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Trachoma is an eye infection caused by Chlamydia trachomatis. The World Health Organization (WHO) targets to eliminate this disease by the year 2020. Elimination of the disease is dependent on adequate information on its distribution and risk factors in any specific district. The study aimed at evaluating the socio demographic characteristics of parents and guardians and 1-9 year old children infected with active trachoma in the District as well as to establish the prevalence of active trachoma among 1-9 year old children in Samburu Central District. A cross-sectional descriptive study based on the 30 by 7 cluster sampling method was conducted. Through simple random sampling, 30 Manyattas were selected in the District and 7 children selected randomly from households in each of the Manyattas hence a total of 210 children aged 1-9 years were selected. Parents or guardians who were caretakers of the selected children were interviewed and the children physically observed for signs of active trachoma. An interviewer-based questionnaire was used for data collection. The data was analyzed using SPSS version 15.0 where frequencies were used to calculate the prevalence of the disease while pearson’s correlation (r) and chi-square test were used to evaluate association of risk factors and the disease. The results showed that 23.8% of the children showed signs suggestive of active trachoma. Overall, employment status of the children’s caretaker was not significantly associated with active trachoma ($\chi^2(3) = 4.527, P = 0.210$). There was a higher probability of infection with the disease among children from households that had lived in the district for more years compared with those that had existed in the district for fewer years. Additional results also indicate that there was a significant association between active trachoma and taking a bath using water in a basin rather than flowing water ($\chi^2(1) = 6.12, P< 0.013$).There was also a significant association between disposing garbage anywhere in the home compound and the disease ($\chi^2(3) = 7.94, P< 0.047$). Further findings from the study indicate that owning a pit latrine may not automatically result in prevention of active trachoma infections.

Key words: Active trachoma, risk, Samburu District, Kenya.

INTRODUCTION

Background and research gap
Trachoma is an eye infection caused by Chlamydia trachomatis that may result to infection after repeated re-infections. For low-prevalence areas, children below the age of ten years will most likely still serve as the main reservoir of C. trachomatis elementary bodies, and Solomon et al (2003) suggest that these individuals should be the principle target for antibiotic campaigns. Moreover, children below the age of one year have been shown to be capable of harbouring high loads of C. trachomatis infection, which is a finding that challenges the guidelines in certain nations that restrict the use of azithromycin antibiotic treatment to persons older than one year of age. The apparent incongruity of gender biases for trachoma prevalence is very likely the result of complex ecological, social, and cultural interactions that
shape unique environments for the pathology and transmission of trachoma. When considering the higher prevalence among women in certain regions, for example, researchers have suggested that increased contact between children and care-taking women may explain the higher infection rates among women (Schémann et al., 2002; Alene2000).

Active trachoma greatly affects the physical well-being of children through pain and itching of the eyes, swelling of eyelids and watery discharge from the eyes. If not prevented at the early stages, it becomes irreversible and results in permanent blindness (Frick et al., 2003). This shortcoming greatly complicates effective public health interventions. Although encompassed in the Surgery, Antibiotics, Facial cleanliness and Environmental hygiene (SAFE) strategy in the Samburu Central District trachoma control projects, local individual, socio-demographic and environmental factors influencing active trachoma particularly in the district have not been intensely studied and hence are not adequately understood. Furthermore, the SAFE strategy is dependent on adequate information on the distribution of active trachoma and trichiasis in any specific district (Polack et al., 2005). On the contrary, there is hardly any documented information about the prevalence of active trachoma and its risk factors specifically in Samburu Central district. This study, therefore, sought to address the risk factors associated with active trachoma among 1-9 year-old children in Samburu Central District.

**METHODOLOGY**

The study was conducted in Samburu Central District which is considered to be endemic for trachoma (Karimurioct al., 2006). The total population in the district is 114,127 while children aged between one and nine years are approximately 46,472. The study adopted a cross sectional descriptive study. It was carried out to determine the prevalence and establish the socio-economic, demographic and environmental factors associated with active trachoma among children 1-9 year-old in Samburu Central District. The district is mostly inhabited by the Samburu and a few Turkana. Most of the children between the ages 1-9 years are school goers particularly those aged 3-9 years. The rest of the children within the 3-9 age categories who do not go to school are young pastoralists who are tasked with looking after livestock. The target population was children aged 1-9 years. During the study, Manyattas in the district were listed and 30 of them selected randomly. Seven children aged 1-9 years from each Manyatta were randomly selected and their parents/guardians interviewed.

The sample size for the study was based on the 30 by 7 cluster sampling which was developed by the World Health Organization in 1978 (Hoshaw, 2001). Hence:

$$n = 30 \times 7$$

$$n = 210$$

Where:

30 = Total number of clusters in this case manyattas
7 = Sampling units (eligible children) at household level

Therefore, the total sample size for the study was 210 children.

This study used clinical nurses (who had a basic knowledge of the grading system) as research assistants. For the purposes of this study, Grade 1: (Trachomatous inflammation-Follicular (TF) was used. This grade involves the presence of five or more follicles in the upper tarsal conjunctiva. Follicles are round swellings that are paler than the surrounding conjunctiva, appearing white, grey or yellow. Follicles must be at least 0.5 mm in diameter). Data was collected by trained field assistants (nurses by profession) using interviewer-based questionnaires which were administered to adult caretakers (parent or guardians) using the local language Samburu or Kiswahili. Quantitative data was entered, cleaned, processed and analyzed using SPSS version 15.0. Binary logistic regression was used as a confirmatory test of the results. A P value of less than 0.05 was considered statistically significant.

**RESULTS AND FINDINGS**

**Sample Characteristics**

A total of 248 children aged 1-9 years were physically examined for active trachoma using the WHO grading system (specifically grade 1). Those who showed signs of watery discharge, painful eyes, swollen eyelids, itching eyes and follicles were classified as having the disease. Those who did not show the above symptoms were classified as free of disease. Of the 248 children observed, 59(23.8%) had active trachoma. By gender, the prevalence for males was 19.6% and for females, it was 24.9% but the results were not significantly different ($p > 0.05$). Although both groups were equally at risk, females had a higher prevalence than males. The findings are inconsistent with those in some countries, such as Yemen (Sallam et al., 2003) which reveal higher prevalence of active trachoma is found in men. The findings also contrast whereas in other regions including Ethiopia (Alene 2000) and the Kongwa District of Tanzania (Congdon et al., 1993), trachoma prevalence is greater for women, especially above the age of fifteen years. However, the findings agree with those in Schémann et al., (2002), which reveal higher but insignificant prevalence of active trachoma in men in Mali study. The findings concur with other studies for instance Solomon et al., (2003) have shown no gender bias for disease prevalence for study populations in Gambia and...
the Rombo District of Tanzania

The respondents who had no formal education were 145 (58.5%) out of whom were 38 (26.2%) cases of active trachoma. The respondents who had incomplete primary education were 36 (14.5%) out of whom were 4 (11.1%) cases of active trachoma while those who had completed primary education were 26 (10.5%) out of whom were 7 (26.9%) cases of active trachoma. A total of 24 (9.7%) respondents had secondary education of out of who were 8 (33.3%) cases of active trachoma. As per the findings there were more cases of active trachoma among children under the care of educated caretakers than among the uneducated ones. The findings compare well

In total 176 (71%) children were under the care of unemployed caretakers; of these children, 48 (27.3%) had active trachoma infection; 22 (8.9%) children, 3 (13.6%) of whom had active trachoma were under civil servant caretakers while 8 (3.2%) children among whom 2 (25%) had the disease were under self-employed caretakers. Overall, employment status of the children’s caretaker was not significantly associated with active trachoma ($\chi^2 (3) = 4.527, P = 0.210$). Despite this outcome, however, it is evident from the findings that active trachoma infections are more among children under the care of unemployed caretakers.

The disease was most prevalent (over 55%) in households that had existed in the district for more than 50 years and least prevalent (5%) in households that had only been in the district for slightly above 10 years. An association between the number of years the respondent had lived in the district and trachoma was observed ($\chi^2 (4) = 19.46, P = 0.001$). There was a higher probability of infection with the disease among children from households that had lived in the district for more years compared with those that had existed in the district for fewer years. Out of 248 children, 202 (81.4%) washed hands after defecation while 46 (18.6%) did not. Out of the 202 children who were reported to wash hands after defecation, only 42 (20.8%) were cases of active trachoma compared to 17 (37%) cases of the disease among the 46 children who never washed their hands after defecation. Not washing hands after defecation was therefore significantly associated with active trachoma ($\chi^2 (1) = 5.4, P = 0.019$).

Out of the 243 (97.9%) children who claimed to wash their faces with clean water and without soap, 59 (24.3%) were positive with active trachoma while 184 (75.7%). However, out of the 5 children who were reported not to be using clean water on their faces, none of them had active trachoma infection. A child’s dirty face was significantly associated with active trachoma ($\chi^2 (2) = 31.3, P = 0.001$); Hundred and eighty (72.6%) of the respondents reported that their children did not share bathing water while 68 (27.4%) respondents reported that their children shared bathing water. Of the 180 children who did not share bathing water, only 31 (17.2%) had active trachoma. However, out of the 68 children who were reported to be sharing bathing water, 28 (41.3%) had the disease. Sharing bathing water was therefore significantly associated with active trachoma ($\chi^2 (1) = 14.85, P < 0.0001$). A total of 44 children (17.7%) were reported to be using water in a basin while bathing while 204 children (82.3%) were reported to use flowing water while bathing. Out of the 44 children who were reported to be bathing using water in a basin, 17 (38.7%) showed signs of active trachoma while only 42 (21%) of the 204 children who were reported to be using flowing water while bathing showed signs of infection. There was hence a significant association between active trachoma and taking a bath using water in a basin rather than flowing water ($\chi^2 (1) = 6.12, P = 0.013$). The findings agree with those in Edwards et al. (2006) who noted that personal sanitation through improving access to water and encouraging facial cleanliness, may eliminate C. Trachomatis.

Upon observation, a total of 120 (48.4%) children had flies around their eyes while 128 (51.6%) did not. Of those who had flies around their eyes, 30 (25%) had active trachoma while 90 (75%) did not. Of those who had no flies around their eyes, 29 (22.7%) had active trachoma while 99 (77.3%) did not. Presence of flies around child’s eyes was therefore not associated with active trachoma $P > 0.05$. An inspection of the households’ compounds revealed that 171 (69%) had flies while 77 (31%) did not. However, of the households that had flies, 41 (24%) children had active trachoma while 130 (76%) did not; 18 (23.4%) children had active trachoma while 59 (76.6%) did not in the households that had no flies in their compounds. Presence of flies within household compounds was not a predictor of active trachoma, $P > 0.05$.

There were three categories of distances between households and nearest health facilities. The households that were less than 1 km from the nearest health facility were 50 (20.2%) of which 35 (70%) children were free of active trachoma while 15 (30%) had the disease. Of the 148 (59.6%) households that were between 1 and 5 kms away from the nearest health facility, 124 (83.8%) children were free of active trachoma while 24 (16.2%) were cases. The remaining 50 (20.2%) households were located more than 5 kms away from the nearest health facility; of these, 30 (60%) children had no disease while 20 (40%) children had active trachoma. This predictor was significantly associated with active trachoma ($\chi^2 (2) = 12.992, P < 0.002$) in that the respondents located less than a kilometer from health facilities were more likely to access medical attention than those located more than 5
kilometers away. The findings are similar to Bowman et al. (2000), who noted that distance from household location to nearest health facility and active trachoma were consistently associated.

A total of 167 (67.3%) respondents reported that they did not own a pit latrine. Out of these 37 (22.2%) children had active trachoma while 130 (77.8%) did not. On the contrary, 81 (32.7%) respondents reported owning a pit latrine out of whom 22 (27.2%) children had cases of active trachoma while 59 (72.8%) did not. This scenario concludes that owning a pit latrine was not a significant predictor of active trachoma P > 0.05. This is supported by the findings that out of the 81 respondents who owned a pit latrine, only 2 (2.5%) did not use it while among the 79 (97.5%) who used their latrines, there were 22 (27.8%) cases of active trachoma. This indicates that owning a pit latrine may not automatically result in prevention of active trachoma infections. The findings agree with observations in Mali, for example, where Schémann et al., (2002) note that despite wide adult usage of pit latrines, children continue to deposit feces in the bush not far from the villages, thus allowing the supply of muscid fly larval media to persist.

Out of the 248 children, 231 (93.1%) respondents reported no myths associated with latrine use while 17 (6.9%) reported the existence of such myths. Out of the 17 children whose guardians reported the existence of myths against latrine use, more than half, 9 (52.9%) had active trachoma while 8 (47.1%) did not. However, out of the 231 children whose parents reported no myths associated with latrine use, only 50 (21.6%) had the disease. There was hence a significant association between myths associated with latrine use and active trachoma ($\chi^2(1) = 8.554$, P < 0.003). Some of the myths mentioned by the respondents were: “a latrine is considered to be a house and hence cannot be a defecating site”, “the culture does not allow children to share the same latrines with adults” and “women and men cannot share the same latrine”.

While only 38.3% of the respondents deposited waste in dustbins, 61.7% disposed of the waste either in the compound, bush or other sites. Among the households where garbage was disposed of anywhere in the compound (61.7%), the prevalence of the disease was 35% (23 out of 66 children), the prevalence was however lower (23%, 22 out of 95 children) in households that disposed of garbage in dustbins. There was therefore a significant association between disposing garbage anywhere in the home compound and the disease ($\chi^2(3) = 7.94$, P < 0.047).

CONCLUSION AND RECOMMENDATION
The burden of active trachoma among one to nine year old children in Samburu Central is 23.8% as revealed by this study.

These findings led to the conclusion that low education level of the caretaker is not a predisposing risk factor of active trachoma.

As per the study findings, the predictors of active trachoma were identified as:
- An unclean face (P = 0.001),
- Sharing bathing water (P < 0.0001),
- Using water in a basin rather than flowing water to bathe (P < 0.013),
- Failure to wash hands after defecation (P = 0.019),
- Using water from a dam (P < 0.0001),
- Long distance (>5kms) from household to the nearest health facility (P < 0.002),
- Myths associated with latrine use (P < 0.003)
- Poor garbage disposal (P = 0.047).

The study deems the following recommendations key if trachoma is to be fully eradicated in line with WHO 2020 target. There is need to follow up on the referrals made during the study to ensure that the disease is brought under control before further spread. The danger here is that active trachoma is communicable in nature and can be easily transmitted just as it can be easily controlled.

Both the caretakers and their children ought to be sensitized on adequate trachoma prevention and control practices with more focus on Facial cleanliness and environmental hygiene. As earlier discussed, areas of concern under this component include washing the face with clean water and soap, washing hands properly after visiting the toilet with clean water, and soap and proper fecal and garbage disposal.

In line with conclusions, it is recommended that sanitation of Samburu residents should be improved. Consequently, caretakers should ensure that the faces of children are clean to avoid flies coming into contact with the eyes.

Behavioural change should be encouraged to ensure that children do not share bathing water a doing so would increase the risk of active trachoma. In addition, using water in a basin is linked to sharing bath water and these also increase the risk of active trachoma.

County governments should invest more resources in tapped water and this would reduce the tendency of fetching water from dams. In addition, the county governments need to invest in accessible health care. This will be through building more health centres closer to the residencies of Samburu residencies.

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