

East African Medical Journal Vol. 97 No. 9 September 2020

THE SOCIAL DEMOGRAPHIC FACTORS ASSOCIATED WITH TRACHOMA INFECTION AMONG CHILDREN AGED 1-9 YEARS IN KAPENGURIA SUB COUNTY IN WEST POKOT COUNTY; KENYA

Moses Machar Kariworet Ripotolim, School of Health Sciences, Kisii University P.O. Box 408-40200, Kisii, Kenya; Eric Omori Omwenga, School of Health Sciences, Kisii University P.O. Box 408-40200, Kisii, Kenya, Alexander Munyao Mbeke, School of Science and Applied Technology, Laikipia University, P.O Box 1100 - 20300, Nyahururu, Kenya

Corresponding Author: Moses Machar Kariworet Ripotolim, School of Health Sciences, Kisii University P.O. Box 408-40200, Kisii, Kenya, Email: macharmoses@gmail.com

THE SOCIAL DEMOGRAPHIC FACTORS ASSOCIATED WITH TRACHOMA INFECTION AMONG CHILDREN AGED 1-9 YEARS IN KAPENGURIA SUB COUNTY IN WEST POKOT COUNTY; KENYA

M. M. K. Ripotolim, E. O. Omwenga and A. M. Mbeke

ABSTRACT

Background: Trachoma is the commonest source of transmittable blindness in Kenya. The incidence is highest in populations living in areas that are; hot, dry, and dusty. Besides access to; clean, safe water and proper sanitation, social and demographic are known to influence both disease transmissibility and prevention.

Objectives: To establish the social and demographic factors associated with trachoma infection in children.

Setting: Kapenguria Sub-County of West Pokot County, Kenya.

Design: A community survey of parents/guardians of children aged 1-9 years.

Materials and methods

The respondents who fulfilled entry criteria were assessed. Proforma questionnaires were used to collect data on age, gender, level of education, and income sources, accessibility to portable water, keeping animals within the homestead, and common symptoms of the eye; redness, irritation, and discharge. Data collected were analyzed using descriptive statistics and the results presented by the use of prose, graphs, and tables.

Results:

The study was evaluated for 297 children. The findings revealed age ($r = -0.164$, $p=0.003$), gender, level of formal education ($r=-0.908$, $p=0.000$), and income sources are contributing factors to trachoma infections. Inaccessibility to portable water sources and keeping animals were other factors. Eye redness was the most common symptom.

Conclusions and Recommendations: The survey showed that most of the children were suffering from trachoma. Associated factors to trachoma infection were age, gender, level of education, availability of water, and level of income. The study recommends that affected communities be empowered on trachoma risk factors through capacity building to enhance prevention and control of trachoma.

Key Words: Social Demographic Factors, Trachoma Infection, Water Accessibility, Hygiene Practices

INTRODUCTION

Trachoma infection is the source of transmittable blindness globally with about 5.9 million individuals affected worldwide. High incidence occurs in areas that are; hot, dry, and dusty and also have challenges of availability of clean water. However social demographic factors are known to influence the trachoma infection in the most affected populations living in these environmental conditions.

Trachoma is a bacterial eye disease caused by *Chlamydia trachomatis* that is highly infectious and can be spread through an infected person's hands or clothing, or transmitted by flies that have been in contact with discharge from the eyes or nose of an infected person in the community (Melese, 2003).

In Kenya, the six known trachoma endemic sub-counties are found in Arid and Semi-Arid Regions, where water scarcity is common and poverty rates are quite high (Michael *et al.*, 2012). West Pokot County is one such area. It is located in the former Rift Valley Province in the western part of Kenya that has been documented to be at risk of trachoma manifestations and it is estimated that 7,800 people were living with trachoma as per a study by Emerson *et al.*, 2014. Of note is that various organizations and stakeholders have inputted in management of this condition in West Pokot with most like Fed Hollow Foundation Kenya (FHFK) from Australia providing logistics to undertake S&A (Surgical and Antibiotics supply) as part of SAFE, mass drug administration (MDA) was done and 71% was achieved while the target was above 80% alongside MDA (Rodgers *et al.*, 2012). Some of the Countries affected by the endemic use 6% of their GDP allocated for the Ministry of Health to curtail the trachoma menace.

Children less than 9 years are the major reservoir of the bacteria for the infective

trachoma as children under this age cannot take care of themselves and are therefore affected more seriously because this group is characterized by unclean faces, nasal discharge, foods on faces, and dust that attract eye-seeking flies, which are the bacteria carriers (Gambhir *et al.*, 2007). Besides, they are more likely to touch their eyes more often thus encouraging the re-introduction of the trachoma causative agent. Children's physical wellbeing is affected by active trachoma through pain and itching of the eyes, swelling of eyelids, and watery discharge from the eyes (Golovaty *et al.*, 2009). If not controlled earlier, the disease results in irreversible permanent blindness (Frick *et al.*, 2003). In 2013 a research was conducted by OEU (Operational Eyesight Universal) from Canada and the results were 11,000 people at risk and 7,800 are living with trachoma infection in West Pokot, there were more women with trachoma than men 7.2% and 3.4% respectively (Emerson *et al.*, 2014).

West Pokot County for many years has been assumed to have experienced high levels of illiteracy and poverty which could have contributed immensely to the burden of diseases in this region. The problem is also compounded by the fact that there are limited knowledge and awareness on the preventive strategies among the target populations of this study that can be applied to eliminate such diseases like trachoma. Cases of trachoma in the county have been reported and the majority of the cases were from West Pokot County (Kachman, 2013). However, the risk factors, as well as the prevalence of trachoma, had not been documented in the second decade of the 21st century. The reported cases were common among the children aged 1-9 years and therefore this formed the basis of this study to be carried out to unravel the social demographic factors associated with trachoma infection among children aged 1-9

years in Kapenguria Sub County in West Pokot County.

In Kenya, this water-related infectious disease affects commonly the eyes of populations in six counties including West Pokot. The disease excessively afflicts children aged 1-9 years in poor communities without proper access to clean safe water and proper sanitation (WHO, 2013). Trachoma can be managed through proper hygiene and sanitation practices; however, this remains a big challenge among the nomadic communities due to their ways of life (AMREF, SSI, and MOH, 2004).

MATERIALS AND METHODS

Study Design

The study used community-based survey design.

Study Site

The study was carried out at Kapenguria Sub County in West Pokot County, Kenya. West Pokot County lies in the former Rift Valley Province of Kenya. The latitude of West Pokot County is 1.2439°N The longitude of West Pokot County is 35.116°W. The county lies between latitudes 1.5924° N, 35.2854° E. The county covers a surface area of 9,169.4 square kilometers and has a population of about 512,690 with a population density of 59.33 per square kilometer (KNBS, 2009).

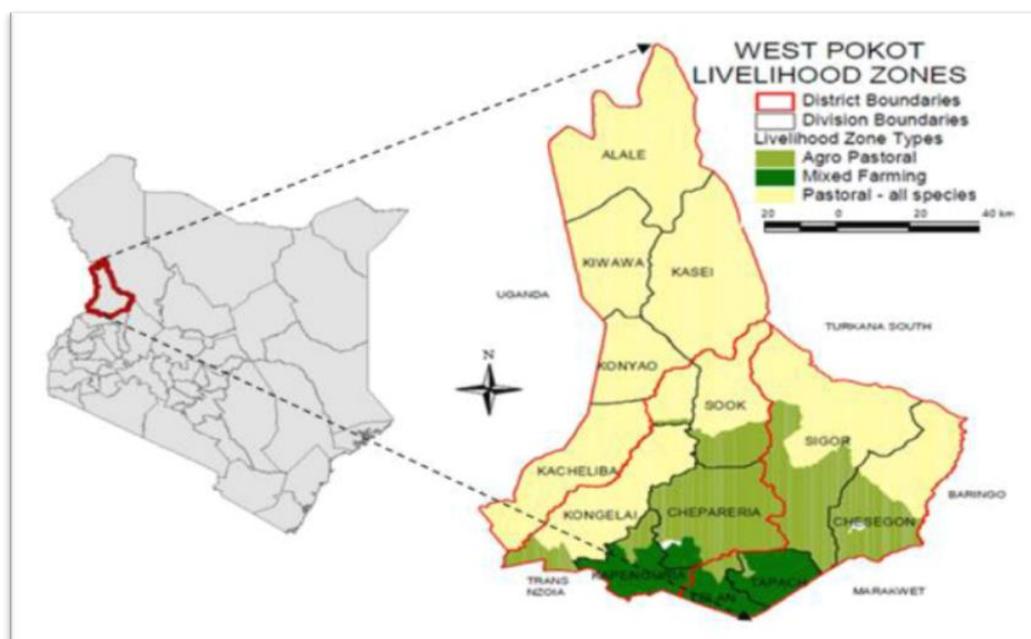


Figure 1 Map of West Pokot County

Source: WFP/VAM Kenya: June 2005

Sample Size and Sampling Procedures

A two-stage cluster random sampling method was used to select the survey samples as used before. The sampling frame

included all the sub-locations in the district. Twenty sub-locations (survey clusters) were selected using the systematic sampling method. According to the survey carried by

Fred Hallows Foundation in West Pokot, it was deduced that the prevalence rate for trachoma (TF) was 26% among the children aged 1-9 years old (MoPHS, 2008). Therefore, the sample size of the study was 297 respondents and 52 health professionals participated in assessing the children under the study.

Selection criteria

Inclusion and Exclusion Criteria

Only parents/guardians of children aged 1-9 years and from Kapenguria Sub-County in West Pokot County were included in the study. The ages of 1-9 years of children were verified by probing the date of birth of children and estimating their age at the time of the study. Ascertainment of residence of the sub-county of Parents/guardians was the first procedure. Informed consent was then sought before administering the questionnaire.

Non-residents' parents/guardians and their children were excluded from the study.

Data Collection Instruments

Proforma questionnaires were used to collect primary data. The questionnaire was translated into the local language of the target group. Structured interviews with mothers of children aged 1-9 years as principal household respondents and direct observations were used to measure collect data on personal and environmental

(household) risk factors and practices in the households.

Data Management

The data was entered and analyzed using the statistical package for social sciences (SPSS) version 20. The data collected was analyzed using descriptive statistics such as frequency, and percentages. Data was presented by the use of tables and figures.

RESULTS

Overview of results

During the period of the study, 297 respondents fulfilled the entry criteria and were evaluated. County registered 52 health professionals participated in the process particularly in communication and data accrual. This section sought to find out the social and demographic factors associated with trachoma infection in children. The study documented age, gender, level of education, access to water, livestock ownership, and health facility factors.

Demographic data

Of the evaluated 297 were males (31%-92/297), female (69%-205/297). Age groups (34.0%) belonged to the age group of 40-49, followed by age group 30-39 years old (23.9%) with the least age group being over 70 years (5.4%) as presented in Figure 2.

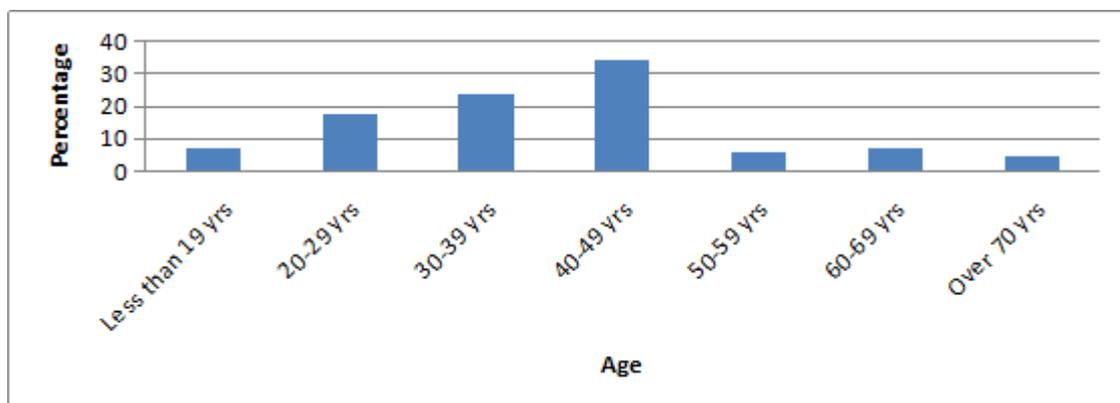


Figure 2 Age Group of the Respondents

Aspects of Social Profile of Respondents

Formal education

The study also showed that most of the parents/guardians had; non-formal education (14.0%) and illiterate (9.0%), 44.0% primary education, secondary (17.0%), 5.0% University, other tertiary education (11.0%).

In terms of the education level of the parents/guardians (respondents), it was deduced that the majority of the parents/guardians attained upper primary education (30.0%) 89/297 with the least 5% attaining university education as illustrated in figure 3.

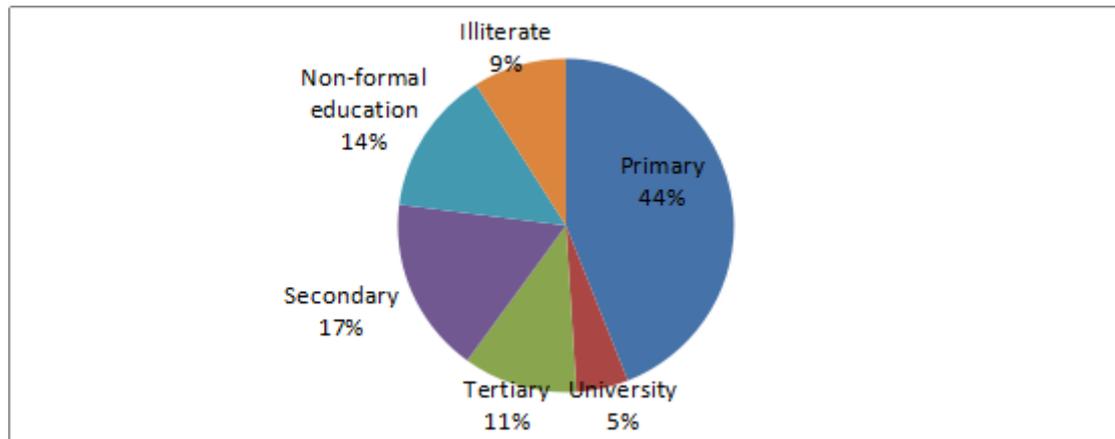


Figure 3 Level of Education

Sociodemographic

The study revealed that (83.0%) 247/297 of the households observed hygiene on their children aged 1-9 years; 79.5%- 236/297 of the respondents was of the view that all the

households have access and use the water conservatively. Additionally, 52.7% - 157/297 of the respondents were of the view that there are latrines in the households, and they are all functional.

Table 1

Household factors associated with trachoma

Statements	N	SD	D	U	A	SA	% Mean
In our household, we observe high levels of hygiene on our children aged 1-9 years	297	7 (2.36%)	8 (2.69%)	55 (18.52%)	90 (30.3%)	137 (46.1%)	83
In the household, we have access and use the water conservatively	297	17 (5.70%)	23 (7.7%)	50 (16.8%)	67 (22.6%)	140 (47.1%)	79.5
There are latrines in our household, and they are all functional	297	68 (22.9%)	95 (32.0%)	52 (17.5%)	41 (13.8%)	41 (13.8%)	52.7

Key: N-Number, SD- Strongly Disagree; D -Disagree; U- Undecided; A-Agree; SA- Strongly Agree

From table 1 it was shown that houseflies accounted for 61.0% of the transmission of the disease hence they were found to be the main agents of trachoma transmission. Flies are associated with a dirty environment such as places where animals and human waste are improperly deposited. From our study, it was deduced that the inhabitants of the study area do practice pastoralism with them keeping various animals like cattle (34.1%).

Occupation

Livestock Turnover

The income of an individual determines the status of that person, its upkeep, health-wise, and promptness of treatment to himself and the rest of its family members.

Land tilting

The respondents of this study revealed that they have various occupations with the majority of them being farmers (61.0 %) 181/297,

Other forms of employment status

Civil servants (17.0 %) 51/297, unemployed (16.0%) 49/297 and self-employed (6%) 18/297. The issue of lack of employment among many Kenyans was also observed in the course of this study.

Consolidated household income

In that case, the study revealed that the majority of the respondents; (41%) 122/297 got an income of between Ksh 5,000-10,000 per month. This was followed by the income of over Ksh 10,000 per month (36.0%) 107/297, Ksh 1000-5,000 (14.0%) 42/297, and lastly those of less than Ksh 1,000 per month (9.0%) 27/297 as shown in figure 4.4 below.

These findings, therefore, assisted in determining the poverty index of the respondents who were involved in this study, which was found to be Ksh. 233.3 per day.

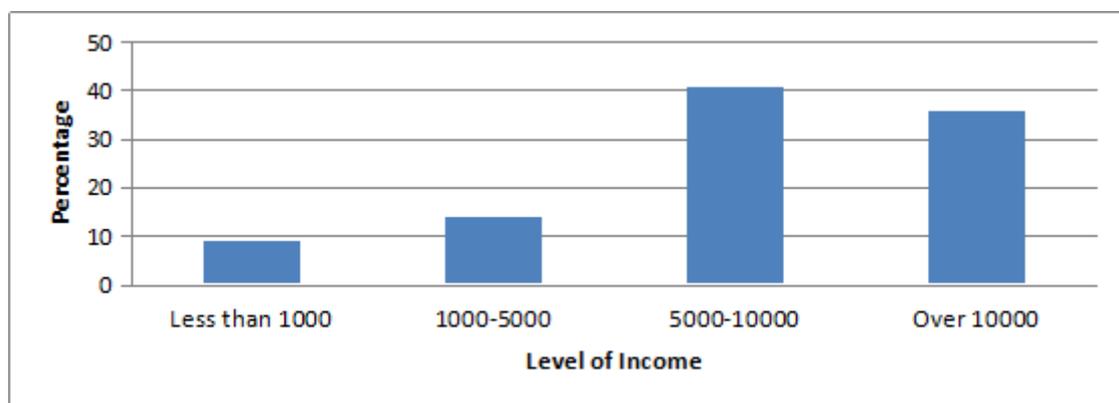


Figure 4 Level of Livestock Turnover

Our findings did document that sheep were the most predominant ones (38.7%) and camels being the least owned (0.01%) by few.

Water availability and accessibility

The study findings showed that 36% of the respondents had problems accessing water

for their use. The majority of the respondents (42.8%) access to water from the rivers; 16.2% access water from boreholes, 23.2% accessed water from protected springs, and 17.8% accessed water from shallow wells (Figure 5).

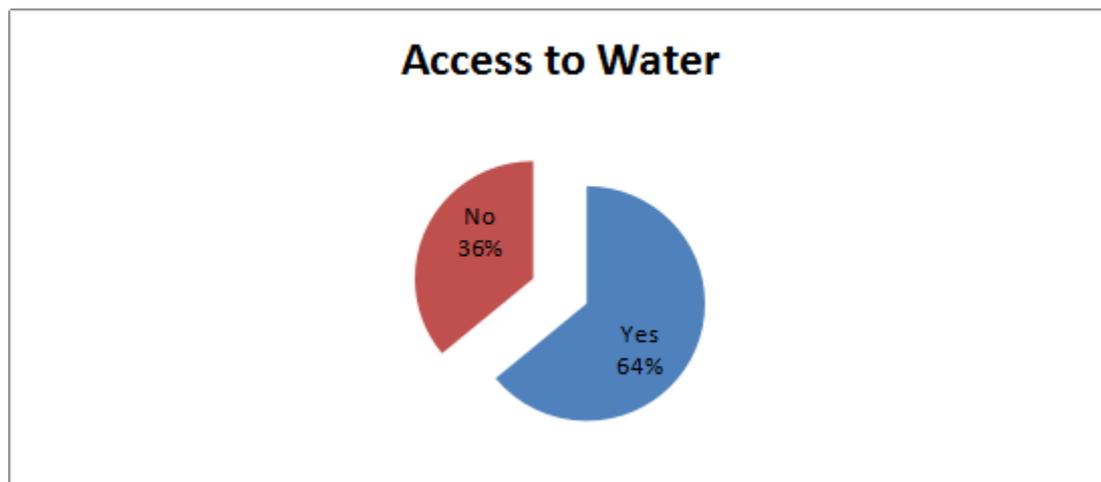


Figure 5 Access to Water

The findings of this study indicated that 107 out of 297 (36.0%) of the households had poor access to water which concur with a study on the scarcity of water concerning hygiene.

Trachoma Transmission

The findings indicated that (61%) 181/297 of the respondents were of the view that

trachoma is spread by flies; (26%) 77/297 of the respondents did indicate that it's spread by the sharing of towels, by dust (11%) 33/297 while (2.0%) 6/297 was of the view that trachoma is spread by sharing of soap as depicted in figure 6.

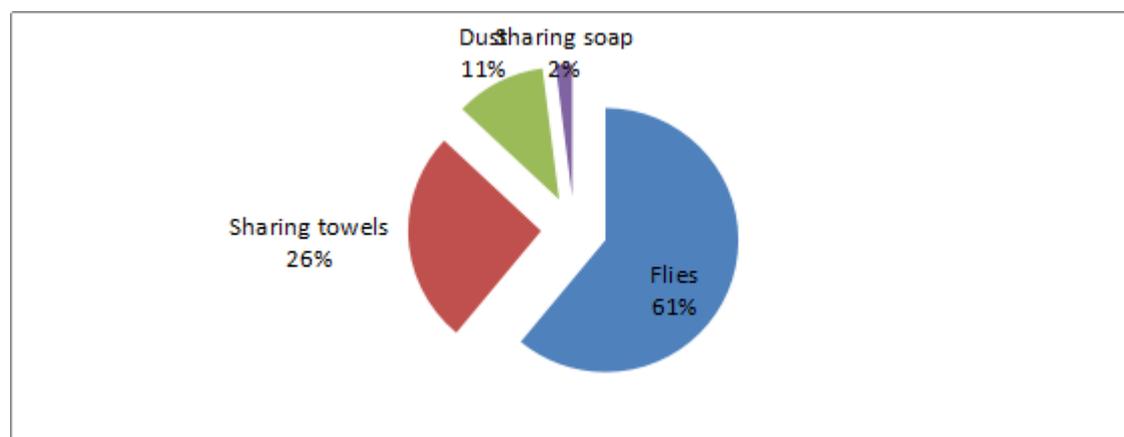


Figure 6 How Trachoma is spread

Health facility

The findings revealed that the majority of the health professionals 36 out of 52 (69.0%) noted that it was a common infection as compared to 14 out of 52 (26.9%) who were of contrary to this opinion.

Signs and symptoms

The findings showed that (29%) 15/52 of the respondents noted that eye redness is the

most common symptom; this was followed by blindness (21%) 11/52 ocular discharge (19%) 8/52 itching of the eyelid (12%) 6/52; blurred vision (10%) 5/52 and (12%) 6/52 noted watery eye.

The relationship between the socio-demographic factors and trachoma infections was performed to ascertain their nature of influence as illustrated in table 2.

Table 2
Socio-demographics and Trachoma Infections

Correlations		Age	Gender	Education
Trachoma Infections	Pearson Correlation	-0.164**	-0.061	-0.908**
	Sig. (2-tailed)	0.003	0.273	0.001
	N	297	297	297

The study results indicated that there was a significant relationship between the age of the children and trachoma infections ($r = -0.164$, $p=0.003$). Pearson correlation coefficient of -0.164 showed a weak negative correlation between age and trachoma infections. There was a significant relationship between education and trachoma infections ($r=-0.908$, $p=0.000$). Pearson correlation coefficient of 0.908 showed a strong negative correlation between education and trachoma infections.

DISCUSSION

This result is consistent with a study conducted in the Tigray region of Ethiopia by Mesfinet *et al.*, (2006) with similar findings reported from Tanzania (Harding-Esch *et al.*, 2010). The likelihood of children being infected by active trachoma due to the effect of illiteracy of the mothers, which is especially important because they are responsible for the caretaking of the children.

The study found that the majority of the parents/guardians had upper primary education (30.0%) 89/297 with the least 5% had a university education. As such, many children from less educated households were more likely to have active trachoma than from highly educated households. This result is consistent with a study conducted in the Tigray region of Ethiopia by Mesfinet *et al.*, (2006) with similar findings reported from Tanzania (Harding-Esch *et al.*, 2010). The likelihood of children being infected by active trachoma may be due to the effect of

illiteracy of the mothers, which is especially important because they are responsible for the caretaking of the children.

The study also showed that 41% of the respondents had an income of between ksh 5000 and 10,000, which is in tandem with a study on children from family unit getting less monthly salary were bound to have trachoma than those from families getting more pay (Kamali *et al.*,1999). The study found that the average income was Ksh. 233.3 per day. An indication that less income can be used for medical expenses and even education as this can only sustain household basic needs. The study also found that the majority of the households depended on incomes from animals/ livestock and their produce. This is an unstable source of income as such animals become wasted and reduce their productivity during harsh seasons of the year especially in drought spells hence disadvantaging such households regarding sources of their livelihoods. Children from households getting low monthly incomes are more likely to have trachoma infections than those from households getting high incomes. A similar scenario was reported in Ethiopia by Negussie (2008).

Various factors have been found to fuel the spread of trachoma among them includes towel sharing, facial washing, and sharing of soaps. The study findings also showed that 50.0% of the respondent's families do share towels a factor that could have been key in the spreading of trachoma as documented before. Other factors like soap sharing (2.0%), facial washing (26.0%), etc. proved

also to be lead factors regarding trachoma spread rates as they have also been documented earlier (Emerson *et al.*, 2004).

The findings indicated that the keeping of animals was important to the study population with sheep being the most commonly owned (38.7%) by the respondents and camels being the least owned (0.01%). The study indicated that the majority of the respondents in the study area keep animals either in the living rooms or within their compounds. This has been documented earlier to be a source of flies which are key vehicles in the transmission of trachoma (Bevan & Pankhurst, 2016).

The study also showed that 36% of the respondents have problems in accessing water for their use. The majority of the respondents (42.8%) access to water from the rivers; 16.2% access water from boreholes, 23.2% accessed water from protected springs, and 17.8% accessed water from shallow wells. This study agreed with a study that states that improvement of environment and social practices such as adjustments in water use fly control. The area where the study was conducted was too dry and dusty; 9% of the respondent attribute trachoma transmission was through the dust. Schémann *et al.*, (2007) also found through a national disease prevalence survey in Mali, families with easy access to a water source tended to use more water for bathing and other hygienic purposes.

The findings of this study revealed that 107 out of 297 (36.0%) of the households have challenges in accessing water which concur with a study on the scarcity of water concerning hygiene (Ngondi *et al.*, 2012). Golovaty *et al.*, (2009) showed that due to inaccessibility to protected water sources and frequently exposed water surfaces, risk factors for contamination as well as the presence of a high number of eye flies lead to high transmission of trachoma. The study found that 28% of the trachoma cases in the

study area presented themselves with eye redness, which was due to the continuous rubbing of the eyes. The progressively serious aggravation of the eyes leads to watery release from the eyes as documented by Mariot *et al.*, (2010).

CONCLUSIONS

The study concluded that children from uneducated households are more likely to have active trachoma than from highly educated households because parents/guardians are responsible for the caretaking of the children. Children from households getting low monthly incomes are more likely to have trachoma infections than those from households getting high incomes. Inaccessibility to protected water sources and frequently exposed water surfaces, risk factors for contamination as well as the presence of a high number of eye flies lead to high transmission of trachoma. The study recommended that the affected communities should be empowered on trachoma risk factors through capacity building to enhance prevention and control of trachoma transmission.

REFERENCES

1. AMREF, SSI, and CBM (2011). *Trachoma Control Project; End Term Evaluation Report*. Nairobi: Upward Bound Company.
2. AMREF, SSI, and MOH (2004). *End-term Evaluation for Trachoma Integrated Project in Kajiado, Samburu, and Laikipia sub-counties*. Nairobi: AMREF, SSI and MOH, Nairobi, Kenya.
3. Bevan, P., & Pankhurst, A. (2016). Report on the Sociological Dimension of the Ethiopian Rural Economies Project. *Unpublished, Centre for the Study of African Economies, Oxford University*.
4. Census, (2009). *The Facts and Figures for 2009 and Kenya 2009 Population and Housing Census Highlights*. Nairobi, Kenya: Kenya National Bureau of Statistics, Nairobi, Kenya.

5. Emerson, P.M., Lindsay, S.W., Walraven, G.E., Faal, H., Bogh, C., Lowe, K., & Bailey, R. (2014). Effect of fly control on trachoma and diarrhea. *The Lancet*, 353, 1401-1403.
6. Fred Hollow Foundation Kenya (FHF). (2012). *Primary Health care level management of trachoma in Six Sub-counties of Northern Kenya*.
7. Frick, Fredlander, E., Worku, A., & Court Right, P. (2003). Active trachoma in children in central Ethiopia: Association with altitude. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 99(11), 840-843.
8. Golovaty, M, Conway, E., Worku, A., & Court right, P. (2009). Active trachoma in children in central Ethiopia: Association with altitude. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 99(11), 840-843
9. Hu, V.H., Harding-Esch, E.M., Burton, M.J., Bailey, R.L., Kadimpeul, J., & Mabey, D.C. (2010). Epidemiology and control of trachoma: Systematic review. *Tropical Medicine and International Health*, 15(6), 673-691.
10. ITI. (2009). Avoidable blindness. *Bulletin of the World Health Organization*, 77(6), 453.
11. Kachman, S.D. (2013). An introduction to generalized linear mixed models. *Proceedings of a symposium at the organizational meeting for an NCR coordinating committee on Implementation Strategies for National Beef Cattle Evaluation*. Athens, Greece.
12. Kamali, K., Butcher, R. M., Sokana, O., Jack, K., Macleod, C. K., Marks, M. E., Kalae, E., & Breuer, J. (1999). Low prevalence of conjunctival infection with Chlamydia trachomatis in a treatment-naive trachoma-endemic region of the Solomon Islands. *PLoS neglected tropical diseases*, 10(9), e0004863.
13. Kenya National Bureau of Statistics (2014) Population and Housing Census. Nairobi, Kenya: Government of Kenya.
14. Melese, M. (2003). Active trachoma in children in central Ethiopia: Association with altitude. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 99(11), 840-843.
15. MOH. (2011). The Global Trachoma Mapping Project: methodology of a 34-country population-based study. *Ophthalmic epidemiology*, 22(3), 214-225.
16. MoPHS. (2008). Kenya National Plan for Elimination of Trachoma. Kenya: Division of Preventive Ophthalmic Services
17. Ngondi, J., Matthews, F., Reacher, M., Baba, S., Brayne, C., & Emerson, P. (2012). Associations between active trachoma and community intervention with antibiotics, facial cleanliness, and environmental improvement (A, F, E). *PLoS Neglected Tropical Diseases*, 2(4).
18. Schemann, Hsieh, Y.-H., Quinn, T.C., & West, S. (2007). Severe disease in children with trachoma is associated with persistent Chlamydia trachomatis infection. *The Journal of Infectious Diseases*, 176, 1524-1530.
19. SSI. (2004). Trachoma control using the WHO adopted \ SAFE with Azithromycin. *East African medical journal*, 84(3), 127-135.
20. WHO. (2013) *Primary Health care level management of trachoma*, WHO/PBL/93.33.