

## Tinea Capitis among Elementary School Students in Jatinangor, Sumedang, West Java

Dilla Aprilia,<sup>1</sup> Lies Marlysa Ramali,<sup>2</sup> Ramlan Sadeli<sup>3</sup>

<sup>1</sup>Faculty of Medicine Universitas Padjadjaran, <sup>2</sup>Department of Dermatovenereology Faculty of Medicine Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital Bandung, <sup>3</sup>Department of Microbiology and Parasitology Faculty of Medicine Universitas Padjadjaran

### Abstract

**Background:** Fungal infection is a common disease in tropical and subtropical countries. Warm and humid climates provide a favourable environment for organism causing superficial mycosis. One of the fungal infections that commonly occurred in children is tinea capitis. Tinea capitis is a superficial fungal infection of the hair and scalp caused by dermatophytes. The age predilection of this disease is children aged 3 until 14 years. The purpose of this study was to detect the presence of tinea capitis among elementary school students in Jatinangor, Sumedang, Indonesia.

**Methods:** This cross-sectional descriptive study involved 391 students from the first until sixth grade at four elementary schools in Jatinangor, in the period of September until October 2013. Anamnesis, physical examination, Wood's lamp examination and direct microscopic examination were conducted to diagnose the disease. The collected data were analyzed and presented in the form of frequency distribution and percentages shown in tables.

**Results:** Out of 391 students participating in this study, 194 were boys and 197 were girls. The age range was 6 until 16 years. Based on the screening results, 74 students were known to have complaints about their hair and scalp and only 49 students could continue the study as they have no positive result of tinea capitis.

**Conclusions:** There is no positive findings of tinea capitis according to anamnesis, physical examination, Wood's lamp examination and direct microscopic examination. Further examination by culture with Sabouraud's dextrose agar should be carried out. [AMJ.2016;3(3):340-4]

**Keywords:** Dermatophytosis, elementary school students, tinea capitis

### Introduction

Fungal infection is a relatively common problem especially in the tropical and subtropical regions of the world. Warm and humid climates provide a favourable environment for organism causing superficial mycosis.<sup>1</sup> One of the fungal infections that commonly occurred in children is tinea capitis.<sup>1-4</sup> Tinea capitis is a superficial fungal infection of the hair and scalp caused by the dermatophytes. *Trichophyton* and *Microsporum* are the caused of this disease.<sup>1,3,4</sup> It is commonly found in children from age 3-14 years old. Humans (anthropophilic) and animals (zoophilic) are the source of transmission of this disease.<sup>3,5</sup> The risk of infection in school children was increasing along with the total numbers of infected children because they can easily

infected each other.<sup>2,6</sup> Hygiene was known to be the most important predisposing factor of the development of the disease. Overcrowded environment and low socioeconomic status were also considered as influencing factors of tinea capitis.<sup>3,5</sup>

Early diagnosis of tinea capitis is needed because if it was not detected and left untreated, it may cause destruction of hair and pilosebaceous structures, and may cause further complications such as alopecia and even various forms of hypersensitivity reactions.<sup>1,7</sup> As a tropical country, Indonesia would be a potential place for the occurrence of this disease. The availability of the latest data about tinea capitis was still limited especially in Indonesia so that the study about tinea capitis still needed to be conducted. The purpose of this study was to detect the presence of tinea

**Correspondence:** Dilla Aprilia, Faculty of Medicine, Universitas Padjadjaran, Jalan Raya Bandung-Sumedang Km.21, Jatinangor, Sumedang, Indonesia, Phone: +62817201898 Email: dilla.aprilias@gmail.com

capitis among elementary school students in Jatinangor, West Java.

## Methods

This study was conducted in September until October 2013 at four elementary schools, namely Cikopo I, Sinarjati, Cikuda, and Jatiroke, in Jatinangor, Sumedang, West Java. The subjects were students, boys and girls from the first until sixth grade. Based on multistage sampling, 391 students were obtained.

The inclusion criteria were defined as first until sixth grade students in elementary schools in Jatinangor. The exclusion criteria of this study were students who did not attend school and students who refused to participate in this study. A cross sectional

descriptive study was carried out. Data collection was conducted after approval by the Education Office of Sumedang and the principal of each school had been obtained. Informed consent was given to the principal of each school and the parents of the students. This study was divided into two steps. First, the researcher conducted a screening to the total number of students. Anamnesis and physical examination such as inspection were performed to the students in order to separate healthy students from students with hair and scalp complaints. Moreover, further physical examination and Wood's lamp examination by the dermatovenereologists team were carried out to specify the diagnosis of student's hair and scalp. Yellow-green fluorescence image reflected ectothrix organism and

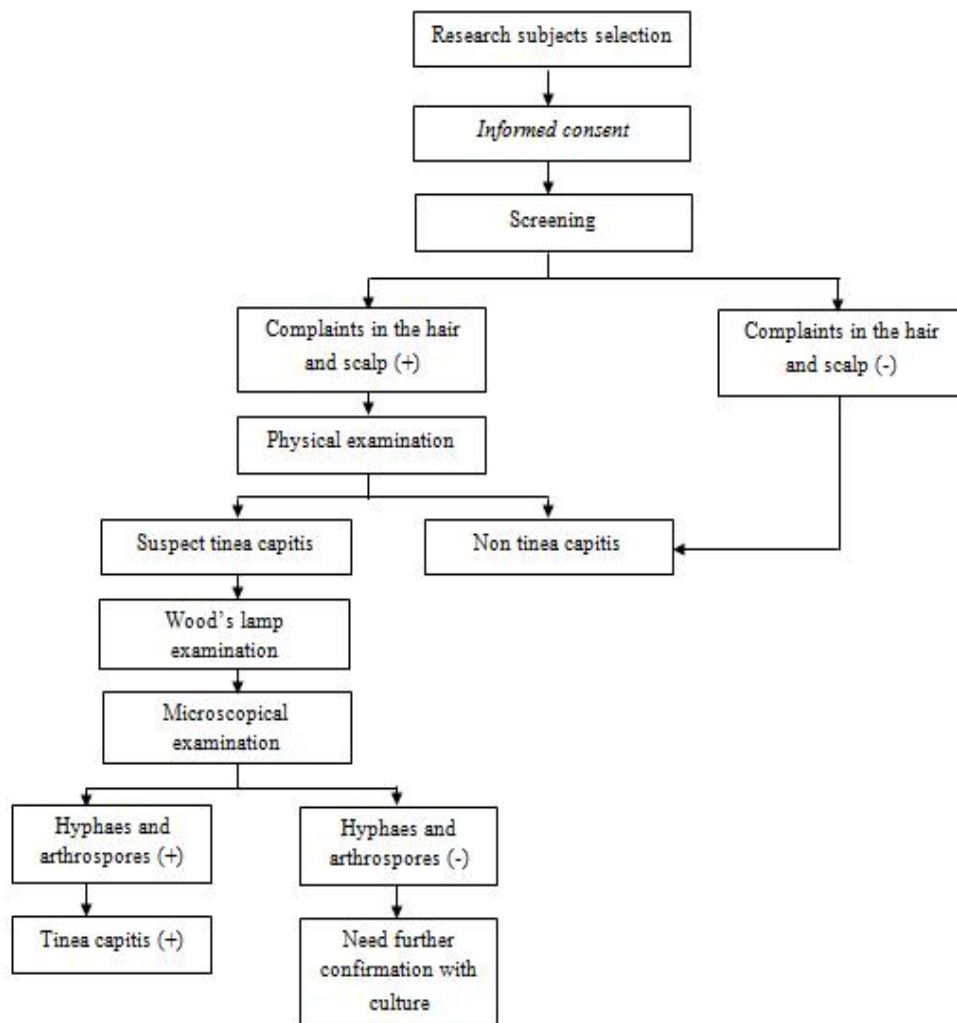


Figure 1 Study Procedures

in the other hand, no fluorescence image reflected endothrix organism. If there was positive findings from anamnesis, physical examination, and Wood's lamp examination, samples of the hair and scalp were collected for further examination. Samples of the hair were collected by pulling 1-2 strands of hair using a pinset or hand. The sample of the scalp was collected by using a cellophane tape and blunt scalpel. Then the samples were put in specimen envelopes to be transported to the Laboratory of Microbiology, Faculty of Medicine, Universitas Padjadjaran.

Before the collected samples were further examined by direct microscope, the preparation of the samples were conducted. The hair-strands or the scalp curettage were put in the labeled object glass, a drop of Lactophenol cotton blue was given and finally the object glass was closed with a cover glass. The prepared samples were heated using Bunsen Burners. If arthrospores were found surrounding the hair shaft, it showed an ectothrix infection. If arthrospores were found inside the hair shaft, it showed an endothrix

infection. Hyphaes and arthrospores were found in the scalp curettage samples. The interpretation of the specimens was confirmed by the microbiologists. Positive findings were diagnosed from combination of clinical manifestations and microscopic examination. The collected data were analyzed and presented in the form of frequency distribution and percentages shown in tables.

## Results

This study was participated by 391 elementary school students who came from four elementary schools in Jatinangor. The distribution of students were classified based on school, gender, and age (Table 1).

From the 391 students, seventy four students were discovered to have complaints about their hair and scalp conditions (Table 2). From the 74 students with complaints, 14 students were not permitted by their parents to continue the study and 11 students were not present during the day of examination. This situation caused only 49 students could

**Table 1 Characteristics of Elementary School Children**

Variables	Frequency (n)	Percentage (%)
School		
Cikuda	85	21.7
Sinarjati	126	32.2
Jatiroke I	98	25.0
Cikopo I	82	20.9
Gender		
Boy	194	49.6
Girl	197	50.4
Age (years old)		
6	27	6.9
7	54	13.8
8	61	15.6
9	77	19.7
10	71	18.2
11	62	15.9
12	29	7.4
13	5	1.3
14	4	1.0
15	0	0
16	1	0.3

**Table 2 Total Numbers of Students with Complaints about Their Hair and Scalp Conditions**

Complaints*	Frequency (n)	Percentage (%)
Yes	74	18.9
No	317	81.1
Total	391	100

Note: \* Complaints : students with complaints about hair and scalp including itch, hair loss, dandruff, scale, white patch, wound, erythema, and other type of lesions

**Table 3 Distribution of Hair and Scalp Disorders among Students**

Diagnosis	Frequency (n)	Percentage (%)
No Abnormalities	25	6.4
Pediculosis capitis	16	4.1
Insect bite	2	0.5
Pityriasis alba	1	0.3
Seborrheic dermatitis	2	0.5
Atopic dermatitis	1	0.3
Xerosis cutis	1	0.3
Pit sika	1	0.3
Total	49	100

continue for further examination.

Further physical examination and Wood's lamp examination by the dermatovenereologists team, discovered that most of the selected students did not have any hair and scalp abnormalities. Furthermore, Pediculosis capitis was the most case that was discovered (Table 3). From the 49 students, there was no positive result of tinea capitis.

## Discussions

Tinea capitis, a fungal infection of the scalp, is the most common dermatophyte infection in children.<sup>5</sup> The distribution of tinea capitis has been spread all over the world but usually happened in tropical and sub-tropical countries.<sup>1</sup> A study by Ayaya et al.<sup>8</sup> in a primary school in Kenya showed that the prevalence rate of tinea capitis was 33.3%. Meanwhile, Woldeamanuel et al.<sup>9</sup> in Ethiopia reported that 463 (90.3%) students were clinically diagnosed with tinea capitis from 513 students diagnosed with dermatophytosis.

In non-tropical countries, the study by Cuetara et al.<sup>10</sup> in Spain revealed that 0.52% children had dermatophytes with 0.33% children had tinea capitis as the most common type of dermatophytes. The study was conducted with samples comprising 10,000

randomly selected school-children in Madrid aged between 2 and 16 years. Furthermore, Ghannoum et al.<sup>11</sup> determined the prevalence of dermatophyte-positive scalp cultures among elementary school-children in Cleveland, Ohio. From 8 Cleveland elementary schools, 937 children were cultured for the presence of dermatophytes, and 122 children (13%) had dermatophyte-positive cultures of the scalp.

A wide variety of numbers in the prevalence rate of tinea capitis can be found worldwide. It was also known that infections are more common in the developing countries rather than in the developed countries.<sup>8</sup> Indonesia which is a tropical country with high humidity and warm climate may become a good place for the development of this disease. Elementary school-children were also considered to be the most susceptible subjects since the highest prevalence rate of tinea capitis was known between the age of 3 until 14 years old.<sup>5</sup>

However, in this study, there was no positive diagnosis of tinea capitis. On the other hand, other infections were discovered and most of them were pediculosis capitis.

There were several limitations during the process of this study. The culture with Sabouraud's dextrose agar was not conducted, whereas, culture may identified the etiologic agents of tinea capitis infection.<sup>3</sup>

Furthermore, the possibility of respondent or volunteer bias might have happened because there were 14 students who were not permitted and 11 students were not present during the examination.

As a conclusion, the presence of tinea capitis can not yet be found. Even though there is no positive diagnosis of tinea capitis, concern still needs to be put towards the students' hygiene because the possible discovery of other skin diseases such as pediculosis capitis. The researcher suggested to conduct a program for clean and healthy lifestyle including the education and evaluation. It aims to ensure that in the future tinea capitis and any other skin diseases will not occur in the school environment. In a further study, culture may be conducted so that the etiologic agents of tinea capitis can be found.

## References

1. Uneke C, Ngwu B, Egemba O. Tinea capitis and pityriasis versicolor infections among school children in the Southeastern Nigeria: the public health implications. *The Internet Journal of Dermatology*. 2005;4(2):1-7.
2. Van Schoor J. Superficial fungal infections. *SA Pharmacist's Assistant*. 2011;11(4):13-4.
3. Hainer BL. Dermatophyte infections. *Am Fam Physician*. 2003;67(1):101-10.
4. Gupta AK, Ryder JE, Nicol K, Cooper EA. Superficial fungal infections: an update on pityriasis versicolor, seborrheic dermatitis, tinea capitis, and onychomycosis. *Clin Dermatol*. 2003;21(5):417-25.
5. Wolff K, Goldsmith L, Katz S, Gilchrest B, Paller A, Leffell D. *Fungal diseases. Fitzpatrick's dermatology in general medicine*. 8th ed. San Diego: McGraw-Hill Companies Incorporated; 2012. p. 1807-22.
6. Naafs B, Padovese V. Rural dermatology in the tropics. *Clin Dermatol*. 2009;27(3):252-70.
7. Isa-Isa R, Arenas R, Isa M. Inflammatory tinea capitis: kerion, dermatophytic granuloma, and mycetoma. *Clin Dermatol*. 2010;28(2):133-6.
8. Ayaya S, Kamar K, Kakai R. Etiology of tinea capitis in schoolchildren. *East Afr Med J*. 2001;78(10):531-5.
9. Woldeamanuel Y, Leekassa R, Chryssanthou E, Menghistu Y, Petrini B. Prevalence of tinea capitis in Ethiopian schoolchildren. *Mycoses*. 2005;48(2):137-41.
10. Cuetara M, Palacio A, Pereiro M, Amor E, Alvarez C, Noriega A. Prevalence of undetected tinea capitis in a school survey in Spain. *Mycoses*. 2009;40:131-7.
11. 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(2):189-93.