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Original Article

Comparison between clinical diagnosis with and without dermoscopy in the assessment of hair disorders

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Abstract

Background Hair dermoscopy or trichoscopy is a tool used to find hair abnormalities more clearly. Morphologic feature of skin and hair abnormalities becomes more visible under this tool compared with naked eye. It helps to diagnose hair disorders faster and can be used for follow up treatment in patients. The purpose of this study is to compare superiority between clinical diagnosis alone and with addition of dermoscopy tool in the assessment of hair disease.

Methods Research was conducted in October 2018 in a boarding school in West Java, Indonesia. This was a cross-sectional descriptive study. Statistical analysis was done using SPSS Statistics 20.0. Data were collected from 127 subjects through anamnesis, general physical examination and dermatological findings, pull test, dermoscopy, and photographs of scalp and hair lesions.

Results The highest incidence of hair disorder in this study found by clinical examination and dermoscopy was pediculosis capitis, with a total of 86 subjects (67.7%). From the comparison between clinical examination and dermoscopy, we found that dermoscopy was superior for diagnosis. As much as 43 cases of hair disorders which were not detected on clinical examination screening were found by dermoscopy. Out of 127 children, there were 49 subjects with hair disorders found in clinical examination and 92 subjects found by dermoscopy.

Conclusion Dermoscopy as a non-invasive tool which plays an important role in determining the diagnosis of hair disorder.

Key words
Dermoscopy, diagnosis, hair disease, lice infestations, pediculosis capitis.

Introduction

Hair disorders in children can be congenital or acquired. It includes alopecia, hypertrichosis, hirsutism, hereditary and congenital hypotrichosis, structural abnormalities of hair shafts, trichotillomania, infections and infestations of hair like tinea capitis and pediculosis.[1,2] For making a diagnosis of hair diseases, clinicians must obtain comprehensive anamnesis about hair disorders, physical examination of the scalp and hair area, examination of the eyebrows, eyelashes, body hair, nails, and teeth. A thorough physical examination is needed if the lesion is not directly visible and localized. For additional examinations, there are fungal test, pull test, and examination using a light microscope or

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dermoscopy.[3,4]

Hair dermoscopy or trichoscopy is a tool used to find hair abnormalities more clearly– a manual dermoscopy is able to produce 10 times magnification. Morphologic feature of skin and hair abnormalities becomes more visible under this tool compared to with naked eye. It helps to diagnose hair disorders faster and can be used for follow up treatment in patient. This examination is not invasive and well tolerated especially for children.[5,6]

The purpose of this study is to compare clinical diagnosis alone and with addition of dermoscopy tool in the assessment of hair disease.

Methods

This was a cross sectional study which aimed to observe dermoscopic findings in children with hair abnormalities. It was expected to help the clinician in making a diagnosis. Research was done in October 2018 at a boarding school in West Java. Inclusion criteria was all students in the boarding school with hair and or scalp disease while exclusion criteria was whom refused to participate in research. Samples that meet our criteria were included as research subjects. The number of subjects observed was 127 persons. In the first place, diagnosis was determined through anamnesis, general physical examination and dermatological findings, also pull test. After the clinical screening, all the same subjects had dermoscopy (Heine Delta 20T® dermatoscope) examination and photographs were taken. Their medical record of clinical diagnosis before and after dermoscopic examination were listed. Statistical analysis was performed by SPSS Statistics 20.0. Qualitative data were represented as frequencies and percentages. Categorical variables were analyzed by chi-square and if expected cell counts less than five, Fisher test was conducted with p value <0.05 considered as significance.

Results

The demographic characteristics from the 127 subjects can be observed in **Table 1** below.

From the comparison between clinical examination and dermoscopy in **Table 2**, we found dermoscopy to be superior. As much as 43 cases of hair disorders undetected from clinical examination screening were later discovered by dermoscopy. Out of 127 children, there were 49 subjects with hair disorders found in clinical examination. The dermoscopy was able to help determine hair disorders on 92 subjects.

Statistical tests showed p value < 0.05 for all diagnosis compared between clinical examination and dermoscopy findings. Those

Table 1 Demographic characteristics of students in a boarding school, West Java, Indonesia.

Characteristics	*N (%)*
Gender	
Boy	85 (66.9%)
Girl	42 (33.1%)
Age (years),	
median (minimum-maximum)	13 (11-15)
Body Mass Index	
Underweight	22 (17.3%)
Normoweight	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%)
No	108 (85%)
Hair symptoms complained	
Itching	97 (76.4%)
Hair loss	15 (11.6%)
Baldness	4 (3.1%)
Lice	4 (3.1%)
Duration of hair disorders (months), median (minimum - maximum)	12 (0-120)
Duration of living in pesantren (months), median (minimum - maximum)	12 (1-36)

Table 2 Diagnosis findings comparison with and without dermoscopy of students in a boarding school, West Java, Indonesia.

Hair Disorders Findings	*Examination Findings*		*p-value*
	Clinical examination (n)	*Dermoscopy (n)*	
Pediculosis capitis	46	86	0.000
Scar alopecia	2	4	0.001*
Seborrheic dermatitis	1	1	0.008*
Nevus sebaceous of Jadassohn	0	1	0.008*
No disease	78	35	0.000

Notes : statistical test: Pearson Chi-square, Fischer test *

Figure 1 Eggs and lice head of pediculosis capitis in dermoscopic finding.

Figure 2 Pediculus humanus var. capitis or head lice in dermoscopic finding.

Figure 3 Scar alopecia in dermoscopic finding.

Figure 4 Nevus sebaceous of Jadassohn in dermoscopic finding.

Figure 5 Scalp with nevus sebaceous of Jadassohn in dermoscopic finding.

results were statistically and clinically significant.

Several dermoscopic findings can be observed in **Figure 1-5**. Pediculosis capitis show grey, translucent, ovoid eggs with flattened free ends firmly attached to the hair shaft, corresponding to nits. Post-trauma scar alopecia gave an irregular appearance. We also found brown globules aggregated in clusters on a yellow background, which was a nevus sebaceous of Jadassohn.

Discussion

The standard methods to diagnose hair and scalp

disorders such as simple clinical inspection, pull test and biopsy vary in reproducibility and invasiveness. There is a need for non-invasive methods that help clinicians in everyday practice.[7] Dermoscopy is a non-invasive technique allowing rapid and magnified (×10) in-vivo observation of the skin, with the visualization of morphologic features often imperceptible to the naked eye. In the last few years many studies have utilized it for the diagnosis of hair and scalp disorders.[8] The advantages of dermoscopy in evaluating hair and scalp disorders of children are numerous: it is non-invasive and painless, it can be repeated after treatment. It allows rapid examination of the whole scalp and is useful in detecting scalp or hair shaft disorders that involve a limited area. Dermoscopy is considered to be as reliable as microscopy in the detection of most hair shaft diseases.[5,6]

Our study describes the dermoscopic findings observed in hair and scalp disorders in children in a religious boarding school. We have found limited study concerning the use of dermoscopy in the study of hair disease done exclusively on children. El-Sayed MM (2017)[8] showed in a study conducted on 242 students at Sharkia Governorate that in establishing a diagnosis of pediculosis capitis, dermoscopy is superior to ordinary visual examination. In this study 80 cases (33%) of pediculosis were obtained using dermoscopy while only 32 cases (14,9%) were obtained using regular examination. This superiority of dermoscopy was in line with our result.

Pediculus humanis var capitis, or head lice, is a common health concern especially in children, causing millions of scalp infestations per year. Diagnosis is based upon the detection of lice or nits on the scalp. However, because the head louse moves quickly and avoids light, it is often not visible to the naked eye. Therefore, the diagnosis of pediculosis capitis is traditionally based on a combination of a complaint of scalp itching, eventually accompanied by local bite reactions and/ or cervical lymphadenopathy, and the presence of nits. Nits containing vital nymphs can be difficult to differentiate from empty nits and so-called pseudonits, such as hair casts, debris of hair spray or gel, or scales from seborrheic dermatitis. Physical examination revealed the presence of excoriated lesions at the occipital and cervical regions along with numerous yellow to brown nits, fixed to hair shaft.[9-10]

In order to avoid misdiagnosis and inadequate treatment, which result in increasingly observed drug-resistance to *Pediculus humanis capitis*, microscopic examination of affected hair is generally recommended, because it allows the distinction of pseudo-nits and hatched empty eggs from the ovoid eggs containing vital nymphs. Dermoscopic examination using nonpolarized light dermoscope revealed the presence of multiple yellow to brown ovoid eggs firmly attached to the hair shaft, corresponding to nits with vital nymph, along with brown translucent flat empty nits. It differentiates lice egg containing the nymph from the empty cases of hatched parasites and from amorphous pseudonits and hair casts.[8] On further examination of occipital area of scalp, we were able to see multiple live lice (*Pediculus humanus var. capitis*).

Nevus sebaceous of Jadassohn is a congenital abnormality, a complex cutaneous hemartoma with various clinical appearances occasionally associated with syndromic features such as mental retardation, central nervous abnormalities, or skeletal abnormalities, referred to as linear nevus sebaceous syndrome.[7]

The use of dermoscopy improves diagnostic accuracy and may contribute in understanding

the pathogenesis of hair disorders.[9] Dermoscope hence not only provides an easier way to establish confirmed diagnosis but also helps in disease monitoring after treatment initiation.[10-11] The highest incidence of hair disorders in this study found by clinical examination and dermoscopy was pediculosis capitis, with total of 86 subjects (67.7%) affected.

Conclusion

Dermoscopy plays an important role in diagnosis of hair disorders and is able to reveal conditions undetected by naked eye observations. It is useful for the evaluation of pediatric hair disorders because it is fast, painless, and well accepted by children and parents. This is a tolerable method for confirming a diagnosis and monitoring disease activity and treatment outcome. Overall, dermoscopy was found to be better in diagnosing pediculosis capitis compared with visual examination. Further investigations concerning trichoscopy in children are necessary to provide more effective means for prevention and treatment.

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