

*Original Research Article*

# Tinea Capitis: Frequency and Clinical Manifestations among Children in Khartoum Dermatological Hospital, Sudan

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## Abstract

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Tinea capitis is a common infection of the scalp hair caused by dermatophyte fungi and occurs predominately in children. It is also known as herpes tonsurans, ringworms of the hair or scalp ringworm. Tinea capitis is the most common dermatophytosis in children. Nowadays it is considered as one of the most common causes of hair loss among children. The aim of this study is to identify the frequency of Tinea capitis and its clinical manifestations among children in Khartoum Dermatological Hospital. That will help control of Tinea capitis infection which is not impossible with current understanding of the immunology, host susceptibility, advances of new methods of diagnosis, treatment and by training of doctors and other health workers. The study was conducted in Khartoum Dermatology and Venereology Teaching Hospital outpatient clinics in 2019 (January – September). Khartoum Dermatology and Venereology Hospital is a referential hospital in Sudan. The type of study was descriptive, retrospective. The number of patients was 117. They were interviewed and answered the questionnaire prepared. The type of study was quantitative and qualitative. Males were 102 and females were 15. According to age distribution; 19 patients (16.2%) were less than 5 years, 53 (45.3%) were 5 – 10 years, 40 (34.2%) were 10 – 15 years, 5 (4.3%) were 15 – 18 years. In relation to history of contact; patients had history of contact were 97 (82.9%) and those had no history of contact were 20 (17.1 %). The clinical picture of the disease was varied; those had one erythematous plaques were 3 (2.6%), with pale scaly papule were 4 (3.4%), with numerous papules in a typical ring form were 8 (6.8 %), with scaling and patchy hair loss were 84 (71.8%), with patch of alopecia were 2 (1.7%), with follicles discharge pus were 16(13.7%). It was found that patients had scalp infection were 106 (90.6%), eyelashes infection were 6 (5.1%) and eyebrows infection were 5 (4.3%) patients. Of those who had scalp manifestation; 102 (87.2%) had hair loss while the other 4 (3.4%) had no hair loss. Tinea capitis prevalence in the community is high. It is important to raise community awareness about Tinea capitis presentation and mode of transmission. Health education, training of doctors and other health workers, a clear plan for diagnosis, treatment, and referring patients to referral hospital are important for reducing infection in the community.

**Keywords:** Tinea capitis, frequency, clinical manifestations, children

## INTRODUCTION

Tinea capitis is a common infection of the scalp hair caused by dermatophyte fungi and occurring predominantly in children (Mapelli et al., 2013). It is also

known as herpes tonsurans, ringworms of the hair or scalp ringworm (Ndiaye et al., 2015; Kundu et al., 2012). Tinea capitis is the most common dermatophytosis in

children aged between six months and prepubertal age (Ndako et al., 2012). Nowadays it is considered as one of the most common causes of hair loss among children (Rapini et al., 2007). Tinea capitis is caused by several species of Trichophyton and Microsporum (Ndiaye et al., 2015). Trichophyton infection predominate in Central America, the United States, and in parts of Western Europe, while Microsporum species are mainly in South America, Southern, and Central Europe, Africa and the Middle East.

Tinea capitis was prevalent in many countries in the early twentieth century. It was brought under effective control in Europe and North America after the introduction of Griseofulvin and concerned public health intervention, while it remains endemic in other regions. The Clinical manifestations range from mild scaling with a little hair loss to large inflammatory and pustular plaques with extensive alopecia which sometimes may be difficult to distinguish from other skin diseases that cause scaling such as psoriasis and seborrhoeic dermatitis.

The basis of diagnosis of Tinea capitis is a positive microscopic examination and microbial culture of epilated hair. Knowledge of underlying pathogenetic mechanisms and development of effective immunity have shown striking advances. New methods of diagnosis ranging from dermatoscopic to molecular laboratory tests have been developed even though have been assimilated into routine practice in many countries. Control of Tinea capitis is not impossible and with current understanding of the immunology, host susceptibility, including the latest findings of specific CARD 9 gene mutation with widespread with deep dermatophytosis (Patel and Schwartz, 2011).

## METHODOLOGY AND RESULT

This study was conducted in Khartoum Dermatology and Venereology Teaching Hospital outpatient clinics in 2019 (January – September). Khartoum Dermatology and Venereology Hospital is a referential hospital in Sudan. The type of study was descriptive and retrospective. The number of patients was 117 included in the study. They were interviewed and answered the questionnaire prepared. The type of study was quantitative and qualitative. The data was collected and analyzed.

Males were 102 and females were 15. The ratio was 1: 6.8 (Figure 1). According to age distribution; 19 patients (16.2%) were less than 5 years, 53 (45.3%) were 5 – 10 years, 40 (34.2%) were 10 – 15 years, 5 (4.3%) were 15 – 18 years (Figure 2). Regarding duration of the disease; less than 4 weeks duration were 29 (24.8%), 4 – 6 weeks were 50 (42.7%), 6 weeks – 6 months were 31 (26.5%), more than 6 months were 2 (1.7%) and uncertain were 5 (4.3%) (Figure 3). According to the family size: less than 5 members in the family were 21 patients (17.9%), 5 members in the family were 27

patients (23.1%), 6 members were 28 patients (24%), 7 members were 22 patients (18.8 %) and 8 members in the family were 19 patient (16.2 %) (Figure 4). In regards to education level of patients' fathers: it was found that 20 (17.1%) were illiterate fathers, 36 (30.8%) were primary school graduates, 38 (32.5%) were secondary school graduates, 19 (16.2%) were university graduates and 4 (3.4%) were postgraduate (Figure 5).

In relation to history of contact; patients had history of contact were 97 (82.9%) and those had no history of contact were 20 (17.1%) (Figure 6). The clinical picture of the disease was varied; those had one erythematous plaques were 3 (2.6%), with pale scaly papule were 4 (3.4%), with numerous papules in a typical ring form were 8 (6.8 %), with scaling and patchy hair loss were 84 (71.8%), with patch of alopecia were 2 (1.7%), with follicles discharge pus were 16 (13.7%) (Figure 7). It was found that patients had scalp infection were 106 (90.6%), eyelashes infection were 6 (5.1%) and eyebrows infection were 5 (4.3%) patients (Figure 8). Of those who had scalp manifestation; 102 (87.2%) had hair loss while the other 4 (3.4%) had no hair loss (Figure 9). It was noticed that 90 patients with scalp manifestations had itching and the other 16 (13.7%) had no itching (Figure 10).

## DISCUSSION

The purpose of this study is to clarify the high prevalence of Tinea capitis among prepubertal children and identify the most clinical finding on presentation. Despite Khartoum Dermatology and Venereology Teaching Hospital being a tertiary hospital, in fact, the patients who attend the hospital do not reflect the true prevalence of all children who had Tinea capitis in the community. Our study identifies a high prevalence of 21.4% of patients presented to Khartoum Dermatological hospital with Tinea capitis. Other studies show high prevalence among prepubertal children and endemicity in part of developing countries (Mapelli et al., 2013; Bennassar and Ramon, 2010). This was similar to the study in Gabon by Hogewoning AA et al which showed high prevalence of Tinea capitis among prepubertal children 23.1% (Hogewoning et al., 2011). Yet in Algeria by Hamroune Z et al it was (33.5 %) (Hamroune et al., 1995), Senegal study by Ndiaye M et al showed high prevalence as (45%) (Ndiaye et al., 2015) and in Tunisia by Kallel A et al showed (59.2%) (Kallel et al., 2017). On the other hand; the study in by F. A. Keckha et al in Cameroon showed low prevalence than in our study as (8.1%) (Keckha et al., 2014).

In our study we found that the vast majority of patients (87.2 %) were males compared to the study by F. A. Keckha et al in Cameroon (63.7%) (Keckha et al., 2014) and to the study by Nenoff P et al in Kenya (59.3 %) (Nenoff., 2014). In regards to the age distribution; we found that the most infected children were between 5 –

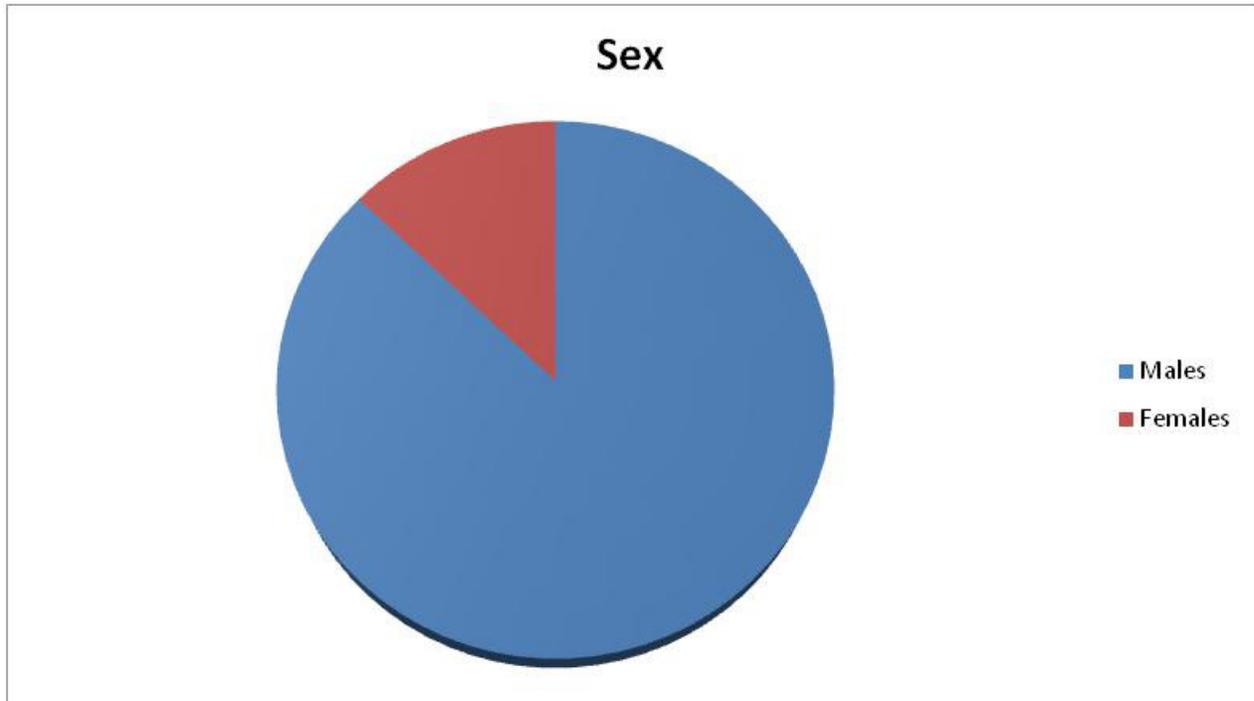


Figure 1. Showed the sex distribution of patients with Tinea capitis

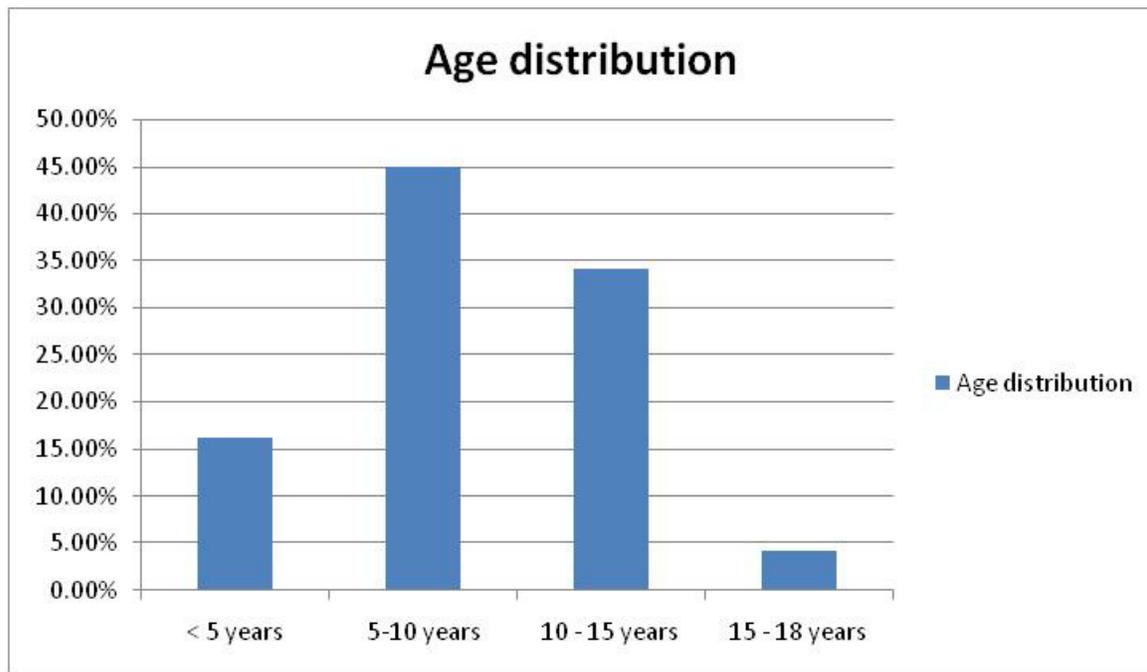


Figure 2. Showed the Age distribution of patients with Tinea capitis

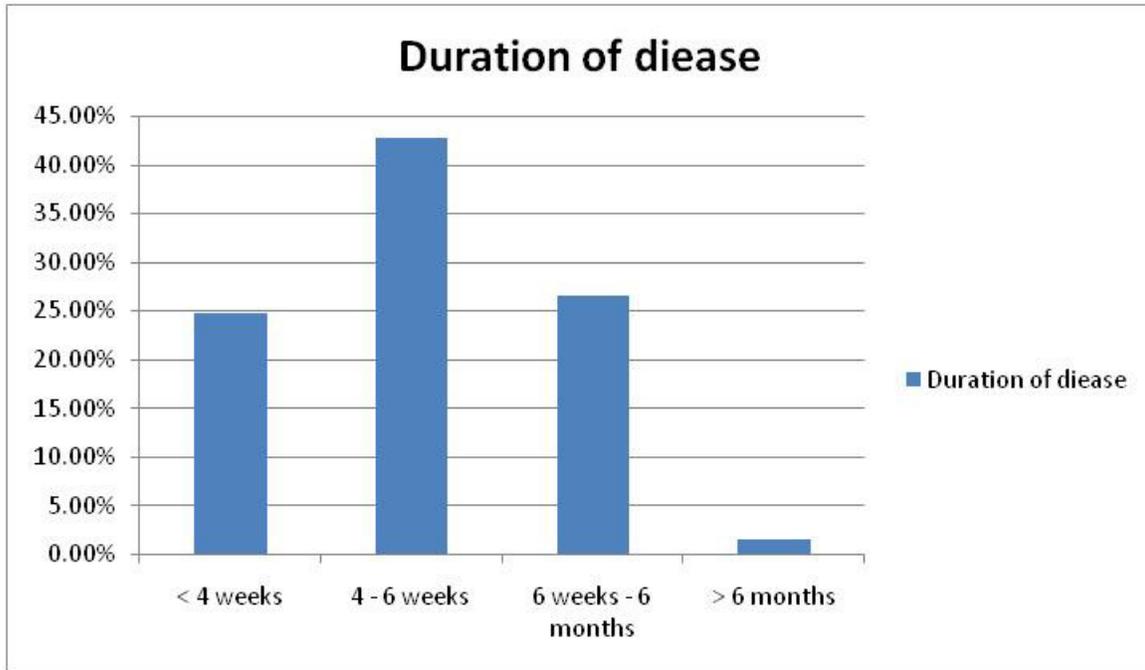


Figure 3. Showed duration of the disease among patients with Tinea capitis.

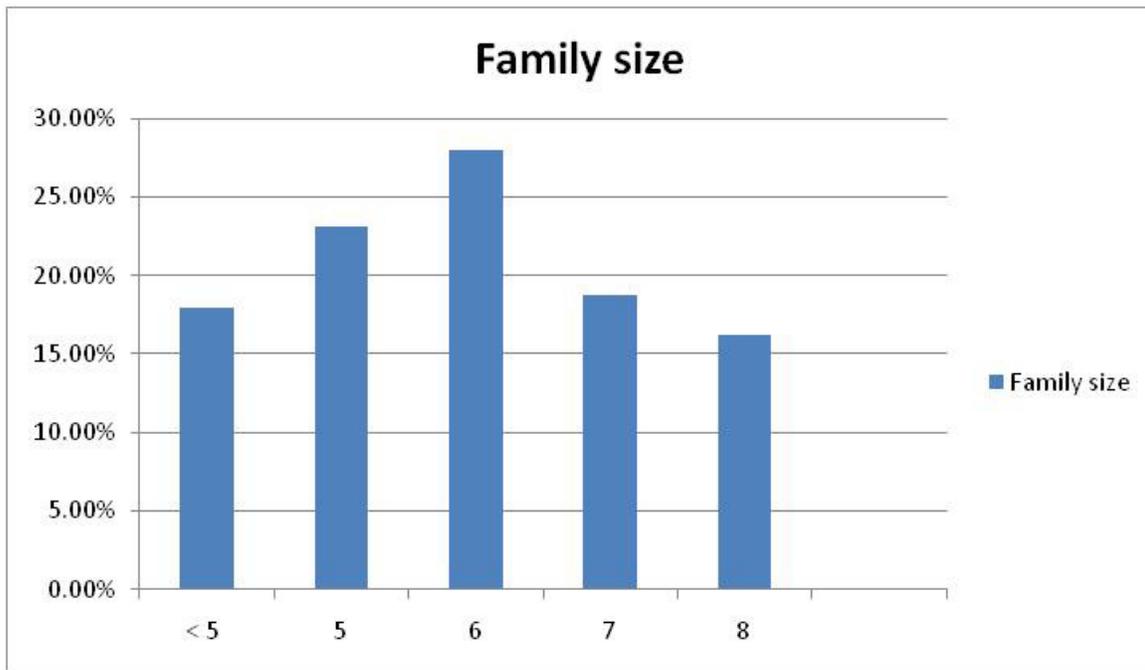
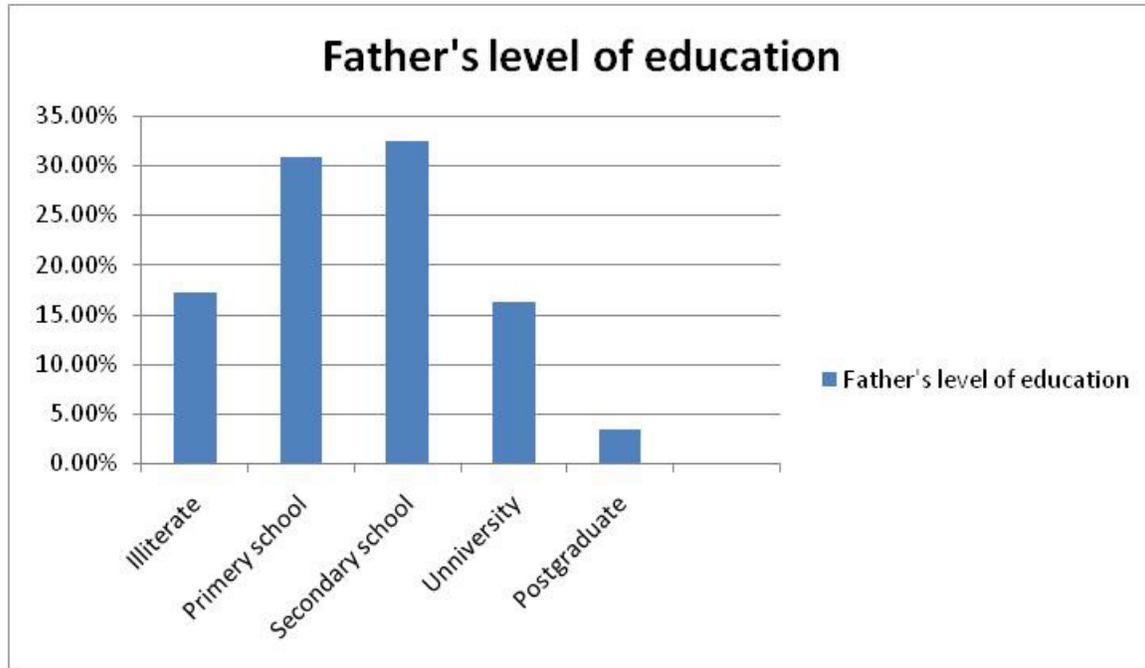
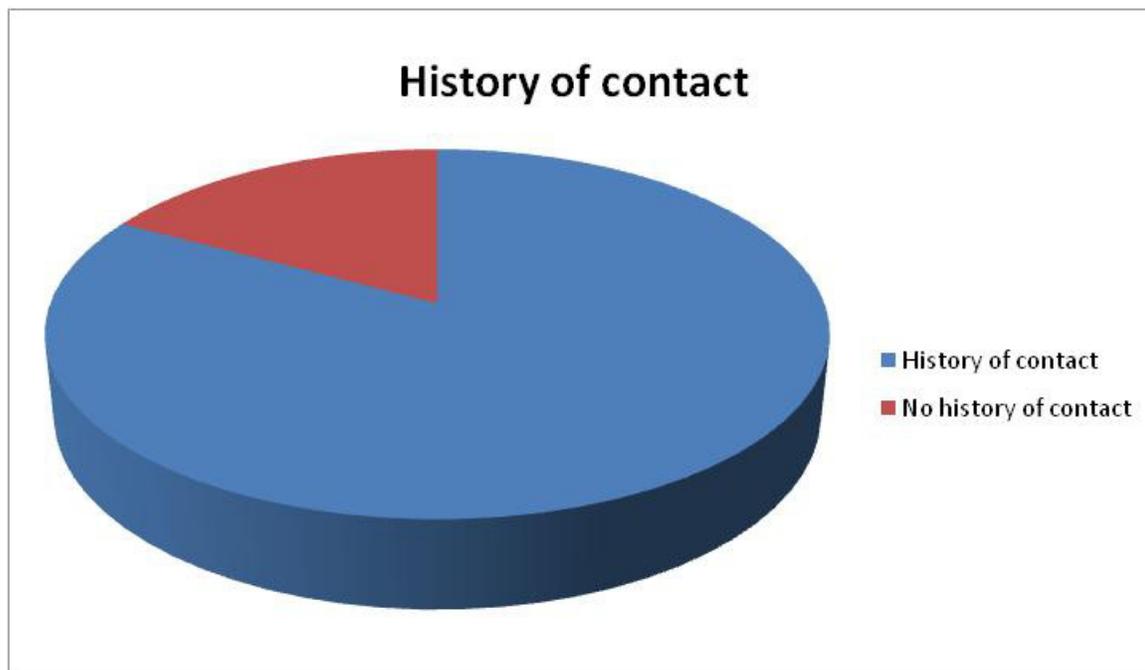


Figure 4. Showed the distribution of patients with Tinea capitis according to family size



**Figure 5.** Showed the Educational level of patient's fathers with Tinea capitis



**Figure 6.** Showed history of contact of the patients with Tinea capitis

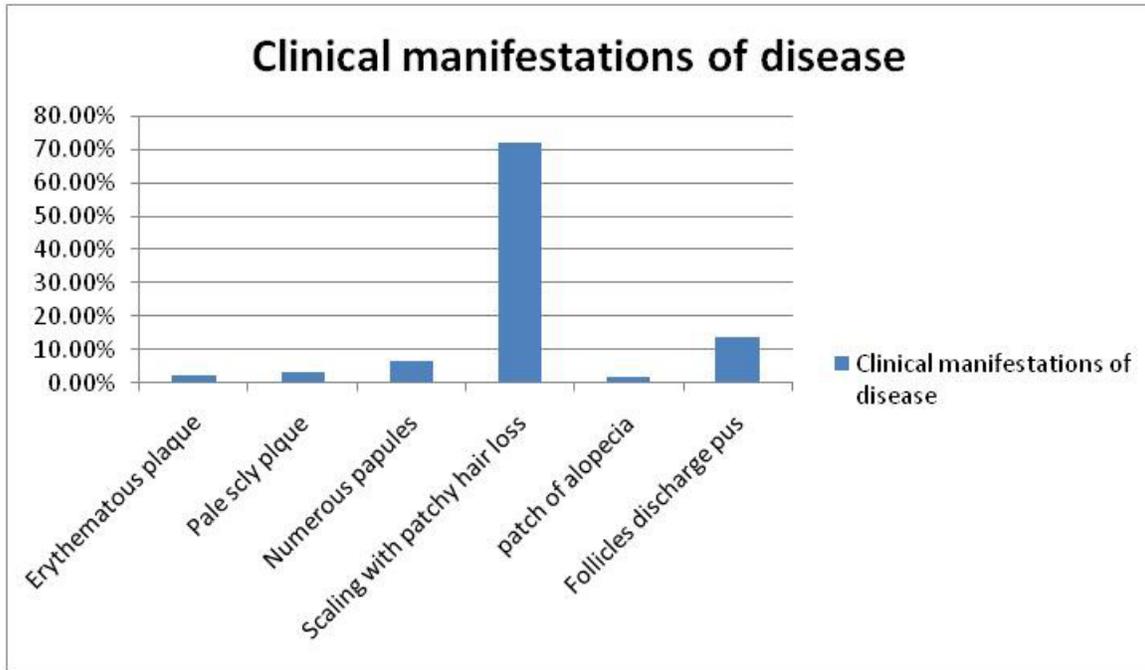


Figure 7. Showed the clinical distribution of the disease among patients with Tinea capitis.

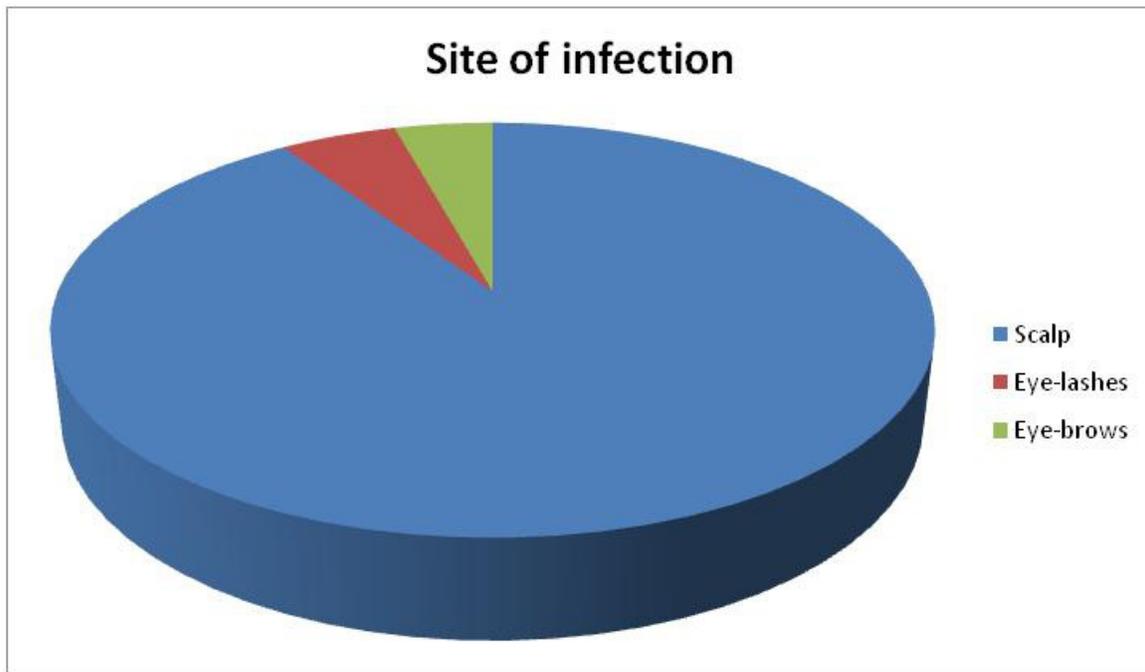
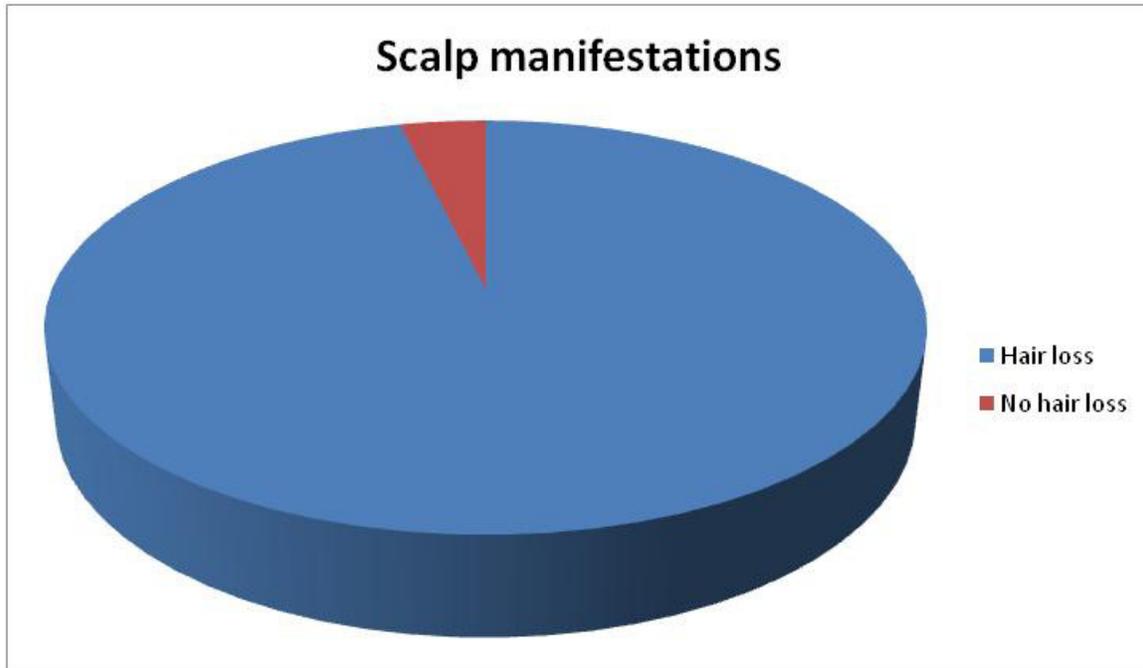
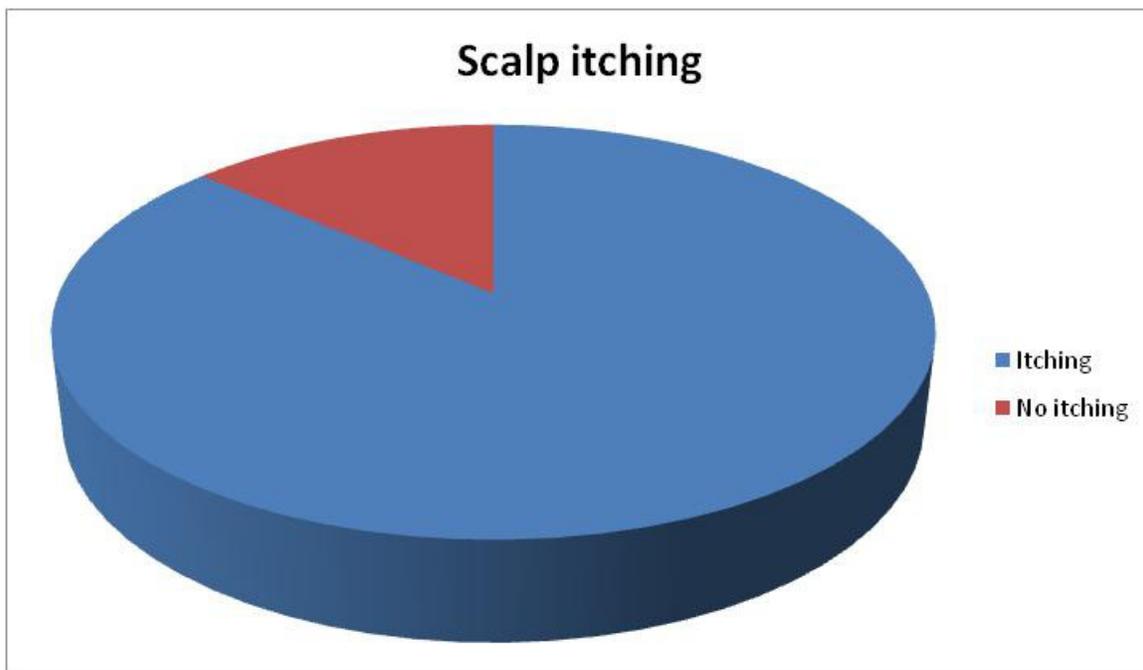


Figure 8. Showed the site of infection



**Figure 9.** Showed scalp manifestation



**Figure 10.** Showed scalp manifestation with itching or without itching.

15 years (80%). In comparison to the study in India by Kundu et al the age group 1 – 15 years was found to be only (50%) (Kundu et al., 2012). Ali et al in Ethiopia reported the median age is 10 years (Ali et al., 2009). The most frequent site of infection in our study was the scalp (90.6%). Scales and patchy hair loss in

(71.8%) were the main clinical manifestations, yet in the study by Keckha et al (59.3%) of children presented with small plaques of alopecia (Keckha et al., 2014).

Many factors contribute to the transmission of *Tinea capitis* among children; we found that 84.6% of the patients share beds and clothes with each other. This

proves that human to human is a mode of transmission (Mapelli et al., 2013; Bennassar and Ramon, 2010). The study done by Kundu et al in India found that one of the predisposing factors with statistically significant association with Tinea capitis was sharing of the same bed (Kundu et al., 2012). Another study in Nigeria by Ndako J. A. et al showed sharing an object was one of the most common predisposing factors for transmission of Tinea capitis among the children (Ndako et al., 2012). Keckha et al study found communal living was the most incriminated risk factor of Tinea capitis (Keckha et al., 2014). One of the important risk factors is the presence of pets in the family. In our study 24.8% of patients had a pet at home which was similar to the study by Kallel A, et al where they found that pets were the main reservoir of Tinea capitis organisms (Kallel et al., 2017).

### CONCLUSION AND RECOMMENDATION

Tinea capitis prevalence in the community is high. It is important to raise community awareness about Tinea capitis presentation and mode of transmission. Health education sessions at schools, community, and health centers are important to increase the public awareness of the disease. Health promotion activities through media (Radio, TV, etc.) and posters are of great importance. Encourage the community especially the students and housewives to practice good personal hygiene habits. All patients should be treated and isolated. Training of doctors and other health workers at all levels of health services to evaluate patients with Tinea capitis infection. A clear plan for diagnosis, treatment and referring patients to referential hospitals shall be implemented. Tinea capitis is not the responsibility of the patients alone but it is a community and government responsibility and all shall share this responsibility.

### ACKNOWLEDGEMENT

The authors would like to thank the Khartoum Dermatology and Venereology Teaching Hospital staff and administration for their great help and support to produce this study.

**Disclosure of Conflict of Interest:** Nil to disclose.

**Statement of Informed Consent:** Informed consent was obtained from all guardians of children included in the study.

### REFERENCES

- Ali J, Yifru S, Woldeamanuel Y (2009). Prevalence of Tinea capitis and the causative agent among school children in Gondar, North West Ethiopia. *Ethiop Med J* .. Oct; 47(4): 261 – 9.
- Bennassar A, G. Ramon (2010). (Management of Tinea capitis in childhood) clinical cosmetic and investigation al *Dermatology*, 3:89 – 98. doi: 10.2147/ccid.s 7992 .
- Hamroune Z, Mazouz A, Benelmouffok AB, Kellou D (1995). Evolution of tinea capitis observed in mycology laboratory of institute Pasteur of Algeria from to 2015. *J Mycol Med*. 2016 Dec;26 (4): 337 – 344.
- Hogewoning AA, Adegnika AA, BouwesBavinck JN, Yazdanbakhsh M, Kremsner PG, Van der Raaij – Helmer EM, et al. (2011). Prevalence and causative fungal species of tinea capitis among schoolchildren in Gabon. *Mycoses*. Sep; 54 (5): e 354 – 9.
- Kallel A, Hdider A, Fakhfakh N, Belhadj – Salah N et al. (2017). Tinea capitis: Main mycosis child Epidemiology study on 10 years. *J Mycol Med.*, Sep; 27 (3) :345 – 350
- Keckha FA, EA Kouoto a, T. Nkoa a, E. I. Nweze c, D.C.M. Fokoua a, S.Fosso b M . R. Somo (2014). Epidemiology of tinea capitis among school-age children in Meiganga, Cameroon. *Journal de Mycologie Medicale*. Volume 24, issue 2, June.
- Kundu D, L. Mandal, I and G. Sen (2012). Prevalence of Tinea capitis in school going, children In Kolkata, West Bengal. *J Nat Sci Biol Med*. Jul – Dec; 3 (2): 152 – 155. Doi: 10 .4103/0976-9668.101894.
- Mapelli ET, Cerri A, Bombonato C, Menni S (2013). Tinea capitis in the pediatric population in Milan, Italy, the emergence of *Trichophyton violaceum*. *Mycopathologia*.; 178:243-246.
- Ndako JA, Osemwegie O, Olopade B, Yunusa GO (2012). Prevalence of Dermatophytes and other associated Fungi among school children. *Glob. Adv. Res. J. Med. Sci.*;1;49 – 56
- Ndiaye M, Diougue K, Seck MC, Badaine AS, Diallo MA, Deme AB, Ndiaye YD, Dieye B, Diallo S. Ndoye NW, Ndir O, Ndiaye D (2015). Epidemiological profile of Tinea capitis in Dakar (Senegal). A 6 – year retrospective study (2008 -2013). *J Mycol Med.*; 25 (2): 169-76.
- Nenoff P, Kruger C, Schaller J, Ginter – Hansmelmaye G, Schulte – Beerbuhl R, Tietz HJ (2014). Mycology – an update part 2: dermatomycoses: clinical picture and diagnosis. *J Dtsch Dermatol. Ges.*; 12 (9): 749 – 77.
- Patel GA, Schwartz RA (2011). Tinea capitis: still an unsolved problem? *Mycoses.*; 54: 183 – 188.
- Rapini RP, Bologna JL, Jorizzo JL (2007). *Geratology: 2 – Volume* . Set. St. Louis: Mosby p. 1135. ISBN 978 – 1 – 4160 – 2999 – 1.