Research Article

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Epidemiology of Trachoma in the Health District of Lelouma

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ABSTRACT

Background: *Trachoma is a disease afflicting people of low socioeconomic status. While some countries have managed to eliminate it, it is still prevalent in the poorest areas, most of which are located in Africa. In Guinea, the National Programme to Combat Blindness and Onchocerciasis had conducted a survey in 10 districts out of the 31 health districts suspected of being endemic. The purpose of this study was to participate in the finalization of the mapping of trachoma in Guinea for a good planning of the SAFE (Surgery, Antibiotics, Facial Cleanliness and Environmental Hygiene) strategy allowing the elimination of this condition.*

Methods: *This was a single-pass cross-sectional survey, random sampling in clusters at two levels (villages and households), from 02 to 9 March 2017. We used the WHO simplified codification for the diagnosis of trachoma. The Kappa approval coefficient of 95% was achieved prior to the survey. All participants were informed and gave their verbal consent to participate in the study. Variables related to age, gender and environment were noted (availability of water and availability of latrines used) and analyzed. The "links system" of the Global Trachoma Mapping Project (GTMP) made it possible to develop the questionnaire, collect and delete the database on an Android platform. The data analysis was performed using epi-infos 6.0 software. The graphs were produced by Microsoft Excel 2007 software.*

Results: *The survey involved 2816 individuals including 1190 children aged 0 to 9 years and 1438 subjects aged 15 years and over. The prevalence of follicular trachoma (FT) was 3.36% in children aged 0 to 9 years and a female predominance with a sex ratio G/B = 1.85. The prevalence of trachomatous trichiasis (TT) was 0.2% in subjects 15 years of age and older and a female predominance with a sex ratio G/B = 2. Surface water use and the absence of latrine in households were the main determining factors with proportions of 65% and 57.5% of TF cases.*

Conclusion: *In this study the prevalence of active trachoma is below the World Health Organization (WHO) threshold of 5% and that of TT reaching just the threshold of 0.2%. The Health District of Lelouma is not eligible for mass treatment but targeted treatments of TT.*

Keywords

Epidemiology, Trachoma, Lelouma-Guinea.

Introduction

Trachoma is an eye infection, reaching the conjunctiva and leading to blindness after several years of progression in a number of cases [1]. It is due to a bacterium, chlamydia trachomatis of human-to-human transmission via nasal and ocular secretions and most likely favored by flies constituting passive vectors [2]. Trachoma is a disease afflicting especially people of low socio-economic status living in rural and remote areas of Africa, Southeast Asia, Australia, the Middle East, Central and South America [3]. While some countries have managed to eliminate it, it still plagues the poorest areas of more than 44 countries, mostly located in

Africa [2]. Trachoma remains and remains a major public health problem. According to the Report of the International Coalition for Trachoma Control of July 2011, the best estimates suggest that nearly 110 million people live in areas where endemic trachoma is confirmed and where the implementation of the SAFE (Surgery, Antibiotics, Facial Cleanliness and Environmental Hygiene) strategy is necessary [2].

In Guinea, the national programme to combat blindness and onchocerciasis had conducted a survey in 10 districts in Upper Guinea of the 31 health districts suspected of being endemic. The prevalence was 33% for follicular trachoma in children 1 to 9 years of age and 2.7% for trachomatous trichiasis in adults 15 years of age and older. Another survey in Middle Guinea in 5 health districts found a prevalence of 23% among children aged 1 to 9 years; 1.1% trachoma trichiasis in adults 15 years of age and older [4]. It is in order to finalize the mapping of trachoma in Guinea, for a good planning of the SAFE strategy allowing the elimination of this condition, that we conducted this investigation in the health district of Lélouma suspected endemic.

Method

We conducted a single-pass descriptive cross-sectional, two-level cluster random survey, lasting 8 days from March 02 to 9, 2017. The study included children aged 1 to 9 years for the assessment of the prevalence of active trachoma (FT/IT) and subjects aged 15 years and older for the assessment of the prevalence of trachomatous trichiasis. Sampling was carried out using a two-level cluster random survey: The first level of the survey was 20 villages (groups) that were randomly sampled from the database using the random numbers table. The second level of survey was a subsample of 30 randomly selected households in each of the 20 villages, in which all persons aged one (1) year and older were examined. For the random selection of thirty (30) households, a list was made of all the names of the heads of household in the village who received the order numbers. Of these numbers, thirty (30) were drawn at random and these thirty (30) households constituted the sample. A list was made of all the names of the heads of household in the village to whom the order numbers were assigned. In polygamous families, draws were drawn to select a single woman to examine, her children and her husband. The minimum sample size was determined using the population proportion formula [n = [(Zα/2)2*P (1-P)]/d2], assuming a 95% confidence level of Z α/2 = 1.96, a margin of error of 3%, a design effect of 2, an expected prevalence of 10%, and 20% representing non-responses. To estimate the prevalence of follicular trachoma (FT) at unit assessment (UA) level, a sample of children aged 1 to 9 years was calculated for each UA, based on an expected FT prevalence of 10%, with a confidence level of 95%, an absolute accuracy of 3% and a design effect (to adjust for cluster sampling) of 2.65. A minimum sample of 1,019 children aged 1 to 9 years was required. To allow for 20% non-response, we enrolled 1,273 children aged 1-9 in each UA. The survey team underwent training and participated in the pre-test phase prior to the field investigation itself. This training was provided by a team whose experts came from two different backgrounds. A first made up of certified experts sent by Global Mapping Trachoma Project and another made up of national experts.

The training was done in two stages, first in the classroom for the theoretical and on the site for the practice chosen for this purpose. During the preparatory phase, some people were examined in turn by the Senior Ophthalmology Technician (SOT) of each team and supervised by an expert. This procedure has reduced inter-examiner bias. A Kappa approval coefficient of 95% was achieved prior to the field survey. The investigation team consisted of three (3) people: A clinical examiner for signs of trachoma; a registration agent (data entry operator) for recording data in the Smartphone and a driver. A guide (serving at the same time as an interpreter) was recruited in each village and made available to the investigators to accompany them to the selected households. The technique of moving the interviewers in the households was under the direction of the local guide and the itinerary was always prepared taking into account the geographical location of the selected households.

The team started with the household furthest from the dealership where they were staying and ended with the nearest household to avoid unwanted movements. In households where absences were recorded, the team returned to review and record them. Priority for this return was given to households where children aged one (1) to nine (9) years were absent, as this age group is the main target of trachoma. This study included all consenting individuals, whether trachomatous or not, living in the selected households. All cases of trachoma were diagnosed and recorded using the World Health Organization's (WHO) simplified trachoma coding. All children, after parental consent, and consenting adults were examined by an ophthalmology technician (OSI) with a binocular magnifying glass of 2.5 power under adequate lighting (preferably daylight), looking for the different stages of trachoma. Variables related to age, gender and environment were noted (availability of water and availability of latrines used). The examiner first looks for the presence of trachoma trichiasis (TT: an eyelash, rubbing at least the eyeball, evidence of recent hair removal of deviated eyelashes (s) was considered trichiasis), followed by corneal opacity (CO: corneal opacity evident on the pupillary area), then he turns the upper eyelid and looks on the tarsal surface of the upper conjunctiva for signs of inflammation (FT: presence of 5 or more follicles on the upper tarsal conjunctiva, and IT: pronounced inflammatory thickening of the tarsal conjunctiva masking more than half of the deep vessels of the tarsus) and scars (TS: healing on the upper tarsal conjunctiva). Each eye was examined separately and all signs were clearly visible to be present. In case of doubt, the sign was considered absent. Adult subjects sat in front of the examiner, who himself was seated.

Children could stand in front of the examiner. As for very young children, their heads were placed between the examiner's knees, their faces turned upwards, with the child's body firmly held on the lap of another adult (preferably the child's mother or guardian) sitting in front of the examiner. The examiner washed his hands after each examination with the appropriate disinfectant (Dakin or

alcohol) or washed his hands with soap and water. It also ensured that all data collected in the Smartphone was saved. To participate in this study, we were selected by the Chair of Otolaryngology and Ophthalmology of the Faculty of Medicine of the University of Gamal Abdel Nasser of Conakry as part of the finalization of the mapping of trachoma in Guinea where we had received training before being in the field. In addition, the activities were explained to the local and regional authorities with a view to obtaining their membership and authorization by giving them the mission order issued by the Guinean Ministry of Health.

At the community level, the purpose of the survey was explained to village chiefs, followed by heads of household and individuals. In the case of children, this explanation was given to parents or their guardians. Verbal agreement was given by village chiefs, households or guardians. Subjects have been informed that they have the right to participate or not in the survey. There was no premium for participation in the study. Information on the condition of each subject related to trachoma was confidential. However, anyone diagnosed with active trachoma received two (2) tubes of 1% tetracycline ophthalmic ointment. Subjects with trachomatous trichiasis (TT) were referred to the nearest and most appropriate health facility for surgery. The Global Trachoma Mapping Project (GTMP) made it possible to develop the questionnaire, collect and delete the database on an Android platform using Motorola Smartphones. The data analysis was performed using epi-infos 6.0 software. The graphs were produced by Microsoft Excel 2007 software.

Results

A total of 524 households divided between 20 clusters were surveyed, 2890 subjects were identified. Of these 2890, 2816 were amino or 98.7% of the subjects identified. There were 36 subjects absent at the time of the survey or 1.2% and 1 case of refusal. All children in households could be examined. The age group of 15 years and over was the most represented with 1438 respondents, or 55% against 1190 aged 1-9 years, or 45%. In the 1-9 age group, there were 569 boys versus 621 girls, a G/F ratio of 0.9 figure 2. In the age group of 15 years and over, there were 998 women against 440 men, an M/F ratio of 0.4. Of the 1190 aged 1-9 years, 40 had active trachoma, a prevalence of 3.36% as shown in Table 1. Of the 40 children with FT, there was a female predominance (65%) with a sex ratio of 1.85. The prevalence of follicular trachoma in Lelouma district compared to other health districts is shown in Figure 1. The prevalence of TT was 0.2% among respondents aged 15 years and older as summarized in Table 2. Twenty-six (26) out of 40 children with follicular trachoma resided in households that used water from unprotected dug wells or river water for face washing, compared to 14 children who used protected water sources. In households that did not have latrines, we recorded 23 cases of TF out of the 40 cases detected, a proportion of 57.5% (Table 3). Among households that had latrines, we identified 13 cases of TF in children living in households with unimproved latrines compared to 4 cases in households with improved ventilated pit latrines (Table 4).

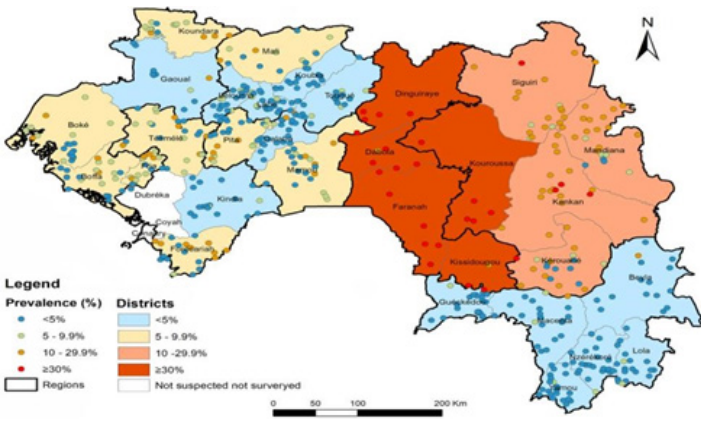

Figure 1: Situation of trachoma in Lélouma compared to other districts of Guinea.

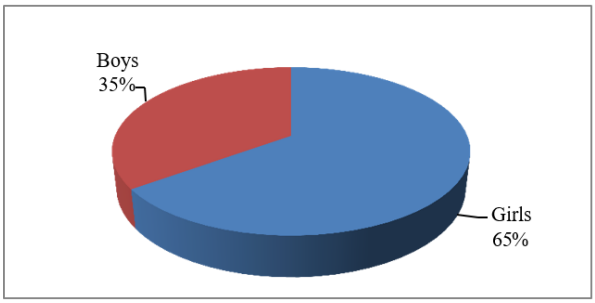

Figure 2: Distribution of children aged 1-9 years with active trachoma by sex.

Table 1: Distribution of follicular trachoma in children aged 1-9 years of the 1190 children examined, 3.36% 95% CI [2.3%: 4.3%] had follicular trachoma.

	Examine		follicular trachoma (FT)	
	Number	Percentage (%)	Number	Prevalence (%)
1	58	4,9	1	0,08
2	119	10	6	0,50
3	116	9,7	5	0,42
4	147	12,4	7	0,59
5	120	10,1	3	0,25
6	165	13,9	8	0,67
7	162	13,6	6	0,50
8	134	11,3	3	0,25
9	169	14,2	1	0,08
In all	1190	100,0	40	3,36

Table 2: Distribution of trichiasis trachoma prevalence among adults aged 15 year old and over by age group.

	Examine		Trichiasis trachoma (TT)	
	Effective	Percentage (%)	Effective	Prevalence (%)
15-24	312	21,7	0	0
25-34	210	14,6	2	0,1
35-44	241	16,8	0	0
45-54	210	14,6	0	0
55-64	212	14,7	0	0
65-74	168	11,7	1	0,1
75-84	85	5,9	0	0
Total	1438	100,0	3	0,2

Table 3: Distribution of Active Trachoma (TF/TI) by Primary Source of Drinking Water for Households during the Dry Season.

	Courtyards		Active Trachoma (TF/TI)	
	Number	%	Number	%
Surface water (e.g. rivers, dams)	241	46	16	40
Tubed well or drilling	120	23	16	40
A protected dug well	53	10	4	8
Tap water at home	0	0	2	6
Unprotected source	79	15	0	0
Tap water in the courtyard	10	2	0	0
Public tap water	0	0	0	0
Protected source	0	0	0	0
Unprotected dug well	21	4	2	6
Water for sale	0	0	0	0
Rainwater collection	0	0	0	0
Total	524	100	40	100

Table 4: Distribution of the prevalence of active trachoma by type of latrine in courtyeards.

	Courtyards		Active Trachoma (TF/TI)	
	Number	%	Number	%
No toilet or scrubland or farm	212	40,45	23	57,5
Unimproved latrine	262	50	13	32,5
Improved Ventilated Pit Latrines	50	9,55	4	10
In all	524	100	40	100

More than half of our subjects (57.5%) defecated in nature.

Discussion

The survey conducted in 20 villages in the Lelouma health district assessed the prevalence of active trachoma in children aged 1 to 9 years and that of trachomatous trichiasis in subjects aged 15 years and older. This investigation also identified risk factors for the occurrence of trachoma. Targets were selected by random sampling in a two-tier cluster; the population examined was 2816 persons out of 2890 registered in 524 households, for a participation rate of 98.7%. This was achieved through the information strategy that involved community workers and local authorities who explained to the population extensively the purpose and benefits of the study. This result is higher than that reported by Traore et al. [6] in Mali in 2009 who found an 82% participation rate. The number of subjects aged 15 and over was more numerous at 55% while that of children aged 1 to 9 years was 45%. The prevalence of follicular trachoma was 3.36%, which is below the WHO threshold of 5%. This result is comparable to that found in Gaoual (3.6%) which is a health district with almost environmental characteristics and much lower than that found in Kankan (25.8%) where climatic conditions are very different after surveys conducted by Goépogui A et al. [7] in 2013. This difference is explained by the fact that the Kankan Health District is a semi-desert area where water scarcity is felt in places and times while Lelouma has a high rainfall with an abundant river network and has virtually no water shortage. The prevalence of trachomatous trichiasis in subjects 15 years of age and older was 0.2%. Our results are superimposed on those reported by Sylla A et al. [8] who had found 0.21% of TT among those aged 15 and over in the survey conducted in the Health District of Fria in Lower Guinea, but different from those found in the study by Goépogui A et al. [7] in the health districts of Upper Guinea: Kankan, Kouroussa, Siguiri, Dinguiraye, Dabola, Faranah and Kissidougou with very high TT prevalences above 5%. Girls aged 1 to 9 years were the most affected with a rate of 65%. Our observation is identical to that reported by Sylla A et al. [8]. in Guinea (53.1%),), Traoré L, et al. [6] in Mali (57.1%). This is explained by the fact that the female sex does, even at a young age, would be more exposed to trachoma than the male sex, due to the role played by women in African society. In our study, we did not find a link between the age of the children and the occurrence of trachoma as pointed out by Sylla A et al. [8] and Victor H, et al. [9] who evoke a certain breakdown of contact between mother and child at school age where [10] the mother pays very little attention to the child's personal hygiene and clothing, which puts him at risk of trachomatous infections. In subjects 15 years of age and older, 3 subjects had trachomatous trichiasis or 0.2% IC95% (0.03%: 0.4%). This result is close to those found in Koubia 0.1% and Kérouané 0.2% by Goepogui et al. [7] in 2013. The survey also made it possible to identify the main risk factors on which action must be taken in the prevention of trachoma, namely the availability of water and latrines. In our study, active trachoma was more common in households that used tube wells (40%) or river water (40%) as the main source of drinking water during the dry season. However, it was almost absent in households that used boreholes and protected dug wells. This observation is corroborated by studies by Sylla A et al. [8], Goépgui A et al. [7], Traoré L et al. [6] and Schemann JF et al. [10] which report that trachoma is more common in communities or concessions where water supply is difficult. This difficulty of access to water translates into less use in rural areas of Africa. The risk of the disease is linked to poor water management to keep children clean. In our series it is not the lack of water that is the risk factor but rather its misuse. Trachoma was more common in children living in households without latrine (57.5% of cases) than in children living in households with improved ventilated pit latrines (10%). Our results are consistent with those of Sylla A et al. [8] and Schemann et al. [10] who showed that the presence of functional latrines in concessions or houses was associated with lower prevalences of trachoma.

Conclusion

This basic survey conducted in the health district of Lélouma found a prevalence of active trachoma of 3.36% below the WHO threshold of 5% and that of TT reaching just the threshold of 0.2%. The Health District of Lelouma does not require mass treatment but targeted treatments of TT. This study shows that the non-use of water and the absence of latrines are major determining factors in the occurrence of active trachoma in Lélouma.

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