

Research Article

Knowledge, Attitude and Practices of School Children on Prevention and Control of Superficial Fungal in Western Kenya

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Superficial fungal infections are common among school-going children due to their involvement in practices that promote the spread at school or home. However, practices, knowledge and attitude of these children on prevention and control of fungal infection are poorly understood. This study assessed the practices, knowledge and attitude on the prevention and control of fungal infections among 163 children aged 5-12 years in western Kenya. A cross-sectional study design and systematic sampling method were adopted. Information on knowledge, attitude and practices on fungal prevention and control was collected using a structured questionnaire. Results showed that over 50% of the pupils had adequate knowledge on prevention and control of superficial fungal infections. On attitude, 58.9% of the children believed that those with fungal infection should not be allowed to play with others or go to school. Furthermore, 70.6% and 54.6% of the pupils agreed that sharing of toys and hairbrushes respectively leads in promoting the infections. These findings show that pupils demonstrate a good knowledge of superficial fungal with marked limited infection and control measures. Therefore, there is a need for stakeholders in health and education sectors to develop a policy framework involving learners in prevention and control of fungal infections.

Keywords: *practices, knowledge and attitude, prevention and control of superficial fungal infections, school going children*

INTRODUCTION

Tinea capitis is common in children before and during puberty and prevalence varies by geographic regions, seasonal and closely associated with none hygienic living conditions (Cai *et al.*, 2016, Chen *et al.*, 2018). *T. capitis* is a superficial fungal infection that may infest scalp and hair (Yang *et al.*, 2020a, Moto *et al.*, 2015). The infection is characterized by invasion of dermatophytes into hair follicles and keratinized layer of hairy skin leading to hair loss, scaling, kerion, agminate folliculitis, favus, black dot, grey patch type, erythema or impetigo-like lesions (Nweze and Eke, 2018, Dogo *et al.*, 2016). The infection originates from diverse sources that includes animals and/or soil with high frequency occurring in prepubertal, school-going

children aged between 6 and 10 years of age (Adesiji *et al.*, 2019). Nonetheless, the infection occurs across age and sex groups with high occurrence being reported among males (Alkeswani *et al.*, 2019, Alemayehu *et al.*, 2016).

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Tinea infections have remained a significant public health problem with poor hygiene, sharing of fomites, overcrowding and low socioeconomic being among some of the factors that predispose populations to infections (Gnat *et al.*, 2020, Moto *et al.*, 2015). Despite high cases being detected in poor resource settings, these infections have a worldwide distribution with most cases being detected in Africa, Asia, and Southern and Eastern Europe (AL-Khikani, 2020).

It occurs predominantly in rural or sub urban areas and some of the factors associated with this increased frequency include poor personal hygiene, overcrowding, and low socioeconomic level (Leung *et al.*, 2020, Yang *et al.*, 2020b). Therefore, it is important to generate regional epidemiological data for the development of strategies of prevention and control, and a possible eradication (Ismail and Al-Kafri, 2016). Internationally, it is common in parts of Africa and India (Yotsu *et al.*, 2018). In Kenya, a study showed a prevalence of 11.2 %, with *Tinea capitis* infection being the most prevalent (Moto *et al.*, 2015, Dogo *et al.*, 2016). The prevalence of superficial fungal infection in both rural and urban schools in Kenya stands at 10.1 % and 33.3 % respectively (Chen *et al.*, 2016). In general, fungal infections remain prevalent in Kenya at 13.9% (May *et al.*, 2016, Lan *et al.*, 2015).

The commonly overcrowded school environment in developing countries is a strong source of transmission as infectious dermatoses have a high chance of spreading among children with limited hygiene skills (Oyedepo *et al.*, 2020). The most affected are children between 6 - 12 years who are attending early childhood classes. In addition, most of these children are orphaned and being taken care of by their grandparents who poorly understand intervention for their medical condition. It is estimated that 152 million children worldwide, ranging from infants to teenagers, have lost one or both parents (Kelley *et al.*, 2016).

This proneness to infections calls for special attention to these children in relation to their skin health. Furthermore, various dermatoses, due to their morbidity characteristics, have been shown to constitute a serious setback to the education of the child (Kalu *et al.*, 2015, Kelbore *et al.*, 2019). Although these diseases are not common causes of mortality, they may be common causes of morbidity and may interfere with learning (Ogunbiyi and Adedokun, 2015, Oyedepo *et al.*, 2020). Currently, guardians/parents

play a key role in the administration of drugs and provide all the necessary medical care to infected children. However, their role in the prevention and control of these skin infections has not been explored. In this study, we assessed the knowledge, attitude and practices of school children that promote the spread of superficial fungal infections.

MATERIALS AND METHODS

The study was conducted in Seme Sub-County approximately 50km from Kisumu. Seme sub-county has a total population of 98,805 with an area of 190.20km². This was a cross sectional study targeting children in lower primary schools with a population of 1620 aged between 5 to 12 years with or without superficial fungal infection. Other than the ethical approval of the study, the permission was obtained from the school heads, and the consenting was done accordingly before participating in the study. A structured questionnaire was administered to children. The questionnaire was pretested on 20 study participants using the test-retest technique in a nearby school not within the study site. Sample size (n) was determined as 163 using the Cochran formula, 1977 (Cochran, 1977). The prevalence was 13.9% and the study population (p) was 1440 of children after excluding 180 who were not in school during the data collection and those whom their parents did not consent to participate in the study. Systematic sampling was used to select the subjects. The interval of the study subjects' selection was given by p/n (1440/163) which was 8. Every 8th pupil was selected. The completeness and consistency of information obtained were checked at the end of data collection. Descriptive statistics on the Statistical package for social sciences (SPSS) version 21 were used to analyze the data. The data were then presented in form of tables.

RESULTS

Demographic Characteristics

The target population age for this study ranged from 5-12 years with 46.6% of the respondents being in the age bracket of 10-12 years consisting of 57.1% females (Table 1). In terms of family life, 69.9% of the respondents came from a household with both parents while 50.3% of those interviewed had 3-5 siblings.

Table 1: Demographic Characteristics of the target population

Characteristics	Proportion N(%)	
Age	5-6yrs	43(26.4)
	7-9yrs	44(27)
	10-12yrs	76(46.6)
Gender	Male	93(57.1)
	Female	70(42.9)
Siblings	0-2	40(24.5)
	3-5	82(50.3)
	6-8	27(16.6)
	9-10	14(8.6)
Orphaned	No	114(69.9)
	Yes	49(30.1)

Knowledge on prevention and control of superficial fungal infections

The findings on the knowledge of students on the prevention and control of superficial fungal infections in pupils are presented in Table 2. Assessment of the knowledge on control of fungal infections showed that 103 (63.2%) and 120 (73.6%) of the pupils strongly agreed that disinfecting equipment and applying surgical spirit respectively prevent transmissions. On the side effects of fungal infections, 115 (73.6%) of pupils believe that

"Mashilingi" causes loss of hair while 91 (55%) are aware that it affects hair shaft on the scalp, eyebrows or eyelashes. Most pupils are aware that the infection can be acquired through close physical contact with an infected person as well as from close with pets such as cats and dogs. The majority of the pupils interviewed are aware of the strategies used to manage the infection including the use of systemic antifungal drugs (46.6%), proper personal hygiene (82.2%) and oral antimycotic therapy (53.4%). In contrast, over 50% of the pupils did not have information on the treatment options for the superficial fungal infection.

Table 2: Knowledge on prevention and control of superficial fungal infections

Variables	Proportion of the responses N (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Disinfection of Shaving equipment can prevent transmission	11(6.7)	9(5.5)	24(14.7)	16(9.8)	103(63.2)
Application of surgical spirit after shaving prevents infection	8(4.9)	9(5.5)	10(6.1)	16(9.8)	120(73.6)
"Mashilingi" can cause loss of hair on the affected area	9(5.5)	5(3.1)	17(10.4)	14(10.4)	115(70.6)
Infection can be acquired through close physical contact with infected person	4(2.5)	8(4.9)	32(19.6)	20(12.3)	99(60.7)
Treatment of superficial fungal infection is through systemic antifungal drugs	8(4.9)	4(2.5)	54(33.1)	21(12.9)	76(46.6)
The infection can affect the hair shaft on the scalp, eyebrows or eyelashes	3(1.8)	5(3.1)	48(29.4)	16(9.8)	91(55.)
I can get infected through close contact with pets such as cats and dogs	14(8.6)	13(8.0)	37(22.7)	53(32.5)	46(28.2)
It's necessary to practice proper personal hygiene	2(1.2)	2(1.2)	9(5.5)	16(9.8)	134(82.2)

Shampoo and oral antimycotic therapy can be used in eradication of carrier state	6(3.7)	2(1.2)	56(34.4)	12(7.4)	87(53.4)
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Attitude on prevention and control of superficial fungal infections

The results showed that 40 (24.5%) of the pupils strongly agreed that a person infected with superficial fungal infection should neither go to school nor attend classes compared with 55 (33.7%) that strongly disagreed (Table 3). On the transmission of the fungal infection, 107 (65.6%) of the learners strongly agreed that the infection is acquired through shaving at the barbershop "Kinyozi" compared to 61 (37.4%) who believe that the disease is spread through shaving using a razor blade. The majority

of the pupils (58.9%) strongly agreed that they should not play with someone infected with superficial fungal infection 54 (33.1%) agreed that fellow pupils refuse to either sit or play with the infected friends. Information on treatment varied among the pupils, 110 (67.5%) strongly agreed that fungal infection does not warrant going to the hospital for treatment and 14 (8.6%) disagreed that treating the infection is difficult. A total of 110(67.5%) of the pupils strongly agreed to shave their hair or wear a cap during treatment compared to 13(8%) who strongly disagreed.

Table 3: Attitude on prevention and control of superficial fungal infections

Variables	Proportion of the responsesN (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Person infected with superficial fungal infection should not go to school nor attend classes	55 (33.7)	32(19.6)	13(8.0)	23(14.1)	40(24.5)
Should not play with someone infected with superficial fungal infection	22(13.5)	12(7.4)	15(9.2)	18(11.0)	96(58.9)
Treating of superficial fungal infection is difficult	23(14.1)	14(8.6)	24(14.7)	25(15.3)	77(47.2)
Superficial fungal infection is acquired through shaving at the barbershop "Kinyozi"	7(4.3)	5(3.1)	22(13.5)	22(13.5)	107(65.6)
Shaving using a razor blade causes superficial fungal infection	27(16.6)	17(10.4)	32(19.6)	26(16.0)	61(37.4)
Do your fellow pupils refuse to either sit or play with you?	12(7.4)	25(15.3)	26(16.0)	46(28.2)	54(33.1)
I should shave my head or wear a cap during treatment	13(8.0)	19(11.7)	22(13.5)	17(10.4)	92(56.4)
Superficial fungal infection does not warrant going to the hospital for treatment	12(7.4)	5(3.1)	13(8.0)	23(14.1)	110(67.5)

Practices on prevention and control of superficial fungal infections

The results of the pupil's awareness of practices on the prevention and control of superficial fungal infections are presented in Table 4. The interviews revealed that 89 (54.6%) of the respondents strongly confirmed that they share hairbrushes with family members at home and friends in school compared to 15 (9.2%) who strongly disagreed. The number of pupils who strongly agreed that

they often share sleeping pillows, bathing towels and clothes with family members and friends ranged from 49.7%, 45.4% to 57.7%. The pupils who believe that sharing playing toys with friends could lead to infection accounted for 70.6% of those interviewed compared to 3.7% who disagreed. The number of who observed daily personal hygiene like bathing daily varied among the respondents.

Table 4: Practices on prevention and control of superficial fungal infections

Variables	Proportion of the responses N (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I share hairbrushes with family members and friends at school	15(9.2)	14(8.6)	18(11)	27(16.6)	89(54.6)

I share the same pillow with my family members	17(10.4)	17(10.4)	20(12.3)	28(17.2)	81(49.7)
I share bathing sponge with my family members	19(11.7)	15(9.2)	26(16.0)	26(16.0)	77(47.2)
I share bathing towel with my family members	11(6.7)	11(6.7)	35(21.5)	32(19.6)	74(45.4)
I share toys either in school or at home	10(6.1)	6(3.7)	10(6.1)	22(13.5)	115(70.6)
I share clothes with my family members and friends	10(6.1)	15(9.2)	18(11.0)	26(16)	94(57.7)
I bath daily	7(4.3)	9(5.5)	21(12.9)	45(27.6)	81(49.7)

DISCUSSION

Findings from the study revealed an average knowledge above 50% among children despite the relatively high prevalence of superficial fungal infection ranging from 10.1-33.3% as previously reported (Chen *et al.*, 2016, Ayaya *et al.*, 2001). The knowledge of infections is very important for interventions and this study focused on the knowledge of children who are the vulnerable members of the community. The study further revealed knowledge gaps among 39.3% of pupils who did not know that close physical contact with pets can spread the fungal infection. The attitude and knowledge of the pupils reflected their discriminative habits as the majority recommended that those with fungal infection should not play with others nor go to school. Similarly, a study conducted by Sahin *et al.*, 2014, indicated that "shared facilities and objects also may promote the spread of disease, both within the home and the classroom". Continuous shedding of fungal spores may last several months despite active treatment and therefore, keeping patients with superficial fungal infection out of school is impractical. The negative attitude of the pupils can be attributed to inadequate health education on fungal infection offered to these children both in school by teachers and at home by parents/guardian (Sahin *et al.*, 2014).

A total of 59% of the children in this study demonstrated practices that perpetuate the spread of fungal infection with the sharing of toys and hairbrushes taking the highest lead at 70.6% and 54.6% respectively. This is comparable to a study conducted by Pomeranz *et al.*, 1999 which stated that "playmates in close physical contact with patients can spread *Tinea capitis* organisms by sharing toys or personal objects including combs and hairbrushes." In another study by Grover *et al.*, 2010 indicated that "infection of the scalp by dermatophytes usually is the result of person-to-person transmission". The organism remains viable on combs, brushes, couches, and sheets for longer periods (Pomeranz *et al.*, 1999). Due to the poverty, we expect the sharing of essential items however it is important that information on the

consequences of sharing these items on the spread of superficial fungal infections.

CONCLUSIONS

Despite the children demonstrating good knowledge of superficial fungal infection, there is a need to improve on their attitude and practices so that they are supplement the efforts of parents or guardians in the prevention and control of infectious diseases such as superficial fungal infections. This kind of approach may particularly benefit and very helpful to children who are orphaned. Indeed, the population of orphaned children is very high in many rural parts of Kenya. Also, the strategy may help to improve the compliance/adherence to treatment in terms of dosage avoiding common re-occurrence of superficial fungal infection. We also believe that teachers being involved in the prevention and control of superficial fungal infection will enable the approach of engaging children on prevention and control be very successful.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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ETHICAL APPROVAL:

Ethical approval was granted by Jaramogi Oginga Odinga Teaching and Referral Hospital Ethical Review Committee and National Commission for Science, Technology and Innovation (NACOSTI) (Permit number ERC.1B/VOL.I/315 and NACOSTI/P/17/93439/19349) respectively.

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