

Original Research Article

Investigating the hygiene-related factors influencing prevalence of trachoma among children below nine years in Turkana West Sub-County, Turkana County, Kenya

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ABSTRACT

Background: Turkana County is one of the counties where trachoma is endemic. Trachoma impact survey of 2024 indicated Turkana West Sub County having a prevalence of 11.8%. The purpose of the study is to investigate factors influencing prevalence of trachoma in children below nine years in Turkana West Sub County. The objective of the study includes investigating the hygiene related factors among children below nine years.

Methods: The target population consisted of 23,493 households in wards in Turkana West Sub County. Stratified random sampling was used to obtain a sample of 223 households from all the wards in Turkana West Sub County. Purposive sampling was used to select 21 healthcare workers. Questionnaires and interview were used to collect data. University supervisors from Turkana University College assessed validity of the questionnaires. Piloting of the study was done in Loima Sub County. Data was presented using tables and graphs where frequencies and percentages were used to describe the data.

Results: The findings revealed that presence of excess flies (47.3%), presence of human faeces (21.6%), sharing of clothing (45%) and poor facial hygiene (66.7%) contribute to trachoma transmission.

Conclusions: These results underscore the urgent need for integrated public health interventions focused on improving sanitation, water access, and hygiene education to reduce trachoma prevalence and enhance child health in the region. The findings of this study help to reduce cases of trachoma in children below nine years. This study also benefit medical practitioners and other stakeholders for planning purposes.

Keywords: Hygiene-related factors, Hygiene education, Trachoma

INTRODUCTION

Trachoma continues to be one of the leading causes of preventable blindness in the world.¹ Worldwide, more than 1.9 million people suffer from blindness or visual impairment due to trachoma causing about 1.4% of all blindness worldwide. Trachoma is hyper endemic in many of the poorest and most rural areas of Africa, Central and South America, Asia, Australia and the Middle East. Overall, Africa remains the most affected continent, and the one with the most intensive control

efforts.² Trachoma causes inflammation and scarring on the surface of the eye resulting in the margin of the eyelid turning inwards.^{3,4}

In the United States, the prevalence of trachoma is extremely low, largely due to comprehensive sanitation, healthcare access, and public health interventions.⁵ In Africa Nigeria, has one of the highest burdens of trachoma globally, with prevalence rates varying across regions. In some areas, particularly in the northern states where environmental factors such as poor sanitation and

limited access to clean water are more prevalent, trachoma prevalence rates can be as high as 20% or more among children and adults.⁶

Sudan continues to face challenges in managing trachoma as observed in most endemic areas that are insecure or inaccessible during the rainy season, hindering preventive service provision. Trachoma continued as a public health problem in Ethiopia due to a lack of sanitation and inadequate prevention strategies. Despite the national Trachoma Action Plan for Ethiopia conducted in 2012 for elimination of trachoma as a public health problem through Surgery for Trichiasis, Antibiotics, Face washing, and Environmental improvement (SAFE) strategy.⁷

Trachoma prevalence in Kenya varies broadly from region to region (highest in arid areas of Rift Valley and Northeastern regions). Turkana County is one of the counties where trachoma is endemic. Factors influencing prevalence such as lack of or insufficient water and unhygienic practices, practice of keeping cattle within households and poor health seeking behaviors lead to high prevalence of trachoma in certain parts of Kenya compared to others.⁸

The multifaceted factors influencing prevalence trachoma demand a comprehensive approach involving improved sanitation, waste management, and meticulous hygiene practices to effectively combat this prevalent infectious disease. Pit latrines serve as crucial tools for eliminating human faeces from the environment, effectively curbing housefly proliferation and subsequently reducing trachoma transmission.⁹ Regular and consistent face washing emerges as a pivotal factor in reducing active trachoma.² This practice mitigates the transmission of the disease, primarily facilitated through infected secretions transferring from one child to another via face towels, hands, or flies.

Turkana County has for many years experienced high prevalence of trachoma. Due to several interventions from development partners, the prevalence of trachoma has significantly reduced. However, the prevalence in Turkana West Sub-County remains high at a score of 11.8%.¹⁰ The County Department of Health and Sanitation, in collaboration with a myriad of partners has enhanced its commitment to accelerating the reduction of the trachoma burden through the control, elimination, and eradication of targeted Neglected Tropical Diseases (NTDs). However, much need to be done. According to County Government of Turkana (2024), Turkana West Sub-County had a score of 11.8%, which is much higher than the World Health Organization (WHO) threshold. With such a prevalence (11.8%) trachoma has posed socio-economic problem which has affected quality of life amongst the populace in Turkana West Sub County. Community productivity has also been affected thereby endangering long term development in Turkana County. The prevalence of trachoma follicles should be below

5.5% for children aged one to nine years, while trichiasis is meant to be below 0.2%.⁴

Increase in trachoma is a public health problem; trachoma poses a public medical health concern given its risk to blindness among the population and specifically among children. Owing to this it places high cost to the schooling and the healthcare system. Kenya has made substantial progress towards elimination of trachoma as a public health problem. However, according to conducted trachoma impact survey in 2024, Turkana West had a score of 11.8% indicating persistent trachoma cases in the area. Persistent trachoma infections among children below nine years may lead to increased cases of visual impairment and blindness, poor school attendance and performance, reduced quality of life, and increased economic burden on families and the healthcare system, while also undermining efforts towards elimination of trachoma as a public health problem. Therefore, there is need to investigate hygiene-related factors influencing prevalence of Trachoma among children below nine years in Turkana West Sub-County, Turkana County, Kenya. The purpose of the study was to investigate the hygiene-related factors influencing prevalence of trachoma among children below nine years in Turkana West Sub-County, Turkana County, Kenya.

METHODS

The study employed a cross-sectional survey design to investigate the hygiene-related factors influencing prevalence of Trachoma among children below nine years in Turkana West Sub-County, Turkana County, Kenya. The design was suitable for the study since trachoma is a community health problem influenced by existing environmental and behavioral conditions, which do not require manipulation of variables but rather observation and measurement in their natural setting.

The study was conducted in wards in Turkana West Sub-County, Turkana County, Kenya because of high prevalence of trachoma among children. The target population will consist of 46,986 households in Turkana West sub-county, Turkana County (KNBS, 2019) as well as healthcare workers involved in trachoma prevention, treatment, and community health services within the sub-county. The accessible population was 23,493 pastoral household who were residing with the sub-county in the months of November to December (2024) when the field work for this research was conducted, together with 21 selected healthcare workers available in health facilities and community health units within the study area during the period of data collection.

Stratified random sampling was used to obtain the sample from different locations (strata) in the Sub-County. For uniformity purposes, proportionate stratified sampling method was used to ensure that all the administrative wards were represented in the study. Simple random sampling was used to select households from each

stratum. In addition, purposive sampling was used to select three healthcare workers from each of the seven wards based on their involvement in trachoma prevention, treatment, and community health services, totalling to 21 healthcare workers.

This study used World Health Organization guidelines along with study specific objectives to inform the inclusion and exclusion criteria of study participants. All households residing in Turkana West sub-county would be eligible for participation in the study. Households whose heads would fail to give informed consent for participation in this study would be excluded. In addition, healthcare workers involved in trachoma prevention, treatment, and community health services within Turkana West Sub-County were eligible to participate in the study. Healthcare workers who were unavailable during the period of data collection or declined to provide informed consent were excluded from the study.

Using Nassioma (2000) formula a sample of 223 households in Kaloboyei, Kakuma, Lopur, Letea, Lokichogio, Nanaam, and Songot wards in Turkana West Sub-County were selected. Primary data was collected using a semi-structured questionnaire to collect both quantitative and qualitative data. Semi-structured questionnaire was constructed based on the research objectives. The questionnaire was divided into five sections. The first section collected demographic information about the participants while other sections collected information related to the research questions under study. The interview schedules enabled the researcher to obtain in-depth information and professional opinions on hygiene-related, sanitation-related, and water-related factors influencing prevalence of trachoma among children below nine years.

With the recommendation of the Turkana University College Board of Postgraduate Studies (Graduate School), a license was acquired from the National Commission for Science, Technology and Innovation (NACOSTI). The Turkana West Sub-County department of public health was contacted to be informed of researcher's presence and to provide an introductory letter where possible. During the actual data collection, the researcher was helped with research assistants, introduce themselves to the respondents and explain the purpose of the study. The researcher went through the questionnaire together with the respondents to clarify issues that might not be clear. In addition, interview schedules were administered to selected healthcare workers involved in trachoma prevention, treatment, and community health services in the study area. The interviews enabled the researcher to obtain detailed information and professional opinions related to hygiene, sanitation, and water-related factors influencing prevalence of trachoma among children below nine years.

The researcher sought permits from the relevant authorities. Respondents in this study were informed

about the purpose and nature of the study, including its period, expected outcome, and confirmation that all information given will be confidential. Participation in the study was voluntary, and respondents were free to withdraw from the study at any stage without any penalty or negative consequences. Informed consent was obtained from all participants before data collection commenced. The researcher also ensured anonymity by not recording names or personal identifiers in the questionnaires and interview schedules. Permission to conduct the study was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) and relevant county and sub-county health authorities. In addition, the researcher ensured that the data collected was used strictly for academic purposes and stored securely to prevent unauthorized access. Respect, dignity, and privacy of the respondents were maintained throughout the study process.

RESULTS

Child diagnosed with trachoma

The study sought to find out children who had been diagnosed with trachoma. Figure 1 indicates that 19.4% of the children in Turkana West were diagnosed with trachoma, while 79.7% reported not having a child diagnosed with trachoma. This implies that cases of trachoma were high.

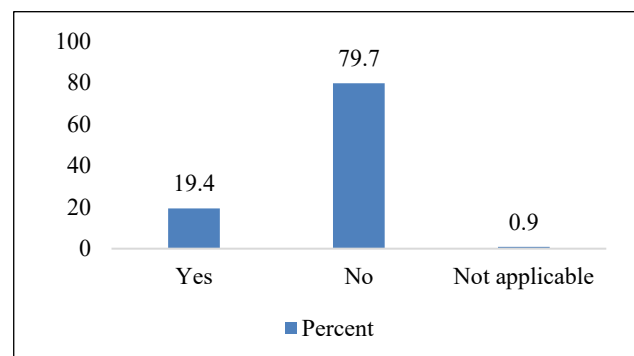


Figure 1: Child diagnosed with trachoma.

Hygiene-related factors influencing prevalence of trachoma

Table 1 presents hygiene-related factors influencing prevalence of trachoma. Seven items were investigated to give an overview of hygiene related factors that influence prevalence of trachoma among children aged 9 years and below. Table provides useful information such as 105 (47.3%) of the respondents agreed that there is presence of excess flies in the household living within the area. In addition, 11 (5%) of the respondents strongly agreed. On the other hand, 89 (40.1 %) of the respondents disagreed while 17 (7.7%) strongly disagreed. From the findings it can be argued that majority of the children aged below 9 years could be facing the threat of trachoma because of

the presence of excess flies. It is important to note that these flies are within the home environment such as the kitchen, playing grounds and home compounds therefore compounding the spread of trachoma among the 9 years old and below.

Item two sought findings on the presence of human faeces. Data shows that 145 (65.3%) of the respondents disagreed that there is presence of human faeces in the household compound while 26 (11.7%) strongly disagreed. On the contrary 48 (21.6%) agreed and 3

(1.4%) strongly agreed. This information suggests that majority of the respondents disagreed that there is presence of human faeces in the compound. This information implies that whereas this is good progress in terms of latrine construction thus no human faeces there still exists a small significant number of respondents who indicated otherwise. The few respondents who agreed that faeces exists in the compound brings to the fore the fact that faeces are a good predisposers of flies thus a likelihood of having trachoma among children in Turkana West.

Table 1: Hygiene-related factors influencing prevalence of trachoma.

Statements	SD, N (%)	D, N (%)	N, N (%)	A, N (%)	SA, N (%)
There is presence of excess flies in the household living area	17 (7.7)	89 (40.1)	0	105 (47.3)	11 (5)
There is presence of human faeces in the household compound	26 (11.7)	145 (65.3)	0	48 (21.6)	3 (1.4)
The household has a pit latrine/toilet	12 (5.4)	73 (32.9)	0	130 (58.6)	7 (3.2)
The status of the pit latrine/toilet is sympathetic	26 (11.7)	57 (25.7)	9 (4.1)	60 (27)	70 (31.5)
Children in the household share cloths such as towels or handkerchiefs	42 (18.9)	34 (15.3)	1 (0.5)	45 (20.3)	100 (45)
Children in the household wash their faces every morning	5 (2.3)	169 (76)	7 (3.2)	34 (15.3)	7 (3.2)
We can observe anything like flies, nasal discharge, food on faces, and dust among the children of the sampled household	6 (2.7)	59 (26.6)	1 (0.5)	148 (66.7)	7 (3.2)

This data was qualified with data from the Public Health Officer (PHO) whose excerpt was presented below.

“In areas where disposal of waste is poor as a result of limited latrines possibilities of having flies essentially becomes high. As a result of these children’s especially below the age of 9 years who customarily like playing from one homestead to the other will automatically be affected. This exposure will be made even worse because flies will move from one point to the other.”

This response shows that environmental management is critical in the transmission of trachoma within the community. The findings corroborates with the quantitative data that a small proportion of the respondents homes had human faeces confirming presence of poor disposal of human waste.

Item three of the hygiene factors indicated that 130 (58.6%) of the respondents agreed that the household had a pit latrine/toilet. Another 7 (3.2%) strongly agreed. On the other hand, 12 (5.4%) and 73 (32.9%) strongly disagreed and disagreed respectively implying to a lack of a pit latrine. This information confirms the earlier findings on the presence of human. The findings indicated that the human faeces were very small thus implying that latrines could be many. This is true given that majority of the respondents affirmed that there was enough latrine

within the homesteads. However, the current study is still oblivious of the few respondents who indicated that there were very few latrines. This could be a panacea to presence of flies resulting from the open defecation practice that will lead to presence of flies.

The fourth sub variable looked at the status of the pit latrine/ toilets. From the data gathered 26 (11.7%) strongly disagreed, 57 (25.7%) disagreed, 60 (27%) agreed while 70 (31.5%) strongly agreed on the status of the latrines being pathetic. This information gives a mixed reaction with majority of the respondents agreeing that the latrines were pathetic, though few the number disagreeing is substantive implying that quite a good number of homesteads had latrines which are pathetic. This data provides useful information such as the latrines may be almost filled up or maybe the latrines are not well cleaned with soap and water. Such circumstances may lead to high presence of flies

These findings are in line with the health seeking behaviour which propose that sanitation infrastructure is crucial in terms of mitigating presence of flies. It is important to note that the theory further postulates that presence of the latrines is not sufficient but also the perception of the use. It states that the toilets may be there but the willingness to use them may not be there. Thus, the need to have the infrastructure and use it.

Qualitative data from the interview from the Community Health Promoter 1 stated the following in the excerpt;

“In deed many families had pit latrines though the latrines were poorly maintained. This makes the latrine very dirty and unsafe for children to use. Very importantly is that whenever the latrines are dirty people tend to use open defecation thus escalating the breeding of flies. This will in the long run lead to spread of trachoma in the community.”

This response underscores the importance of properly maintaining the latrines for them to act as preventive measure as compared to having latrines and they are not well maintained.

Item five indicates Another important behavioural factor identified was the sharing of cloth items such as towels and handkerchiefs among children. A combined 65.3% of respondents acknowledged this practice. Sharing such personal items can facilitate the spread of trachoma through the transfer of infectious ocular secretions, indicating a notable behavioral risk factor within households. Studies indicate that, one of the major transmission routes of trachoma is secretions from an infected child's eyes to another person's eyes, either via hands, cloths such as towels or handkerchiefs, or via flies. Frequent face washing possibly also reduces chances of automatic re-infection. Hygiene promotion for face washing, as well as for improved excreta disposal and environmental sanitation, can have positive effects.

Concerning facial hygiene, the results were particularly alarming. A vast majority (76%) of respondents disagreed that children in their households wash their faces every morning. Only 18.5% either agreed or strongly agreed with the statement. This point to a significant gap in daily hygiene practices. Clean faces are crucial in reducing the presence of ocular discharge, which attracts flies and harbours bacteria. The lack of regular face washing is therefore a critical contributor to the continued transmission of trachoma. The Health Seeking Behaviour (HSB) Theory supports this finding by explaining that daily facial hygiene practices among children are influenced by caregivers' perceptions, awareness, and prioritization of preventive health actions. In this context, the low rate of face washing suggests that caregivers may have limited risk perception of trachoma transmission or are constrained by factors such as water scarcity and competing household needs, leading to poor adoption of recommended hygiene practices. The theory further posits that when preventive behaviours like face washing are not perceived as necessary or feasible, the likelihood of infection and reinfection increases, thereby sustaining the transmission cycle of trachoma within households and the wider community.

Lastly, the findings presented showed that 148 (66.7%) of the respondents can observe anything like flies, nasal discharge, food on faces, and dust among the children of

the sampled household, 7 (3.2%) strongly agreed while 59 (26.6%) disagreed and 6 (2.7%) strongly disagreed. This interpretation shows that majority of the families were able to observe flies, nasal discharge food and dust implying that facial hygiene was a challenge amongst families leading to transmission and high cases of trachoma in Turkana west.

In summary, the data illustrate that poor hygiene practices and inadequate environmental sanitation significantly contribute to the high risk of trachoma among children in Turkana West Sub-County. Key risk factors include the lack of regular face washing, sharing of personal items, and presence of flies, household waste, and poor toilet conditions or complete absence of sanitation facilities.

DISCUSSION

It is important to note that these flies are within the home environment such as the kitchen, playing grounds and home compounds therefore compounding the spread of tytrachoma among the 9 years old and below. Related study indicated that *Chlamydia trachomatis* very critical in the spread of trachoma. In this study the author claims that households that are within flies infested zones stand a high chance of having high infections.¹¹

Studies indicate that poor access to an improved sanitation infrastructure will lead to an increased breeding of flies that will eventually lead to transmission of trachoma.¹² The author further confirmed that high exposure is likely to be witnessed where toilets were lacking. Literature indicates that face washing obviously has no effect on the course of an episode of infection but may reduce the likelihood of auto-reinfection or transmission of infection to others. Several studies have found that mothers of children with trachoma are more likely themselves to have active disease compared with women who either did not take care of children or whose children did not have trachoma.¹³ Flies seeking moisture and protein, which may be physical vectors of infection, are liable to be less attracted to clean faces than to faces with ocular and nasal secretions.¹⁴

These findings underscore the urgent need for targeted hygiene promotion, improved sanitation infrastructure, and community-based interventions to reduce the burden of trachoma in the region. This finding is similar to what MOH, AMREF and SSI described as that hygiene is associated with presence and absence of flies and by extension with trachoma infection. Research done by MOH, AMREF and SSI found an association between fly density in the household or the presence of flies on children's faces and the presence/severity of trachoma.¹⁵

CONCLUSION

In conclusion some sampled respondents assumed that the research was aimed at funding their health promotion goals, something that potentially influenced the quality of

data in this study. Some respondents were also unwilling to provide accurate information due to fear, suspicion, or lack of adequate understanding of the study objectives. To address this challenge, the researcher obtained informed consent, maintained confidentiality and anonymity of the respondents, and used simple language that was understandable to the local community.

The investigation into hygiene-related factors influencing trachoma prevalence among children below nine years in Turkana West Sub-County reveals that poor hygiene practices and inadequate sanitation infrastructure significantly contribute to the persistence of the disease. The presence of excess flies 47.3%, limited access to clean and well-maintained latrines 31.5%, and the sharing of personal hygiene items 45%, create an environment that facilitates the transmission of *Chlamydia trachomatis*.

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