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PREVALENCE OF TRACHOMA IN SIX DISTRICTS OF KENYA
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ABSTRACT

Objectives: **To estimate the prevalence of active trachoma (TF) in children aged one to nine years and potentially blinding trachoma (TT) in adults aged 15 years and older in six known trachoma-endemic districts in Kenya.**

Design: **Community based survey.**

Setting: **Six known trachoma endemic districts in Kenya (Samburu, Narok, West Pokot, Kajiado Baringo and Meru North).**

Subjects: **A total of 6,982 children aged one to nine years and 8,045 adults aged 15 years and older were randomly selected in a two stage random cluster sampling method: Twenty sub-locations (clusters) per district and three villages per sub-location were randomly selected. Eligible children and adults were enumerated and examined for signs of trachoma.**

Results: **Blinding trachoma was found to be a public health problem in all the surveyed districts. Active trachoma was a district wide public health problem in four districts (Samburu, Narok, West Pokot and Kajiado) and only in some of the sub-locations of the other two (Baringo and Meru North).**

Conclusions: **There is need for district trachoma control programmes preferably using the WHO recommended SAFE strategy in all the surveyed districts. Extrapolation of these survey results to the entire country could not be justified. There is need to survey the remaining 12 suspected endemic districts in Kenya.**

INTRODUCTION

Trachoma is the number one infectious cause of blindness in the world contributing to an estimated 5.9 million blind people. It is commonly found in areas with hot, dry and dusty climates. Most surveys have been carried out in known trachoma endemic areas. Due to the focal nature of the disease, extrapolation to the entire country or region may not be justified (1-3). The WHO simplified trachoma grading allows for recording of clinical findings in a standardised way as follows: TF = Trachomatous follicular inflammation, TI = Intense trachomatous inflammation, TS = trachomatous conjunctival scarring, TT = trachomatous trichiasis and CO = corneal opacity due to trachoma (4-6). The active disease (TI and TF) is a contagious chronic keratoconjunctivitis which occurs mainly in children. TF is more specific to active trachoma than TI because it has less confounders and hence is used as the indicator for active disease in children. The blinding sequelae (TT and CO) occur in adults. TT

is the indicator for potentially blinding trachoma in adults. The WHO has adopted the SAFE (S = surgery for trichiasis, A = antibiotics for active disease, F = face washing, E = Environmental cleanliness) strategy for control of blinding trachoma (5-9).

Trachoma is considered the second leading cause of avoidable blindness in Kenya, accounting for 19% of the blind. The national eye care management information data from the districts and a national blindness survey conducted in the early 1980s, indicate that trachoma may still be endemic in 18 out of the total 73 districts in the country. The population of the 18 suspected trachoma-endemic districts is about six million. The six districts included in this first phase of the national trachoma survey are among the 18 suspected endemic districts (10,11).

MATERIALS AND METHODS

A community-based survey was conducted between 16th June 2004 and 17th July 2004. Data collection tools were developed at the Department of Ophthalmology of the University of Nairobi based on a protocol developed by the International Trachoma Initiative and endorsed by WHO. The Kenya specific survey tools were approved by a technical seven-member survey core team which reported to the DMS through the National Prevention of Blindness Committee (PBC). The team members were drawn from the Department of Ophthalmology of the University of Nairobi, Division of Ophthalmic Services (DOS) of the Ministry of Health, AMREF (The lead trachoma NGO in Kenya) and the International Trachoma Initiative.

Study population: The six districts had a population of 2,092,465 mainly nomadic people distributed over an area of about 80,000 square kilometers (10). Target population for TF were children aged one to nine years and for TT adults ≥15 years. Epi info sample size calculation software was used to determine the minimum sample sizes. The sampling details were as follows: (12) Children one to nine years: Prevalence estimate of TF = 15%, Precision ± 5%, Design effect = 4. Adults ≥15yrs: Prevalence estimate of TT = 3%, precision ± 1.5%, Design effect = 2. Confidence level was 95%. After allowing for 10% non-response, the minimum sample sizes were: 900 children and 1,200 adults per district. The marginal cost (survey time and logistics) resulting from doubling the children's minimum sample sizes was negligible since most households had more children than adults. Every district was sampled separately. Two stage cluster random sampling method with population proportional to size (PPS) was adopted. Twenty clusters (sub-locations) per district were randomly selected using 1999 Population and Household Census Volume 1 as the sampling frame (10). The predetermined samples were distributed proportionately among the selected clusters. In every cluster, a minimum of three villages were randomly selected. All the villages were selected if a cluster had less than three villages. The cluster samples were then proportionately distributed among the selected villages. The adult sample was the most difficult to achieve. As a guide to assist in picking the minimum number of households to be visited to achieve the required sample, it was assumed that there are at least two adults in each of the households. To estimate the minimum number of households to be visited, the adult sample was divided by two. All the members of the selected households who fulfilled the survey criteria were enumerated and examined for signs of trachoma. In case there was need to pick an additional household, it was done using random selection method. Efforts were made to trace all the sampled children and adults who were within reach. Sick patients were treated and referred to hospital if necessary.

Training examiners and pretest: Pre-survey workshop was convened to train the survey team (examiners) on the standardised trachoma survey methods and survey logistics. The examiners were drawn from Ministry of Health, African Medical and Research Foundation (AMREF), University of Nairobi and the Kenya Medical Training College. They were health workers with experience in diagnosis and control of trachoma. Lectures on simplified trachoma grading and standardised survey protocol were given by experts from the ITI and University of Nairobi. The ability of the examiners to grade trachoma was tested using the set of standard WHO grading slides (4). This was repeated several times during the workshop, until all the participants were able to score over 90% on the reliability test. They were also tested practically in the field during the pretest of data collection tools at Bisil, a sub-location in Kajiado district, which had not been sampled for survey.

Table 1

Demographic characteristics of survey districts as per 1999 national census[10]

District	Area in Km^2	Population			Total number of Households	Population Density (people/Km^2)
		Male	Female	Total		
Kajiado	21,903	206,353	199,701	406,054	96,621	19
Narok	15,098	184,231	181,519	365,750	76,450	24
Baringo	8,646	130,054	134,924	264,978	56,663	31
West Pokot	9,064	151,506	156,580	308,086	63,993	34
Samburu	21,127	69,378	74,169	143,547	32,794	7
Meru North	3,942	293,385	310,665	604,050	119,664	153

Minimum prevalence criteria (12,13): The ITI (International Trachoma Initiative) and the WHO consider TF prevalence equal to or above 10% and 5% for district and sub-location respectively a public health problem. The ultimate intervention goal for trachoma control is to reduce the prevalence of TT to less than one case per 1,000 in people aged 15 years and above. In this study, TT prevalence equal to or above 1% was considered a public health problem.

Statistical methods: Statistical analysis was done with SPSS 10.0. Data for every district was analysed separately. Cross tabulation by sub-location and sex was done.

RESULTS

Participants: Table 2 shows the study participants.

Prevalence of TF: TF was a public health problem in Samburu with 35.0% (95% CI: 29.5% - 40.3%), Narok 30.5% (95% CI: 25.6 – 35.8%), Kajiado 28.1% (95% CI: 23.1% – 33.6%) and West Pokot 26.6% ((95% CI: 21.7% – 32.3%). Seven sub-locations in Meru North district and nine in Baringo district had prevalence of TF equal to or above 5%. Kajiado district had a higher prevalence of TF in boys (32.0%) than in girls (24.0%): p-value 0.03. There was no significant statistical difference in other districts (Table 3).

Table 2

Study population

District*	Number of Villages surveyed	Number of Households visited	Number of People examined		
			Children 1-9yrs	Adults ≥ 15 yrs	Total
Kajiado	63	506	1,182	1,414	2,596
Narok	62	481	1,348	1,376	2,724
Baringo	65	601	1,180	1,432	2,612
West Pokot	51	424	1,142	1,324	2,466
Samburu	41	285	1,250	1,368	2,618
Meru North	106	490	880	1,131	2,011
Total	388	2,787	6,982	8,045	15,027

* Twenty sub-locations were surveyed in each district

Table 3

Prevalence of TF by district

District	No. of children 1-9 yrs		TF Prevalence (%)	95% C.I
	Examined	TF		
Samburu	1,250	434	35.0	(29.5% - 40.3%)
Narok	1,348	411	30.5	(25.6% - 35.8%)
Kajiado	1,182	332	28.1	(23.l% - 33.6%)
WestPokot	1,142	304	26.6	(21.7% - 32.3%)
Meru North	880	71	8.1	(4.9% - 12.7%)
Baringo	1,180	75	6.4	(3.9% - 9.9%)

Table 4

Prevalence of TT by district

District	No. of adults ≥15 yrs			TT Prevalence (%)	95% C.I
	Examined	TT	CO*		
Samburu	1,368	82	60	6.0	(4.4% - 8.1%)
Baringo	1,432	83	48	5.8	(4.2% - 7.8%)
West Pokot	1,324	79	48	5.7	(4.2% - 7.8%)
Kajiado	1,414	46	21	3.3	(2.1% - 4.9%)
Narok	1,376	31	11	2.3	(1.3% - 3.7%)
Meru North	1,131	11	3	1.0	(0.4% - 2.3%)

*Number of TT patients with visual loss (CO).

Prevalence of TT: TT was a public health problem in all the six districts. Over *50%* of people with TT had CO. In West Pokot district, there were more women (7.2%) with TT than men (3.4%): p-value 0.03. There was no significant statistical difference in the other districts (Table 4).

DISCUSSION

Despite being a preventable disease and the reported overall downward trend in the global prevalence of blindness due to infectious diseases, trachoma still remains a major cause of blindness in poor nations like Kenya. Its prevalence is known to reduce with improving socio-economic status (1,14). Its control contributes towards poverty eradication and should be included in the health sector strategic plans aimed at achieving the Millennium Development Goals.

Five of the surveyed districts (Baringo, Samburu, Narok, Kajiado and West Pokot) are in the Rift Valley Province of Kenya and are inhabited by nomadic communities who keep livestock. The Rift Valley lies within the trachoma belt of Africa where known socio-ecological risk factors like semi arid environment, poor sanitation, poverty and low literacy levels are in abundance. Meru district is in Eastern Province of Kenya but a part of it is trachoma endemic since it is arid and has the above known trachoma risk factors. The rest of the district is densely populated, fertile and inhabited by small scale farmers.

The entire population of Samburu, Narok, Kajiado and West Pokot districts where active trachoma (TF) is a district wide public health problem will need mass antibiotic treatment. The same applies to the population of the endemic sub-locations in Meru North and Baringo districts. Baseline TF surveys should be conducted in all sub-locations

suspected to be trachoma endemic in Meru North and Baringo districts and antibiotic treatment given where necessary (targeted community treatment). The WHO defines the elimination of trachoma as a public health problem in a community as when there is less than 5% clinical activity in children since at this prevalence, it is no longer possible for the *Chlamydia* to spread within the community (13).

Prevalence of TF in boys was higher (32.0%) than in girls (24.0%), p-value 0.03 in Kajiado district. Similar findings were reported in a study conducted by the University of Nairobi in Shompole location Kajiado district in 2002 (not published) (14). There was no significant statistical difference in the prevalence of TF between boys and girls in the rest of the districts. It is recorded in literature that prevalence of active trachoma is quite similar for male and female children (1).

Potentially blinding trachoma was a public health problem in all the six districts. The Global Initiative for elimination of blinding trachoma by year 2020 (GET 2020) Ultimate Intervention Goal (UIG) which sets the final targets to be achieved in order to eliminate blinding trachoma as a public health problem aims to lower TT prevalence to less than one case per 1,000 of the total population. There is immediate need for trichiasis surgery in the six districts.

In West Pokot district, there were more women (7.2%) with TT than men (3.4%), p-value 0.03. There was no significant statistical difference in the prevalence of TT between women and men in the rest of the districts. Women are generally considered to be more afflicted and affected by trachoma than men because they have more contact hours with children (reservoir of infection) than men (2,3). This was not so in most of the districts in this survey.

It was recommended that all the surveyed districts should initiate trachoma control projects (SAFE with Azithromycin) which are integrated into the existing primary health care programme; involving the local communities and partners. Azithromycin is preferred to tetracycline eye ointment because of compliance. Azithromycin is given once per year, complemented with the other components of SAFE. Tetracycline is given twice a day for six weeks which is difficulty to follow in rural communities. Azithromycin being a systemic antibiotic clears naso-pharyngeal *chlamydia* hence more clearing effect to the populations treated. In order to achieve maximum effect, community antibiotic coverage should be over 80% (15).

On the basis of the survey finding, 46,000 people in the six districts, have TT and are threatened with blindness. They require urgent surgery. About, 1.4 millions people are in need of Azithromycin treatment for active disease (TF). Environmental and personal hygiene campaigns plus provision of water should be initiated under SAFE.

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CONFERENCE ANNOUNCEMENT