Research Article

2021; Issue 5
ISSN 2591 – 6769

East African Journal of Applied Health Monitoring and Evaluation

FACTORS PREDISPOSING CHILDREN AGED 0-9 YEARS TO TRACHOMA IN KIRINDON DIVISION, TRANS MARA SUB-COUNTY, KENYA

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Introduction
Trachoma is an infectious disease caused by the bacterium *Chlamydia trachomatis*, and it is more prevalent among young children, aged 9 years or below the age. Trachoma accounts for more than 1.4% of the world's blindness, and more than half of African countries are estimated to be, or to have been endemic. In Kenya, trachoma causes 16% of all blindness, and it is endemic in Trans Mara sub-county, which has a prevalence rate of 11%. The study sought to address the socio-demographic, and environmental factors that predispose children aged 0-9 years to trachoma infection, in Kirindon division, Trans Mara sub-county.

Methods
A community based cross-sectional study was carried out from March to April 2016. Cluster sampling and simple random sampling were done at household and at individual levels respectively. Structured questionnaires were administered to 158 households whereby a parent was interviewed and a child was observed.

Results
The study response rate was at 99.4%. Trachoma prevalence was at 27% (males = 34%; females = 19%, p = 0.04) from the 157 households sampled. The independent factors for trachoma infection included latrine distance of more than 10 meters (OR = 0.11, p = 0.006); hand washing with soap (OR = 0.18, p=0.034); no face washing (OR = 15.86, p = 0.008); and fetching water for less than 15 minutes (OR = 0.03, p=0.001).

Conclusion
Based on the poor personal and environmental hygiene, there is need to improve awareness of personal and environmental hygiene, not only that, but also providing health education on trachoma transmission and prevention strategies.

Keywords: *Chlamydia trachomatis, Trachoma, Blindness, Hygiene*

INTRODUCTION

Trachoma is a bacterial infection of human eyes. It is caused by Chlamydia Trachomatis, which is a gram-negative, coccoid bacterium that typically infects columnar epithelial cells causing the inner surfaces of the eyelids to turn outwards and in rough appearance. It is transmitted through physical or close facial contact, hand-to-eye contact, via fomites (towels, clothing and bedding). It can also be transmitted mechanically by flies. It occurs mostly in dry, and dusty environments. Further, it has been linked to poor sanitation and hygiene. Other factors attributed to the disease include overcrowded households, limited water supply for bathing and general hygiene, poor waste disposal systems, and fly-prone places (Bailey & Lietman, 2001; Karimurio *et al*., 2006; Haddad, 2012; WHO, 2017).

The World Health Organisation (WHO) reports that trachoma is responsible for 1.4% of the world's blindness (WHO, 2017). Trachoma epidemic worldwide has largely disappeared in developed countries i.e., in Europe and North America. However, it is still endemic in some continents with developing countries, namely Africa, some parts of Asia, and Western Pacific (Karimurio *et al*., 2006). The World Health Assembly adopted the WHA51.11 resolution in 1998 targeting worldwide elimination of trachoma as a public health concern. This is because it is a cause of irreversible blindness. The elimination of trachoma has been defined as having a prevalence of less than 0.2% in adults aged over 15 years, and prevalence of less than 5% in children aged 0-9 years. The elimination of trachoma was expected to be achieved by 2020 in countries where it is endemic (WHO,

2017).

The WHO has listed 27 African countries that trachoma is known to be a public health concern (WHO, 2017). It is estimated that 25% of people living in endemic areas such as Africa, Middle East, Latin America and the Western Pacific suffer from trachoma infection (Haddad, 2012). The highest prevalence of trachoma in Africa is found at Sahel in West Africa and Savannah in East and Central Africa (Smith *et al.*, 2013).

Kenya is one of the countries greatly affected by trachoma infection as indicated by studies done in Samburu and Narok in Kenya (Karimurio, *et al.*, 2006; Karimurio, *et al.*, 2013; Ng'ang'a, *et al.*, 2015). A study done in Samburu found the prevalence of active trachoma to be at 23.8% (Ng'ang'a, *et al.*, 2015). The former Narok district had a prevalence of trachoma infection reduced from 30.5% in 2004 to 11.0% in 2010. In addition, the former Trans Mara district had a prevalence of 10.6% in 2014 after interventions of environmental improvement in the region (Karamurio *et al.*, 2013). However, the rates are still higher than the targeted prevalence of 5% and thus the study had to determine the current prevalence rate of trachoma.

Trans Mara sub-County is found in Narok County in the former Rift-Valley Province of Kenya, and mainly nomadic Maasai communities who keep livestock inhabit it. It lies within the trachoma belt of Africa and thus necessitated the need to determine the factors that predispose children aged 0-9 years to Trachoma. Thus, making the elimination of the disease a major challenge.

METHODS

Study design and setting

This was a cross-sectional study conducted in 2016 at Kirindon division located in Trans Mara sub-county. The study area (Kirindon division) is in the southern area of the former Rift Valley Province, and it forms part of the Arid and Semi-Arid lands of Kenya (Figure 1). The entire Sub-County has a population of 170,591 people, with 34,860 households (KNBS, 2009). Kirindon division is a rural area that predominantly consists of two ethnic communities, namely the Kipsigis and the Maasai. The community largely practices nomadic pastoralism, which doubles up as their primary source of income. The sample frame was based on the households at Kirindon division**.**

Study participants

The study population comprised adults who were parents/caretakers to children aged 0-9 years. That is to say the adults who had one of their children aged 0-9 years who was living in that household at the time of this study. The parents/caretakers were interviewed to get the general behavioral characteristics of their children. An observation checklist was used to collect data from the children at the time of interview.

Sampling

A two-stage sampling process was employed by the study. The first stage involved sampling of the clusters. The second stage involved the sampling of the households. The households were selected using a cluster sampling technique. Simple random samples of four proportionate clusters, that could achieve the desired samples size were selected. The clusters were selected from the population from which the study households were drawn. The study sample size was calculated based on Fisher's formula accounting for the prevalence rate of Trachoma infection of 11%. Finite population correction and attrition rate of 5% was used to adjust the study sample size. Due to the homogeneity of the population, a design effect of one was considered. This led to a sample size of 158 households**.**

Measurements

The main measurements were the participant's socio-demographic, household and environmental factors predisposing children aged 0-9 years to trachoma. The measurements were collected using a structured questionnaire. The questionnaire was used to collect data from parents/caretakers. Observation checklist was used to collect data from children and the household environment. The observation checklist measured variables such as a child having a clean face, presence of flies on a child's face, place of solid waste disposal, and distance of latrine from the household. The questionnaires were pretested among 16 (10% of the calculated sample size of 157) households of the neighboring sub county. Reliability tests were done to improve the questionnaire. Trained research assistants administered, and completed the study questionnaires. The data were collected for a period of four weeks in between the months of March and April 2016.

Data analysis

Data analysis was aided by Stata software version 12.0 for Windows at the descriptive, bivariate and multivariate levels. Descriptive statistics was used to analyse parent and child characteristics. In this regard, frequencies and percentages were reported for categorical data. As such, prevalence of trachoma infection was presented in frequencies and percentages for socio-demographic and household environmental characteristics. Chi-square test was used to determine if there was significant difference in prevalence between male and female children. Bivariate logistic regression was used to check for relationship between trachoma infection and the socio-demographic and the household environmental characteristics. Variables that had a $p < 0.20$ were fit in the final multivariate logistic regression. Associations were reported in terms of Odds Ratios (OR) with their 95% confidence interval (CI). Statistical significance was considered at $p < 0.05$.

Ethical considerations

All participants were required to undergo a standard informed consent procedure. Approval for scientific and ethical issues was sought from the Maseno University Ethics and Review Committee with reference number MSU/DRPI/MUERC/00292/16. Permission was also sought at the County Director of Health and the District Public Health Office (DPHO) at Trans Mara.

RESULTS

Socio-demographic characteristics of study participants

The study interviewed 157 participants of whom 123(78.4%) were females, and 34(21.7%) were males. Majority of the participants were aged between 20 to 29 years, 68 (43.3%) and 30 to 39 years 61(38.9%). More than two-thirds of the participants were married 134 (85.4%) and reported as being farmers as their occupation 108 (68.8%). Majority of the parents had primary education 109 (68.8%) followed by university education 35 (22.4%). Parents who earned less than Kenya shillings 3000 comprised 31 (19.8%), 20 (12.7%) had an income of between Kenya shillings 60001 - 9000. The study also found that household sizes ranged from 3-5 persons, 6-8 persons and more than nine persons had a representation of 29.3%, 35.7% and 31.2%, respectively. Lastly, it was found that 96 (61.2%) of adults owned 1 - 5 livestock, 13(8.3%) owned 6 - 10 livestock, and 34 (21.7%) owned no livestock (Table 1).

Table 1: Participants Socio Demographic Characteristics in Kirindon Division

Variable	Frequency	Percentage
Adults		
Sex		
Females	123	78.34
Males	34	21.66
Age (Years)		
15-19	7	4.46
20-29	68	43.31
30-39	61	38.85
40-49	21	13.38
Education Level		
Primary	108	68.79
None	10	6.37
Secondary	3	1.91
Middle level	1	0.64
University	35	22.29
Marital Status		
Married	134	85.35
Divorced	2	1.27
Single	12	7.64
Separated	3	1.91
Widowed	6	3.82
Occupation		
Farmer	108	68.79
Government Employee	8	5.1
Trader	22	14.01
Other	18	11.46
None	1	0.64
Household size		
1-3	6	3.82
3-4	46	29.3
6-8	56	35.67
9+	49	31.21
Monthly Income (KES)		
<3000	31	19.75
3000-6000	84	53.5
6001-9000	20	12.74
9001 - 12000	12	7.64
12001-15000	3	1.91
15001 +	7	4.46
Number of livestock owned		
1-3	96	61.15
6-10	13	8.28
>10	14	8 .92
None	34	21.66
Children		
Sex		
Male	85	54.14
Female	72	45.86
Age (Years)		
0-3	35	22.29
4 -6	80	50.96
7-9	42	26.75
Frequency of bathing		
Always/daily	108	68.79
Sometimes	49	31.21
Soap usage for face		
Yes	126	80.25
No	31	19.75
Frequency of washing face (n=149)		
More than once a day	138	92.62
Once a day	11	7.38
Has a clean face		
Yes	103	65.61
No	54	34.31
Has flies on the face		
No	25	15.92
Yes	132	84.08

Socio-demographic characteristics of study participants – Children

There were 85 (54.1%) male children and 72(45.9%) female children in sampled households. One-half of the participants,

80 (51.0%), were aged between 4 - 6 years, and more than two-thirds, 108(68.8%), of the children always bathed often. Almost all the children, 138(92.6%), washed their faces more than once a day; however, 126 (80.3%) of the children reported not using soap while washing their faces. The study also observed that 103(65.6%) of children had a clean face, and 132(84.1%) of children had flies on their face (Table 1).

Environmental characteristics of study participants

More than half of the participants 83(52.9%) fetched water from rivers, and 85(54.1%) filtered their water. It was observed that 66(42.0%) of the participants and 60(38.2%) of the same took more than 30 minutes to filter it (water) and 15-30 minutes to fetch water. More than half of the participants 66(42.0%) disposed solid wastes in a pit while 42(26.8%) disposed it openly. Lastly, majority of participants reported not washing their hands after long call 79 (50.3%), 34 (21.7%) use water only and 44(28.0%) use water and soap (Table 2)

Table 2: Participants Household and Environmental Characteristics in Kirindon Division

Variable	Frequency(n=157)	Percentage
Source of water		
River	83	52.87
Water tap	22	14.01
Rainwater	6	3.82
Shallow well	31	19.75
Borehole	15	9.55
How do you treat water		
Boiling	26	16.56
No treatment	42	26.75
Water guard/Chlorine	4	2.55
Filtering	85	54.14
Quantity of water used per day		
< 40 litres	23	14.65
40-80 litres	122	77.71
> 80 litres	12	7.64
Time taken to fetch water		
> 30 minutes	66	42.04
15 -30 minutes	60	38.22
> 15 minutes	31	19.75
How do you dispose solid waste		
Open field disposal	42	26.75
In a pit	25	15.92
Common pit	64	40.76
Composting	2	1.27
Burning	24	15.29
Place of long calls		
Open field	14	8.92
Sanitary latrine	143	91.08
Distance from latrine		
< 10 metres	106	67.52
> 10 metres	51	32.48
How you clean hands after long call		
Water only	34	21.66
Don't wash at all	79	50.32
Water and soap	44	28.03

Prevalence and factors associated with Trachoma infection

The overall prevalence of trachoma was represented by 43(27.4%), and it was more prevalent amongst males 29(67.4%), p = 0.040. The variables that were fit in the model were child sex, child age, bath frequency, soap usage for face, frequency of washing face, has clean face, has flies on the face, source if water and time taken to fetch water from Table 3.

Table 3: Prevalence and Factors Associated with Trachoma Infection in Kirindon Division

Variable	Trachoma			
	No n (%)	Yes n (%)	unadjusted OR (95% CI)	p value
Socio-Demographic Factors				
Age (Years)				0.4218
15-19	6 (85.71)	1(14.29)	*ref.*	
20-29	45 (66.18)	23(33.82)	3.07(0.35-27.01)	0.313
30-39	47 (77.05)	14(22.95)	1.79(0.20-16.12)	0.605
40-49	16 (76.19)	5(23.81)	1.88(0.18-19.53)	0.599
Child Sex				**0.0381**
Male	56 (65.88)	29(34.12)	*ref.*	
Female	58 (80.56)	14(19.44)	0.47(0.22-0.97)	**0.042**
Child Age (Years)				0.0747
1-3	20 (57.14)	15(42.86)	*ref.*	
4-6	61 (76.25)	19(23.75)	0.42(0.18-0.97)	**0.042**
7-8	33 (78.57)	9(21.43)	0.36(0.13-0.98)	**0.046**
Household size				0.241
1-3	3 (50.00)	3(50.00)	*ref.*	
4-6	31 (67.39)	15(32.61)	0.48(0.09-2.69)	0.407
6-8	40 (81.43)	16(28.57)	0.40(0.07-2.19)	0.291
9+	40 (81.63)	9(18.37)	0.23(0.04-1.30)	0.096
Frequency of bath				**0.0307**
Always/daily	41 (83.67)	8 (16.33)	*ref.*	

Sometimes	73 (67.59)	35 (32.41)	2.46(1.04-5.80)	**0.04**
Soap usage for face				**0.0049**
Yes	98 (77.78)	28(22.22)	*ref.*	
No	16 (51.61)	15(48.39)	3.28(1.11-7.45)	**0.005**
Frequency of face washing				0.506
More than once a day	101 (73.19)	37(26.81)	*ref.*	
Once a day	7 (63.64)	4(36.36)	1.56(0.43-5.64)	0.498
Has a clean face				**0.0023**
Yes	83 (80.58)	20(19.42)	*ref.*	
No	31 (57.41)	23(42.59)	3.08(1.49-6.37)	**0.002**
Has flies on the face				**<0.0001**
No	105 (79.55)	27(20.45)	*ref.*	**<0.0001**
Yes	9 (36.00)	16(64.00)	6.91(2.76-17.34)	
Household and Environmental Factors				
Source of water				**0.042**
River	53 (63.86)	30(36.14)	*ref.*	
Water tap	20 (90.91)	2(9.09)	0.18(0.04-0.81)	**0.025**
Rainwater	4 (66.67)	2(33.33)	0.88(0.15-5.11)	0.89
Shallow well	26 (83.87)	5(16.13)	0.34(0.12-0.98)	**0.045**
Borehole	11 (73.33)	4(26.67)	0.64(0.18-2.20)	0.48
How do you treat water				**0.033**
Boiling	19 (73.08)	7(26.92)	*ref.*	
No treatment	37 (88.10)	5(11.90)	0.37(0.10-1.31)	0.123
Water guard/Chlorine	2 (50.00)	2(50.00)	2.71(0.32-23.14)	0.361
Filtering	56 (65.88)	29(34.12)	1.41(0.53-3.73)	0.494
Quantity of water used per day				0.1907
< 40 litres	20 (86.96)	3(13.04)	*ref.*	
40-80 litres	85 (69.67)	37(30.33)	2.90(0.81-10.36)	0.101
> 80 litres	9 (75.00)	3(25.00)	2.22(0.37-13.22)	0.38
Time taken to fetch water				0.0051
>30 minutes	45 (68.18)	21(31.82)	*ref.*	
15 -30 minutes	40 (66.67)	20(33.33)	1.07(0.508-2.26)	0.856
< 15 minutes	29 (93.55)	2(6.45)	0.15(0.03-0.68)	**0.014**
Distance from latrine				**0.003**
< 10 metres	68 (64.15)	38(35.85)	*ref.*	
> 10 metres	46 (90.20)	5(9.80)	0.19(0.07-0.53)	**0.001**
How you clean hands after long call				**<0.0001**
Water only	25 (73.53)	9(26.47)	*ref.*	
Water and Soap	70 (88.61)	9(11.39)	0.36(0.12-1.00)	0.05
Don't wash at all	19 (43.18)	25(56.82)	3.65(1.39-9.62)	**0.009**

Those who had a latrine more than 10 metres away (OR = 0.11, 95%CI [0.02-0.53], p = 0.006) and who cleaned their hands with water (OR =0.18, 95%CI [0.04-0.88], p = 0.034) were less likely to have trachoma infection. Children who did not wash their hands at all (OR = 5.40, 95%CI [1.12-25.95], p =0.036), and children who did not wash their face using soap and water (OR = 15.86, 95%CI [2.05-122.74], p = 0.008) were more likely to have trachoma infection. Individuals whose households took more than 30 minutes to fetch water (OR = 0.03(0.01-0.66], p = 0.027), and those fetched water from a shallow well (OR =0.01, 95%CI [0.00-0.11], p = 0.001) were less likely to have trachoma infection than those who fetched water from a river (Table 4).

Table 4: Independent Factors Associated with Trachoma Infection

Characteristic	adjusted OR (95%CI)	p value
Child Sex		
Male	*ref.*	
Female	0.43(0.11-1.67)	0.226
Child Age (Years)		
0-3	*ref.*	
4-6	0.54(0.07-4.21)	0.553
7-9	1.06(0.11-10.58)	0.926
Frequency of bath		
Always/daily	*ref.*	
Sometimes	1.20(0.26-5.67)	0.816
Soap usage for face		
Yes	*ref.*	
No	15.86(2.05-122.74)	**0.008**
Frequency of face washing		
More than once a day	*ref.*	
Once a day	0.14(0.01-1.54)	0.109
Has a clean face		
Yes	*ref.*	
No	2.89(0.78-10.76)	0.114
Has flies on the face		
No	*ref.*	
Yes	1.04(0.23-4.66)	0.953
Distance from latrine		
< 10 metres	*ref.*	

> 10 metres	0.11(0.02-0.53)	**0.006**
How you clean hands after long call		
Water only	*ref.*	
Water and Soap	0.18(0.04-0.88)	**0.034**
Don't wash at all	5.40(1.12-25.95)	**0.036**
Time taken to fetch water		
> 30 minutes	*ref.*	
15 -30 minutes	0.20(0.04-1.08)	0.062
< 15 minutes	0.03(0.01-0.66)	**0.027**
Source of water		
River	*ref.*	
Water tap	0.06(0.01-1.08)	0.057
Rainwater	0.30(0.01-11.53)	0.515
Shallow well	0.01(0.00-0.11)	**0.001**
Borehole	6.19(0.16-238.69)	0.328

DISCUSSION

Ng'ang'a, *et al*., (2015) found the prevalence of active trachoma to be at 23.8% in Samburu which corroborates the current study findings (Ng'ang'a, *et al*., 2015). The study findings are also consistent with findings from studies conducted in Tanzania and Ethiopia (Mahande, *et al.,* 2012; Metadel, *et al*., 2015; Mengistu, *et al*., 2016). However, the current study prevalence is lower than that of South Sudan, which was reported to be at 71% (Edwards, *et al*., 2012). This further confirms that trachoma is still a concern among diseases of public health interest.

Males were found to have a higher prevalence of trachoma than females. This can be explained due to the boy child being active in domestic activities, more playful and taking care of livestock. Similar findings were observed in a study done in Kajiado where the prevalence in boys (32%) was higher than girls (24%). However, the current study findings contradict that done in Samburu whereby the females were disproportionately affected relative to males at 24.9% to 19.6% (Ng'ang'a, *et al*., 2015).

The study found that children who had flies in their faces were significantly associated with trachoma as they were more than 6 times likely to have trachoma infection compared to children who did not have flies. Flies are mechanical vectors of diseases as they pick up pathogens from infectious materials, and transfer them to an uninfected host. Thus, presence of flies on the face of children made them prone to trachoma infection. The study findings were similar to findings from a study done in Zale district, Ethiopia which reported that the odds for trachoma as 6.2 for children observed with flies on their faces (Mengistu, *et al*., 2016).

A study done in Tanzania also found having flies on the face increased the likelihood of trachoma infection (Harding-Esch, *et al*., 2010). The study findings are also comparable to other studies conducted in sub-Saharan Africa (Mahande, *et al.,* 2012; Metadel, *et al*., 2015; Mengistu, *et al*., 2016). However, the study findings contradict results from a study done in Samburu (Ng'ang'a, *et al*., 2015) and this can be explained as was because of the intervention methods that were in place and practiced at the time their study.

How frequently a child washes the face was found to be significantly associated with trachoma infection. In addition, significant association was observed among children who used soap to wash their face as they were less likely to contract trachoma. The study findings are in line with a similar study done in Samburu, Kenya (Ng'ang'a, *et al*., 2015). This can be argued that using soap clears most of the germs; thus, less eye discharge and less flies on the face.

Facial cleanliness was significantly associated with trachoma infection. This means that children who had clean faces were less likely to be infected with trachoma. Poor facial hygiene has been found to result in the spread of the disease. The disease passes from one who has contracted it to a person who is uninfected. The contraction occurs through flies. Children who were observed having unclean faces were three times more likely to contract trachoma. The findings are in line with studies done in Ethiopia (Metadel, *et al*., 2015; Mengistu, *et al*., 2016), Tanzania (Harding-Esch, *et al*., 2010) and southern Sudan (Edwards, *et al*., 2012). This can be connected to trachoma transmission because mostly unclean faces have eye discharge; thus, attracting flies which are vectors of trachoma.

Independent determinants of trachoma infection were usage of soap, washing the face and hand washing. In any case, cleaning the face using soap was found to be a predictor of trachoma infection. Children who did not use soap were fifteen times more likely to have trachoma infection. A study done in in Baso Liben District of East Gojjam, Ethiopia found that children who did not use soap were 5.84 times more likely to be associated with trachoma infection (Ketema, *et al*., 2012). Washing hands with soap is one of the best ways of controlling the spread of trachoma because it removes germs.

The way children washed their hands was also found to be a significant predictor of trachoma infection. Children who washed their hands with soap and water were less likely to be associated with trachoma infection compared to those who washed with water. In addition, children who did not clean their hands after a long call were five times more likely to be associated with trachoma infection. Comparable findings are reported by a study done in Samburu, Kenya, (Ng'ang'a, *et al.,* 2015).

This study found that distance from the latrine was significantly associated with trachoma. Respondents whose latrines distance was less than ten metres were five times likely to have trachoma than those whose latrines were more than 10 metres. This is attributable because a shorter latrine distance from the main house exposes the children to flies. Thus, making them highly susceptible to trachoma infection. Similar findings were observed in studies done in Ethiopia (Mengistu, *et al*., 2016) and Gambia (Harding-Esch, *et al*., 2010).

Hand washing after a long call was found to be associated with trachoma infection. This corroborates findings from a study done in Samburu, Kenya, (Ng'ang'a, *et al*., 2015). Source of water was also found to be significantly associated

with trachoma as those who fetched water from water taps and wells were less likely to be associated with trachoma. In addition, the study also found statistical significance on the time to fetch water. Respondents who fetched water for a distance of less than 15 minutes were found to be less likely to be associated with trachoma. The study findings are similar with studies in Tanzania and Ethipoia that found participants who walked for more than thirty minutes were more likely to be associated with trachoma infection (Baggaley, *et al*., 2006; Golovaty, *et al*., 2009; Mengistu, *et al*., 2016).

The daily consumption of water was found not to be of statistical significance. This is attributable because several other factors like using soap or frequency of bathing and washing of hands have association with trachoma infection. Lack of an association has also been reported in a study conducted in two countries: Gambia and Tanzania (Harding-Esch, *et al*., 2010). Furthermore, no statistically significant association was observed from the way the water was treated.

Statistically significant association was not observed between the household size and trachoma infection. However, a study conducted in Tanzania (Harding-Esch, *et al*., 2010), found that trachoma was associated with an increase in the number of people in a household. Although the number of children per household usually is used as a marker for crowding, it does not necessitate correlation. There is therefore a need to define the household physical space since it would not be possible to decipher whether the numbers of people per household truly defines crowding.

Distance from latrine and time taken to fetch water were found to be significant predictors that influenced trachoma infection. The distance from the latrine was also found to be a significant predictor. Children in households whose latrine distance from the house was more than 10 meters were less likely to be associated with trachoma infection. Similar findings have been reported by studies done in Gambia and Ethiopia (Harding-Esch, *et al*., 2010; Ashebir, *et al*., 2013; Mengistu, *et al*., 2016). This can be explained as the reduction of house-latrine distance exposed the children frequently to the flies that make them get infected with trachoma. However, a study done in Tanzania (Harding-Esch, *et al*., 2010) found no significant association.

Time taken to fetch water was also a significant predictor of trachoma infection. Children whose households had a walking distance of less than 15 minutes were less likely to be associated with trachoma infection. These findings are comparabe with study findings reported in Tanzania (Baggaley, *et al*., 2006) and Ethiopia (Golovaty, *et al*., 2009; Mengistu, *et al*., 2016) that found participants who walked for more than thirty minutes were more likely to be associated with trachoma infection.

STUDY LIMITATIONS

The study results were self-reported and might have been subjected to response and recall bias for the personal hygiene questions.

CONCLUSION

High prevalence of trachoma is reported in the study area and is likely to be associated with personal and environmental hygiene. Person and environmental hygiene predispose children to likelihood of having trachoma infection. Socio-demographic and household environmental factors, which include being a male child, less bath frequency, source of water from river, less than 10 meters distance of latrine from the house, presence of flies in the face are associated with prevalence of trachoma.

RECOMMENDATION

The high prevalence of trachoma in the study region calls for development of a comprehensive programme that encompasses all the four elements of SAFE strategy for trachoma control and elimination needs to be implemented. This will in turn improve not only the community's personal hygiene, but also the environmental hygiene.

ACKNOWLEDGEMENTS

The authors are grateful to the County director of health, the County public health officer, the chief and assistant chief of Trans Mara sub-County who permitted the study to be conducted in their area of jurisdiction. The authors are also grateful to the study participants and the research assistants who conducted the study diligently.

AUTHORS' CONTRIBUTIONS

Adogo Celestine designed, collected and authored the manuscript, Dr. Othero Doreen assisted in the design, authorship and interpretation of the results, and Humwa Felix did the cleaning and statistical analysis. All authors critically reviewed and revised the manuscript.

CONFLICT OF INTEREST

The authors declare that they have no competing interest

REFERENCES

Ashebir, Y., Rai-Sharma, H., Alemu, K. & Kebede, G., 2013. Latrine use among rural households in northern Ethiopia: a case study in Hawzien district, Tigray.. *Int J Environ Stud.,* 70(4), pp. 629-636.

Baggaley, R. *et al.,* 2006. Distance to water source and land in relation to active trachoma in Rombo District Tanzania.. *Trop Med Int Health.,* Volume 11, p. 220–227.

Bailey, R. & Lietman, T., 2001. "The safe strategy for the elimination of trachoma by 2020: will it work?". *Bulletin of the World Health Organization,* 79(3), pp. 233-236.

Edwards, T., Smith, J. & Sturrock, H., 2012. Prevalence of trachoma in Unity State, South Sudan: results from a large-scale population-based survey and potential implications for further surveys.. 6(4).

Figueroa, M. & Kincaid, D., 2010. Social, Cultural and Behavioral Correlates of Household Water Treatment and storage. Center Publication HCI 2010-1: Health Communication Insights, Baltimore.. *Johns Hopkins Bloomberg School of Public Health.*

Golovaty, I., Jones, L., Gelaye, B. & Tilahun, M., 2009. Access to water source, latrine facilities and other risk factors of active trachoma in ankober.. *PLoS One,* Volume 4.

Haddad, D., 2012. The end game for blinding trachoma. *World Ophthalmology News.*

Hagi, M. *et al.*, 2010. Active Trachoma among Children in Mali: Clustering and Enviromental Risk Factors. *PLoS.*

Harding-Esch, E. *et al.*, 2010. rachoma prevalence and associated risk factors in the Gambia and Tanzania: baseline results of a cluster randomised controlled trial. *PLoS Negl Trop Dis,* Volume 4.

Jackson, S., 2011. Research Methods and Statistics: A Critical Approach 4th Edition. *Cengage Learning.*

Karimurio, J. *et al.*, 2006. Prevalence of trachoma in six districts of Kenya. *East African Medical Journal,* 83(4), pp. 63-68.

Karimurio, J., Ilako, F. & Gichangi, M., 2007. Prevalence of active and potentially blinding trachoma in Laikipia district, Kenya.. *East Afr J Ophthalmol,* 13(3), pp. 39-42.

Karimurio, J. *et al.*, 2013. Epidemiological assessment of a large geographical area with clustered trachoma: The Upper Eastern Kenya survey.. *J Ophthalmol East Cent & S.Afr,* 17(1), pp. 31-36.

Ketema, K., Tiruneh, M., Woldeyohannes, D. & Muluye, D., 2012. Active trachoma and associated risk factors among children in Baso Liben District of East Gojjam, Ethiopia.. *BMC Public Health,,* 12(1105).

Mahande, M., Mazigo, H. & Kweka, E., 2012. Association between water related factors and active trachoma in Hai district, Northern Tanzania. Infect Dis Poverty.. *Infect Dis Poverty,* 1(1), pp. 1-7.

Mengistu, K. *et al.*, 2016. Prevalence and factors associated with trachoma among children aged 1–9 years in Zala district, Gamo Gofa Zone, Southern Ethiopia. *Clinical Ophthalmology (Auckland, N.Z.),* Volume 10, pp. 1663-1670.

Metadel, A., Digsu, N., Amare, T. & Kedir, Y., 2015. Prevalence of Active Trachoma and Its Associated Factors among Rural and Urban Children in Dera Woreda, Northwest Ethiopia: A Comparative Cross-Sectional Study,. *BioMed Research International,* Volume 25.

MoPHS, 2011. Kenya Demographic Health Survey 2008/2009. *Ministry of Public Health Services.*

Mpyet, C., Goyol, M. & Ogoshi, C., 2010. Personal and environmental risk factors for active trachoma in children in Yobe state, north-eastern Nigeria. *Tropical Medicine and International Health,* 15(2), pp. 168-172.

Mutua, D., Ng'ang'a, Z., Mbakaya, C. & Muthami, L., 2013. Evaluation of the risk factors associated with active trachoma among 0-9 year-old children Samburu District. *PJSS,* 2(11), pp. 497-501.

Ng'ang'a, Z., Mutua, D., Mbakaya, C. & Muthami, L., 2015. Evaluation of the risk factors associated with active trachoma among 1–9 year-old children Samburu district. *Prime J Social Sci,* 2(11), pp. 497-509.

Njomo, D. *et al.*, 2016. Knowledge, practices and perceptions of trachomaand its contrl among commnities if Narok COunty, Kenya.. *Tropical Diseases, Travel, Medicine and Vaccines,* 2(13).

Noatina, B., Kagmeni, G., Mengouo, M. & *et al.*, 2013. Prevalence of trachoma in the far north region of Cameroon: results of a survey in 27 health districts. *PLoS Neglected Tropical Diseases,* 7(5).

Quicke, E., Sillah, A., Harding-Esch, E. & *et al.*, 2013. Follicular trachoma and trichiasis prevalence in an urban community in The Gambia, West Africa: is there a need to include urban areas in national trachoma surveillance?. *Tropical Medicine and International Health,* 18(11), pp. 563-568.

Smith, J. *et al.*, 2013. The Geographical Distribution and Burden of Trachoma in Africa.. *PLoS Neglected Tropical Diseases,* 7(12).

Taylor, H., 2008. Trachoma: A Blinding Scourge from the Bronze Age to the Twenty-First Century.. *Centre for Eye research Australia.*

WHO, .., 2010. World Health Organization. Report of the third Global Scientific Meeting on Trachoma Elimination.. *Geneva.*

WHO, 2017. Trachoma: Word Health Organization (WHO) Factsheet.*http://www.who.int/mediacentre/factsheets/fs382/en/.*