ORIGINAL ARTICLE

Prevalence And Magnitude Of Trachoma In A Local Government Area Of Sokoto State, North Western Nigeria

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Abstract

Introduction*: In order to have baseline data for monitoring and evaluation of trachoma control activities in Sabon Birni LGA of Sokoto state Nigeria, a population based trachoma survey was conducted. The survey was designed to determine the prevalence of active trachoma and trichiasis as well as assess the prevalence of major risk factors for trachoma in the study area.*

Method: *The survey was a population based cross sectional survey of persons of all ages in the study area. A minimum sample size of 2760 was determined and the study population was selected by two stage cluster random sampling technique. In the first selection stage 34 communities were randomly selected by probability proportional to size, while for the second sampling stage 90 persons of all ages were randomly chosen in each selected cluster. All chosen persons were assessed for trachoma using WHO trachoma simplified grading system and their households were assessed for trachoma environmental risk factors.*

Results*: The prevalence of blindness in the study population was 2.0% (95%CI 1.4% -2.6%) with trachoma responsible for13.8%. The prevalence of active trachoma amongst children (1-9 years) was 37% (CI 34.3%-39.8%), while trichiasis amongst adults was 2.3% (95%CI 1.9%-2.7%). Over sixty percent of households had no functional latrine, while 81% of households had refuse and animal dung littered within their compounds. Sixty percent of children had 'unclean faces' and over 85 % of households had access to water within their villages.*

Conclusions*: Trachoma of public health concern still exists in some districts of northern Nigeria with significant environmental risk factors.*

Key words *Trachoma , Magnitude , Nigeria .*

INTRODUCTION

Trachoma is estimated to be responsible for 3.6% of the global burden of 37 million blind.[1] It is the major cause of preventable blindness in many underprivileged communities of developing countries. Severe trachoma is observed in all the countries of West and Central Africa and in the dry arid areas of Southern, Central and East Africa, including Ethiopia.[2]

The clinical picture of the disease varies from a mild condition with hardly any symptoms to a severe and blinding disease.[3] Chronic inflammation from recurrent infections leads to conjunctival scarring in late childhood or early adulthood. Progressive scarring and contraction of existing scars can distort the upper tarsus, leading to cicatricial entropion and trichiasis.[4] Trichiasis predisposes individuals to bacterial and fungal corneal ulcers. In addition, decreased mucin and tear production from the scarred conjunctiva and lacrimal glands are a risk for corneal ulcers.[4] Although pannus alone occasionally leads to reduced visual acuity, central corneal ulcers are the most frequent cause of visual loss in trachoma.[4]

The World Health Organization (WHO) has developed the 'SAFE' strategy to control trachoma as a disease of public health importance.[5] This is a comprehensive strategy that includes Surgery, Antibiotics, Facial cleanliness and Environmental improvements. The WHO aims to eliminate trachoma as a cause of blindness by the year 2020. Many national Ministries of Health, UN Agencies, Non-Governmental Organisations and research institutions are currently working towards this goal.[6] The International Trachoma Initiative (ITI), a major player in the Neglected Tropical Diseases (NTD) initiative, Global Elimination of Trachoma by the year 2020 (GET-2020) and the 'Vision-2020:The Right to Sight' are all initiatives working towards that goal.[6] The WHO has also evolved a protocol to assist control programmes in planning, monitoring and evaluation of control programmes. This involves the determination of Ultimate Intervention Goal (UIG) for each of the components in the SAFE strategy.[7] This is based on the prevalence of the disease and its risk factors and the total population in the respective country or district that are in the programme area. The goal is then translated into Annual Treatment/Intervention Objective (ATO or AIO) to be achieved annually over the programme period.

Following a Trachoma Rapid Assessment (TRA) in some local government areas (LGAs) of Sokoto, Kebbi

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and Zamfara states (north western Nigeria) in which blinding trachoma was confirmed to be endemic in the zone,[8] a control programme was initiated by a non - governmental organisation- Sight Savers International (SSI) Nigeria, in collaboration with the respective states in 2003.[9]

As the TRA methodology does not provide data for planning, monitoring and evaluation of trachoma control programmes, an epidemiologically-sound house to house survey was conducted to provide data for planning and evaluation of the programme in one of the LGAs with the highest burden of trachoma as identified by the TRA.

The aim of this study was to provide baseline data on trachoma for a trachoma-endemic LGA in Sokoto state. The specific objectives included

i) To determine the prevalence of active trachoma in children 10 years and below in the study area;
ii) To determine the prevalence of trachomatous trichiasis in the study population; and
iii) To determine the prevalence of some trachoma risk factors in the study area.

MATERIALS AND METHODS

A population based cross-sectional survey was conducted in the non-planting months of September and October 2003 to determine the magnitude of trachoma in the study area.
The estimated 2003 population for the LGA was 215,354 based on the projected 1991 population census.[10]

Minimum Sample size

Sample size for active trachoma assessment
Minimum sample size of 1,030 for active trachoma (Trachomatous inflammation-TF/Trachomatous intense inflammation -TI) assessment in children 10 years and below was determined using the following parameters:

i. Estimated population: *81,835* children (38% of the total population).
ii. Expected prevalence of *20%*. Based on the findings in a nearby area.[11]
iii. Precision of the estimate: *5%*.
iv. Design effect: *4*.
v. Confidence interval: *95%*.
vi. Non response: *5%*

Sample size for trichiasis assessment
Minimum sample size of 1380 for trachomatous trichiasis (TT) assessment in adults 15 years and above was determined using the following parameters:

i. Estimated population: *118,444* (55% of the total population).
ii. Expected prevalence of *4%*. Based on the findings in a nearby area.[11]
iii. Precision of the estimate: *1.5%*.
iv. Design effect: *2*.
v. Confidence Interval: *95%*.
vi. Non response: *5%*.

The minimum sample size was calculated using the Epi-info 1.06 software.
In order to have an all age assessment, the sample size for TT assessment was doubled to 2760, to examine all age groups. By the population structure of the study area about 38% of the total population are below 10 years. Thus an all age survey of 2760 people is expected to yield 1,048 children (which is more than the minimum sample size for active trachoma assessment as calculated above).

SAMPLING TECHNIQUE

The study sample was selected by 2 stage cluster random sampling technique. In the first sampling stage, within the sampling frame of 171 communities in Sabon Birni LGA, Sokoto state Nigeria, 34 communities were randomly selected by probability proportional to size (PPS). The villages/communities were chosen by selecting 34 random numbers in Epi-info between the least populated villages to the most populated town.

In the second sampling stage 90 people of all ages were randomly selected in each of the chosen villages. They were chosen by randomly selecting a direction from the centre of each community through spinning a bottle and sampling all households in that direction. All individuals living in households that had stayed therein in the last 6 months in the community were included in the survey until the required cluster size (90 persons) was attained.

DATA COLLECTION PROCEDURE

The demographic data of each selected individual (age, sex, occupation, tribe etc) was recorded by the local guide. Visual acuity was then tested for each eye with E-illiterate chart placed at 6 meters from the subject. Eyes with vision less than 6/18 were retested with a pin hole. Subsequently each person was examined for trachoma using the WHO simplified grading system[12] with a magnifying loupe X2 and a pen torch. Each eye was examined separately. All the stages of trachoma (as contained in the WHO grading[12]) present in the eyes were recorded for each eye. The vision testing and examination was conducted in front of or inside each

household. Each of the children (0-9 years) examined was assessed for 'dirty face', defined as presence of wet or dry nasal or eye discharges.

Households were also assessed for likely trachoma environmental risk factors like water availability, refuse/garbage within households, and availability/usage of latrines. The head of the household or his/her representative was asked the source of their water and this was categorised as either within the household, within the village or outside the village. Households were assessed for the presence of littered refuse and or animal dung. For latrine assessment heads of households were asked for the presence of a latrine and if available the latrine was inspected and assessed for cleanliness and presence of a cover. A latrine is assessed as clean if there is absence of remnant of faeces on or around the latrine, while it is considered covered if there is presence of any material covering the pit of the latrine. A house hold is defined as a group of people living in the same house and eating from the same kitchen/pot.

Blindness is defined as per the WHO definition i.e. a presenting visual acuity of less than 3/60 in the better eye with best possible correction. While low vision is defined as visual acuity of less than 6/18 but equal or better than 3/60 in the better eye with best possible correction[13].
Visual acuity testing, examination and households assessment was done by the experienced ophthalmic nurses and or the ophthalmologist.
All information was recorded in a pre-designed questionnaire. The team leaders checked individual data forms at the end of each days field work to correct mistakes.
Data was entered into a pre-designed programme in the Epi-info software and then analysed by a statistician.

SURVEY TEAM COMPOSITION AND PRE SURVEY ACTIVITIES

The survey team was made up of one ophthalmologist, 4 experienced ophthalmic nurses, 2 local guides and 2 drivers. Two teams were used for data collection. A 2 day training session was conducted in Sokoto town before the survey to standardise the grading techniques among the 2 leaders of the team who assessed the study subjects, this was to ensure an inter-observer agreement of at least 80% amongst assessors. The protocol for subjects' examination, household assessment, and recording of findings into the questionnaire were also tested and standardised among the teams.

The study got the approval of the Medical Ethics Committee of National Eye Centre Kaduna, Nigeria. The study was designed to obey the principles of Helsinki declaration. Approval for the conduct of the survey was also obtained from the Sokoto state government and Sabon Birni LGA. Verbal consent was also obtained from all participants examined during the survey. The study was conducted in September 2003.

RESULTS

Response rate

A total of 2575 persons out of the enumerated 2700 were examined. This gives a response rate 95.4%. Those not examined were either at the farm, school, or had travelled. A total of 402 households were assessed during the survey.

Demographic characteristics of the sampled population

Children l0 years and below constituted 43.4% of the sample while persons 15 years and above constituted 52.9%. Fifty five percent of the study samples were females. Table I shows the age-sex distribution of the sample.

Table I. Age-Sex distribution of the study sample

Age group	Males		Females		Total.	
	n	(%)	n	(%)	n	(%)
0-10	533	*(20.7)*	585	*(22.7)*	1118	*(43.4)*
11-20	175	*(6.8)*	253	*(9.8)*	428	*(16.6)*
21-30	157	*(6.1)*	249	*(9.7)*	406	*(15.8)*
31-40	102	*(3.9)*	177	*(6.9)*	279	*(10.8)*
41-50	73	*(2.8)*	76	*(2.9)*	149	*(5.9)*
51-60	59	*(2.3)*	48	*(1.9)*	107	*(4.1)*
61-70	44	*(1.7)*	17	*(0.06)*	61	*(2.4)*
₡1	16	*(0.06)*	10	*(0.03)*	26	*(1.0)*
Total	**1160**	***(45.1)***	**1415**	***(54.9)***	**2575**	***(100)***

PREVALENCE OF BLINDNESS

The prevalence of blindness for the study population was 2.0% (95% CI 1.4%-2.6%); 48% (24 persons) of the blind were females. Trachomatous corneal opacity was responsible for 4% of the total blindness. The prevalence of low vision was 4.4% (95%CI 3.6% - 5.2%) for the study population; 61% of whom were females (69 persons). Trachoma was responsible for 13.8% (5 of 36 persons) of low vision.

PREVALENCE OF ACTIVE TRACHOMA

A total of 380 children aged 1-9 years were found with active trachoma (TF or TI) thus giving a prevalence of 38.3% (95%CI 36.7%-39.8%); while 331 children had TF giving a prevalence of 33.3% (95%CI 31.8-%-34.8%). Majority (60.2%) of the children examined had 'dirty faces' as defined above.

BLINDING TRACHOMA (TRACHOMATOUS TRICHIASIS)

The prevalence of trachomatous trichiasis (TT) for the study population was 1.4% (95%CI 0.9%-1.9%); 53% were females (19 persons). This gives a TT prevalence of 1.5% and 1.3% for males and females respectively. The prevalence among persons 15 years and above was 2.3% (95%CI 1.9%-2.7%), while it was 3.2% (95% CI 2.4-4.0) amongst persons 40 years and older. Table II shows the prevalence of TT in different age groups; the prevalence can be seen to increase with age.

Table II. Prevalence of *Trichiasis by age groups*

Age group	Prevalence of trichiasis	95% CI
Below 15 years	0.33% *(4/1213)*	*0.03- 0.63*
15 years and above	2.3% *(32/1362)*	*1.9%-2.7%*
40 years and above	3.2% *(15/ 472)*	2.4- 4.0

SEVERITY OF TRICHIASIS

A total of 63 eyes in 36 persons of all ages had TT. Of these, 28 persons (77.7%) admitted to having eye discomfort due to the trichiasis. Only 38.8% (14) of those with TT practice epilation regularly. Sixty eight percent of eyes with trichiasis (43 eyes out of 63 eyes) had offending lashes touching the cornea with or without additional peripheral offending eyelashes. Only about 5% of the trichiases were located at the periphery of the eyelid. While about 20% of the people with trichiasis had epilated eye lashes

UPTAKE OF LID SURGERY FOR TRICHIASIS

Majority (66.6%) of persons with TT were willing to have free eye surgery if made available to them. One person (2.7%) was not willing to have surgery even for free. In fact she refused to be examined on the first visit, but was examined on repeat visit for mop up. Eleven (30.5%) of the examination forms were not marked to indicate the patient's response.

CORNEAL OPACITY (CO)

The Prevalence of CO for the study population was 0.3% (7 persons) involving 10 eyes; 0.3% for persons 15 years and above. Three (42.8%) of the people with CO have bilateral disease. Of grave concern is that all of these 3 persons were 14 years and below.

SEVERITY OF CO

Six (60%) of the eyes with CO had the mild form of the disease defined by visibility of the pupillary margin, while 4 eyes (40%) had the severe form of the disease i.e. no part of the pupillary margin was visible, thus accounting for those blind from trachoma.

ENVIRONMENTAL RISK FACTORS

Source of water

The source of water was within the household in 16.6% of the households and within the village in 69%; thus 85.6% of the households had access to water within the vicinity of their village.

Refuse disposal.

Disposal of refuse was within the house in 74.6% of households; while 22.4% dispose refuse within the village. Household assessment revealed the presence of refuse and animal dung in 81.8% of the households.

Latrines

Functional latrines were available in only 39.3% of the households; 31.6% of which were assessed 'not clean' and 61.4% of them were not covered. In the households with latrine, up to 4.4% of the members were not using the latrine.

DISCUSSION

The high coverage (95.4%) in this study was achieved through publicity and mop up visits.

The study population had a high burden of blindness (2%), which is higher than the estimated Nigerian national average (1.3%) [14] and that reported in a nearby district of Katsina state (1.5%).[11] The high prevalence of blindness is not surprising as the population do not have access to eye care services except for an irregular eye care service in a tertiary centre about 150km away.

Although the burden of trichiasis amongst the study population was high, the burden of trachomatous trichiasis in this study is lower than that reported in a nearby district (8.6%),[11] and in Sudan (9.2%).[15] Additionally, blindness attributable to trachoma was low (4%) unlike the findings in the nearby district (20.4%).[11] Previous studies have documented a genetic susceptibility of communities to severity of trachoma, such that some individuals have a more severe inflammatory response than others.[16] Possible reasons provided include associations between trachoma scarring and HLA class II alleles as well as polymorphisms in the promoter region of the gene for tumour necrosis factor alpha.[16]

The burden of active trachoma (prevalence of 38.3%) is higher than that reported in a nearby community (11.8%),[11] the Gambia (5.9%),[17] Senegal (10.8%),[18] and Morocco (18%).[19] However, the prevalence is lower than those reported from Sudan (53.7%),[15] Zambia (55%)[20] and Ethiopia (59.2%).[21]

There was high prevalence of some trachoma risk factors in the study area. These included poor facial hygiene in children (60.2%) and poor environmental hygiene, as over 80% of the households were assessed to be dirty, either due to presence of animal dung or improper disposal of refuse. This is compounded by the people defecating in the open as over 60% of households do not have latrines. A study from Ethiopia[21] has reported even a higher (79%) absence of latrines in homes; 87.1% of households had no waste disposal facilities and 46% had dung in households; and a higher prevalence of active trachoma (59.2% vs. 37%). On the contrary, the Ethiopian study[21] however reported a higher percentage of children with clean faces. Abdou, Nassirou, and Kadri et al[16] have reported that unclean faces are a significant risk factor for trachoma in Niger republic; while in Nepal[22] less access to water was reported among the risk factors.

With a population of 152 994 in the study area and a TT prevalence of 2.3% in persons 15 years and above, the number of lid surgeries needed to eliminate trachoma trichiasis (UIG) in the population lies between 1453 and 2065 surgeries (persons). The UIG for antibiotic distribution should be the application of mass treatment strategy to treat active infection preferably using Azithromycin. This can be achieved through community-based lid surgical services and mass distribution of antibiotics in the area. In order to reduce the risk of transmission, health education messages and advocacy for personal hygiene of children are essential. Environmental sanitation with emphasis on the provision of latrines and clean compounds is also a necessity, The ready availability of water in the study communities suggests the need for a strong health education campaign towards the appropriate use of water for personal hygiene; promoting clean children may have a pronounced impact on prevalence of disease and infection.[23]

In the spirit of NTD control, availability and appropriate use of water for hygienic purposes, as well as development and utilisation of proper sewage and waste disposal systems will also assist in the control of other NTDs like soil transmitted helminthes, schistosomiasis e.t.c.

The major limitation of the study was its inability to quantify the risk factors of the disease and correlate them with the presence or severity of disease in the households surveyed.

CONCLUSION

The burden of active and cicatricial trachoma is high among the population, although the burden of blindness from trachoma is low. There was a high prevalence of some major risk factors for trachoma like poor environmental and personal hygiene. The control programme should include a strong health education messages in addition to the community-based lid surgical services and mass distribution of antibiotics. These activities can be effectively undertaken in collaboration with the recently inaugurated Neglected Tropical Diseases (NTD) initiative in Nigeria, to which Nigeria's trachoma control program is a part. These may not only strengthen the commitments of governments and the NGOs in terms of co-implementation of trachoma control with other existing debilitating diseases in the communities e.g. soil transmitted helminthes, lymphatic filariasis etc), but also share resources for the control programme. Furthermore the co-implementation may also enhance uptake of the trachoma control programmes.

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