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Prevalence of Zoophilic and Geophilic Dermatophytosis in Bajabure and Lainde-Badirisa Primary School, Girei Local Government, Adamawa State Nigeria

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Abstract

Dermatophytosis is a common global problem which causes a lot of morbidity among affected individuals. This study assessed the prevalence of zoophilic and geophilic dermatophytosis in Bajabure and Lainde-Badirisa Primary school children, aged 5 – 15 years old in Damare Ward, Girei Local Government Area of Adamawa State. A total of 138 hair samples were collected and 124 (90%) yielded positive for fungal growth. out of which 116 (94.0%) were identified from males and 8 (6.0%) from females school aged children respectively. Age group 5-10 years had the higher prevalence 100(81.0%) while the least prevalence of identified dermatophytes among age group 11-15 years 24(19.0%). The species of dermatophytes isolated in both the two primary schools were *M. Audounii* (50%), followed by *T. rubrum* (26.0%), *T. schoenleini* (16%) and the least were *M. gypseum* (8.0%). This study revealed that the prevalence of dermatophytosis among Bajabure and Lainde-Badirisa Primary school children was high with tinea capitis as the commonest.

Keywords: Zoophilic, Geophilic, Dermatophytosis, Bajabure, Lainde-Badirisa.

Introduction

Dermatophytosis (also known as ringworm) are mycoses (Fungal Infections) of the skin caused by dermatophytes- a filamentous fungi which have the ability to invade the epidermis and keratinized structures such as skin, hair and nails of humans and animals (Centre for Disease Control and Prevention (CDC, 2015). Symptoms include red, itchy, scaly, circular rash and hair loss may occur in the affected area. Globally, it ranked as one of the most common cutaneous fungal related infections of the stratum corneum of the epidermis and keratinized tissues (Midgley *et al*., 1997; Mahmoud and Ghannoum, 2009; Ameen, 2010). They comprise three (3) genera: *Trichophyton*, *Epidermophyton* and *Microsporum*. Dermatophytosis could be geophilic, zoophilic and Anthropophilic (Davies *et al*., 1982; Domino *et al*., 2013). Zoophilic dermatophytosis is sporadic infection of man caused by dermatophytes typically invading animals. The major source of this fungi infection is coming in contact with pets, wild animals and farm animals etc. Farmers are at high risk of contracting zoophilic dermatophytosis because they are in regular contact with farm animals as well as wild animals such as rats, Mice, etc which can transfer the infection. Geophilic dermatophytes are found mainly in soil and are associated with decomposing hair, feathers, hooves and other keratin sources. They infect both humans and animals. Farmers, children and gardeners etc. are at high risk of geophilic dermatophytosis. Anthropophilic (human loving) (Adefemi *et al*., 2011). Other risk factors include sharing of showers, contact sports like boxing, wrestling, judo etc, excessive sweating, contact with soil and animals and poor immune function (Domino *et al*., 2013). This study therefore investigated the prevalence of dermatophytosis among two selected primary school pupils in Damare Ward of Girei Local Government Area, Adamawa State Nigeria.

Materials And Methods

Study Area

The study was conducted in Bajabure and Badirisa Primary School, Damare Ward, Girei Local Government Area. Girei is one of the Local Government Area in Adamawa State North-Eastern Nigeria. It lies between latitude N9°18'23" and Longitude E12°27'48". The LGA has a Projected population of 211,717 (National Population Commission (NPC, 2006). The schools are located after Radio/TV Gotel base station. People in these areas are mostly farmers, cattle rearers, a few civil servants and business persons and their children mostly attend these schools. The LGA has a tropical climate, marked by dry and rainy seasons. Topographically, it is a mountainous land crossed by large river valleys-Benue, and Gongola. The rainy season commences around May and ends in the middle or late October. The rainfall is characterized by a single maximum with a mean total rainfall of 1,113.3mm. The dry season starts in late October and ends in late April. Maximum temperature in Girei can reach 40°C, around April, while minimum temperature could be as low as 18.3°C between December and early January. The major occupation of the people is farming as reflected in their two notable vegetation, fishing, and cattle rearing. Their food crops include maize, Guinea corn, Millet and groundnuts and rice.

Ethical Consideration

Approval and permission for this study was granted by the Adamawa State Ministry of Health Ethical committee on Health Research.

Sample Collection and Population

A total of 138 pupils that showed visible clinical signs of dermatophytic infection constituted the study population. Also, 138 hair and skin scrapings were collected using sterile razor blades and epilator forceps respectively and were folded in aseptic A4 papers between January-May 2013. All areas were scrapings were collected, was swabbed with ethanol before sample collection. Each of these papers was labeled with the pupils name, age, gender, date of collection, locale of infection and was transported immediately to the Department of Microbiology Laboratory, Modibbo Adama University of Technology, Yola for identification of dermatophytes via microscopy and culturing.

Direct Microscopy

Collected 138 samples (scales from skin, stubs of hairs from scalp) were observed under the microscope according to Collee *et al*. (1989) was adopted. A small portion of each sample collected from an affected skin part was placed on a grease free glass slide followed by adding drops of 10% potassium hydroxide (KOH) and was covered with a cover slip. It was then subjected to slight heating for 1 minute to soften it or to aid rapid penetration and complete tissue maceration and was viewed microscopically at low power (X10) and high power (X40) objectives for the presence of fungal elements or hyphae.

Culture of Sample

The collected 138 scrapings or samples were inoculated on Sabouraud Dextrose Agar (SDA) supplemented with chloramphenicol and incubated at room temperature at 37°C for at least 3 weeks and examined at 2 days interval for fungal growth. Pure isolates were generated by sub-culturing on Saboraud Dextrose and Potato Dextrose Agar (PDA) media respectively for both visual and microscopic examinations of cultural (colour and growth pattern) and morphological characteristics respectively. The media were prepared according to the manufacturers' instructions and followed by the addition of sodium chloride and 0.05 g chloramphenicol as described by Weitzman and Summerbell.

Identification of the Isolates

After colonies were developed, species of the cultured fungus was identified based on its microscopic and macroscopic morphology using lactophenol cotton blue by slide culture technique. Gross morphology included in the study were appearance, texture and pigmentation of the isolates (Davies *et al*., 1982).

Data Analysis

The data obtained was entered using SPSS Version 22.0 and associations were determined by the use of chi-square (X^2) at a confidence level of 5%.

Results

A total of 138 pupils were recruited for this study in the two selected primary schools. Out of which, 124 samples were positive. Microscopy and macroscopic identification revealed that the

most encountered dermatophytes are *Microsporum audounii*, *Trichophyton rubrum*, *Microsporum gypseum* and *Trichophyton schoeleinii*. *Microsporum audounii* was the leading dermatophyte isolated while *Microsporum gypseum* was the least.

The incidence of tinea capitis in the two selected primary schools showed that out of the 138 pupils recruited, 84 were from Bajabure Primary School while 54 were from Lainde-Badirisa Primary School. Out of the 84 samples in Bajabure Primary School, 72(58.0%) were positive while out of 54 samples in Lainde-Badirisa Primary School, 52(42.0%) were positive given a total of 124(90.0%) positivity (Table 1).

In terms of species of dermatophytes isolated in Bajabure and Lainde-Badirisa Primary School. *Microsporum audounii* was the highest 62(50.0%), followed *Trichophyton rubrum* 32(26.0%) and *Trichophyton schoeleinii* 20(16.0%) while *Microsporum gypseum had the least 10*(8.0%) (Table 2).

The prevalence of dermatophytes in relation to gender in Bajabure and Lainde-Badirisa Primary School (Table 3). Males examined were 128 and 116(94.0%) were positive while the females examined were 10 and yield 8(6.4%) positivity. Males were more affected than their females counterparts 94.0% versus 6.0% of them respectively, and this difference was statistically significant.

The prevalence of dermatophytes in relation to age in Bajabure and Lainde-Badirisa Primary School indicated that the highest prevalence was found among the age group 5– 10 years 100(81.0%) while the least were age group 11-15 24(19.0%) (Table 4).

Table 1: Incidence of Tinea capitis in Bajabure and Lainde-Badirisa Primary School.

Primary School	No. Examined	No. Positive (%)
Bajabure	84	72(58.0)
Lainde-Badirisa	54	52(42.0)
Total	**138**	**124(90.0)**

Table 2: Species of dermatophytes isolated in Bajabure and Lainde-Badirisa Primary School.

Dermatophytes Isolated	No. Isolated	Prevalence (%)
Microsporum audounii	62	50.0
Trichophyton rubrum	32	26.0
Microsporum gypseum	10	8.0
Trichophyton schoeleinii	20	16.0
Total	**124**	**100**

Table 3: Prevalence of dermatophytes in relation to gender in Bajabure and Lainde-Badirisa Primary School.

Gender	No. Examined	No. Positive (%)
Male	128	116(94.0)
Female	10	8(6.4)
Total	**138**	**124(90.0)**

Table 4: Prevalence of dermatophytes in relation to age in Bajabure and Lainde-Badirisa Primary School.

Age	No. Examined	No. Positive (%)
5-10	110	100(81.0)
11-15	28	24(19.0)
Total	**138**	**124(90.0)**

Discussion

Dermatophytosis is common and remains an important public health problem among children worldwide and particularly in Nigeria (Ajao and Akintunde, 1985; VanderStraten *et al*., 2003). Incidence of dermatophytic infections globally showed high prevalence rate recorded in many developing countries within the tropical and subtropical regions of the world including Nigeria. This study revealed that the overall prevalence of superficial fungal infection as 90.0%. Bajabure Primary school has a prevalence rate of 58.0% while Lainde-Badirisa Primary school had a prevalence of 42.0%. The result revealed Bajabure primary school with the highest positive cases attended by mostly the children of Bajabure, Sami-naka and Koma. The prevalence in this study is higher than the findings of Anosike *et al*. (2000) who reported 21.0% in a study conducted in Ebonyi State, South-Eastern Nigeria. Also, findings from this study is consistent with previous report by Ndako *et al*. (2012) on the prevalence of dermatophytic infections among randomly sampled school children within Nassarawa Local Government Area of Kano State which reported 91.0% fungal infection. Sporadic reports on the frequency of dermatophytes and dermatophytosis emerging from different parts of the country in line with Hay (2003). Ibrahim and Mohammed (2004) stated that nomadic lifestyle and human interactions with domestic and wild animals promote the prevalence of dermatophytosis globally. The major reasons for higher prevalence may be because of so many factors such as host socioeconomic characteristics (age, gender, family size, individualistic and communal lifestyle etc), over-crowding, geography, level of hygiene practice, nature of school infrastructure and amenities, locality, climate, contact sports, contact with domestic and wild animals and nature of health care system in the environment that facilitate the transmission of dermatophytic infections. Ogbonna *et al*. (1985) stated that differences in the prevalence of superficial fungal infection in many regions is as a result of variation in climatic and environmental conditions of the areas.

The dermatophyte species isolated in this study belonged to two genera *Trichophyton* and *Microsporum*, of which two species, mostly anthropophilic, were identified. *Microsporum audouinii* was the commonest specie followed by *Trichophyton rubrum*. Others include *T. schoenleinii*, and *Microsporum gypseum*. A lot of Studies have showed differences in the dermatophytes species isolated from one geographical region to the other (Ayanbimbe *et al*., 2008). The commonest dermatophyte species isolated *was Microsporum audouinii* (50.0%) and this is similar to findings done by Olaide *et al*. (2014) which reported *Microsporum audouinii* as the leading cause of dermatophytic infections among school children in Ile-Ife, South-Western Nigeria While *M. gypseum* recorded the least in these study.

The male are the mostly affected than their female counterpart (94.0% versus 6.0%) in this study due to the fact that they play in the sand/school playground where they end up contaminating/infecting themselves. This is in consonance with findings of Ndako *et al*. (2012) which investigated the prevalence of dermatophytosis and associated non-dermatophytes among Islamiyya school children of ages 5 – 13 years old in Kano metropolis. Physical activities of male pupils in contact sports such as Judo, Basketball, wrestling, football, boxing and tag games coupled with a African tradition that vanquish females over males in attending to pets/animals in household,

farming activities are some of factors that predispose males to high prevalence of dermatophytic infections.

Prevalence of dermatophytic infection in relation to age group of pupils attending the selected two primary schools. The study revealed that aged group 5-10 years had the highest infection of 81.0% while the least infection rate was recorded in pupils with age group 11-15 years which was 19.0%. Our finding is at variance with the findings of Olaide *et al*. (2014) which reported about 40.0% among age group 5-10 years but consistent with the findings of Olaide *et al*. (2014) among age group 5-13 years which recorded 91.0% of the distribution of dermatophytosis and associated fungi across age groups of sampled population.

Conclusion

Superficial mycoses are the most common and widely distributed of all fungus diseases. They are confined to the keratinized layer of the skin and its appendages. The disease is incited by a group of fungi the dermatophytes, embracing many species. The prevalence of dermatophytic infection among primary school children in Damare ward, Girei LGA, Adamawa Stat Nigeria, remains high. Tinea capitis was the most common fungal infection. *Microsporum audouinii* was the commonest organism isolated in the study as well. The general sanitary condition of the primary school should be improved. Also, health education should be taught in all schools to educate students on personal hygiene.

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Conflict of Interests: The authors declare no conflict of interests.

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