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ORIGINAL ARTICLE

Prevalence of Hair Disorders and Their Related Factors among Adolescent Students in Public Boarding School, West Java, Indonesia

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ABSTRACT

Objective: Hair disorders in children and teenagers are abnormalities that often appear and can cause complex clinical problems. It can be congenital or acquired from the environment. The aim was to observe the prevalence of hair disorders and their related factors in specific population, also to recognize their dermoscopic description.

Study Design: Descriptive cross-sectional study

Place and Duration of Study: The research was conducted from September 2018 to February 2019 in one public boarding school (PBS), West Java.

Material and Methods: Participants were 127 students consisting of 85 boys and 42 girls, with age ranging from 11-15 years. Diagnosis was determined by history taking, physical and dermoscopic examination.

Results: The most common hair disorder was pediculosis capitis, identified in 86 students (67.7%). All girl subjects were diagnosed with it, while in boy group there were 44 out of 85 students. When the pediculosis capitis group was compared with no hair disease group, the statistically significant factors were gender, frequency of washing towel and habit of using towel. Other kind of hair disorders discovered were scarring alopecia (3.2%), seborrheic dermatitis (0.8%), and nevus sebaceous (0.8%).

Conclusion: Very high prevalence of pediculosis capitis in this PBS is influenced by high occupancy in one bedroom, also poor hygiene, such as longer frequency of changing towel, and habit of sharing prayer dresses. These results should be an important note for public health officer to raise awareness about this case.

Key Words: Adolescent, Dermoscopy, Hair diseases, Lice infestations, Prevalence

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INTRODUCTION

Hair disorders in children and teenagers are abnormalities that often appear and can cause complex clinical problems. Hair disorders can also be a source of anxiety and concern for the patients and their families. These can be congenital or acquired from the environment.¹ In

congenital abnormalities, hair disorder can stand alone or be a part of a syndrome.² Hair disorders that can occur include alopecia, hypertrichosis, hirsutism, hereditary and congenital hypotrichosis, structural abnormalities of the hair shafts, trichotillomania, infections and hair infestations, such as tinea capitis and pediculosis.^{1,2}

Based on the national health research data (RISKESDAS) in 2018, there are no exact number regarding the prevalence of hair disorders in Indonesian children.³ Conti et al. (2016)¹ found that in 2640 children who went to pediatric dermatology clinic in 2009 at Pediatric Anna Meyer Hospital, Italy, there were 190 children who experienced hair and scalp disorders. Of 190 children, 60 patients (31.57%) had nonscarring alopecia, 56 patients (29.47%) had benign tumors, hematomas, or vascular malformations of the scalp, 51 patients (26.84%) had scalp inflammatory disease, 14 patients (7.36%) had scarring alopecia, 5 patients (2.63%) had an infection and 2 patients (1.05%) experienced scalp infestations.

On the other hand, children who live in boarding schools, have a different prevalence of hair disorders. Yap et al.⁴ found in two boarding schools, Islamic school and technical school in the area of Sarawak, Malaysia that 233 from 944 children (24.7%) had head lice. Moreover, the study conducted by Wahdini (2018)⁵ found that in PBS in Pemijahan Village, Bogor Regency out of 121 students, 107 students (88.4%) also had head lice. There are other factors that might influence the emergence of hair disorders in PBS, including close contact between students while in class and dormitory, crowded communities, the use of head scarves, long hair, and rarely washing their hair.⁴

This study was conducted to see the prevalence of hair abnormalities and their related factors that occur in specific population, children and teenagers living in PBS, including both non-infectious and infectious hair disorders.

MATERIAL AND METHODS

Participants and study design: This descriptive cross-sectional study was a part of an extensive study of skin diseases in one PBS in West Java. The research was conducted in October in 2018 at a PBS in West Java. Participants were students in the same age group ranging from 11-15 years old. Inclusion criterion was all students in the boarding school with hair and or scalp disease while exclusion criterion was whom refusal to participate in the research. Sample size was calculated by descriptive categorical formula, and after correction with drop out the anticipation, 127 subjects were recruited.

Clinical assessment: The diagnosis was determined by collecting data from history taking, physical examination and dermatological examination, pull test, dermoscopy, also photographs were taken of the hair and scalp lesions. Dermoscopic examination was done in all subjects.

Statistical methods: Data were analyzed statistically using SPSS Statistics 20.0. Chi-square test was applied on data with a nominal variable. If expected cell count was less than five, the Fisher test was conducted. Numeric data with normal distribution were analyzed with analysis of variance (ANOVA) test. Numeric data with scattered distribution were analyzed with the Kruskal-Wallis test.

Ethical considerations: This research was a part of its main research titled 'Scabies and Another Dermatology Diseases Early Detection in Public Boarding School, West Java.' The ethics committee approved with ethical number 0920/UN2.F1/ETIK/2018. Informed consent was obtained from the parents or legal guardians of minors participants.

RESULTS

The demographic profiles of 127 subjects in PBS are given in table 1. Subjects ranged from 11-15 years old. The number of boys was about twice higher than girls. Most of them had complained about itchy sensation on their head (76.4%), followed by hair loss, baldness, and head lice. Only four subjects admitted that they found head lice on their hair or scalp.

TABLE 1: Demographic profiles of students in a PBS, West Java, Indonesia

Characteristics		N (%)
Gender	Boys	85 (66.9)
	Girls	42 (33.1)
Body Mass Index	Underweight	22 (17.3)
	Norm weight	96 (75.6)
	Overweight	8 (6.3)
	Obesity	1 (0.8)
Atopic history	Yes	30 (23.6)
	No	97 (76.4)
History of hair disorders in parents	Yes	19 (15.0)
	No	108 (85.0)
Hair symptoms complained	Itchy	97 (76.4)
	Hair loss	15 (11.6)
	Baldness	4 (3.1)
	Head lice	4 (3.1)

From table 2, we could see that the symptoms have started from 12 months or even more. This median is the same as the duration of children living in PBS. In each bedroom, there were

approximately 25 children and hence were quite crowded. Frequency of changing towel was also long with a maximum of 180 days.

TABLE 2: Characteristic data of students in a PBS, West Java, Indonesia

Characteristics	Median (min-max)	
Occupants in one bedroom (persons)	25 (7-32)	
Duration of hair disorders (months)	12 (0-120)	
Duration of living in PBS (months)	12 (1-36)	
Duration of using prayer cap (weeks)	16 (1-336)	
Duration of using hijab (months)	4 (1-8)	
Frequency of changing towel (days)	7 (0-180)	
Frequency of changing hijab (days)	2 (1-7)	
Frequency of changing prayer cap (weeks)	1 (0-96)	
Frequency of changing prayer dress (weeks)	1 (1-8)	
	Number (%)	
Frequency of washing hair (days)	Every 1 day	37 (29.1)
	Every 2 days	60 (47.2)
	Every ≥ 3 days	30 (23.6)
Habit of towel usage	Sharing	4 (3.1)
	Not sharing	123 (96.9)
Ways of washing prayer dresses	Mix	2 (1.6)
	Separately	40 (31.5)

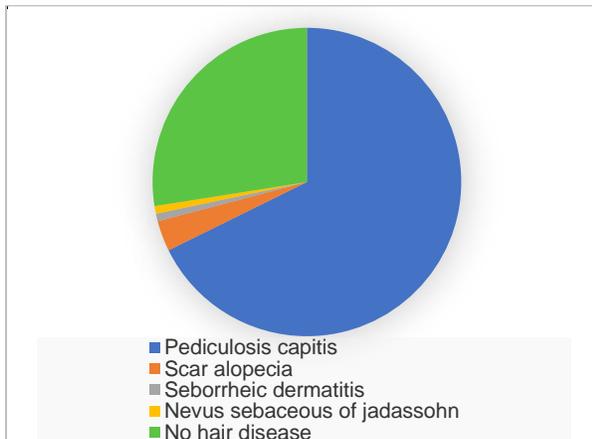


Fig 1: Prevalence of hair disorders in all subjects

From our study, hair disorders that we found are presented in fig 1. Pediculosis capitis appeared to be the most common findings (67.7%), followed by a small number of diseases which were scarring alopecia (3.2%), seborrheic dermatitis (0.8%), and nevus sebaceous of Jadassohn (0.8%). As many as 27.5% of all subjects had no hair disease.

Because almost all of the hair disorders were pediculosis capitis, we compared this group with no hair disease group. We could see from table 3 whether their related factors in PBS had any significant differences.

The first statistically significant factor was the subjects' gender ($p=0.000$). No one from 42 girls was free from pediculosis capitis. Whereas, from 85 boys, there were 41 subjects without hair disease, and the rest of them were diagnosed with pediculosis capitis. Another significant factor was the frequency of changing towel ($p=0.010$). It was longer in pediculosis capitis group, with an average of 7 days and a maximum of 180 days.

Meanwhile, subjects without any hair diseases change their towel every three days with a maximum of seven days. The last factor which is statistically significant but not clinically significant was the habit of using a towel ($p=0.018$). We found that all subjects in pediculosis capitis group were not sharing their towel while there were four subjects without hair disease sharing their towel. However, it could be accidental or caused by the habit of sharing prayer dresses that taking more effect.

TABLE 3: Comparisons of factors related in with and without pediculosis capitis group of students in PBS, West Java, Indonesia

Characteristics		Group		p value
		No hair disease (n)	Pediculosis capitis (n)	
Gender	Boys	41	44	0.000
	Girls	0	42	
Frequency of washing hair (days)	Every 1 day	8	29	0.092
	Every 2 days	19	41	
	Every ≥ 3 days	14	16	
Habit of using towel	Sharing	4	0	0.010
	Not sharing	37	86	
Median (min-max)				
Occupants in one bedroom (persons)		25 (17-32)	24 (7-31)	0.372
Duration of living in PBS (months)		12 (1-36)	12 (1-36)	0.091
Frequency of changing towel (days)		3 (0-7)	7 (0-180)	0.018
Duration of using cap (weeks)		16 (1-288)	16 (1-336)	0.381
Frequency of changing cap (weeks)		1 (0-96)	1 (0-48)	0.485

DISCUSSION

From physical examination and dermoscopy in this study, four diagnoses were identified which were pediculosis capitis with the highest rates, followed by few cases of scarring alopecia, seborrheic dermatitis and nevus sebaceous of Jadassohn. A clinician could diagnose pediculosis capitis only by physical examination. Dermoscopy usage is not a routine. Meanwhile, in this study, we utilize dermoscopy to facilitate mass examination of hair disorders. In some subjects, dermoscopy could help to find eggs and lice that missed in physical examination easily.

Pediculosis capitis is the infestation of human hair and scalp caused by head lice (*Pediculus humanus capitis*). However, they generally spread through direct transmission, head-to-head contact with an infected person, which is the primary route, or indirect transmission by sharing clothing, hair brushes, hats, towels, or other personal items of an infected person. Head lice infestation is usually detected by three types of evidence which are itching and inflammation of the scalp and neck, presence of lice, and detection of eggs attached to the hair shafts. conjunctivitis and allergic reaction.⁶

However, head lice are a common infection in school-aged children worldwide, varying from 1.6 to 87%. The variation of infestation rate may be due to several factors, including the eradication

methods, number of head-to-head contacts, diagnostic techniques, school head lice policy (no-nit policy), pesticide resistance, and knowledge regarding head lice.⁶

In Egypt, head lice infestations were mostly seen in the primary school age group. El-din and El-Nadi⁷ reported the prevalence of head lice infestation among primary school children during 2004 in Beni Suf as 15.98%. In 2007, Ali and Amir⁸ reported the infestation rate of head lice among primary school children in Assuit city to be 13.4%. Data of pediculosis capitis prevalence in Indonesia has not been available yet.

In our study, all of the girl subjects with a total of 42 students had been diagnosed for pediculosis capitis. In the boy group, there were 44 out of 85 students. The result showed a very high prevalence of pediculosis capitis in this PBS. The previous study showed different prevalence, which matches or lower compared to our study. Wahdini S (2018)⁵ study in PBS based in Bogor, Indonesia found 107 (88.4%) from 121 subjects manifesting live head lice with the prevalence in female up to 88.4%. Meanwhile, a study by Yap (2010)⁴ in Boarding School Sarawak, Malaysia found pediculosis capitis only in girls, with a prevalence of 24.7%. Higher prevalence on girls in ours and theirs was expected due to their long hair and continuous hijab usage which facilitate eggs to attach and adult head lice to hide.

High occupancy in one bedroom could increase the risk of close contact between the students, which facilitates the transmission of *Pediculus humanus capitis*. Our study, did not find statistically significant difference. Another factor that we assumed could be related to this infectious hair disease is poor personal hygiene, especially in a crowded population such as PBS. Frequency of towel changing was found to be statistically significant when comparing between two groups. In pediculosis capitis group, it can be seen that the frequency was longer, with seven days average (ranging from 0-180 days), even some subjects were not using a towel after taking a bath or hair washing.

The perception of a child could influence inconsistency between data from history taking and results in this study. Because they always wear prayer cap and hijab, eggs and lice will not be seen by others. This condition makes children not really aware of head lice and only feel itchy scalp.

The public boarding school is located in the countryside of West Java, quite far from the central city. Health workers were rarely visiting there and also students rarely had medical examination. Omidi et al⁹ found that prevalence of pediculosis in Iran is more in the areas which are deprived of the access to health facilities. Therefore, educational campaigns about the danger of infection and routine mass screening like what we have done are necessary to eliminate pediculosis.

Our study showed a very high prevalence of pediculosis capitis in this PBS. Pediculosis capitis appeared to be the most common findings (67.7%), followed by a small number of diseases which were scarring alopecia (3.2%), seborrheic dermatitis (0.8%), and nevus sebaceous of Jadassohn (0.8%). As many as 27.5% of all subjects had no hair disease. One related factor which we found to be statistically significant when no disease group compared to pediculosis capitis group was a more extended frequency of changing towel. At the same time, other factors were not statistically significant.

Limitation: This study was to do a mass examination in limited time and place.

CONCLUSION

Our suggestion is to do further researches on the hair disorders findings, especially in special populations in community. These results should be such an important message to the public health officer for providing better strategic health planning. Remembering the number of specific populations like PBS in Indonesia are quite a lot. To break the chain of transmission in the nearest neighborhood, we had given treatment for the students who suffered pediculosis capitis in that PBS.

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Conflict of interest: The authors have no conflicts of interest to declare for this study.

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