The conformity between dermoscopy imaging and Wood's lamp diagnostic on periorbital hyperpigmentation

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ABSTRACT

Introduction: Periorbital hyperpigmentation (POH) is a common skin problem characterized by homogeneous/dark brown hyperchromic/pigmented macules around the lower eyelid and upper eyelid up to the malar area temporal area and the sides of the nose. POH is a multifactorial condition caused by both endogenous factors and exogenous factors, without one aspect dominating. Dermoscopy and Wood's lamp can assist the diagnosis of POH types when the inspection is regarded as weak. The assessment of the suitability of the dermoscopic image and Woods' lamp diagnosis indicates an alternative supporting test in POH diagnosis. This study aimed to examine the conformity between dermoscopic images and Wood's lamp examination in POH diagnosis.

Methods: This observational conformity study was conducted using a cross-sectional design. There were 38 subjects diagnosed with POH who went to the Cosmetics Division of Dermatology and Venereology, Universitas Sumatra Utara Hospital participated as subjects. Assessments regarded the types of POH analyzed based on dermoscopic images and Wood's lamp examination. Data analysed with SPSS version 20 using Kappa test.

Results: On dermoscopy examination, the mixed type was the type most obtained, as many as 18 subjects (47,4%), whilst on Wood's lamp examination, the most dominant type obtained was pigment type, as much as 21 subjects (55,3%). Moderate conformity value on POH examination was obtained with dermoscopy and Wood's lamp.

Conclusion: Dermoscopic images and Wood's lamp examination shared a sufficient conformity value in POH diagnosis.

Keywords: periorbital hyperpigmentation, dermoscopy, Wood's lamp, conformity value.
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INTRODUCTION

Periorbital hyperpigmentation (POH) is a common condition and often occur, marked by hyperchromic macula/homogenous brown pigment macula/dark brown involving lower eyelid and could spread to upper eyelid to mallard area, temporal, to the side of the nose.[1] POH also known as periorbital melanosis, periocular hyperpigmentation, Dark Circles (DC), infraorbital color changes, infraorbital darkening, or hyperchromatic idiopathic skin on the orbital area.[2,3]

POH could be seen on either young ages or old ages that could disturb face visual aspect with a face appearing worn, exhausted, depressed, sad, and much older, which could affect life quality.[4] POH often occur to a woman related to cosmetic appearance.[5] Limited data related to incident and prevalence POH caused by its natural characteristic could be temporarily and few etymology explanations.[3] On a study in India, discovered POH often occur in the age range of 16-25 years old.[6] POH etiology could happen on multifactorial with endogen factor and exogenous factor, without one factor dominating.[6]

POH diagnosis could stand clinically with identifying contributing etiology factor and evaluating skin to detect eyelids involvement, skin disease existence or scar in the periorbital area, tear trough, and visible superficial blood vessel on the infraorbital area.[5] Histopathology examination gold standard on POH, but this could go into consideration because it could cause the formation of a scar on the area.[7] Some other examinations could be helpful in diagnosing POH, such as eyelid stretch test, dermoscopy, Wood's lamp examination, and ultrasonography.[5]

Dermoscopy is a non-invasive diagnostic technique for in vivo observation on pigmented skin lesions that could better visualise on the surface and under surface structure, convenient and proper to use. This device could be used to differentiate POH types whenever there is hesitation on naked eyes examination.[5] On

Gaon et al study that examined 48 subjects with POH using dermoscopy, mixed type is the most common type obtained as much as 21 subjects followed by 15 subjects pigment type, and 12 subjects of vascular type.[8]

Wood's lamp examination was done to differentiate epidermal pigmentation and dermal. Variation in epidermal pigmentation becomes more obvious under Wood's lamp's light compared to dermal pigmentation. Wood's lamp could also help to differentiate POH types.[5] On Huang et al examination, examine 65 subjects using Wood's lamp obtained the most POH type is 78% mixed type, followed by 14% vascular type, and 5% pigment type.[9]

Dermoscopy examination and Wood's lamp has the same merit on determining POH types, and examination on POH conformity image has never been done in Indonesia. Therefore this study aimed to examine the conformity between dermoscopic images and Wood's lamp examination in POH diagnosis.

METHODS

This study is an observational suitability test study with a cross sectional approach involving 38 subjects with POH. Sampling was done from February 2021 to March 2021. This study was approved by the Ethics Commission of Faculty of Medicine, Universitas Sumatra Utara, number 717/KEP/USU/2020.

The inclusion criteria in this study were women with POH in the age range of 18-55 years old who were disposed to participate in the study signing informed consent. Exclusion criteria are pregnant women with POH lesions followed with other skin lesions on the eyes area (periorbital skin tumor, seborrheic keratosis, skin tags, syringoma, and milia).

Sampling on this study done with consecutive sampling technique, done by choosing a sample that qualifies study criteria on a certain period until sample amount is fulfilled.

The data were analyzed using SPSS version 20. The sample demographic and clinical data of the samples were analyzed univariately to describe the number and proportion of each and displayed with tables. To assess the conformity between dermoscopy and Wood's lamp, the results of each examination were cross-tabulated in 3 x 3 table, the number of subjects with the same result considered concordant, and the number of subjects with different results between these two examinations was considered as inconcordant cells. Then, the Kappa test was used to evaluate the significance of the result. The result was significant if p value <0,05.

RESULTS

The study subject's demographic characteristics are explained on Table 1. As many as 38 women with POH participate in this study. Based on age, the majority subjects in the age range of 26-35 years old, in total of 31 subjects (81,6%), based on occupation, as much as 33 subjects (86,9%), occupation as un-employed, specifically university student and housewife.

Clinical image, dermoscopy image, and Wood's lamp on POH are explained in Table 2. Based on the clinical image, the majority were found as pigment type as many as 23 subjects (60,5%). On dermoscopy images on POH, the majority were found as mixed type as much as 18 subjects (47,4%), while on Wood's lamp image, the majority were found as pigment type as much as 21 subjects (55,3%).

Conformity dermoscopy image with Wood's lamp on POH is explained in Table 3. On dermoscopy examination, pigment types were as much as 17 subjects (44,7%) and 21 subjects (55,3%) pigment types on Wood's lamp examination. On vascular type obtained 3 subjects (7,9%) on both dermoscopy and Wood's lamp examination, While on mixed type obtained 18 subjects (47,4%) on dermoscopy examination and 14 subjects (36,8%) on Wood's lamp.

In conclusion, from the table, as much as 63,2% from both examinations, either

Table 1.   Demographic characteristics of research subjects

Variable	n	%
Age n (%)		
18-25 age group	2	5,3
26-35 age group	31	81,6
36-45 age group	4	10,5
46-55 age group	1	2,6
Occupation n (%)		
Health professional	2	5,2
Administrative staff	3	7,9
Un-employee	33	86,9

Table 2.   Clinical image, dermoscopy image, and Wood's lamp on POH

Variable	n	%
Clinical image n (%)		
Pigment type	23	60.5
Vascular type	0	0
Mixed type	15	39.5
Dermoscopy image n (%)		
Pigment type	17	44,7
Vascular type	3	7,9
Mixed type	18	47,4
Wood's lamp n (%)		
Pigment type	21	55,3
Vascular type	3	7,9
Mixed type	14	36,8

Table 3.   Conformity dermoscopy image with Wood's lamp on POH

		Dermoscopy n (%)				Kappa value	p value
		Pigment	**Vascular**	**Mixed**	**Total**		
Wood's Lamp n (%)	Pigment	12 (31,6)	0	9 (23,7)	21 (55,3)	0,356	**0,007**
	Vascular	0	3 (7,9)	0	3 (7,9)		
	Mixed	5 (13,1)	0	9 (23,7)	14 (36,8)		
	Total	17 (44,7)	3 (7,9)	18 (47,4)	38 (100,0)		

N.B: concordant cells were colored in gray, inconcordant cells were colored. The result is significant if p<0,05 using Kappa test

dermoscopy and Wood's lamp give the same result (concordant cell), and 36,8% from both examinations give different results (discordant). With Kappa test, obtained p value=0,007 (p<0,05) and Kappa value=0,356 shows the result of dermoscopy examination and Wood's lamp examination shows moderate conformity (Table 3).

DISCUSSION

Most age ranges involved in this study were 26-35 years old and 31 subjects (81,6%), and the least age range were 46-55 years old of 1 subject (2,6%). Parallel with a study done by David et al in India to 250 subjects with POH shows the most study subjects in the 26-35 years old age range as much as 98 subjects (39,2%).[10] On a study by Chatterjee et al in India to 82 subjects with, highest POH prevalence were found on the 21-30 years old age range as much as 40,2%.[11] Study by Mendiratta et al in India to 50 subjects found patient average age range is 29,5 years old.[12] Sheth et al, on a study in India, discovered POH mostly happened on 16-25 years old range as much as 47,50%.[6] From some studies also discovered new respondents care about the existence of POH on young ages because in that age range, they are more concerned about cosmetics.[13,14]

The occupation was grouped by Indonesia Occupation Standard Classification 2014 (KBJI 2014) by the ministry of labour and the Central Bureau of Statistic (BPS). The majority of subjects were unemployed, as many as 33 subjects (86,9%). The report regarding POH and occupation was limited. The study done by Sheth et al, stated that POH commonly was found on housewives (45,5%), workers in closed space (29%) and students (19,5%).[6] Stated that there is a connection between POH with surrounding factors such as drop off and picking up children, doing groceries, and house works on housewives.[6] While on a study done by Chatterjee et al, the majority of subjects were housewives as much as 51 subjects, followed by a university student as many as 21 subjects.[11]

The clinical image on POH consists of pigment type, vascular type, and mixed type. Few factors are causing different types of POH. Pigment type caused by melanin sediment linked to ethnic factor and sun exposure factor, while vascular type commonly found genetically, with darkening caused by overly thin and translucent skin, the visualization of the blood vessel and muscle below, and mixed type cause by factor combination of pigment and vascular type.[1,11,15] This study discovered 23 subjects (60,5%) had pigment type clinical image and 15 subjects (39,5%) had mixed type when observed directly. The study by Ranu et al discovered that most patients with POH were vascular type, on Chinese ethnic and pigment type on Indian ethnic.[16] But there is a little contradiction in Fatin et al study, where majority Indian ethnic on mixed type similar to Malaya ethnic.[13]

On dermoscopy examination most types found were mixed type as much as 18 subjects (47,4%), followed by pigment type as much as 17 subjects (44,7%), and the least is vascular type as much as 3 subjects (7,9%). In Gaon et al study, there are 25 subjects (31%) pigment type, followed by 21 subjects (44%) mixed type, and the least is vascular type with 12 subjects (25%).[8] On Rocha et al study, 113 subjects (75,8%) with pigment type, followed by 20 subjects (13,4%) with vascular type, and 16 subjects (10,7%) with mixed type.[17]

Wood's lamp image on POH showed pigment type was the most type found, as much as 21 subjects (55,3%), followed by 14 subjects (36,8%) with mixed type, and the least is 3 subjects (7,9%) with vascular type. Huang et al examined 65 subjects using Wood's lamp, the most type found was 78% with POH mixed type, followed by 14% with vascular type, and 5% with pigment type. On pigment type, a dark brown discoloration was visible, while on vascular type there was no discoloration, and on mixed type are the combination between pigment and vascular type followed by clinical image.[9]

Dermoscopy conformity image with Wood's lamp on 38 subjects showed 21 subjects (55,3%) with pigment type on Wood's lamp examination. There are 12 subjects (31,6%) that show pigment type on dermoscopy examination. On vascular type, there were subjects (7,9%) on Wood's lamp examination

and dermoscopy. The mixed type had the same result with 9 subjects (23,7%) on Wood's lamp and dermoscopy. From both examinations, 63,2% had the same result (concordant cell), and 36,8% had different results (discordant). With Kappa test, obtained p value=0,007 or p<0,05 and Kappa value=0,356 shows the result of dermoscopy examination and Wood's lamp examination shows moderate conformity.

POH is not a condition linked with morbidity, but became a cosmetic problem that has a negative effect on individual quality of life but could show sadness or exhaustion. Cause of POH is not just one factor, it could also be caused by too much pigmentation, thin and translucent eyelid skin, the secondary shadow caused by skin weakness, and change linked to anatomy that causes the basin. The Periorbital area is one of the first signs of aging, wrinkles, textures changes, dryness, volume changes, and uneven or irregular pigmentation.[18] Periorbital aging is unstoppable and unavoidable progress that evolve.[19] Sheth et al, who studied POH prevalence, reported the most common age range is 16-25 years old and mostly happens to woman to man (4,2:1).[6] POH etiology is genetic, Post inflammation hyperpigmentation, superficial blood vessel location, periorbital oedema, surrounding (UV radiation, lack of sleep, alcohol, and smoking).[3,6,20,21]

Dermoscopy and Wood's lamp could be used to differentiate POH types whenever there is hesitation on naked eyes examination. The strength of this study is that there is still no study regarding assessing conformity between dermoscopy and Wood's lamp image on POH, and this study is one of the first studies to talk about it. But this study still has limitations such as small sample size and only being collected in one center.

CONCLUSION

On dermoscopy examination, the most type discovered is mixed type, and on Wood's lamp examination is pigment type. There is conformity between dermoscopy and Wood's lamp examination on POH with moderate conformity value.

DISCLOSURES

Conflict of Interest

All authors declare no conflict of interest.

Ethical Statement

The Ethics Commission of the Faculty of Medicine, Universitas Sumatra Utara approved the study protocol with registration number: 717/KEP/USU/2020.

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Author Contribution

All authors contributed equally.

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