

Original research article**Prevalence of Tinea Capitis in School Going Children in Lucknow, Uttar Pradesh**

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Received:20-12-2021. Revised:15-01-2022. Accepted:27-01-2022

Abstract

Background and Objective: Tinea capitis is a prevalent infection, particularly in areas with few resources. The purpose of this study was to investigate the prevalence of tinea capitis in school-aged children and the impact of personal hygiene on prevalence.

Materials and Methods: A cross-sectional study was carried out in 422 school going children during month of July 2019 to December 2019. All the children belong to class first to class seven and the age group of 6 years to 14 years. A questionnaire was given out, and cultures of scalps, skin scraping/hair stub samples were taken in order to identify and confirm the etiological agents.

Results: Out of 422 children screened in the study, 42 were observed to have Tinea capitis by clinical examination, providing an overall prevalence rate of 10% among the school children. 252 males and 170 females aged between 6 and 14 years with mean age of 10.5 ± 2.16 years. Majority of children with Tinea capitis had black dot type of patches (57%) followed by those having grey patches (38.3%). Majority of children had poor personal hygiene.

Conclusion: Tinea capitis is common among school-aged children in Lucknow, Uttar Pradesh, and appropriate efforts must be made to reduce its prevalence.

Keywords: Tinea capitis, Prevalence, Children, Dermatophytes

Introduction

Tinea capitis is a fungal infection of the scalp, hair follicles, and hair shafts that is particularly frequent in children and in tropical areas. [1] Children aged 3–7 years have the highest incidence. [2] If a child has hyperkeratosis of the scalp, seborrhea-like symptoms, excoriation

due to pruritus, alopecia, broken hair or a "black dot" appearance, cervical lymphadenopathy, pustules, or indurated or swampy plaques, the dermatologist should suspect tinea capitis. [3] Various dermatophytes cause tinea capitis. The prevalence of different causal fungus varies depending on the geographical area under investigation. Tinea capitis has morphological forms that are either noninflammatory or inflammatory. [4] Early detection is critical to avoid transmission between children, particularly siblings, as well as scarring and irreversible hair loss. Tinea corporis and its response in a youngster should alert you to the possibility of tinea capitis. [5] The epidemiology of tinea capitis, like that of most infectious diseases, is constantly changing and varies greatly depending on geography and specific demographic groups. [6] Tinea infections have remained a major public health issue, with inadequate hygiene, fomites sharing, overcrowding, and low socioeconomic status among the variables that predispose people to infection. [7] While the fact that the majority of cases are found in low-resource settings, these infections have a global distribution, with the majority of cases found in Africa, Asia, and Southern and Eastern Europe. [8-10] Despite this, their epidemiological distribution has exhibited a wide range of geographical and seasonal fluctuations, based on a variety of factors such as lifestyle, population type, migration, and climate circumstances. [11] Trichophyton, Microsporum species [8, 12], and Epidermophyton floccosum of the genus Epidermophyton are all responsible for Tinea capitis. [12] Tinea infections are one of the most frequent infectious diseases in humans all over the world. [10] The aim of present study was to determine the prevalence and the impact of personal hygiene on the prevalence of tinea capitis in school going children.

Materials and Methods:

A cross-sectional study was undertaken on school-aged children to determine the prevalence of tinea capitis and the impact of personal cleanliness on the disease. Children were selected from Techno school of village dasauli, tehsil Baksi ka talab, district Lucknow, Uttar Pradesh. Study was conducted during month of July 2019 to December 2019. All the children belong to class first to class seven and the age group of 6 years to 14 years were included in the study using purposive sampling methods. This study was ethical approved by Institutional Ethical committee before its execution. A predesign pretested questionnaire was administered to only those children from whose parent's consent was obtained and who fulfilled the inclusion criteria and not falling into the exclusion criteria were enrolled in the study. On enrolment, all children/parents provided demographic information, education history, existence of any pet in the family, family/plamate/schoolmate history, and the number of contacts with positive indications and symptoms. The child's major complaints were recorded if he or she was symptomatic. Information on the duration of symptoms was also acquired from symptomatic patients. There was also a history of sharing towels, combs, and pillows with infected people, as well as oil massage. Moreover, assuming the maximum variability, which is equal to 50% ($p = 0.5$) and taking 95% confidence level with $\pm 5\%$ relative precision, the calculation for required sample size will be as follows: So, using the formula $n = z^2pq/(l)^2$

And putting in values as, $p = 0.5$ and hence $q = 1 - 0.5 = 0.5$; $l = 0.05$; $z = 1.96$

$n = (1.96)^2(0.5)(0.5)/(0.05)^2$, $n = 384$, Total sample size = $384 + 10\%$ loss to attrition = 422

Clinical examination:

All students with/without Tinea capitis-related symptoms: Scaling, crusting, follicular inflammation, hair loss, and erythema were all investigated for in all parts of the scalp. Scaling and erythema were looked for on other regions of the body (nails, hands, chest, and legs). Hair samples from suspected Tinea capitis cases were tested with potassium hydroxide as per normal technique. Hair samples were collected using a sterilised hairbrush. After being treated with a 25% potassium hydroxide solution, the specimens were examined under a light microscope.

Statistical Analysis:

The data were collected using the questionnaire and entered into excel software (Microsoft office Excel 2010). Under descriptive statistics, frequency distribution table and graph were used for categorical variables. Pearson's Chi-square test was used to test for statistical significance. P value was $P < 0.05$ was taken as statistical significant.

Results:

A total four hundred twenty-two children were requested to take part in the study with their guardian's consent. They comprised of 252 males and 170 females aged between 6 and 14 years with mean age of 10.5 ± 2.16 years. Out of 422 children screened in the study, 42 were observed to have Tinea capitis by clinical examination, providing an overall prevalence rate of 10% among the school children. Age groups indicating an almost similar prevalence rate ranging from 9.6% to 10.2% in the age groups 6–8, 9–11 and 12–14 years. The prevalence rate among male children was 9.5% and 10.6% in female children.(table 1)

Table 1: Age gender wise distribution of prevalence of Tinea capitis among children

Age groups (years)	Total number of children screened			Number of children with Tinea capitis			Prevalence rate (%)
	Male	Female	Total	Male	Female	Total	
6- 8	41	32	73	4	3	7	9.6
9-11	56	42	98	6	4	10	10.2
12-14	155	96	251	14	11	25	10.0
Total	252	170	422	24	18	42	10.0

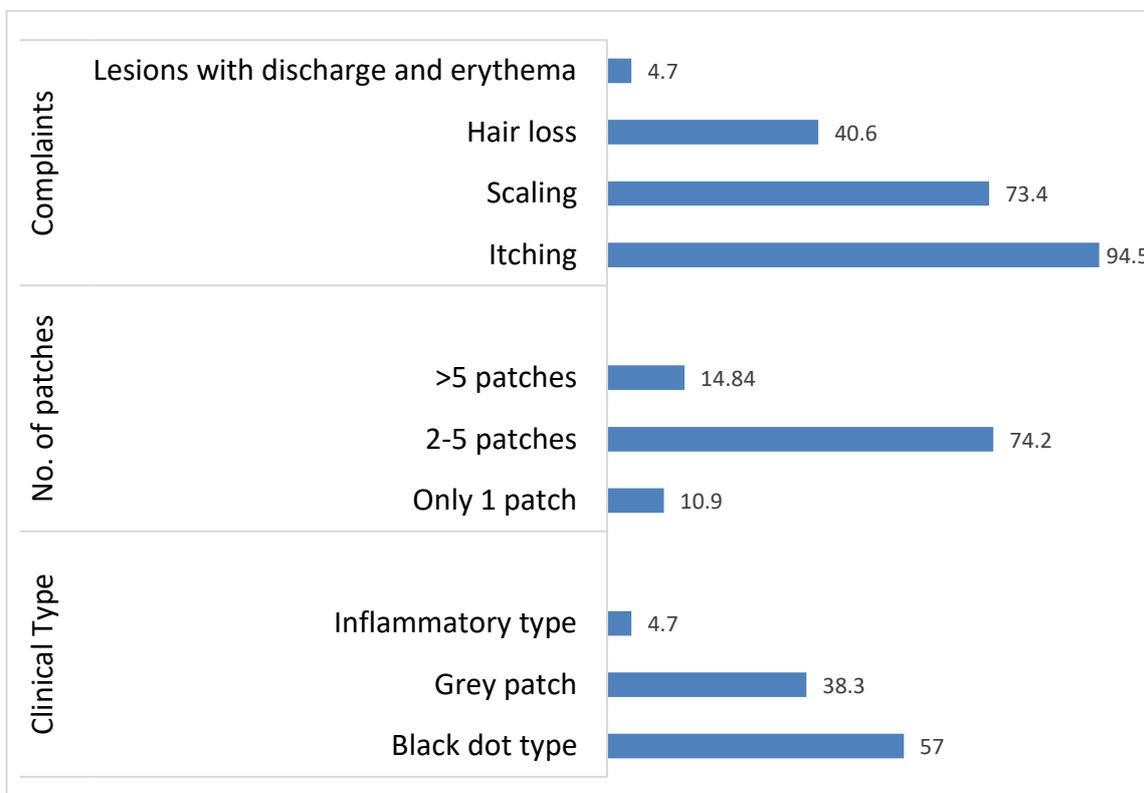
**Figure 1: Percent distribution of clinical profile of children with Tinea capitis**

Figure 1 shows that the clinical profile of children with Tinea capitis. In which, majority of cases had black dot type of patches (57%) followed by those having grey patches (38.3%). There were (4.7%) with inflammatory patches. Majority had 2-5 patches (74.2%). There were (10.9%) with only 1 patch and (14.8%) with >5 patches. Complaints of itching were most common (94.5%). Scaling was seen in (73.4%) patients, hair loss in (40.6%). Lesions with discharge and erythema were seen in (4.7%) cases.(figure 1)

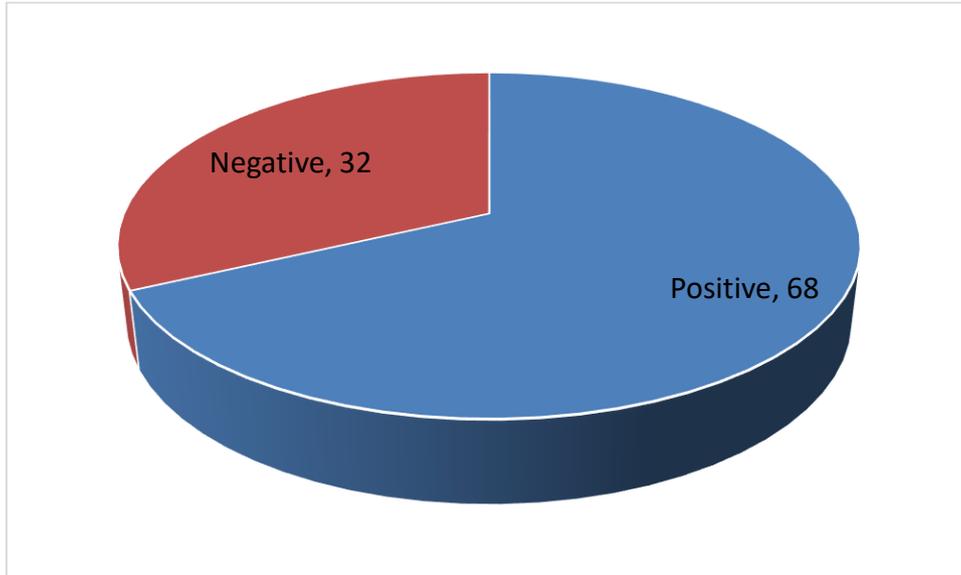


Figure 2: Distribution of children with Tinea capitis according to KOH positivity status

Figure 2 depicts that the frequency of children according to KOH positivity status. Out of 42 specimens subjected to KOH evaluation. A total of 68% were positive for fungal elements. Remaining 32% were negative.(figure 2)

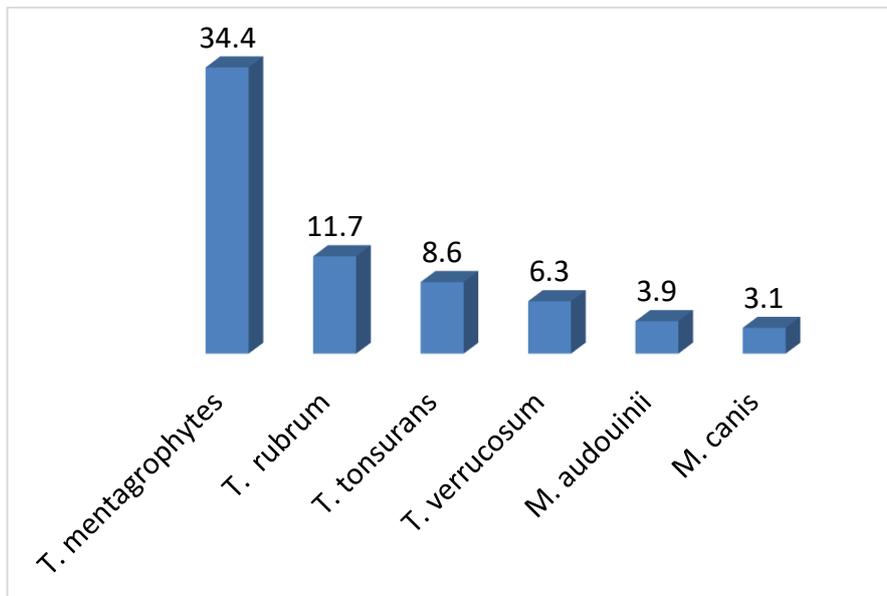


Figure 3: Percent distribution of Organism Identified (n=29)

A total of 6 species were isolated. *T. mentagrophytes* was the most common isolate (34.4%) followed by *T. rubrum* (11.7%), *T. tonsurans* (8.6%), *T. verrucosum* (6.3%), *M. audouinii* (3.9%) and *M. canis* (3.1%) respectively. (figure 3)

Table 2: Personal Hygiene, Nutritional Status and History of Pet/Cattle contact of children

Parameter	Total number of children screened		Number of children with Tinea capitis	
	No.	%	No.	%
Personal Hygiene				
Poor	300	71.09	21	50.00
Fair	88	20.85	12	28.57
Good	34	8.06	9	21.43
Nutritional Status				
Undernourished	67	15.88	6	14.29
Normal	302	71.56	24	57.14
Overweight/Obese	53	12.56	12	28.57
Contact with pet/cattle	154	36.49	18	42.86

Table 2 shows personal Hygiene, nutritional status and history of pet/cattle contact of children. Majority of children had poor personal hygiene (71.09%) however fifty percent among of children with Tinea capitis. Nutritional status of majority of children among all screened and children having Tinea capitis shows normal status. Proportion among children screened had history of contact with pet/cattle (36.49%) as compared to children with Tinea capitis (42.86%).

Discussion:

It usually begins with modest scaling and a little amount of hair loss, which is reversible. In some cases, however, it is accompanied by severe inflammation and cicatricial alopecia, which results in permanent cosmetic deformity. Furthermore, because the virus is highly contagious, it must be identified and treated as soon as possible to prevent transmission to siblings and classmates. Tinea capitis was found to be prevalent in 10% of school-aged children in Lucknow in the current study. Furthermore, Ahmed et al. (2006) studied 682 school-aged children and found a prevalence rate of 4.5 for Tinea capitis, whereas Kundu et al. (2012) studied 505 school-aged children and found a prevalence rate of 10.3 for Tinea capitis. Sajjan and Mangalgi (2012) studied 218 male orphans and discovered a 23.3 % prevalence rate of Tinea capitis. [13-15] In Cleveland, Ghannoum et al. [1] calculated a prevalence of 13% and discovered that all of the children affected were African American. Hay et al. found that the prevalence ranged from 0 to 12 %, with a mean of 2.5 %, in another London study. [16] A prevalence rate of 33.3 % was recorded in two African investigations. [7] and 11.3 %, respectively. [17] Tinea capitis is projected to affect 4.43% of people with superficial mycosis, according to a study conducted in Rajasthan. [18] In the current study, the prevalence rate among male children was 9.5% and 10.6 % among female children.

Almost all studies undertaken around the world have found a skewed male-to-female ratio, with males having a higher prevalence than females. [19-22] The prevalence rate in the age categories 6–8, 9–11, and 12–14 years was practically same in the current study, ranging from 9.6 percent to 10.2 percent. Furthermore, Menan et al. [17] found a higher incidence among children aged 8–11 years, while Ayaya et al. [7] found a considerably higher number of children aged approximately 10 years to be afflicted. In a study conducted in Delhi, Singhal et al. [23] discovered that 90 % with Tinea capitis were under the age of 15 years.

Almost large percentage of youngsters with Tinea capitis (57 %) had black dot type patches, followed by those with grey patches (38.3 %). Black dot and grey patch have been found to be the most common clinical type in a number of studies [15,24,25], which is consistent with

the findings of this investigation. Itching, scaling, hair loss, and lesions with discharge and erythema were reported by 94.5 %, 73.4 %, 40.6 %, and 4.7 % of the subjects, respectively, in this study. *T. capitis* causes itching as a first symptom¹. Similar to the findings of this study, Ahmed et al. (2006) [13] found that itching (90%), scaling (73.4%), and hair loss (46.6%) were the most prevalent clinical characteristics, with lesions with discharge being less common (10 %).

Kundu et al. (2012) [14] reported itching with hair loss as the major symptom. Hackett et al. (2006) [26] also reported scaling to be one of the most common signs of *Tinea Capitis* infection. Majority of cases had a poor personal hygiene (59.4%). Only 29 (22.7%) had good personal hygiene. Personal hygiene is considered to be one of the important variables affecting the prevalence of *T. Capitis*. [27] A high prevalence of cases with poor personal hygiene endorses the findings of other researchers who also emphasized on the poor personal hygiene as a factor promoting the prevalence of *T. Capitis*. [28,15]

Conclusion:

T. Capitis is quite common in among the school going children aged 6 months to 14 years in Lucknow. The prevalence rate in male children was higher than that in female children. The pathological profiling indicated the changing trend of causative fungal species. Poor personal hygiene, history of contact with pet/cattle, increasing number of patches and complaints like scaling and hair loss emerged as potential risk factors for fungal positivity

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest

References:

1. Ghannoum M, Isham N, Hajjeh R, Cano M, Al-Hasawi F, Yearick D, et al. *Tinea capitis* in Cleveland: Survey of elementary school students. *J Am Acad Dermatol* 2003;48:189-93.
2. Elewski BE. *Tinea capitis*: A current perspective. *J Am Acad Dermatol* 2000;42:1-20.
3. Alvarez MS, Silverberg NB. *Tinea capitis*. *Cutis* 2006;78:189-96.
4. Hay RJ, Moore MK. Mycology. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. *Rook's Textbook of Dermatology*. 7th ed. Massachusetts: Blackwell Publishing; 2004. p. 31.1-31.101.
5. Rasmussen JE, Ahmed AR. Trichophytin reactions in children with *tinea capitis*. *Arch Dermatol* 1978;114:371-2.
6. Chen BK, Friedlander SF. *Tinea capitis* update: a continuing conflict with an old adversary. *Curr Opin Pediatr* 2001;13:331-5.
7. Ayaya SO, Kamar KK, Kakai R. Aetiology of *Tinea capitis* in school children. *East Afr Med J* 2001;78:531-5
8. Oguzkaya Artan M, Koc AN, Baykan Z, Buldu H. Prevalence of *Tinea capitis* in primary school children. *Int J Med Investig* 2013; 1(2):104-110
9. Yu J, Li R, Bulmer G. Current topics of *tinea capitis* in China. *Jpn J Med Mycol* 2005; 46:61-66
10. Yehia MA, El-Ammawi TS, Al-Mazidi KM, Abu El-Ela MA, Al-Ajmi HS. The Spectrum of fungal infections with a special reference to dermatophytoses in the capital area of Kuwait during 2000-2005: a retrospective analysis. *Mycopathologia* 2010; 169:241-246
11. Asticcioli S, Di Silverio A, Sacco L, Fusi I, Vincenti L, Romero E. Dermatophyte infections in patients attending a tertiary care hospital in northern Italy. *New Microbiol* 2008; 31:543-548

12. Liu D, Coloe S, Baird R, Pedersen J. Application of PCR to the identification of dermatophyte fungi. *J Med Microbiol* 2000; 49:493–497
13. Ahmed I, Ahmed Z, Nasreen S. Prevalence of tinea capitis and asymptomatic carriage amongst school going children. *Journal of Pakistan Association of Dermatologists* 2006; 16: 215-219
14. Kundu D, Mandal L, Sen G. Prevalence of Tinea capitis in school going children in Kolkata, West Bengal. *J Nat Sci Biol Med.* 2012 Jul;3(2):152-5.
15. Sajjan AG, Mangalgi SS. Clinicomycological profile of tinea capitis in children residing in orphanages. *Int J Biol Med Res.* 2012; 3(4): 2405-2407
16. Hay RJ, Clayton YM, De Silva N, Midgley G, Rossor E. Tinea capitis in South-east London a new pattern of infection with public health implications. *Br J Dermatol* 1996;135:955-8.
17. Menan El, Zongo Bonou O, Rouet F, Kiki-barro PC. Tinea capitis in school children from Ivory coast (western Africa) A 1998-1999 cross sectional study. *Int J Dermatol* 2002;41:204-7.
18. Kalla G, Begra B, Solanki A, Goyal A, Batra A. Clinico-Mycological study of Tinea capitis in Desert district of Rajasthan. *Indian J Dermatol Venereol Leprol* 1995;61:342-5.
19. Kechia FA, Kouoto EA, Nkoa T, Nweze EI, Fokoua DC, Fosso S, Somo MR. Epidemiology of tinea capitis among school-age children in Meiganga, Cameroon. *J Mycol Med.* 2014 Jun;24(2):129-34.
20. Triviño-Duran L, Torres-Rodriguez JM, Martinez-Roig A, Cortina C, Belver V, Perez-Gonzalez M, Jansa JM. Prevalence of tinea capitis and tinea pedis in Barcelona schoolchildren. *Pediatr Infect Dis J.* 2005 Feb;24(2):137-41
21. Sidat MM, Correia D, Buene TP. Tinea capitis among rural school children of the district of Magude, in Maputo province, Mozambique. *Mycoses.* 2006 Nov;49(6):480-3
22. Oudaina W, Biougnach H, Riane S, El Yaagoubil I, Tangi R, Ajdae L, Agoumi A, Tligui H. Epidemiology of tinea capitis in outpatients at the Children's Hospital in Rabat (Morocco). *J Mycol Med.* 2011 Mar;21(1):1-5
23. Singhal A, Rawat S, Bhattacharya SN, Mohanty S, Baruah MC. Clinico mycological profile of Tinea capitis in North India and response to griseofulvin. *J Dermatol* 2001;28:22-6
24. Fuller LC, Child FJ, Midgely G, Hay RJ, Higgins EM A practical method for mycological diagnosis of tinea capitis: validation of the toothbrush technique. *J Eur Acad Dermatol Venereol* 1997; 9 (Suppl. 1): S209
25. Farooqi M, Tabassum S, Rizvi DA, Rahman A, Rehanuddin, Awan S, Mahar SA. Clinical types of tinea capitis and species identification in children: an experience from tertiary care centres of Karachi, Pakistan. *J Pak Med Assoc.* 2014 Mar;64(3):304-8.
26. Hackett BC, O'Connell K, Cafferkey M, O'Donnell BF, Keane FM. Tinea capitis in a paediatric population. *Ir Med J.* 2006 Nov-Dec;99(10):294-5
27. Pomeranz AJ and Sabins SS. Tinea Capitis: epidemiology, diagnosis and manegment stratiges. *Pediatr Drugs* 2009; 4(12):779-83
28. Ayanbimpe GM, Taghir H, Diya A, Wapwera S. Tinea capitis among primary school children in some parts of central Nigeria. *Mycoses.* 2008 Jul;51(4):336-40