Research Note

Prevalence of tinea capitis among school age children in eastern Sudan

Abstract

Background: Tinea capitis is a widespread fungal disease affecting the scalp, hair follicles, and skin underlying them. Ring worm infection is most common in children, particularly in late childhood and adolescence, as well as in immunocompromised individuals. There are no reports on the prevalence of Tinea capitis in children in Port Sudan.

Objective: The aim of this study is to explore out how prevalent Tinea capitis is in school-aged children, to identify associated risk factors, to help raise public awareness about the importance of hygiene and treatment, and to mitigate infection spread.

Methods: This study included a retrospective descriptive review of dermatology clinic patient reports from May 2016 to March 2018, as well as a direct interview with primary school students in Port Sudan, Red Sea State. To recognize the most susceptible age groups, genders, risk factors, and clinical manifestations. Data was collected based on clinical diagnosis by dermatologists, and children were interviewed based on laboratory diagnosis by authors using KOH of unstained scraping preparations after overnight incubation, and Tinea capitis was confirmed microscopically. Data from documents and questionnaires were manually interred and analyzed, and frequencies were measured and displayed in tables.

Results: An overall prevalence of Tinea capitis was (17%) 235/1350 among the entire study population. The study showed that the disease is more in male than female with male: female ratio (8.4:1), and the most vulnerable age group was (4–8 years), 116/235 (49.4%), the incidence was increased by crowding [46/50,92%] the most affected neighborhoods was El Qadisiyah[62/235 (26.4%)].The commonest clinical feature was the weakness of the hair[40/50,80%].

Conclusion: There has never been a report on Tinea capitis in Port Sudan, and there are no screening services to assess the incidence. According to the findings of present study, Tinea capitis was common (**17**%) among children attending government-owned state primary schools in Portsudan-Red Sea State. Male gender and residing in Sudan's Red Sea climatic region were reported to be independent risk factors.

Keywords: fungal infections, superficial mycoses, tinea capitis, port Sudan

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Introduction

Humans are remarkably susceptible to fungal infections in general. Invasive fungal infections (IFIs), which are life-threatening and commonly reported a rise in immunocompromised people, vary from mucocutaneous infections, which do not endanger life but impair quality of life.[1] Their incidence varies greatly from country to country. In certain parts of the world, a high burden of dangerous fungal infections has been displayed.[2]

Dermatophytosis is the most common form of superficial fungal infection caused by dermatophytes, a fungus that can develop by invading the keratin of skin, hair, and nails to acquire nutrients. Several studies have been published on the intracontinental variations of global occurrence as a result of changing climatic conditions around the globe.[3] Tinea capitis is a scalp and hair shaft infection that is the most prevalent dermatophytosis in children. Anthropophilic, zoophilic, and geophilic transmission are also possible methods of transmission. Clinical manifestations are influenced by the host's immunity, the organisms present in the system, and the mechanism of transmission.[4] These organisms colonize keratin tissues, causing inflammatory reactions in the host as a result of their metabolic residues. Due to their failure to enter viable tissue of an immunocompetent host, they are normally limited to the nonliving accredited layer of the epidermis. Tinea capitis is a superficial dermatophyte infection marked by either inflammatory or non-inflammatory lesions on the non-glabrous surface. Acid proteinases, elastase, keratinases, and other proteinases are thought to function as virulence factors (i.e. skin regions other than the scalp, groin, palms, and soles). Tinea capitis, also known as ringworm, is a superficial fungal infection (dermatophytosis) of the scalp, especially on non-glabrous skin.[5]

In the past few years, fungi have evolved dramatically. These microorganisms' virulence has been tailored to the human body, resulting in a variety of clinical manifestations. Depending on the human body part in consideration and the host's immune system, fungi can cause disease in a multitude of ways.[6] Dermatphyter, a form of fungus that can reside on the external skin, inside hair, and in skin, infects about 10-20% of the world's population, causing skin diseases.[7] Tinea capitis clinical symptoms vary based on the form of hair invasion, host resistance, immune system, and degree of inflammatory host response, but may be broadly categorized as alopecic or inflammatory. Kerion, a tender mass of pustules, purulent drainage, lymphadenopathy, malaise, and fever, and favus, a yellow cup-shaped crust around the hair with inflammation and scarring, are two types of inflammatory Tinea capitis.[8] Our respondents were from

Red Sea State, where the climate was hot and humid most of the year. Due to the high moisture content of the environment, this climate slows sweat evaporation, allowing fungal growth to flourish, resulting in a high occurrence of fungal diseases in this region. This study was conducted to determine the prevalence of Tinea capitis in school-aged children, to display the associated risk factors, and to discover more about the most common fungal pathogen that causes superficial mycosis. Knowledge of Tinea capitis incidence aids in raising public consciousness about the importance of hygiene and care, as well as reducing transmission OF infection.

Patients and methods

This study was a retrospective hospital based conducted at Dermatology clinics in Port Sudan hospital from May 2016 to March 2018 from patients and statistical reports. None of them had any significant medical history as an important criterion for inclusion. Gender and age listed as independent variables, while residence reported as dependent. The collection and preservation of specimens and entire mycological evaluation was carried out in the microbiology lab.

Study protocol

Each child's sample was acquired by scraping the affected head region using a sterile scalpel. Before collecting samples, the collection site was disinfected with 70% (v/v) ethanol. Scrapings were collected on sterile paper and rolled inside a neatly-labeled wrapper to reduce moisture and sunlight exposure, as well as contamination growth. The piece of paper was identified (with the student's name, age, and gender) and transported to the lab for analysis. A sufficient quantity of sample material was gathered to ensure that enough was available for any of the necessary inquiries. All scrapings were subjected to direct microscopy for fungal elements in 10% Potassium Hydroxide (KOH).

Data management

Data from documents and questionnaires were manually interred and analyzed, and frequencies were measured and displayed in tables.

Ethical consideration

Educational Development Center's (EDC) ethical committee and the administrator of the Port Sudan dermatology and venereology hospital all issued their authorization. As an eligibility criterion, the patient's informed consent was obtained.

Results

An overall prevalence of Tinea capitis was (17 %) 235/1350 among the entire study population. Of the 235 infected with T.capitis form patient's statistical reports of dermatology clinics at Port Sudan hospital, 210 males and 25 females participated in this study with male: female ratio (8.4:1), including 62 (26.4%) from El Qadisiyah, 19/235 (8.0 %) from Slalab and 105/235 (44.7 %) from other neighborhoods, and a higher proportion of children categorized at (4-8 year) of age 116/235 (49.4%) (Table1). As detailed in Table 2, 40 from 50 (80%) of children presented with weak hair as clinical dermatophytosis lesions, the most frequent (46/40) (92%/80%) risk factors were crowding and poor hair hygiene respectively.

Table1 Distribution of gender, age groups, and residency

Variables	Parameter	Frequency n=235	Percent %
Gender	Male	210	89.4
	Female	25	10.6
Age group (Years)	< 4.0	18	7.6
	4-8	116	49.4
	8-11	39	16.6
	>11	62	26.4
Residence	El Qadisiyah	62	26.4
	Slalab	19	8.0
	Toker	14	6.0
	Hayi Almatar	14	6.0
	Dar Alsalam	9.0	3.8
	Umm Al-qura	12	5.1
	Other neighborhoods	105	44.7

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Table 2 Distribution of clinical features and associated risk factors

Variables	Parameter	Frequency n=50	Percent %
Clinical feature	Itching	33	66
	Weak hair	40	80
	Scale	26	52
	Stain	26	52
	Bold spot	26	52
	Red papule	13	26
	Others	6	12
Risk factors	Crowding	46	92
	Sharing beds	34	68
	Pets	17	34
	Poor hair hygiene	40	80
	Sharing hair brush	43	86
	Infected person at home	23	46

Discussion

Tinea capitis is a highly contagious fungal infection and compliance with the treatment, which is required to last for several weeks, may be difficult to achieve. Tinea capitis has been reported as a major medical condition in primary school children in Africa and globally, and healthcare professionals should address that issue when designing school health. Tinea capitis primarily affects African American and migrant African children, according to published studies in the United State of America (US) and Europe. In Nigeria, the incidence of Tinea capitis varies greatly: in the eastern part of the country, it ranges from 9.4% to 51.8 %. The prevalence was 11.34 % in Ivory Coast, and Ethiopia had a high prevalence close to Ebonyi State in Nigeria.[9] In present study the prevalence was higher (**17**%) than many other African countries, The high temperature and humidity that dominate Port Sudan's climate, as well as the overcrowding that characterizes primary schools, can be attributed for the significant increase in Tinea capitis infection among school children. It may also be attributable to some of the practices and rituals of some tribes in these communities about head hair care, this suggestion in agreement with that of.[10] In agreement with the majority of African studies, our findings highlight male gender as a significant Tinea capitis risk factor among school children. For example, in Mali, the prevalence of Tinea capitis was 4.4% and 2.1% in school boys and school girls, respectively. Meanwhile, the prevalence was 3 and 5 times higher in boys than in girls in Abidjan (Côte d'Ivoire) and Central Nigeria, respectively Tinea capitis, a condition commonest in primary school children.[9] Male pupils were found to have a higher prevalence of the infection (56.2 %, 59/105) than female pupils (43.8 %, 46/105). Female students and their families may be more concerned about their personal styles and hygienic habits than male students.[2]

We report that Tinea capitis is more prevalent in children between the ages of 4 and 8 years. This is similar to the findings by other studies, which reported that most of the infected children were below the age of ten years. These results support the suggestions that dermatophytosis, especially Tinea capitis, is predominantly a pre-pubertal disease. Some of the explanations that have been accorded to this are that the fatty acids in the sebum produced at puberty may have some fungistatic properties, thereby preventing the infection of older children. For this reason, some studies even consider children in older age categories to be immune to Tinea capitis. Another factor that may support the higher prevalence of Tinea capitis among younger children is the likelihood of poor hygiene in pre-pubertal stages, compared to older children who usually become more conscious of their hygiene practices when they reach their teenage years.[2] The higher prevalence was reported in children from El Qadisiyah (26.4%), which characterizes by high population density and popular neighborhoods with poor urban design and lack of standard health facilities, and may play a significant role in the spread of a variety of infectious diseases among the general public, particularly among children. These findings in agreement with other studies implemented in such medical issues. Our study showed a significant association between the infection and factors such as crowding, sharing beds, hair brush, poor hair hygiene, and living in contact in with pets. This is in conformity with results from similar studies.[11,12] For these reasons, teachers must conduct strict hygiene inspection, that is, inspect pupils for the presence of lesions and enforce the frequent and proper washing of heads and hand practices. Lower prevalence of infection may observe in schools where the hygiene inspection and intervention was committed. Major limitation of this study was the difficulty obtaining information from children, and thus, some of this information was collected from their relatives. Moreover the accuracy of the diagnostic modality was not carried out based on assessment of response to antifungal therapy. A major factor in addressing the epidemic of Tinea capitis is improving the socio economic status, hygiene, living conditions in these communities, and using a combination of topical and systemic antifungal therapy. Parents and primary school children will benefit from periodic mass treatment and eventual isolation and prompt treatment of subsequent new infections. Moreover the accuracy of the diagnostic modality was not carried out based on assessment of response to antifungal therapy.

Conclusion

According to the findings of this study, Tinea capitis was common (17%) among children attending government-owned state primary schools in Port Sudan-Red Sea State. Male gender and residing in

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Sudan's Red Sea climatic region were reported to be independent risk factors. More epidemiological studies are needed to determine the impact of climatic and ethno-cultural variables in the dissemination of dermatophytosis.

Recommendations

We motivate schools to adopt healthy lifestyles via comprehensive health education and promotion initiatives, with an emphasis on dermatophytosis early diagnosis and treatment. Teachers and school health care providers are crucial members of such teams. There is a need to facilitate regular veterinary examinations for pets and domesticated animals in order to diagnose and manage infection early.

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Conflicts of interest

The authors report no conflicts of interest. Authors alone are responsible for the content and the writing of the paper.

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