Risk Factors of Potentially Blinding Trachoma in Loodokilani Ward, Kajiado County, Kenya

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Abstract

Trachoma is a neglected tropical disease, that is most prevalent in the nomadic communities greatly associated with poverty. This study sought to determine the ascendancy of potentially blinding trachoma and its prospect among adults aged 18-60 years in Loodokilani ward, Kajiado County. This research was a graphic transverse study. Multistage sampling technique was used where every location represented one unit. The initial stage used the random sampling which was used for listing of households in the study area. The second stage involved going through the listed households to identify patients. A total of 155 male and 267 female adults residing in the area of study were sampled. The comprehensive occurrence of potentially blinding trachoma was established as 44.5%. Sorted by age and location, it was noted that age was statistically vital ($p < 0.05$) to potentially blinding trachoma. Geographical locations were also significant ($p<0.05$) to potentially blinding trachoma. However, gender of patients was not scientifically reliable ($p>0.05$) to location. Majority of the respondents did not own or utilize toilets; hence, a clear indication of open defecation especially at night that led to increased number of vector-*musca sorbent* flies responsible for chlamydia trachomatis bacteria which causes infection. Previous studies indicate that Kajiado West subcounty recorded the least average of 11.6% on water accessibility as compared to the county`s average of 62.3%. Due to the scarcity of water there was limited practice of hand and face washing. It was noted that all facial cleanliness and environmental hygiene indicators were statistically significant ($p<0.05$) to prevalence of potentially blinding trachoma, apart from presence of impermeable floored toilets and presence of eye seeking flies. Consistent community sensitizations on regular facial and environmental hygiene to achieve a trachoma free environment was recommended. Mass drug administration should continue annually until the prevalence drops below 5%.

Key Words: *Potentially blinding trachoma, Adults 18-60 years, Risk factors, Control and prevention, Kenya.*

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1.0 Introduction

This study describes potentially blinding trachoma as a combination of trachoma scarring and trachoma trichiasis. WHO Grading Report of 2018 provides a simplified trachoma grading that categorizes antiseptic results in a uniformized way noted as: TF = Trachoma folliculitis, TI = trachoma intense, TS =trachoma scarring, TT = trachoma trichiasis and CO = corneal opacity because of trachoma. Worldwide, an estimated 2.2 million individuals are totally blind and 1.2 million others are sightless as a consequence of trachoma infections.

It is estimated that two hundred and eighty-five million people are visually impaired around the world, thirty-nine million are blind while two hundred and forty-six have vision that is low (Burton & Mabey, 2009).Africa leads in being the continent that is worst affected by trachoma. It has eighteen million patients (85 %) of vigorous trachoma and 3.2 million trichiasis (44%) patients globally (Smith et al., 2013).

In Kenya, potentially blinding trachoma disease is endemic in several counties exposing about 7.3 million people at risk of trachoma disease and blindness (Schwab et al., 2013).All endemic counties characterized by challenges of perennial water shortages, inadequate sanitation, poor hygiene and poverty (Schwab et al., 2013).Kajiado county is one the most endemic counties, putting thousands of victims in its indigenous areas at possibility of infection and even sightlessness (Ng'etich et al.,2016).

A study in Shompole area of Magadi ward in Kajiado West sub-county revealed that pervasiveness of agile trachoma amidst school going children of 1-9 years was 16.0% in 2006 and that of potentially blinding trachoma (TT) was at 1.7% in the same age bracket. It was also noted that the community held strong negative believes about construction and utilization of pit latrines (Karimurio et al., 2007).Trachoma infection usually begins in childhood presenting as active trachoma with the infections progressing to potentially blinding trachoma disease in adulthood because of repeated infections that cause scarring on the inside of the eyelid.

The infections lead to blindness as eyelashes gradually turn inwards and rub on the cornea (Mpyet et al., 2010). Potentially blinding trachoma is commonly found in arid and semi-arid environments with hot, dry and dusty climates, and unlike Loodokilani ward, most of the researches done have been done in known trachoma endemic areas (Ng'etich et al., 2016).

This research deliberated on traversing the space of comprehension on potentially blinding trachoma and aid in upgrading the SAFE plan of action and interpositions presently established. The facts will furnish a wide perception of population's prevalence of potentially blinding trachoma and assist in improvements of preventive measures.

The study objectives included: to find out the prevalence of potentially blinding trachoma in adults (18-60 years) and to investigate the risk factors for active trachoma in Loodokilani ward.

2.0 Materials and Methods

Study Area

This research was performed in June 2017 in Loodokilani ward, Kajiado west Sub County. Kajiado County lies at the southerly border of the erstwhile Rift Valley Province, which is approximately 80km from Nairobi county. It has a population of 687,312 and

an area of 21,292.7km2 (Kenya National Bureau of Statistics [KNBS], 2015).The county encircles Nairobi and expands to Tanzanian borderline in the southern part. It has five sub counties namely; Kajiado Central, West, North, South and East. Kajiado West sub county has a population of approximately 104,376(KNBS, 2013).

It consists of five wards namely; Euwaso Ekidong, Loodokilani, Magadi, Keekonyokie and Mosiro.Most of the residents are nomadic pastoralists of the Masai population. Loodokilani ward has an approximate area of 2,010.60 sq.km and an approximate population of 11,832(KNBS,2013). The six locations under Loodokilani ward include; Torosei, Oltepesi, Elangata Waus, Kilonito, Loodokilani and Singiraine. Loodokilani ward has high trachoma prevalence making it suitable for this study.

At the County extent, therapeutic systems are given by the community and mission health centers. Preventative systems are facilitated by the Department of Public Health and Sanitation at the county level and Sub-County Health Management Teams (SCHMT). Procedures endure for Ministry of Health management along with observation of Non-Governmental Organizations (NGOs) in the County for instance AMREF, World Vision, Fred Hollows Foundation, Sight Savers International along with private amenities. NGOs, private amenities the general population work synergistically with the SCHMTs.

Study Population

This study targeted adults of both sexes of 18 to 60 years of age. The number of households in Loodokilani ward was approximately 2400 (KNBS, 2013) .The number of sampled households in Loodokilani ward was unproportionate due to the different population densities in the locations.

Study Design

This study was trans-sectional research that was both descriptive and analytical. The study is descriptive because the researcher described the proportion of persons utilization of surgical and antibiotic therapy among persons with potentially blinding trachoma in Loodokilani ward(Anthonj et al., 2017). It is analytical because the study discusses the variables that influenced the use of surgery and administration of antibiotics among people suffering from potentially blinding trachoma (Migchelsen et al., 2017).

Sample Size Determination and Sampling Procedure

The representative sample was resolved by employing the Fisher`s test (Mugenda, 2009). This technique was appropriate for this research since the population under study in Loodokilani ward was higher than 10,000 i.e.11832 people. The representative sample was resolved using the formula below;

$$\mathbf{n = Z^2 P Q / D^2}$$

where: n– is the predicted number of households ,Z- is the Z-score for a 95% confidence level in a normal distribution table, P– is the unknown segment of persons in the selected populace ailing from potentially blinding trachoma in Loodokilani ward, and therefore it is assumed to be at 50% (Lazzeroni et al., 2016) ,Q –is the accolade of P, that is (1-P) ,D -sampling error which is catalogued as 0.05.

$$n = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2}$$

$$n = \frac{3.84 \times 0.5 \times 0.5}{0.0025}$$

n= 384 ,10%*384= 38,

Consequently, the actual sample size was 422. The estimated sample size was adjusted by 10 % to compensate for non-response ,i.e. 10%*384= 38, therefore the sample size was 384+38=422 (Singh & Masuku, 2014) .The sampling unit for the study was the community households which translated to the number of people interviewed in the community since only the household heads or a patient aged eighteen years to sixty years of age were interviewed.

Sampling methodology

The control group in Loodokilani ward was chosen by veneered illustrating by localities and effortless unmethodical selection was utilized to choose the families in each locality up until the sought-after representative unit was achieved. Across the six locations in Loodokilani ward were chosen and the representative unit equally assigned to the six stratums.. Data was randomly collected at the entrance, the center and the exit of each location. The sampling technique used was a multistage sampling that involved two stage sampling process (Sedgwick, 2015). In the ward, every location represented one unit.

The initial stage used the random sampling which was used for listing of households in the locations. Using convenience sampling, the researcher first visited those households that had better access to a health facility in terms of distance. The second stage involved a census of the listed households that was used to collect data to identify persons with potentially blinding trachoma. One adult per sampled households was engaged in answering of the administered questionnaires.

Study Instruments

The instruments that were used in this study included community household questionnaires which were used to measure knowledge and practice of utilization of surgical and antibiotic therapy services, for adult patients aged between 18 – 60 years, and community household observational checklists were used to record the facial cleanliness and environmental sanitation status of households and Kajiado West CHV`s case identification tool was used in house to house visit.

Validity and Reliability of Instruments

To guarantee dependability and rationality of the gathered information, coaching of the community health volunteers was done to acquaint them with the study apparatus and course of action. Coaching on the study apparatus focused on regulating collection of particulars and methods. Rationality of the study tools confirmed the content validity of instruments, that is, the checklist and interview guides, and were approved by the supervisor and public health experts in the field. Reliability was done through pretesting, and was repeated for two weeks to evaluate transparency of the questionary reports. Those questions that were established as insufficient were customized to upgrade the data attributes of collecting instruments. A pilot study was conducted before the actual data collection on the 10% household sample drawn from study site for pretesting. This helped in the determining the accuracy, clarity and suitability of the research instruments (Mugenda, 2009). Only Kajiado west CHV`s case identification tool was already in use before the study as part of routine case reporting.

Data Collection Methods

Questionnaires were used to interview adults aged 18 to 60 years in the households selected for study. Semi-structured and structured questionnaires collected both qualitative and quantitative information.(Leeuw & Schmeet, 2016).Direct observation was also used to identify potentially blinding trachoma cases

among the population under study via signs and symptoms of potentially blinding trachoma. Observation checklists evaluated the F&E factors which affected the prevalence of potentially blinding trachoma in Loodokilani ward.

Inclusion and Exclusion Criteria

The study excluded all people that were not 18-60 years of age, and are of unsound mind, those that were totally blind during the study and those that were not residents of Loodokilani ward. Any visitor found in the sampled households at the time of research, whether or not affected with potentially blinding trachoma was not allowed to participate. The study included resident adults, both male and female of 18 – 60 years of age only who agreed to be involved in the research.

Statistical Analysis

Data was entered in SPSS version 27 for scrutiny. Absolute variables were encapsulated as numbers and equivalent percentages. Descriptive statistics were used to measure central tendencies and the distribution of the data in the population. The means, medians and the variance were also calculated as percentages for categorical variables (Rendón-Macías et al., 2016). Analytical statistics were used to test hypotheses. The relationship linking categorical variables was evaluated using Pearson's Chi Square test at 95% Confidence Interval. Significance of the outcome were tested using inferential statistics and were used to test the null hypothesis. (DasGupta, 2008).

3.0 Results

Prevalence of Potentially Blinding Trachoma in Adults.

The prevalence of potentially blinding trachoma was 44.05%. The tables below give a synopsis on prevalence layered by age, location as well as sex respectively.

Age

It was noted in the study that age was statistically significant ($p < 0.05$) to potentially blinding trachoma.

Table 1

Prevalence of Potentially Blinding Trachoma by Age among Adults aged 18-60 years

		Age in years											
	Total with PBT	**18-28**	**With PBT**	**%**	**29-39**	**With PBT**	**%**	**40-50**	**With PBT**	**%**	**51-60**	**With PBT**	**%**
Elangata Waus	76	23	9	12	33	13	17	66	27	36	29	12	16
Torosei	23	7	1	4	13	2	7	13	2	7	9	1	4
Loodokilani	40	20	4	10	26	6	15	28	6	15	16	3	8
Kilonito	10	8	1	10	16	1	10	16	1	10	5	0	0
Singiraine	10	6	0	0	39	2	20	5	0	0	0	0	0
Oltepesi	29	11	2	7	14	2	7	12	2	7	7	1	3
Total=	188	75	16	43	141	26	76	140	38	75	66	17	31
Chi square	12.674												
P value	$p<0.05$												

Location
Geographical locations were statistically significant ($p<0.05$) to history of potentially blinding trachoma.

Table 2

Prevalence of Potentially Blinding Trachoma by Location in Loodokilani ward.

Location	Sample size (n=422)	Respondents with disease (n=188)	% of respondents with disease	Chi square	p-value
				33.223	**P<0.05**
Elangata Waus	151	76	50		
Torosei	42	23	55		
Loodokilani	90	40	44		
Kilonito	45	10	22		
Singiraine	50	10	20		
Oltepesi	44	29	66		

Gender
It was noted that gender was not statistically significant ($p>0.05$) to location.

Table 3

Prevalence of Potentially Blinding Trachoma stratified by Gender per Location in Loodokilani ward.

Location	Respondents with PBT (n=188)	Male population (n=155)	Males with PBT (n=41)	%	Female population (n= 267)	Females with PBT (n=44)	%
Elangata Waus	76	49	20	26	102	41	54
Torosei	23	14	2	9	28	3	13
Loodokilani	40	38	8	20	52	11	28
Kilonito	10	21	1	10	24	1	10
Singiraine	10	16	1	10	34	2	20
Oltepesi	29	17	3	10	27	4	14
Chi square	1.512						
P value	0.219						

Potential Risk Factors for Active Trachoma

The results illustrated risk factors in all the six locations in Loodokilani ward. It was noted that latrine coverage was higher in respondents without disease (83%) than those with disease (55%) as observed in Singiraine and Torosei locations respectively. Latrines with lockable doors were seen highest (56%) in patients at Torosei location whereas those without disease recorded highest (75%) at Singiraine location. Respondents with access to latrines that had impermeable floors were observed highest with patients at Torosei location (57%) while those without disease were recorded highest at 80% in Singiraine location.

Patients who practiced face washing were observed highest in Torosei location while those without disease and practiced face washing were seen highest (90%) in both Kilonito and Singiraine locations. Majority of respondents kept livestock near their households, among them, patients were seen highest (66%) at Oltepesi location while those without disease were seen highest (81%) at Singiraine location. Safe garbage disposal was practiced highest (56%) at Torosei location by patients and highest (79%) at Singiraine location by non-patients. Eye seeking flies around patients' households were observed highest (66%) at Oltepesi location and at Singiraine location (81%) by non-patients.

4.0 Discussion

Prevalence of Potentially Blinding Trachoma in Adults.

The study found out that 188 (44.5%) respondents had potentially blinding trachoma. Proportions of respondents between ages of 40-50 years recorded the highest number of patients with 36% in Elangata Waus location, while Singiraine location recorded no patient (0%) for potentially blinding trachoma in the ages between 18- 28 ,40-50 and 51-60 years. Usually most young adults don't have the habit of going for general eye checkups. They assume that the potentially blinding trachoma disease is only for the old people and hence unknowingly, or ignorantly, they assume that despite their unhygienic actions, they will not get the disease (Babitsch et al., 2012).

More females (44) than males (41) were affected by potentially blinding trachoma. The study implies that gender does not have a direct relation with disease prevalence. This study agrees with a study by Babitsch et al., (2012) that gender does not necessarily have a direct impact on prevalence of disease and health seeking behaviors.There is unresolved lack of information on epidemiology for topographical dispensation of trachoma to reinforce worldwide delineation and upgrading of interposition for the eradication of trachoma(Smith et al., 2013). In this study, various geographical conditions determined the presence and distribution of the disease. Potentially blinding trachoma exhibits a localized disease pattern, where its occurrence is favored by specific environmental conditions (Schwab et al., 2013).

Potential Risk Factors for Active Trachoma

According to this study, it was noted that all F&E indications were statistically significant ($p<0.05$) to prevalence of potentially blinding trachoma apart from presence of impermeable floored toilets and presence of eye seeking flies. Having the majority of the respondents not having toilets nearby was a clear indication that

there was a lot of open defecation practice especially at night that led to increase in the presence of the vector-*musca sorbent* flies which carries the chlamydia trachomatis bacteria to the persons' eyes and thus leading to infection. Due to the scarcity of water there was limited practice of hand and face washing. Face to face contact, use of shared infected clothing to wipe children faces, poor disposal of food waste and practice of open defecation increase the spread of potentially blinding trachoma. In the Maasai culture, livestock keeping is the order of the day. Most of the residents practiced keeping of livestock within the compound of their homesteads. In public health, livestock should be kept about 30 meters away from the boma (homestead). This is to prevent the presence of flies in the homestead(Anthonj et al., 2017).

5.0 Conclusion

The trachoma case burden in the research community was established as 44.5%, a t reality incompatible with WHO accepted levels of 10% prevalence. This is a powerful manifestation that trachoma is still a huge public health threat in the research community. The certainty that 44.5% are affected displays a unconnected magnification and maturation of youngsters in times to come if active trachoma is ungoverned in the community which may later influence their capacity to forefront wellness and fruitfulness.

Inaccessibility to treated water hampers productive prevention and control of active trachoma since it is a water-related disease hence this impacts the attainment of Sustainable Development Goals (SDG) on health. Obstructed health pursuant practice and fatalistic traditional behaviors, will prolong untimely outset of prognosis and medicament, hence levelling up the hazard of active trachoma amidst the society. Outreach services in the communities and health training ought to be improved in Loodokilani ward for eradication of potentially blinding trachoma.

6.0 Recommendation

The County Government should ensure necessary recommendations are met towards achievement of all levels (tertiary, secondary and primary) of prevention for potentially blinding trachoma. More non-governmental organizations are encouraged to assist in the livelihood of communities through implementation of water related projects. Cultural practice should be used as an avenue towards better eye care utilization. It should also encourage the safe preventive measures, namely; face washing and environmental hygiene, for prevention and control of potentially blinding trachoma. It is therefore recommended that livestock be kept at least thirty meters away from the homes to avoid interaction of flies (Emerson et al., 2004).

There should be periodic mapping (surveys) of potentially blinding trachoma so as to monitor trends, alert and action thresholds on prevalence of the disease. Community health volunteers should be more equipped with advanced technological methods towards community sensitizations and regular monitoring of the disease at household level. More campaigns towards elimination of trachoma should be done in Kajiado county every year. Through the Community led Total Sanitation program, the county should ensure proper funding towards facilitation of health officers in sensitizing communities on effects of open defecation and the burden of potentially blinding trachoma.

Conflict of Interest

The writers divulge that they have no conflict of interests.

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