## ACADEMIC SUPERVISORS

DR. REX ASANTE




PROF. G. ASHITEY


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## DEDICATION

This work is dedicated to the memory of my late beloved mother and senior brother. May they rest in the bosom of the Almighty God!

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Finally, to my dear wife and children I say a big thank you for your patience and encouragement throughout the whole year that I left you for school.

## LIST OF ABBREVIATIONS

DHMT	District Health Management Team
B.C	Before Christ
W.H.O	World Health Organization
S.A.F.E	Surgery, Antibiotic, Face Washing and Environmental Sanitation
I.T.I	International Trachoma Initiative
Et al.	Et alii (and other people)
T.F	Trachoma Follicle
T.I	Trachoma Intense
T.T	Trachoma Trichiasis
T.S	Trachoma Scar
C.O	Corneal Scar
P.B.L	Prevention of Blindness
M.O.H	Ministry of Health

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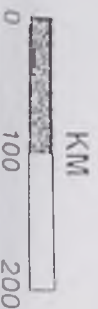
# MAP OF GHANA SHOWING THE TEN REGIONS



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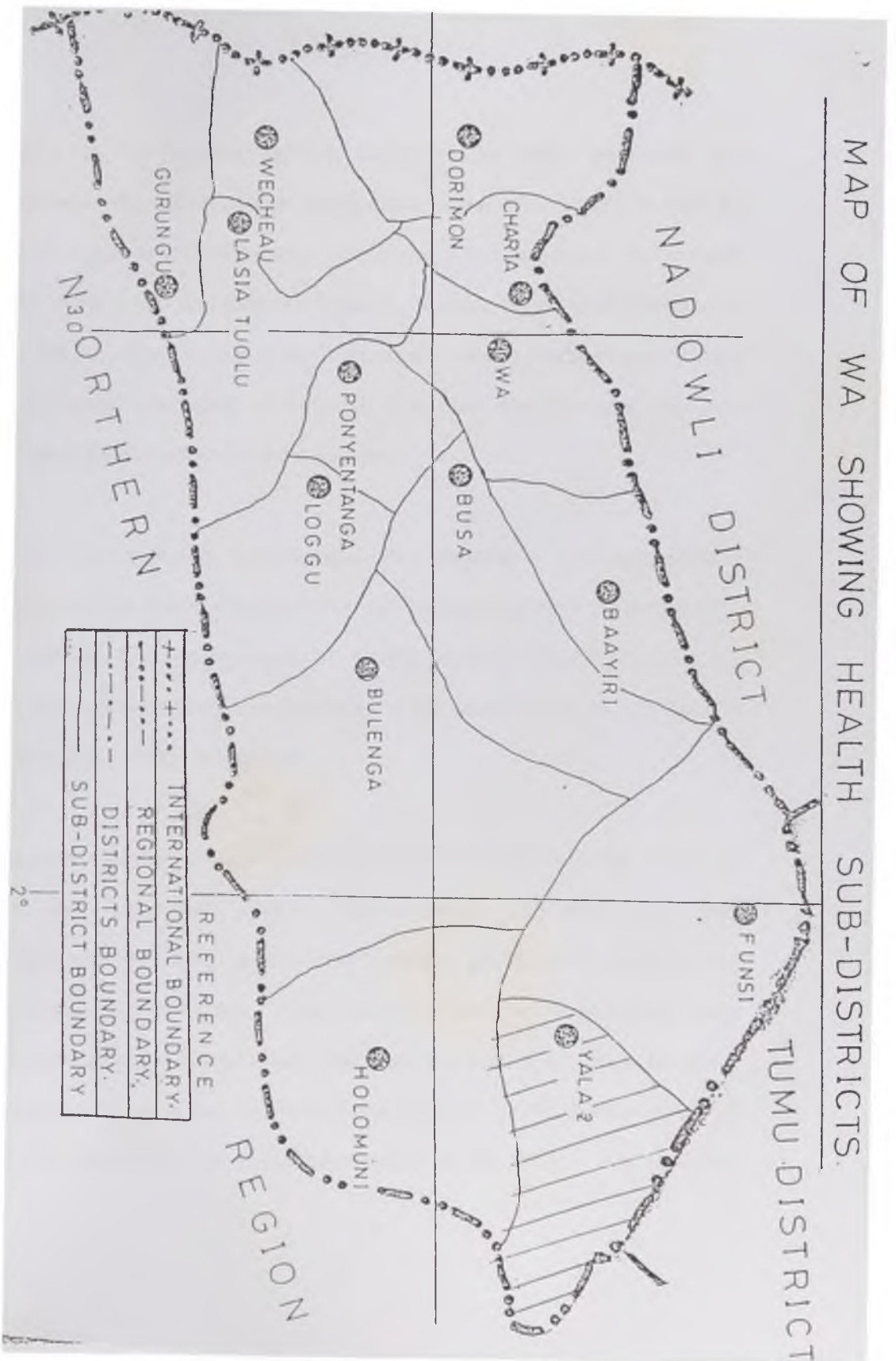
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# MAP OF UPPER WEST REGION SHOWING DISTRICTS



MAP OF WA SHOWING HEALTH SUB-DISTRICTS.



## ABSTRACT

Trachoma is the second leading cause of blindness worldwide with approximately 150 million people having active ocular infection and at least 5.5 million blind due to corneal scarring. In Ghana, the disease is a public health problem in the Upper and Northern Regions. In many trachoma endemic areas factors like lack of water, lack of facial cleanliness among children, overcrowding in a household (especially of children) and poor environmental sanitation contribute to the transmission of the disease.

The Wa District Health Administration has initiated a Trachoma Control Programme in the district with the aim of controlling the disease. To facilitate the implementation of the programme, the DHMT needs to know the specific risk factors that are associated with trachoma in the district so as to prioritise the strategies of the control programme.

A case control survey to determine the risk factors for trachoma in the Yaala sub-district was conducted among children aged 1-9 years and their mothers/caregivers using clinical examinations, observation studies and questionnaire administration. Four trachoma endemic communities were conveniently selected (based on the data from the trachoma rapid assessment that was carried out in the sub-district) and the eyes of 245 children aged 1-9 years were examined. All mothers/caregivers of the children with trachoma

(cases) and mothers/caregivers of the children without trachoma (controls) were interviewed. Observation studies were also conducted in the study communities to strengthen the outcome of the interview.

The prevalence of active trachoma among children aged 1-9 years in the study area was 17.5%. Distance more than 1 mile walk from a household (OR = 2.48,  $X^2=5.91$ , P-value = 0.02), Indiscriminate refuse disposal (OR = 3.37,  $X^2=5.03$ , P-value = 0.03) and keeping cattle inside or near a household (OR = 2.67,  $X^2=5.03$ , P-value=0.03) were found to have statistically significant association with trachoma.

The recommendations are:

- More bore-holes should be constructed in the communities to ensure that the people do not travel long distances to fetch water.
- Mothers/caregivers should be educated on the need to use water for washing faces of their children regardless of the quantity of water in a household.
- Communities should be educated on compose method of refuse disposal.
- Health Inspectors should be charged to intensify their activities in the communities to ensure good environmental sanitation.
- Cattle owners in the communities should be educated to keep their cattle far way from households.

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background Information

Trachoma is a chronic disease, which progresses slowly in an individual patient. The disease and methods of its treatment were known in China in the 27<sup>th</sup> century B.C., in Sumaria in the 21<sup>st</sup>, Egypt in the 19<sup>th</sup>, Greece in the 5<sup>th</sup>, and Rome in the 1<sup>st</sup> century B.C.<sup>1</sup>

Trachoma is caused by *chlamydia trachomatis*, a microorganism resembling both bacteria and viruses. The organism has an incubation period of 5 – 7 days and begins slowly as a mild conjunctivitis.<sup>2</sup> The infection gives rise to inflammation, which can be seen as redness, discharge, follicles and swelling of the inner lining of the eyelids. After repeated infection, the inflammation causes scarring of the inner lining of the eyelid. If the scarring is severe, over time the eyelashes turn in, a condition called trichiasis. The inturned eyelashes constantly rub on the cornea causing scarring, which produces loss of vision and blindness.

The disease is found mostly in developing countries. It is usually found in rural areas where there is lack of water, poor environmental sanitation, overcrowding in a household and poor personal hygiene, especially where the climate is dry and the

environment is dusty. The spread of the infection is by means of eye-to-eye transmission from an ocular reservoir. The mode of transfer of the infection is by fingers, face-to-face contacts, fomites and flies. The main carriers of the infection are children below the age of 10, and especially pre-school children. Hence, in communities where trachoma is a problem, infection starts early in childhood. In adults, however, inflammation is seen in a small percentage and scarring is common which in most cases leads to blindness.<sup>3</sup>

Considering the fact that trachoma can be prevented, much emphasis is laid on its control. World Health Organization (W.H.O) has therefore developed an integrated strategy - the "**SAFE**" strategy to effectively control trachoma worldwide. This approach includes **S**urgery for trichiasis, **A**ntibiotics treatment of clinically active trachoma, promotion of **F**ace washing and improvement of **E**nvironmental sanitation.<sup>4</sup>

## 1.2 Global Burden of Trachoma

Trachoma remains the second leading cause of blindness worldwide after cataract and accounts for 15-20% of the total. Approximately 150 million people have active ocular infection; at least 5.5 million are blind or have low vision due to corneal scarring.<sup>5</sup>

In Nepal, a Blindness Survey that was conducted found trachoma to be the second leading cause of blindness after cataract.<sup>6</sup> In sub-Saharan Africa, trachoma is

responsible for almost one fifth (19.4%) of blindness – amounting to 1.4 million blind people. Most of the people affected are in the poorer rural communities especially in the arid areas.<sup>7</sup>

### **1.3 National Burden of Trachoma**

In Ghana trachoma has become a major cause of blindness. Epidemiological study of trachoma has shown that trachoma is a disease of Public Health importance in the Upper and Northern Regions of Ghana<sup>8</sup> The Eye Care Unit, Ghana, Ministry of Health in a report on National Trachoma Assessment found out that 70% of 112 communities in these regions required one or more of the components of the SAFE strategy<sup>9</sup> A trachoma rapid assessment study conducted in 1999 revealed that the disease is found to be prevalent mainly in the Northern and Upper West Regions. According to the study, among 6,100 children less than ten years of age that were examined in the two regions, 15.9% were found to have active trachoma.<sup>10</sup>

### **1.4 Statement of Problem**

A trachoma rapid assessment study that was conducted in Ghana in Northern and Upper West Regions in 1999 identified active trachoma and several cases of trichiasis in Wa and Sissala districts in Upper West region. The study also found that dirty

environment, poor personal hygiene, animals in compounds, children sleeping together, as the possible risk factors for trachoma. Sombisi, a community in the Yaala sub-district of Wa district, which was included in the study was found to be a trachoma endemic area.

As a follow up to the survey in 2000, with support from the International Trachoma Initiative (ITI), the World Health Organization (WHO) and Global 2000, the District Health Administration started the implementation of the “SAFE” strategy for the control of trachoma in the endemic communities. This control programme was guided by the globally known risk factors of trachoma namely: availability of water, poor environmental sanitation, lack of facial cleanliness among children and overcrowding of children in a household.

The District Health Management Team (DHMT) has plans to extend the trachoma control programme to all the communities in the Yaala sub-district and they would therefore like to know the particular risk factors for trachoma in the sub-district. There was therefore the need to embark on this case control study to identify the risk factors that are associated with trachoma in the sub-district. The findings of this study will provide the District Health Administration the relevant information on the priority areas of the strategy for the control of trachoma in the district.

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Description

Trachoma is the leading cause of preventable infectious blindness worldwide and is endemic in poor, dry regions of Africa, Australia, South America, and South East Asia. Trachoma causes inflammation and scarring of the conjunctiva, the inner lining of the eyelid. Progressive scarring from these infections causes series of effects: entropion, trichiasis, corneal infections, corneal scarring and, ultimately, blindness.<sup>2</sup>

David Mabey, professor of communicable diseases at the London School of Hygiene and Tropical Medicine in 1996, describes trachoma, which is spreading in Africa, as "the forgotten disease of the poorest people in the world".<sup>11</sup>

Milder degrees of trachomatous inflammation may undergo spontaneous resolution. While trachoma may heal with no permanent damage, severe forms lead to blinding damage to the cornea. Frequent, repeated episodes of the disease produce conjunctival scarring, which can cause inward deviation of eyelashes (trichiasis) or of the lid margin (entropion).

Persons with trachoma may either have signs of conjunctival inflammation, indicating active trachoma, or scarring of the conjunctiva or other signs without inflammation, indicating inactive or healed trachoma.

According to Smith (1992) trachoma can vary from mild to severe disease in different situations. Mild form of trachoma also known as inclusion conjunctivitis or paratrachoma heals spontaneously only with slight sub-conjunctival scarring with no significant damage to the eye after a few weeks of coming into contact with the infection. This type is found in a newborn child infected at birth with trachoma organisms from the mothers' genital tract.<sup>12</sup>

Hyper-endemic trachoma is the severe form that is seen in some rural village communities where almost everyone has either active trachoma or scars from an earlier infection. In these communities, many people may develop trichiasis or entropion and corneal scars.

## 2.2 Causative Organism

Trachoma is caused by **chlamydia trachomatis**, a microorganism resembling both bacteria and viruses. In 1977, Beem and Saxon first outlined the clinical picture of neonatal chlamydial pneumonitis and stated that it is the same agent that causes trachoma. Chlamydia trachomatis is directly transmitted by sexual or perinatal contact,

and indirectly by flies or fomites. West et al in 1991 also found the same causative organism in their study.<sup>13</sup>

The organism has an incubation period of 5-7 days and begins slowly as a mild conjunctivitis. *Chlamydia trachomatis* provokes an inflammatory reaction in the eye with formation of follicles in the conjunctiva. It then develops into a fulminant infection producing large amounts of discharge and swollen lids.

### 2.3 Epidemiology of Trachoma

Trachoma has a worldwide distribution. At present, blinding trachoma is a major public health problem in parts of Africa, the Eastern Mediterranean region, the drier regions of the Indian subcontinent.

Trachoma remains the second leading cause of blindness worldwide, accounting for 15-20% of the total. Approximately 150 million people have active ocular infection; at least 5.5 million are blind or have low vision due to corneal scarring.<sup>5</sup> In Nepal, a Blindness Survey that was conducted found trachoma to be the second leading cause of blindness after cataract.<sup>6</sup>

In sub-Saharan Africa, trachoma is responsible for almost one fifth (19.4%) of blindness – amounting to 1.4 million blind. Most of the people affected are in the poorer rural communities especially in the arid areas.<sup>7</sup>

In most heavily affected communities, most children are infected by the age of 1 or 2 years with peak rates of active trachoma from 2 to 7 years. By adolescence the prevalence of active disease starts to decline, but some adults continue to have episodes of active disease. Because children constitute such a large proportion of the population in areas with endemic trachoma, children with active disease are the chief source of trachomatous infection in the community.

#### 2.4 Risk Factors of Trachoma

Trachoma has long been known to be associated with poverty and that, with economic development, the active disease disappears or its severity and prevalence decrease<sup>3</sup> Among the environmental and behavioural features of greatest importance are the following:

Lack of facial cleanliness among children, which facilitates the exchange of infected ocular secretions between children and with other family members. Dirty faces also attract flies to the eyes, thus increasing the risk of transmission of trachoma and the development of repeated eye infections.

Crowding, in circumstances where people live in close physical contact with each other, e.g. sharing the same sleeping space or bedding.

Poor environmental sanitation, particularly for sewage and garbage disposal at the community level, and the lack of latrines at the family level, keeping cattle next to human dwellings enable flies to breed close to the household.

A risk factor analysis of trachoma by West et al (1989) in Tanzania has established an association between trachoma prevalence and distance to water source. It was also established that children were more likely to have unclean faces if they lived more than 30 minutes from a water source.<sup>14</sup>

Quantity of water used in increased face washing among children has been shown to bring about reduction in trachoma. West et al in 1995 indicated that the quantity of water used is associated with facial cleanliness with a subsequent reduction in trachoma prevalence.<sup>15</sup> Findings from a study in Gambia in 1991 also showed an association between the amounts of water used to wash children and trachoma risk.<sup>16</sup>

Trachoma is spread in poor overcrowded communities where hygiene is bad and conjunctival discharges frequently pass from eye to eye. In overcrowded houses especially where there are many children sharing the same room and bed trachoma spreads widely from child to child by direct contact on the fingers of the children and their mothers, and through mutual use of clothes, handkerchiefs, towels and pillows. A

study in 1997 showed that families with two or more children sharing the same room have a higher prevalence of trachoma.<sup>17</sup>

Poor environmental sanitation, particularly for sewage and garbage disposal at the community level, and the lack of latrines at the family level, keeping cattle next to human dwellings enable flies to breed close to the household. The flies, which are very effective agents in transmitting trachoma, lay their eggs on the rotting rubbish and cattle droppings and multiply more rapidly.

Studies by Dolin et al in Gambia observed that from 1986 to 1996 the prevalence of blindness resulting from trachomatous corneal opacity in a study population in Gambia fell from 10% to 2%. At the same time the prevalence of clinically active trachoma decreased by 54%. They attributed the findings to improved environmental sanitation.<sup>18</sup>

A review of 19 studies selected from the 39 conducted in different parts of the world in 2000 by Pruss et al. also showed that improvement of personal and community hygiene has great potential for a sustainable reduction in trachoma.<sup>19</sup>

Faecal matter around the house has been considered to contribute to increased fly density and thereby contributing to the spread of trachoma. In South-Western Ethiopia, where 24.5% of the population have clinically active trachoma, Zerihun in 1997 found out that both active and cicatricial trachoma were significantly associated with communities not having a latrine.<sup>20</sup>

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W.H.O clinical grading for trachoma is very helpful for anyone doing community surveys of the trachoma. The clinical grading is as follows:

- **Active Trachoma with follicles (TF)** – The presence of at least five follicles on the upper tarsal conjunctiva. The follicles must be at least 0.5 mm in diameter.
- **Active trachoma intense (TI)** – The presence of pronounced inflammatory thickening of the tarsal conjunctiva, which secures half the normal deep tarsal vessels.
- **Trachomatous scarring (TS)** – The presence of scarring in the tarsal conjunctiva. These scars are easily visible as white lines, bands or sheet (fibrosis) in the tarsal conjunctiva
- **Trachomatous trichiasis (TT)** – At least one eyelash rubs on the eyeball or an evidence of recent removal of inturned eyelashes.
- **Corneal opacities (CO)** – Corneal scarring which is so dense that at least part of the pupil margin is blurred when seen through the opacity.

According to World Health Organization (W.H.O) the findings of TF/TI  $\geq$  20% respectively in children aged less than 10 years and TT more than 1% in older individuals indicate that trachoma is a major public health problem in a community.<sup>21</sup>

## CHAPTER THREE

### 3.0 STUDY OBJECTIVES

#### 3.1 Main Objective

- ❖ To determine the risk factors for trachoma in Yaala Sub-District of the Wa District of Upper West Region.

#### 3.2 Specific Objectives

1. To determine the prevalence of trachoma in children (1-9 years).
2. To determine the risk factors associated with trachoma in the Sub-district.

## CHAPTER FOUR

### 4.0 METHODOLOGY

#### 4.1 Study Area

The study was carried out in the Yaala sub-district in the Wa District of Upper West Region. Yaala Sub-district has a population of 8,436 (projected from the 2000 census). The growth rate is 3.1%. The population is predominantly illiterate with a literacy rate of 15% for both sexes.

The study area shares border on the east, west, north and south with Sissala District, Holomuli Sub-district, Sissala District and Funsu Sub-district respectively. There are 11 communities in the study area. The vegetation is predominantly savanna grassland. The study area experiences a wet season between April and October and dry season between December and March. During the dry season the area is very hot and dusty.

Availability of water is a problem for the inhabitants in the study area. There are few boreholes and wells, which are sparsely distributed in some few communities. Some of the communities also depend on streams as their source of water. However, these streams usually dry up during the dry season.

Environmental sanitation is another problem of concern in the communities in the study area. There are few community refuse dumps, which are poorly patronized. The result is that most of the communities are littered with refuse.

There are three main ethnic groups (Wala, Sissala and Dagarti). Majority of the people live in compounds. One compound houses one family unit, which could include several generations of that family. It is recognized by the name of its head. The people are mostly subsistence farmers. Apart from the cash crops that are grown, the people also rear animals such as cattle, sheep and goats. The animals are kept either in the compounds, in the communities or at the outskirts of the communities.

A small proportion of the population is within easy reach of the few health institutions in the district. There are two health centers cited at Yaala No.1 and Kundugu. There are trained community volunteers in each community who are able to detect trachoma cases and refer them to the eye care centre at the Wa regional hospital for further examinations and management.<sup>22</sup>

## 4.2 Variables

### A. Dependent variable:

- ✓ **Case of trachoma** – This is defined as an individual with active trachoma (i.e. follicles and inflammation on the superior sub-tarsal conjunctiva).

## B. Independent variables:

- ✓ **Availability of water** Distance of primary water source from household and quantity of household water.
- ✓ **Overcrowding** – Number of children aged 1-9 years in a household sharing the same mat.
- ✓ **Environmental sanitation:**
  - Methods of household disposal of refuse.
  - Ownership of cattle in a household and nearness of the site where the cattle are kept to a household.

## 4.3 Study Design

### 4.3.1 Study Type

The study, which was a case control study, used observation studies, clinical examinations and interviews. The case group consisted of children 1-9 years with active trachoma and the control group, children without active trachoma.

### 4.3.2 Sample Size

The sample size was 256. Please refer **Appendix 1** for sample size calculations.

## B. Independent variables:

- ✓ **Availability of water** Distance of primary water source from household and quantity of household water.
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### 4.3.2 Sample Size

The sample size was 256. Please refer **Appendix 1** for sample size calculations.

### 4.3.3 Sampling

There were four endemic communities in the Yaala Sub-district (based on the data from the trachoma rapid assessment that was carried out in the sub-district) and these 4 communities were conveniently selected for the study. Within each of the 4 endemic communities a list of the households were made. Households were then randomly sampled to give a study population of approximately 64 children aged 1-9 years per community. A household was defined according to local customs as being those persons who shared a common "pot". Children in the sample who were aged 1-9 years were examined for signs of active trachoma.

The mothers/caregivers of the children 1-9 years with active trachoma (cases) and the mothers/caregivers of children without active trachoma (controls) were interviewed

## 4.4 Data Collection Techniques

One ophthalmic nurse and an assistant and four local research assistants were recruited to carry out the survey. There was a two-day training for the ophthalmic nurse and the assistant and the research assistants. The ophthalmic nurse and the assistant were re-trained in the W.H.O grading of trachoma, while the research assistants were trained in the interpretation of questionnaire into the local language, community entry and how to conduct the interviews.

The ophthalmic nurse and the assistant did clinical eye examinations on the children. The principal investigator conducted the observation studies while the 4 research assistants conducted the interviews for the mothers/caregivers. The research assistants were made up of 2 health staff (health center orderlies) and 2 students.

### *Eye examinations*

The eyelids of the children were everted and examined separately for signs of active trachoma (follicles and inflammation) on the superior tarsal conjunctiva using a magnifying loupe (x 2.5) and torchlight. To prevent cross-infection, the ophthalmic nurse and the assistant were supervised to ensure that they complied with hand washing after examining every subject. Tetracycline ointment was given to each child of a case of active trachoma. The findings of the eye examinations were graded according to the current simplified W.H.O grading scheme.

### *Interviews and Observation studies*

The four research assistants, using questionnaire (Please refer **Appendix 2**), conducted interviews on the mothers/caregivers of the case and control groups while the principal researcher, using observation checklist (Please refer **Appendix 3**)

conducted the direct observation to collect basic indicators of the communities where the study was conducted.

#### **4.5 Pre-Testing Of Tool**

The questionnaire and the observation checklist were pre-tested in a community in a nearby sub-district, which is similar to the study area. The pre-testing enabled the research team identify the potential problems in the survey and where necessary revised the methods and logistics of data collection before starting the actual fieldwork.

#### **4.6 Quality Check**

At the end of each day the Principal Researcher checked the data collected for completeness and accuracy. As an Ophthalmologist, using random sampling, the principal investigator selected some of the children who have already been examined and re-examined them for confirmation of the findings of the ophthalmic nurse and the assistant. Agreement score was 80% (based on WHO requirement agreement score,  $\geq 80\%$  is considered valid).

#### 4.7 Data Processing And Analysis

The data was coded, manually sorted and then entered into the computer for analysis using EPI6-info. The prevalence of active trachoma among children (1-9 years) in the study area was calculated. The results of the interviews were also entered into two-by-two tables and odds ratios and chi-square test (using p-values as a proxy) were used to investigate the individual factors association with prevalence of trachoma.

#### 4.8 Ethical Considerations

- ❖ Permission to conduct the study was obtained from the District Health Administration and the chiefs of the selected communities.
- ❖ In the communities, the study was explained to the heads of the households and the mothers/caregivers and oral informed consent was obtained from them before the survey commenced.
- ❖ Individuals were requested to voluntarily participate in the survey. Individuals who wished to opt out during the study were allowed. Nobody, however, opted out.
- ❖ The mothers/caregivers were assured of the confidentiality of the results.
- ❖ Children with active trachoma were given tetracycline eye ointment.

#### 4.9 Limitations Of The Study

1. The study was conducted during the farming period. While some families had left their communities for other places, some had moved to stay on their farms with their children. This affected the study as in spite of revisits to the households, 96% of the children were examined leading to small effective size of the study group and possible effect on the test of significance.
2. The study was based mainly on household characteristics. As the households in the study area are such that some share the same compound, they may have similar characteristics in terms of some risk factors like environmental sanitation. This could bias the findings of the study in some extent.
3. Two of the research assistants were health staff working in a health center in the study area. They were well known by the community members. The presence of these health workers could make the respondents not expose certain things concerning themselves and their households.

Despite these limitations, the findings of the study were not significantly affected and the results are valid and acceptable as the response rate was 96%.

## CHAPTER FIVE

### 5.0 RESULTS

During the survey the following definitions were used for some variables. A **household** was defined as a unit of the community that eat from the “same pot” with one member of the unit as the “figure head” in a housing compound. This comprises the man, the wife, the children and any other person who lives in the unit and depends on the man and wife. **Trachoma in a household** was also defined as a household with a child identified with an active trachoma during the eye examinations.

Distance 1 mile walk or more from a household to a primary source of water was considered as far, while less than 1 mile walk was considered as near. Proper methods of household refuse disposal included burning and burying of refuse and disposal of refuse at a community refuse disposal site.

### 5.1 Prevalence of Trachoma

A total of 245 children aged 1-9 years were examined in four trachoma endemic communities (response rate = 96%). Out of the 245 children examined, 43 were found to have active trachoma (TFTI). The prevalence of active trachoma in the study population was therefore 17.5%.

**Dirty Faces:** Out of the 245 that were examined 135 (55%) had dirty faces (presence of eye and nasal discharges). Out of the 135 children with dirty faces 30 (22%) had trachoma and 105 (78%) were trachoma free.

## 5.2 Factors for Spread of Trachoma

The mothers/caregivers of the children examined were identified. Thirty-five mothers/caregivers had children with one or more cases of active trachoma, while 162 mothers/caregivers had children with no case of active trachoma.

5.2.1 Availability of Water: Parameters used to measure the availability of water were distance of primary water source from the household and the quantity of water in the household.

Table 1: Association between distance from household to a primary water source and trachoma.

Distance to primary water source	Households with trachoma	Households without trachoma	Total
> 1 mile walk	21	68	82
≤ 1 mile walk	14	94	115
<b>Total</b>	35	162	197

Odds Ratio = 2.48

Chi -square = 5.91

P-value = 0.02

**Table 3: Association between number of children (1-9yrs) sharing the same mat in a household and trachoma.**

Number of children	Households with trachoma	Households without trachoma	Total
> 1 child	70	54	124
1 child	44	46	90
<b>Total</b>	<b>35</b>	<b>162</b>	<b>197</b>

Chi-square = 1.20

P-value = 0.27

There was no statistically significant association between number of children aged 1-9 years sharing the same mat in a household and trachoma.

5.2.3 Environmental Sanitation: The parameters used to measure environmental sanitation were method of refuse disposal in a household, presence of cattle in a household and places where cattle are kept.

**Table 4: Association between method of household refuse disposal and trachoma**

Method of household refuse disposal	Households with trachoma	Households without trachoma	Total
Indiscriminate refuse disposal	25	69	94
Proper methods of refuse disposal	10	93	103
<b>Total</b>	<b>35</b>	<b>162</b>	<b>197</b>

Odds Ratio = 3.37

Chi-square = 9.59

P-value = 0.002

There was a statistically significant association between indiscriminate methods of household refuse disposal and trachoma. The odds of trachoma in households, which

dispose off refuse indiscriminately, were 3.37 times higher than those, which have proper methods of refuse disposal.

Table 5: Association between ownership of cattle in a household and trachoma

Ownership of cattle	Households with trachoma	Households without trachoma	Total
Yes	20	70	90
No	15	92	107
<b>Total</b>	<b>35</b>	<b>162</b>	<b>197</b>

**Chi-square = 2.25**

**P-value = 0.13**

There was no statistically significant association between ownership of cattle in a household and trachoma.

Table 6: Association between place where cattle in a household are kept and trachoma.

Place where cattle are kept	Households with trachoma	Households without trachoma	Total
Behind a household	34	14	48
Far from a household	20	22	42
<b>Total</b>	<b>54</b>	<b>36</b>	<b>90</b>

**Odds Ratio = 2.67**

**Chi-square = 5.03**

**P-value = 0.03**

There was a statistically significant association between keeping cattle behind a household and trachoma. The odds of trachoma in households, which keep cattle behind the households, were 2.67 times greater than those, which keep cattle far from the households.

5.2.4 Toilet Facilities: All the respondents said that there were no toilet facilities in the communities and they defecate in the bush. However, there was no littering of feces in the communities.

### 5.3 Observation Studies

To strengthen the findings of the case control studies; observation studies were carried out in all the study communities. The findings of the observation studies were as follows.

5.3.1 Availability of Water: - Apart from one community whose primary source of water was a stream; the rest relied on bore-hole as their primary source of water. It was observed that one out of the three communities had two bore-holes, while the remaining two communities had one each. The distance from the community to the stream was more than one-mile walk. The bore-holes were cited within the

communities (about 50 meters away from the nearest household) and a lot of people were seen crowded around them waiting for their turns to fetch water.

5.3.2 Environmental Sanitation: The environmental sanitation was poor in all the communities. There were only few community refuse disposal sites and refuse and animal excreta were littered all round. There were a lot of houseflies in all the communities and the houseflies could be seen resting on the refuse and the animal excreta. There were neither household nor community toilets in any of the communities.

Cattle were seen being kept in households and in kraals just behind the households and at the outskirts of the communities. Some of the cattle were also seen loitering about in the communities, while one kraal was seen sited in the center of one of the communities. The places where the cattle were kept were left untidy.

#### 5.4. **Summary of Findings**

The main issues that came out of the results are:

1. The prevalence of active trachoma among children aged 1-9 years in the study area was 17.5%.

2. There was a statistically significant association between distance from household to primary water source and trachoma.
3. There was no statistically significant association between quantity of water in household and trachoma.
4. There was no statistically significant association between the number of children (1-9 years) in a household sharing the same bed and trachoma.
5. There was a statistically significant association between indiscriminate disposal of refuse and trachoma.
6. There was no statistically significant association between owning cattle in a household and trachoma.
7. None of the communities had toilet facilities and the people defecate in the bush.
8. Environmental sanitation in all the communities was very poor.
9. There was a statistically significant association between keeping cattle in or behind a household and trachoma.

## CHAPTER SIX

### 6.0 DISCUSSION

#### 6.1 Prevalence of Trachoma

WHO has established guidelines for identifying trachoma as a public health problem. According to the guidelines prevalence of active trachoma among children aged 1-9 years in a community is considered as a public health problem. In this situation, all the children irrespective of their trachoma status are to be treated with both oral and topical antibiotic treatment (tetracycline ointment and azithromycin tablets), i.e. a mass treatment.

In our study the prevalence of active trachoma among children aged 1-9 years in the study population was found to be 17.5%. The prevalence did not exceed the WHO guidelines for active trachoma (TF/TI  $\geq$  20.0%) as a public health problem.

#### 6.2 Risk Factors

In the study we found out that there was a statistically significant association between distance from household to primary water source and trachoma (OR=2.48,  $X^2=5.91$ , P-value=0.02). The findings of the study agreed with the findings of studies in Tanzania by

West et al (1989), who also found an association between distance from household to primary water source and trachoma.

Overcrowding has been implicated as an important risk factor for trachoma in a number of areas. Guraksin et al. in 1997 showed that families with more than one child have a higher prevalence of trachoma. The findings of our study, however, showed that there was no significant association between the number of children (1-9 years) in a household sharing the same mat and trachoma ( $X^2 = 1.20$  and P-value = 0.27).

Considering the methodology used in our study, our findings were valid. The difference between the results of our study and other studies may be due to the differences in the settings of the study areas. Similar studies have to be done in some areas in Ghana with similar settings as our study area to validate the findings.

There was no statistically significant association between quantity of water in a household and trachoma ( $X^2=1.68$ , P-value=0.19). West et al also established that daily quantity of household water was unrelated to the prevalence of trachoma. This agrees with the findings of our study. The explanation for the no association between the quantity of water in a household and trachoma may be that the households and mothers/caregivers do not know the importance of face washing. They are therefore less likely to use it for washing the faces of their children.

The findings of our study may therefore suggest that an important determinant of water use for hygiene purposes, especially for washing children's faces, is the value placed on the water that is collected. This is supported by the findings of the study that showed that out of the 245 that were examined 135 (55%) had dirty faces (presence of eye and nasal discharges) 22% of those with dirty faces had trachoma, while 78% were trachoma free.

Our study also found that there was a statistically significant association between indiscriminate refuse disposal and trachoma (Odds ratio = 3.37,  $X^2 = 9.59$  and P-value = 0.002). This association underlines the importance of environmental sanitation in the occurrence of trachoma. Garbage provides an excellent medium for the breeding of flies, which are the principle vectors of transmission. The observation study revealed that all the 4 communities in the study area had poor environmental sanitation.

Pruss et al (2000) showed that facial cleanliness and environmental improvements prevent trachoma. Dorlin and others in 1998 also found out that improved environmental sanitation reduced prevalence of trachoma in Gambia. All these findings go to support the findings of our study.

Keeping cattle in or behind household had a statistically significant association with trachoma (Odds ratio = 2.67,  $X^2 = 5.03$  and P-value = 0.03). The study therefore demonstrates that cattle ownership in a household may not play a major role in the transmission of trachoma but what are important are cattle droppings. Cattle droppings, by increasing the number of flies, contribute to the transmission of trachoma.

The findings of the study are supported by the observation studies, which showed that some of the communities had kraals that were close to households and lots of flies were seen settling on the cattle droppings. It appears, therefore, that not the presence of cattle in a household plays a major role in the transmission of trachoma. Instead, the major determinant seems to be the way in which the cattle are kept.

In the literature review, West et al. in 1991 observed that owning cattle in a household exposes the children 1-9 years in the household to having trachoma. This observation was found to be different from what our study observed at the Yaala sub-district.

## CHAPTER SEVEN

### 7.0 CONCLUSION AND RECOMMENDATIONS

#### 7.1 Conclusion

In the study the prevalence of active trachoma of 17.5% was lower than the cut off point of WHO criteria for considering trachoma as a public health problem.

The association between distance from household to a primary water source and trachoma was statistically significant (Odds ratio = 2.48,  $X^2 = 5.91$  and P-value = 0.02).

The association between indiscriminate disposal of refuse and trachoma was also statistically significant (Odds ratio = 3.37,  $X^2 = 9.59$  and P-value = 0.002). Again, the association between keeping cattle inside the household or near to the household and trachoma was statistically significant (Odds ratio = 2.67,  $X^2 = 5.03$  and P-value = 0.03).

It can be deduced from the above that distance more than 1 km from a household to a primary water source, indiscriminate methods of refuse disposal in a household and keeping cattle either in a household or near to the household are the risk factors for trachoma in the study area. They are important risk factors and in drawing up trachoma control programmes priority should be attached to them.

## 7.2 Recommendations

1. More bore-holes should be constructed in the communities to ensure that the people do not travel long distances to fetch water.
2. The communities should be educated on compose method of refuse disposal and also the need to keep their environment neat.
3. Activities of Health Inspectors should be intensified in the communities to ensure good environmental sanitation in the communities.
4. The communities should be encouraged to acquire requisite community refuse disposal sites where refuse could be dumped.
5. Community members should be educated to keep their cattle in kraals cited far away from household and should be kept tidy.
6. A cohort study should be done to determine the relationship between the use of water in the household and trachoma.

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## APPENDICES

### Appendix 1

#### Sample Size Calculation

The sample size calculation was done using the formula below. <sup>24</sup>

$$\text{Sample size (N)} = p(1 - p)/e^2$$

Where:

p = estimated proportion of active trachoma in the study population

$$p = 20\% (0.2)$$

e = required value of standard error

$$e = 2.5\% (0.025)$$

This gives the sample size (N) =  $0.2(1 - 0.2)/0.025^2$

$$= 0.2 \times 0.8 \div 0.025^2$$

$$= \mathbf{256}$$



6. Marital Status:

1. Married
2. Single
3. Divorced

7. Number of all children 1-9 years living in the household:          

8. Occupation: **Main Source of Income.**

1. Farmer (Animal rearing)
2. Farmer (Crop production)
3. Petty Trader
4. Government employee
5. Pito Brewer

9. Religion (current):

1. Moslem
2. Christian
3. Traditionalist

## Risk Factors for Trachoma

10. Do you have any source of water in your house?

1. Yes
  2. No
- (If no, **skip to Q 12**)

11. What is the type?

1. Well
2. Bole-hole
3. Pipe-borne

12. How far is your water source from your house?

1. One mile walk or less
2. More than one mile walk

13. In your opinion, how do you consider this distance?

1. Near
2. Far

14. How many bowls of water is collected to the household per day?

1. One
2. Two
3. Three
4. Four or more

15. Where do you go to toilette?.....

16. How many community toilets do you have in your village currently in use?

1. None
2. One
3. Two
4. Three or more

(If the answer is none, go to Q21)

17. What type(s) of toilet do you have in the village currently in use?

1. KVIP/VIP
2. Pit latrine
3. Bucket latrine

18. What type of toilet do you have at home?

1. None
2. KVIP/VIP
3. Bucket latrine
4. Pit latrine

19. How do you dispose off your refuse in your house?

1. By burning in individual households
2. Burying
3. Indiscriminate (throwing outside the house)
4. Depositing at community disposal site

20. How many community disposal sites do you have in this village?

1. None
2. One
3. Two
4. Three or more

21. How many children (1-9 years) sleep in the same room?

1. One
2. Two
3. Three
4. Four or more

22. How many children (1-9years) share the same mat in a room?

1. One
2. Two
3. Three or more

23. Do you own cattle in your household?

1. Yes
2. No

(If the answer is no, **end the interview**)

25. Where do you keep your cattle most of the time?

1. In the household
2. Near the household
3. Far from the household

THANK YOU

## Appendix 3

**OBSERVATION CHECKLIST**

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Name of Observer:.....

Name of Community:.....

## 1. Community structure

1. Gathered  2. Scattered 2. School 1. Yes  2. No 

3. Source of water.....

## 4. Cattle are kept in:

a) Inside the compound  b) Behind the compound 

c) Far from the compound

5. Cattle excreta: 1. Present  2. Not present 6. Community Toilets: 1. Present  2. Not present 

a. Type:.....

b. Condition: 1. Clean  2. Not clean 1. Covered  3. Not covered 7. Human feces: 1. Present  2. Not present 

## 8. Rubbish container or common disposal site:

1. Present  2. Not present 9. Dirty faces (children 1-9 years): 1. Yes  2. No   
(defined as eye and nasal discharges).

10. Specific unhygienic behaviours and habits of people:.....

.....

11. Other remarks and indicators:.....

## Appendix 4

## CLINICAL EXAMINATION FORM FOR PRESENCE OF TRACHOMA AND DIRTY FACES

District		Village		Household #	Name of landlord	Date	
Serial #	Name of Subject Examined	Sex	Age	Write the code for each sign 0=absent 1=present			Discharge Nasal/ Ocular
					TF	TI	
1				Right Eye			
				Left Eye			
2				Right Eye			
				Left Eye			
3				Right Eye			
				Left Eye			
4				Right Eye			
				Left Eye			
5				Right Eye			
				Left Eye			
6				Right Eye			
				Left Eye			
7				Right Eye			
				Left Eye			
8				Right Eye			
				Left Eye			
9				Right Eye			
				Left Eye			
10				Right Eye			
				Left Eye			
11				Right Eye			
				Left Eye			
12				Right Eye			
				Left Eye			
13				Right Eye			
				Left Eye			
14				Right Eye			
				Left Eye			
15				Right Eye			
				Left Eye			
16				Right Eye			
				Left Eye			
17				Right Eye			
				Left Eye			

Name of examiner.....

Name of recorder.....