RISK FACTORS OF TRACHOMA AMONG CHILDREN AGED 1 TO 9 OF NAROOSURA LOCATION IN NAROK - SOUTH DISTRICT, KENYA

BY:

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DECLARATION

Declaration By Student

This is my own original work and has not been presented for a degree in any other University.

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DEDICATION

This dissertation is dedicated to my parents who gave me support both socially and financially, and have enabled me to be a public health specialist.

Mr. Joseph Sang and Mrs. Sarah Sang

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ABSTRACT

Background: Trachoma is a major cause of blindness in the developing nations especially in Africa, Asia and Middle East. It is a communicable disease caused by *Chlamydia trachomatis* serotypes A, B and C. Serotypes D to K are sexually transmitted. In Kenya, Trachoma is reported to be endemic in areas of the Rift Valley, North Eastern and Eastern Provinces.

Problem statement: Trachoma prevalence in Kenya varies widely from region to region. High prevalence is associated with high climatic aridity, and lower prevalence is associated with areas of greater rainfall, sustainable agriculture, and a higher general standard of living. Within high-risk regions, there are wide variations in age-specific prevalence and severity of the disease, Trachoma is reported to be endemic in areas of the Rift Valley, North Eastern and Eastern Provinces. Prevalence in Kenya has been established but it is estimated to have contributed up to 19% of the total cases of the preventable blindness. Survey done in six districts of the total 18 affected by trachoma in Kenya showed Samburu District to be the leading in prevalence of active trachoma with 34%. Narok had 30.5%, Kajiado 28%, Baringo had 15.6% and the other districts had prevalence of greater than 6.5%. A goal of the survey was to determine the prevalence of trachoma and its risk factors among children aged 1-9 years in Narok-South District**.**

Justification: Previous studies have shown the estimated prevalence of 30.5% in Narok District, but did not relate it to the risk factors. The study therefore aims at relating the prevalence to the risk factors and provides information on what further interventions can be put in place to reduce the prevalence of trachoma in the region.

Methods: Using simple random and systematic household technique 326 children aged 1-9 years, in Naroosura location were identified. The simplified clinical coding system proposed by the World Health Organization was used. The mother or caretaker of each child was questioned about personal and environmental risk factors. At the time of examination, facial cleanliness and the presence of flies on the face were noted. Data was analyzed using the statistical package for social science (SPSS). Frequencies and Pearson $\chi 2$ were used

Results: The prevalence of trachoma in Naroosura Location was 44.8% with Naroosura sub – Location having the lowest (32.7%). Children with dirty faces were more likely to have trachoma than those with clean faces. There was a statistically significant association between facial hygiene (p=0.000), lack of access to pit latrines (p=0.018), Education status p=(0.043) and trachoma.

Conclusion: Of all the risk factors examined, facial cleanliness had the strongest association with the prevalence of trachoma. This was followed by lack of access to pit latrines and education status of the parents. It is likely that hygiene education and environmental improvement could have a very significant impact on the prevalence of trachoma in Naroosura Location.

Keywords: Trachoma, Chlamydia trachomatis, prevalence, Risk factors, Narok study

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LIST OF ABBREVIATIONS

AMREF	African Medical and Research Foundation
CMS	Centimeters
CO	Corneal opacity
GET 2020	Global Eradication of Trachoma by year 2020.
IEF	International Eye Foundation
KMS	Kilometers
MOH	Ministry of health
TT	Trachomatous Trichiasis
TI	Intense Trachomatous
TF	Follicular Trachoma
TS	Trachomatous conjunctival scarring
WHO	World Health Organization

CHAPTER ONE

1.1 Introduction

Trachoma is an infection of the eye that may result in the blindness after repeated reinfection. It is prevalent in poor, rural communities that lack the tools for basic hygiene, clean water, and adequate sanitation. The specific etiological agent is *Chlamydia trachomatis* serotypes A, B and C [1]. This type of eye disease is however common in industrialized communities and is a common cause of ophthalmia neonatorum [2]. *Chlamydia trachomatis* is a surrogate intracellular organism attacking the epithelial cells of the conjunctiva and other relevant sites. Current estimates are that active trachoma affects some 84 million people worldwide [45] .The disease is widespread in the Middle East, Northern and sub-Saharan Africa, parts of Indian sub-continent, South East Asia and China. In Kenya, Trachoma is reported to be endemic in areas of the Rift Valley, North Eastern and Eastern Provinces

Trachoma risk factors are multiple and interrelated. It would be difficult to address to one without reference to the others [37]. For example, having animals and keeping them in or around the homesteads, poor housing, lack of toilet, garbage scattered within the homesteads may all be related to high housefly density, Poverty, lack of formal education and strong traditional beliefs. On the other hand, owning a toilet and having children with clean faces may point to a rich family with formal education.

1.2 Transmission of Trachoma

Young children bear the heaviest burden of trachoma infections and are the main source of infection for other people. Transmission takes place when the bacteria move from the eyes of young children to the eyes of an uninfected person through

several different ways: flies, touching eyes, mothers' shawls, bed sheets, pillows, and towels. (Refer to appendix II). Transmitting trachoma through shawls, bed sheets, pillows, towels and washcloths

Mothers like to keep their children's faces clean by wiping them. In most countries, the mother uses her own clothes to do this. The bacteria that cause trachoma are often present in the discharge from the eyes and nose and can be spread to another child like this. Additionally, because children in a household often share the same bed, bed sheets and pillows may become infectious agents if a child with active trachoma uses them. Sharing face-washing cloths or towels can also lead to transmission of trachoma. This may contribute to high levels of infection in a family or even within a school or other group of people who share washing facilities. [27]

Transmitting trachoma through flies, faces, and faeces

The fly that transmits trachoma, *Musca sorbens*, breeds in faeces, especially in human feces lying in the shade on the soil surface. Where *Musca sorbens* is present in trachoma-endemic areas, steps to minimize fly-eye contact and reduce breeding opportunities by disposing of faeces properly are taken [12]

Transmitting trachoma through touching eyes

Children touch their faces and rub their eyes much more frequently than adults do. Children usually touch their faces when dirt, dust, and flies irritate them.

(Refer to appendix I). Contaminated hands or face clothes, with the organism *(Chlamydia trachomatis*), can initiate infection.

Routes of Transmission

Intimate contact has been documented as a major risk factor for Trachoma.[12, 13]

The established risk factors have been summarized at a glance as: Six d's dry, dusty, dirty, dung, discharge, density and five f's flies, faeces, faces, fingers and fomites.

Flies are considered a major factor in the spread of Trachoma, Studies in Gambia using flytraps (Refer to appendix III) found that only two species of fly, *Musca sorbens* and *Musca domestica*, were caught from the eyes of children. Though *Musca sorben* comprised of less than 10% of the total number of flies caught with attractant traps, it was responsible for greater than 90% of the fly – eye contacts. Further research on the routes of transmission in the role of hygiene and means of sustainable fly control should be priority.[25]

1.3 Other significant factor

Smoke from a cooking fire, dust, traditional treatments and other eye infection, cause the eye to be red and sore so the person rubs and further irritates and infects the eye. An arid or semi - arid climate is windy and produces dust at the driest times of the year. These conditions further irritate the eyes, leaving them more vulnerable to infection from Trachoma.

1.4 Pathophysiology

Chlamydiae are gram-negative obligate intracellular bacteria. The species *C.trachomatis* causes trachoma and also genital infections. Serovars D-K occasionally causes a chronic follicular conjunctivitis that is clinically

indistinguishable with pannus and, at times conjunctivitis scarring, these genital serovars do not typically enter stable transmission cycles within communities.

Therefore they are not involved in the genesis of trachoma blindness of the serovar (which is determined by polymorphisms in a surface – exposed protein), isolates of *C. trachomatis* obtained from the eye have mutations that inactivate the genes coding for tryptophan synthase whereas genital isolates have a functional enzyme. Infection causes inflammation that is a predominantly lymphcytic and monocytic infiltrate with plasma cells and macrophages in follicles. The follicles are typically germinal centers with islands of intense B-cells proliferation surrounded by seas of T-cells. Recurrent conjunctival reinfection causes the prolonged inflammation that leads to cojunctival scarring associated with atrophy of conjunctival epithelium, loss of goblets cells and replacement of the normal, loose vascular sub epithelial stroma with thick compact bands of type iv and type v collagen. [24]

1.5 CLASSIFICATION OF TRACHOMA.

Trachoma infection can be classified into 5 stages [22]

Stage 1: Trachoma inflammation (TF) characterized by the presence of five or more follicles each at least 0.5 mm more in diameter on the central part of the upper tarsal conjunctiva. This stage usually occurs in children below the age of 10 years.

Stage 2: Trachomatous inflammation intense (TI) is pronounced inflammatory thickening of the upper tarsal conjunctiva that obscures more than one half of the normal deep tarsal vessels.

Stage 3: Trachomatous conjunctiva scaring (TS) is the presence of easily visible scars in the tarsal conjunctiva.

Stage 4: Trachomatous Trichiasis (TT) is defined as the presence of at least eyelash rubbing on the eyeball or evidence of recent removal of in turned lashes

Stage 5: Cornea opacity (CO). Easily visible opacity over the pupil. It is so dense that at least part of the pupil margin is blurred when viewed through the opacity

Prevention and treatment strategies.

Environmental risk factors are water shortage, flies, poor hygiene conditions, and crowded households. A prolonged exposure to infection throughout childhood and young adulthood appears to be necessary to produce the complications seen in later life. A single episode of acute Chlamydial conjunctivitis is not considered sight threatening, as there is virtually no risk of prolonged inflammation or blinding complications.

A Global Partnership for Trachoma Elimination

A global initiative to eliminate trachoma as a blinding disease, entitled GET 2020 (Global Elimination of Trachoma), was launched under WHO's leadership in 1997. Through this initiative control activities are instituted through primary health care approaches that follow the evidence-based "SAFE" strategy. This consists of lid surgery (S), antibiotics to treat the community pool of infection (A), facial cleanliness (F); and environmental changes (E). VISION 2020 national plans that address trachoma are written in line with the GET2020 "SAFE" strategy and recommendations.

The Alliance for the Global Elimination of Blinding Trachoma by the year 2020 (GET 2020) supports and collaborates with WHO in carrying out essential activities such as epidemiological assessment, including rapid assessment and mapping,

project implementation, coordination, and monitoring, disease surveillance, project evaluation and resource mobilization. [31]

The study area is Narok-South District, situated in the Southwestern side of the country and lies in the southern part of the Rift Valley Province. It borders the Republic of Tanzania to the South, Transmara District to the West, Bomet, Bureti and Nakuru Districts to the North and Kajiado District to the East. The district lies between latitudes 0° 50' and 2° 05' South and longitudes 35° 58' and 36° 00' East. Administratively the district is divided into 8 divisions, with 54 locations and 103 sub locations.

The total population of the Narok District was 365,750 according to 1999 census. This population was projected to be 490,795 persons as at the end of 2007. The main sources of water in this district are rivers, boreholes, springs, shallow wells, and water pans and catchments pools. The Greater Narok is endowed with five permanent rivers with their tributaries that never dry up that are Mara, Ewaso Nyiro, Enkare Narok, Siyiapei and Naroosura Rivers. Other tributaries draining in these rivers include, Enkare Ngossur, Sikinderr, Entoroboni and Kanunka. There are about 40 productive public boreholes and about 30 private boreholes, and about 70 water pans that take a maximum of 3-4 months to dry up after rains.

The district has a bimodal rainfall distribution pattern. Long rains fall from March to May and short rains are received between September and November. Generally, the district receives below average amounts of rainfall compared to the long-term average. The month of September to December 2007, received 9.5% rainfall in excess of the long-term average [26].

Water conditions have been affected by the weather conditions both in quality and quantity. Water usage by livestock is increasing. Competition for water however, is still high between livestock and wild animals. Inadequacy of water therefore, renders the populants more prone to hygiene oriented health problems such as trachoma. Also Narok inhabitants are popularly known to keep large numbers of cattle whose excreta harbors flies, which are vectors of trachoma.

Further more, wastage of resources; misprioritization because of male dominant factor where a man is in charge of family resources could lead to mismagement hence inadequate money for health services. Drought also has led to starvation of livestock, leading to dead thus lowering the economic status of people in the region, hence poverty. This could then contribute to low health resources.

1.3 Problem statement

In Kenya, Trachoma is reported to be endemic in areas of the Rift Valley, North Eastern and Eastern Provinces. Prevalence in Kenya has been established and is estimated to have contributed up to 19% of the total cases of the preventable blindness. Survey done in six districts of the total 18 affected by trachoma in Kenya showed Samburu District to be the leading in prevalence of active trachoma with 34%. Narok had 30.5%, Kajiado 28%, Baringo had 15.6% and the other districts had prevalence of greater than 6.5%. According to the survey report, the prevalence of trachoma is still higher than the W.H.O recommended level, which is less than 5% for disease to be considered not a public health problem [25]. Narok District in southwest Kenya is one of six districts surveyed in 2005 with suspected endemic or hyper-endemic trachoma infections. In Narok, trachoma prevalence exceeds 30%.

Dust as result of dryness in the region can act as risk factors of trachoma and also insufficient water can lower hygienic practices**.**

Distances to and from watering points have slightly increased for both livestock and domestic use in Narok North and South Districts. The situation is likely to worsen if the prevailing weather conditions persist. Increased in distance may lead to low usage of water. This will impact negatively to the hygiene practices in the area and in turn will predispose someone to diseases such trachoma.

1.4 Justification

Previous studies have shown the estimated prevalence of 30.4% in Narok District, but didn't relate it to the risk factors. The study therefore aimed at relating the prevalence to the risk factors and provides information on what further interventions can be recommended to reduce the prevalence of Trachoma in the region.

The World Health Organization (WHO) raised the alarm over the disease in 2004 after surveys revealed that it could lead to a huge increase in blindness in Kenya, hence need for studies [31]

1.5 Research question.

What are the risk factors for Trachoma among children aged 1 to 9 years in Naroosura Location of Osopuko Division in Narok South District?

1.6 Objectives

1. To determine the prevalence of trachoma among children aged 1 to 9 years in Naroosura Location of Osopuko Division in Narok South District.

.2. To assess the risk factors for Trachoma among children in Naroosura Location of Osopuko Division in Narok South District

CHAPTER TWO

2.0 Literature review

2.1 Epidemiology

Effective eradication of avoidable blindness due to trachoma, requires an understanding of epidemiological determinants that promotes the transmission of disease**.**

These determinants include host factors such age, sex and race and environmental determinants that include climate, water availability and general socioeconomic conditions. All these factors may drastically modify the incidence, prevalence and severity of trachoma within a community [7]

2.1.1. Age, sex and race

Active infection with *Chlamydia trachomatis* is mostly seen in young children with peak incidence before age 10, while subsequent scarring and blindness is seen in adults. Studies have found that women are mostly affected because of their involvement with children. It has also been found that Trachoma has no racial preponderance [24]

2.1.2. Geographical distribution

Climate, water availability and general socioeconomic conditions

The distribution of Trachoma in the hot and arid parts of the world leads to a general perception that it is linked with dry environments and scarcity of water. However, Trachoma has in the past been a great concern in more temperate climates [3, 4, 5]

Higher prevalence of Trachoma exists in households with lower income than their neighbours and where the household head is poorly educated [6, 7, 8, 9]. Trachoma in

Kenya varies widely from region to region. High prevalence of about 63% is associated with high climatic aridity and lower prevalence of about 1% is associated with areas of greater rainfall, sustainable agriculture and higher general standards of living [10]. .Although Trachoma is currently associated with arid areas, with low standard of personal hygiene, published evidence linking Trachoma with water is not conclusive. Improved access to water, however is supposed to reduce Trachoma transmission though the mechanisms are not entirely clear. It is believed that increase in water availability results in more frequent use for hygiene purposes. [14]. Increased frequency of laundry and face washing has been proposed as some of the mechanism. [5, 7, 15, 19]

The amount of water used does not appear to increase when the distance is reduced from 1 kilometer (approximately 30 minutes round trip), unless it is placed in the home. [11] Providing more accessible water to households currently than traveling further by one kilometer for water could promote water use behavior change; possibly increasing the amount used for hygiene. For communities having primary water sources within one-kilometer, new water provisions alone may be less likely to change traditional water use behaviors. Therefore water use behavior and hygiene practices need to be strongly considered when identifying water as a risk factor for the disease [13] .The quantity of water brought into a household and how it is used may be more significant than the distance

The distance from the source to household as a measure of availability of water has been used as an indicator of risk of Trachoma. Some studies show that the further the distance to water source is, the higher the risk of Trachoma, while others show no effect [14, 15, 16.].

2.1.3. Garbage disposal, toilets, livestock and flies

Waste disposal habits contribute to the fly density. Discarded rubbish and scraps provide breeding sites for *Musco sorben*. [18] Garbage, rotten vegetables and other decaying wastes attract flies because of some odors that emanate from certain foods. The flies use these areas as breeding sites. In warm climates fly Larvae may leave the waste containers after only 3 – 4 days from the time the eggs are laid. Flies have been associated with trachoma for more than 400 years. [19]

Variation in the time of day affects the population of face seeking flies in an area. The lowest numbers of flies are reported to occur between 7 and 8 AM and 5 and 6 PM. [20] There are many species of flies in the domestic environment, but only the Bazaar fly, *Musca sorbens*, has been shown to be a vector of Trachoma. [5, 15] Although Synanthropic flies are common in areas of endemic Trachoma and can act as Vectors, they are not universally associated with Trachoma nor are they essential vectors. However, it has been observed that those seasons when most severe disease occurs correlate with the increase in the number of both common and face-seeking flies [21]

A population based survey conducted in randomly selected clusters in Chikwawa district (population 438,895), southern Malawi and Mchinji district (population 456,558), central Malawi. Children aged 1-9 years and adults aged 15 and above were assessed for clinical signs of trachoma. The study found the same risk factor as protective of trachoma.

Variables of the study.

In this study different demographic, environmental and behavioural 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

- Age of the child
- Sex of the child
- Face washing habit of the child
- Educational status of head of the households
- Cattle ownership of the house
- Presence of latrine
- Distance of water sources from living home.
- Presence of uncovered faeces
- Presence of flies
- Confinement area of livestock

CHAPTER THREE.

3.0. Methodology

3.1 Study area

The study was conducted in Naroosura Location of Osopuko Division, Narok South District Kenya. This was due to instruction by Medical Officer of Health (M.O.H) of Narok-South District, that the Cases of Trachoma in the site has been high All respondents were found in manyattas. Manyatta is like a small village, home to members of the same extended family. A manyatta in Naroosura has an average of 50 households with each household having an average of 6 members (nuclear family).

Naroosura is located in Naroosura Location, Osupuko Division of the Narok South District an approximately 70km drive from Narok Town in the south direction. The area is surrounded by Loita hills making it drain several springs from these hills. These springs are; Enkong Enkare, Olkina Oirrobi, Entiapirr, Kanunka, Nchorroi, Olaruwa .The lowlands cover Osupuko, Mara, Loita, parts of Ololulunga and Mau divisions. The semi arid lowlands have good potential for hair sheep, meat goats and beef production.

Temperature range from 5°c to28°c with lower temperature reaching 5°c in June - September period while maximum temperature reaches 28°c between November and February

Naroosura has one operational health facility, named Naroosura health centre, this normally provides health services to the community and refer extreme cases to the Narok District hospital.

The study was conducted in dry season in the month of february ,and the data can change over the wet season.

3.2 Study population

The study population was Children aged 1 to 9 years in the sampled location of Narok South District. Studies have shown that, active infection with *Chlamydia trachomatis* is mostly seen in young children with peak incidence before age 10, while subsequent scarring and blindness is seen in adults [21

3.3 Study design

This is a community based cross sectional descriptive study. All children aged 1 to 9 were included. It entailed the examination of the whole sampled population for features of trachoma and grading them. The information on the distribution of the risk factors was obtained both by interviews and observations

3.4 Sample size determination

Sample size was calculated using the following formula,

$n = Z^2 P (1 – P) / D^2$

Where n is the sample size. Z is the Z-score for a 95% confidence interval in a normal distribution table, P being the prevalence of trachoma from previous studies taken as 0.3.While Q is the compliment of P, thus (1-P), and D as the sampling error which is taken to be 0.05.

Thus sample size came to be, $n=1.96^2(0.3)(0.7)/(0.05)^2=326$

3.5 Sampling method

To achieve geographical representation, six sub- locations were listed as per the names and three were selected randomly, this was achieved by writing names of sub locations on pieces of papers, folded, then three were picked randomly. From Naroosura health centre, a pen was spinned to determine the first manyatta for the study. In the middle of a manyatta a pen was also spinned to determine the initial household. From the first household, the next household was arrived at by skipping one household in a clockwise direction systematically, till eligible respondents were exhausted in the manyatta. The next manyatta was arrived at by always moving to the neighbouring in the eastward direction till the sample size determined was arrived at. The households where there were no eligible children were excluded from the study.

3.6 Data collection

Severity of active trachoma signs. Eligible children were examined for trachoma signs by Clinical officer using the WHO simplified grading scheme [34]. Clinical signs of inflammatory trachoma (TF and TI) were graded for each eye separately. An ordinal severity score of active trachoma comprising two categories was then assigned to all eligible subjects on the bases of the presence or absence of trachoma.

Risk-factor measurement**.** Structured interviews with mothers of children as principal household respondents and direct observations were used to measure personal and environmental (household) risk factors. Standard questionnaires were printed and precoded in English, and interviews were conducted in a local language. Prior to the survey, the questionnaire was translated and then back translated in the field by two interviewers who were familiar with both English and

the local languages to ensure its accuracy. [35] Interviewers were trained to standardize translation and completing of the questionnaire. The survey tool was then piloted in a site that had not been sampled, to validate questions and observations. *Unclean face.* Prior to screening for signs of trachoma, faces of children were briefly inspected for cleanliness and defined as "not clean" if nasal and/or ocular discharge were present. All other possible criteria were ignored.

Face washing frequency. Frequency of washing children's faces was determined by asking the mother or caregivers the number of times children's faces were washed in a day and categorized as not washed, washed once, and washed two or more times daily.

Access to water. The person responsible for water collection reported on how long is the water source, Water accessibility was analysed in two categories: ≤1KM, and >1KM

Pit latrine. Each household head was asked if there was a latrine in the household. The presence and usage of a latrine were confirmed by visual inspection.

Livestock confinement. The distance from the house to where the livestock was confined was estimated and classified as ≤20 m or > 20 m.

Cattle ownership. The household head was asked if the family owned cattle.

Fly density. In three study sites (Ntuka, Nkimpa and Naroosura), household-fly density was determined by examining the presence of flies on children's faces for about half a minute. Fly density was graded as none (0 flies), or many (≥ 5 flies).

Manyattas were visited between 8.30am and 5.30pm. Children aged 1 to 9 were examined and questionnaire filled .All examinations were done at home. The mothers of children as principal household respondents were interviewed for the purpose of filling the questionnaire

Questionnaires and observations (physical examinations) were used to collect data on the prevalence and risk factors of trachoma.

3.7 Data analysis

Quantitative data was then entered in statistical package for social scientist (SPSS 10.1), Frequencies was run; Chi Square was used to find the measures of association/ relationship among the variables. Descriptive statistics that is use of percentages, frequency tables, was also be used. Figures and tables were used in data presentation

3.8. Ethical considerations

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- Verbal permission for individual examination was also sought.
- Clearance was also sought from the school of public health through Head of department of Epidemiology and Disease control prior to the commencement of the study. An approval from the Institutional Research and Ethics Committee (IREC) of Moi University was attained prior to the commencement of the Research.
- Permission was also sought from medical officer of health (M.O. H) of Narok south district

STUDY LIMITATIONS

Climatic conditions.

During the study it was too hot which could force us to be out of the field early.

Time of visits

We could visit the households in the study area at various hours the day. During weekends boys could go out herding, therefore reduced male coverage. During school days we could take time waiting for children to come home

Seasonal variation

Risk factors observed during this survey were mainly reflective of the situation in the dry seasons. The situation in the wet season could possibly be different

Quantity of water used by household**.**

We found difficult in getting data on amount of water used by household, because the respondents were having difficult in estimating the amount, hence we end up using the distance to water source.

Responder biases.

Asking about frequency of face washing and pit latrine usage, the respondents might have been bias in giving the wrong information.

Observational bias.

During observation, we might have been bias in reporting fly population on the faces of the children.

CHAPTER FOUR

4.0 RESULTS

4.1 Prevalence Data

Table 1 Demographic characteristics of study participants

AGE (YEARS)	n (%)	Boys (%)	Girls (%)
1-3	160 (49)	82 (52)	78 (46)
4-6	119 (37)	54 (34)	65 (39)
7-9	47 (14)	22 (14)	25 (15)
TOTAL	326	158	168

Demographic characteristics.

Table 4 shows basic demographic age characteristic of the study subjects. The mean age was 4.2 (SD=2.1). The respondents who participated in the study were aged between 1 to 9 years of age. According to age distribution, majority 160 (49 %) of the respondents were aged 1- 3 years and a small proportion 47 (14%) was in age 7-9 years**.** The chance of getting children of age 1-3 years is 1.4 times higher in trachomatous children than non-trachomatous

Table 2: Demographic profiles and respondents in the study area

Information Sought	Responses	Frequency and (% in Parenthesis
Study site responses Done	Nkimpa	96 (29.5%
	Ntuka	126 (38.7%)
	Naroosura	104 (32%)
Sex	Female	326 (100%)
Ethnicity	Masaai	
Education level	Formal	76 (23.3%)
	Informal	250(76.7%)
Age	<20	40 (12.2%)
	21-30	53 (16.3%)
	31-40	204 (63%)
	41-50	29 (9%)

The prevalence of active trachoma and trichiasis found in this study is shown in table 3 whereas table 4 shows the sex-specific prevalence of trachoma.

Table 3: The prevalence of trachoma in Naroosura Location (95% C.I)

AREA (Sub-Location)	Trachoma		Total	PREVALENCE	95%C.I
	Yes	No			
Naroosura	34	70	104	32.7	23.7-41.7
NTUKA	71	55	126	56.3	47.6-65.0
NKIMBA	41	55	96	42.7	33.6-51.8
NAROOSURA LOCATION	146	180	326	44.8	39.4-50.2

The prevalence of trachoma in Naroosura Location was 44.8% (95% CI, 39.4%-50.2%) with Naroosura sub – Location having the lowest (32.7%) (95% CI, 23.7%-41.7%).

Table 4: Sex-distribution of Trachoma in Naroosura Location.

Sex	Trachoma				Total
	Yes	%	No	%	
Male	71	49	87	48	158
Female	75	51	93	52	168
Total	146	100	180	100	326

A higher proportion of females (51%) had trachoma as compared to males (48%). But there was no statistically significance (p=0.957, OR=1**,** CI 0.803-1.260**)** between trachoma and sex.

TABLE 5 Shows association between trachoma and age.

Age (Years)	Trachoma				Total
	Yes	%	No	%	
1-3	68	47	92	51	160
4-6	56	38	63	35	119
7-9	22	15	25	14	47

From the study, there was no statistical significance (x^2=10.606, p=0.644) association between trachoma and age, meaning age has no influence on trachoma.

Table 6. Proportion of grades of trachoma in males and females aged 1-9 years with trachoma in Naroosura location and sub locations:

		TF	TI	TS	TT	CO	TOTAL
MALES	Ntuka	12 (33%)	19 (53%)	3 (8%)	1 (3%)	1 (3%)	36
	Nkimba	4 (17%)	14 (61%)	3 (13%)	2 (9%)	0 (0%)	23
	Naroosura	3 (25%)	5 (42%)	4 (33%)	0(0%)	0 (0%)	12
FEMALES	Ntuka	9 (26%)	17 (50%)	4 (11%)	3 (9%)	1 (3%)	34
	Nkimba	4 (21%)	7 (37%)	3 (16%)	3 (16%)	3 (16%)	20
	Naroosura	3 (14%)	14 (67%)	2 (10%)	2 (10%)	0 (0%)	21
TOTAL	Ntuka	21 (14%)	36 (25%)	7 (5%)	4 (3%)	2 (1%)	34
	Nkimba	8 (5%)	21 (14%)	6 (4%)	5 (3%)	3 (2%)	20
	Naroosura	6 (4%)	19 (13%)	6 (4%)	2 (1%)	0 (0%)	21
TOTAL		35 (24%)	76 (52%)	19 (13%)	11(7%)	5 (3%)	146

4.2 RISK FACTORS:

4.2.1 WATER

Household's main source of water in Naroosura location and sub location was stream**.**

Due to the presence of this water source, there was no much problem with the water but the habit of usage seems to be the problem.

TABLE 8 Association between sex and clean face.

		Clean face				Total
		Yes	%	No	%	
Sex	Male	71	45	87	55	158
	Female	85	51	83	49	168
Total		156		170		326

Boys had a higher prevalence of unclean faces compared with girls (26.7% versus 25.5%, OR= 1.1, 95% CI 0.904-1.377). But there was no significant association between sex and facial cleanliness, implying that facial cleanliness was the same between the sexes.

TABLE 6. Association between trachoma and risk factors.

		Trachoma		Total	P-values	OR
		Yes	No			
Distance to water source	>1KM	9	9	18	0.323	1
	<1KM	137	171	308		
Clean Face	Yes	16	140	156	0.000	0.141
	No	130	40	170		
Face wash: by frequency	3 2 1	144	171	315	0.049	4.6
	Never	2	9	11		
Access to Pit latrines	Yes	0	7	7	0.018	X^2=5.80
	No	146	173	319		25
Uncovered feaces	Yes	144	176	320	0.012	2.4
	No	2	4	6		
Livestock ownership	Yes	113	116	229	0.011	2
	No	33	64	97		
Flies	Yes	121	143	264	0.432	1.043
	No	25	37	62		
Education	Formal	6	18	24	0.043	1.4
	Informal	140	162	302		
Livestock Confinem-ent area	≥20M	65	86	151	0.292	0.8
	≤ 20M	81	94	175		

CHAPTER FIVE

5.0 DISCUSSION

5.1 PREVALENCE OF TRACHOMA.

This population-based survey provides some of the first reliable data on the prevalence of trachoma in Naroosura Location, and confirms the initial reports that trachoma is a severe public health problem in Narok –south District

The overall trachoma prevalence in Naroosura Location was 44.8% (146/326), with the respective sub locations having prevalence of 32.7%, 56.3%, and 42.7% in Naroosura, Ntuka, and Nkimba respectively.

Despite the unique difference among the sub-locations, there was significant (P=0.000) difference in the prevalence of trachoma in the areas. The prevalence of all grades of trachoma was found to be high in Naroosura Location. This Study found high levels of Active Trachoma (TF/TI) =10.7%, 23.3% respectively.

In areas where the prevalence of TF is ≤20% or TI is ≥5%, WHO recommends mass treatment of the community with antibiotics. [27]. From the findings the prevalence in the area exceeds the WHO minimum prevalence levels used to determine active Trachoma as a significant public health problem in any community.

The prevalence of active trachoma was highest in age group of four to six years.The finding that the prevalence of active trachoma increases with age of the child up to the age of nine, agrees with the study results by Lemma E. (2000) in Guragie zone, South Wollo and Sidano region in Ethiopia [44]. This could be reason that as the children grow, they get involved with environmental factors.

The prevalence of TT in the Naroosura Location was 3.3 %(11/326). This was far in excess of the 1.3% threshold set by W.H.O for TT as public health problem.

,

5.2 RISK FACTORS.

Previous risk-factor analyses for active trachoma, shows the results of our study are consistent with the existing literature. [12,32,33] Factors independently associated with severity of active trachoma signs were, unclean face, face washing less than twice daily and pit latrine ownership. These findings provide essential baseline data that can be used in the design of interventions and specific activities relevant to Naroosura Location

5.2.1 WATER AVAILABILITY:

All of the respondents had water source to be stream. Water availability and pattern of use at the homestead largely determines the status of personal hygiene. However, availability by itself does not automatically imply improved personal hygiene. Socio cultural standards of cleanliness and individual behavior also contribute.

5.2.2 DISTANCE TO WATER SOURCE:

The absence of an association of trachoma or infection with distance to water, is similar to that found in The Gambia [40] .In our population, as people were sufficiently close to water source, the relationship of trachoma with increasing distance to water, as was seen for example in Tanzania by Aylor H R, (1989) [42] could not be observed.

5.2.3 FACE HYGIENE.

People with dirty faces were more likely to have trachoma than those with clean faces. There was statistically significant (χ^2 >0.05, p=0.000) association between trachoma and facial cleanliness. This finding is similar to many other studies, where unclean faces are a risk for trachoma, and face washing is protective. [40, 41, 42]. These findings further support the association, and argue for the need for education on hygiene in this Location. As most of the households had access to a water source, and did not have a long distance to travel for water, a strong health communication message about clean faces will not have to labour under unavailability of water for washing. This would make it ideal to further evaluate the effect of health education on trachoma and infection.

State of the face and trachoma.

There was a proportionately higher count of children with unclean faces in the group with Trachoma in all areas as seen in table 6. Whole location having 52 % dirty faces. **FREQUENCY OF FACE WASHING:**

Household ladies that were interviewed about face washing of the children under there care, showed that 96 %(313/326) of the respondents claimed that they wash their children's face once or twice a day. Mean frequency of face washing was 4, which is face washing once.

Since larger proportion of the study children, 92% (300) wash their faces once per day, the study could show the association between face washing habit and prevalence of active trachoma to be significant ((p=0.049)

5.2.4 TOILETS (PIT LATRINES)

Toilets were non-existent in the studied area with only seven open pit latrines reported and seen. The local community in all studied sub locations preferred going to open fields, do not cover feaces .The local do not appreciate the need for toilets as cultural taboos limit their use. Some of the taboos do not allow a male to share a toilet wit a female, leave alone being seen going for a long call. From the results it was found out that there was high significant (x^2 >0.05, p=0.016) association between trachoma and pit latrines. Other studies have also found the same. [40, 41, 42].

5.2.5 UNCOVERED FAECES

Almost all the households (90%) had the faeces uncovered, a situation favouring fly breeding. However, no statistical significance (p=0.488) association was found between trachoma and uncovered faeces**.**

5.2.6 LIVESTOCK OWNERSHIP

From the study it was found that livestock ownership has the influence on trachoma. The fact that some did not own livestock did not seem to confer them any protection against Trachoma.Cattle ownership was a determinant factor for the occurrence of trachoma, as it was observed in Sahlu's study on impact of cattle on the prevalence and severity of trachoma [45] .The presence of cattle doesn't necessarily affect the size of eye- seeing fly population rather the way in which cattle are kept that influence the rate of fly breeding. [45]

5.2 7 FLIES

Interestingly, the presence of flies on a clean face was not associated with infection. Children whose faces are clean, but who have flies on the face, are more likely to

have trachoma compared with children with clean faces and no flies, but this is not the case the study showed no association of facial flies with infection. In light of the observation that eye-seeking flies carry *C trachomatis*, [43], we expected an association of facial flies with infection. The high prevalence of flies documented in this study is likely to be a result of people living in close proximity with cattle and the very low access to latrines (less than one in 20 households overall). In the absence of latrines, the usual method of human feces disposal is open defecation in the bush between households and surrounding the villages. Human feces and, to a lesser extent, cattle dung are known to be the preferred breeding media for the fly vector of trachoma, *Musca sorbens*. [41, 42,]

5.2.8 EDUCATION STATUS OF THE RESPONDENTS

From the study it was found that Education status has the influence on trachoma. Those respondents who have no formal education have their children more prone to infection. From other studies, similar findings were found where higher prevalence of Trachoma exists in households with lower income than their neighbours and where the household head is poorly educated. [6, 7, 8, 9]

Among 302 children of Households with illiterate heads 140(46.4%) were active trachoma cases

The result of current study showed significant association in prevalence among children due to their maternal literacy status (p=0.043, OR=1.4, 95% C.I 1.1-1.8). Literacy appears to be a protective factor.

CHAPTER SIX

6.0 CONCLUSION

- This study has shown the prevalence of trachoma in Naroosura is a significant public health problem.
- All grades of trachoma were found to be in excess of the minimum prevalence criteria set by W.H.O for considering trachoma a public health problem.
- This high prevalence of trachoma makes Naroosura a hyper endemic pocket of trachoma.
- Poor facial hygiene, lack of access to pit latrines, Livestock ownership and Education status of the parents are associated with trachoma. Therefore these can be considered as indicators for the occurrence of active trachoma in the region.

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CHAPTER SEVEN

7.0 RECOMMENDATIONS:

- Reduction of the prevalence of active disease in the community is mandatory to control of blindness due to trachoma. This is part of the primary effort in the GET VISION 2020 INITIATIVES.SAFE is a WHO comprehensive concept for intervening in trachoma.

- The recommended ranking of sub locations according to the prevalence of trachoma and the priority for the implementation of the SAFE strategy is as follows

Rank	Sub location
1	Ntuka
2.	Nkimpa
3	Naroosura

- The local community needs to be encouraged to observe facial hygiene by frequent face washing. This is a challenging aspect of the SAFE strategy being a non-traditional hygiene behavior [12]
- Access to pit latrines should be made priority to the community.
- Formal education should also be part of SAFE strategy as part of intervention.

7.1 RESEARCH / FURTHER STUDIES

a) Regular monitoring and evaluation surveys should be planned and conducted**.**

b) A study into the relevance and distribution of other risk factors like overcrowding and other eye irritants in the study area is recommended

d) Trachoma KAP survey should be conducted in the study area.

e) The ready availability of water for washing suggests that further research on the effect of a strong health education campaign promoting clean children is warranted in this area.

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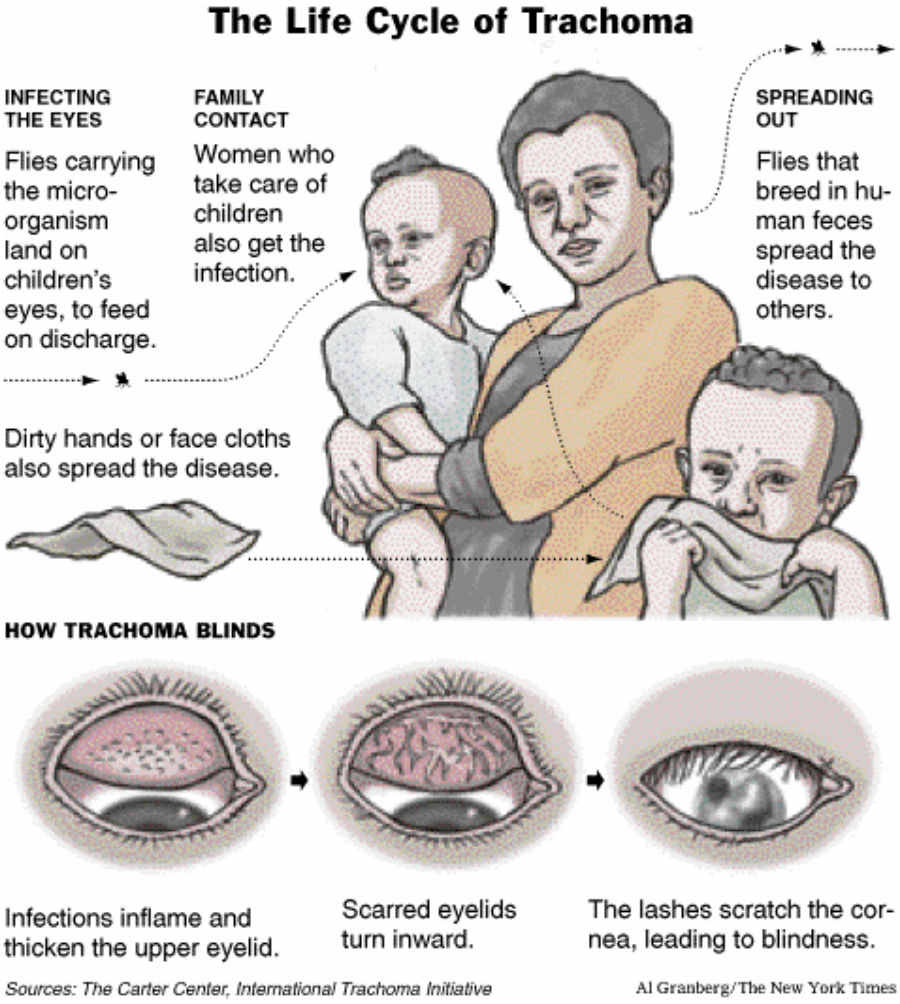
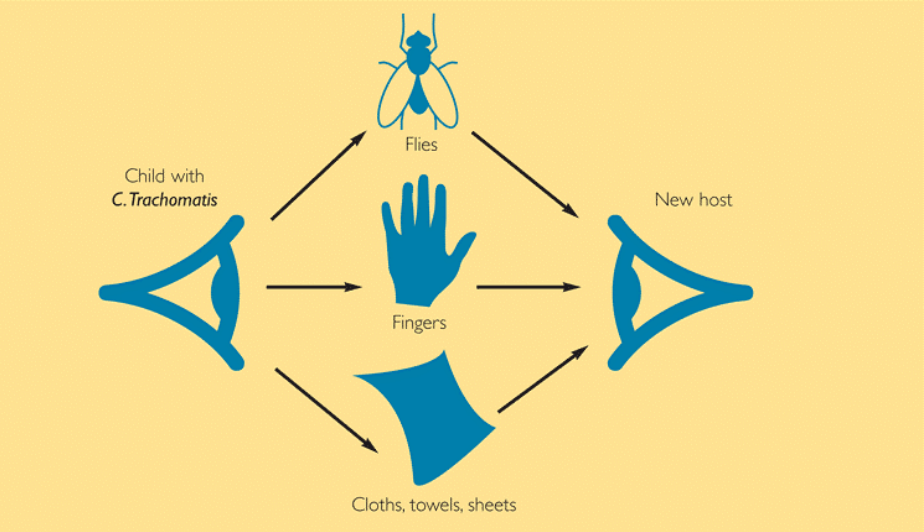
APPENDICES

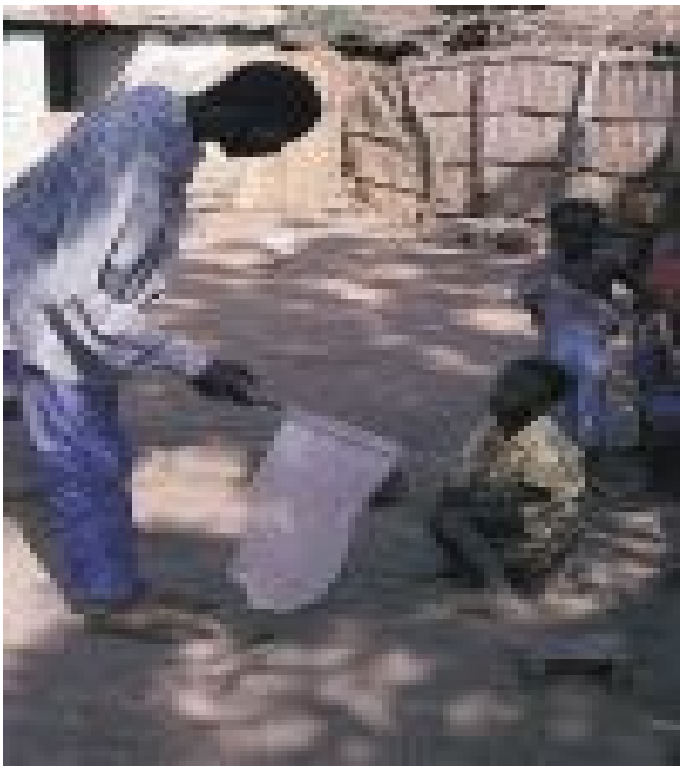
Appendix I: Life cycle of trachoma [36]



Appendix II Transmission of trachoma [36]



Appendix III Shows flytrap by a net. [12]



APPENDIX IV

QUESTIONNAIRE TRACHOMA PREVALENCE-OSOPUKO DIVISION-NAROOSURA LOCATION A (SAMPLED LOCATION)

EPIDEMIOLOGICAL COMMUNITY BASED SURVEY QUESTIONNAIRE HOUSEHOLD NO……..

DATE……

EXAMINER……

LOCATION……

Respondents' Education level……

1 Total number of members in the household……..……..

2. What is this household's main source of water?

- Piped water []
- Stream []
- Well []
- Dam []

PERSONAL HYGIENE-FACES.

3) Are there any children in the household 10 years and younger?

YES []

NO [] →**Next** household.

4 If yes, how often are faces washed?

- Over 3 times a day []
- 3 times a day []
- Two times a day []
- Once a day []
- Never []

ACCESS TO WATER

5) Do you have any difficulty in fetching water?

YES []

NO []

6) If yes, what sort of problems?

7). How long do you take to fetch water?

- Over an hour []
- Less than one hour []
- One hour []

DRYNESS AND DUST.

8 How long is the dry season? During dry season do you experience problems with the dust? YES [] NO []. How dusty is the environment? (Observation)

LATRINE

9) Do you have a functional latrine in the compound? (observation)

YES []

NO []

10) If yes do your children use the pit latrine?

YES []

NO []

11) If No, where do they relieve themselves?

12). If presence of a pit latrine, what type?

- Ventilated pit latrine []
- Open pit latrine []
- Closed pit latrine []
- Bucket latrine []
- **FAECES**

13) Is there uncovered human faeces in the compound? (Observe)

YES []

NO []

ANIMALS

14). Do you have livestock?

YES []

NO []

15) If yes where are they kept?

1. >20 meters from the house? []

2. <20 metres from the house? []

FLIES

16). Is there any child with flies on the face? (Observation)

YES []

NO []

APPENDIX V

OBSERVATIONAL CHECKLIST

HOUSE HOLD NO &NAME……

EXAMINATION TIME…….

DATE……..

EXAMINER……SHEET NO…….

LOCATION…….

TRACHOMA GRADING FORM.

HOUSEHOLD NO:……..NAME…

EXAMINATION TIME…….DATE…….

EXAMINER……..LOCATION……..

SEX	AGE	C.F	TRA. **YES/NO**	EYE	TF	TI	TS	TT	CO
				R					
				L					
				R					
				L					

CF=Clean face, =Right, L= left, TRA. =Trachoma, OR = other eye infections

TF=TRACHOMA FOLLICULAR

TI=TRACHOMATOUS INFLAMMATION

TS=TRACHOMATOUS SCARRING

TT=TRACHOMATOUS TRACHIASIS

CO=CORNEAL OPACITY