

Dermoscopic imaging of melasma on various skin colors



Riefka Ananda Zulfa¹, Imam Budi Putra², Nelva Karmila Jusuf²

¹Postgraduate Master of Clinical Medicine Department of Dermatology and Venereology, Faculty of Medicine Universitas Sumatera Utara, Universitas Sumatera Utara Hospital, Medan, Indonesia

²Department of Dermatology and Venereology, Faculty of Medicine Universitas Sumatera Utara, Universitas Sumatera Utara Hospital, Medan, Indonesia

*Corresponding to:
Riefka Ananda Zulfa; Postgraduate Master of Clinical Medicine Department of Dermatology and Venereology, Faculty of Medicine, Universitas Sumatera Utara, Universitas Sumatera Utara Hospital, Medan, Indonesia;
riefka.zulfa@yahoo.com

Received: 2022-05-03
Accepted: 2022-07-16
Published: 2022-08-01

ABSTRACT

Background: Melasma is an acquired hyperpigmentation disorder characterized by pigmented macules and patches scattered on the forehead, cheeks, and chin area exposed to sunlight. Dermoscopy is a non-invasive technique that allows fast and clear observation of melasma in vivo with morphological visualization that is not visible to the naked eye. The color bar tool is an economical and simple tool that can be used to determine skin color. This study aims to determine the dermoscopic appearance of melasma on various skin colors.

Methods: This study is a descriptive observational study with a cross-sectional method of all patients with melasma who came to the outpatient department of the cosmetic dermatology division, Department of Dermatology and Venereology, Universitas Sumatera Utara Hospital, Medan, Indonesia, from September 2020–October 2021. The assessment was carried out by dermoscopy and color bar tools.

Results: This study included 50 melasma patients in total. Most participants (n=23, or 46 %) were between the ages of 36 and 45. Based on clinical features, 42 subjects (84%) presented with centrofacial pattern. In epidermal type melasma, 21 subjects (42%) were associated with color bar 3. In dermal type melasma, color bar 3 is found in 2 subjects (4%); in mixed type melasma, three subjects (6%) were found in color bar 3.

Conclusion: The dermoscopy of melasma in various skin colors has a similar distribution of skin color. Color bar 3 is the most dominant skin color. There were no color bars 5 and color bars 6 in this study.

Keywords: Melasma, skin color, dermoscopy, color bar tool.

Cite This Article: Zulfa, R.A., Putra, I.B., Jusuf, N.K. 2022. Dermoscopic imaging of melasma on various skin colors. *Bali Medical Journal* 11(2): 676-679. DOI: 10.15562/bmj.v11i2.3608

INTRODUCTION

Melasma is a common acquired condition in the field of dermatology. In most cases, melasma occurs in the facial area and is characterized by pigmented macules and patches scattered on the forehead, cheeks and chin area exposed to sunlight.^{1,2} Several risk factors are associated with the pathogenesis of melasma. A study by Goh *et al.* found that sunlight, hormones and genetics also play a role in the pathogenesis of this disorder.³ Melasma is a common disease. Melasma affects 5-6 million women in the United States, according to the American Academy of Dermatology.⁴ Melasma is a widespread skin condition in Southeast Asia, with a prevalence of 0.25 % to 4 % in dermatological clinics. Melasma patients in Singapore were studied by Goh *et al.* in an extensive retrospective investigation. They reported that the incidence in women is more common in women than men, with an estimated

10% of cases that rarely occur before puberty and generally occur in women of reproductive age. A study by Asditya *et al.* reported that the number of melasma patients who came to the medical cosmetic division of RSUD Dr. Soetomo Surabaya from January 2012 to 2014 was as many as 869 subjects.⁵ Research by Jusuf *et al.* at H Adam Malik Hospital Medan in 2012-2015 showed an increase in the prevalence of melasma from 78.85% in 2012, 83.78% in 2013, 66.67% in 2014 and 87.5% in 2015.⁶

The main clinical features of melasma are light to dark brown macules with well-defined borders with an irregular shape. There are three distinctive distribution patterns, namely centrofacial, malar and mandibular.⁷ Based on the location of the melanin pigment, melasma is classified into epidermal, dermal and mixed types. Other diagnostic tools in melasma include wood lamp examination, dermoscopy and

histopathological examination. As a result of sentiments about skin appearance, melasma has a significant impact on quality of life. There was no statistically significant difference in the mean MelasQol scores between participants with centrofacial type and those with epidermal type, according to a study by Jusuf *et al.* According to clinical patterns and lesion depth. However, not statistically significant, melasma nonetheless harmed the subject's quality of life, albeit to a lesser extent.⁸

Dermoscopy is a non-invasive technique that can observe further features that are not visible to the naked eye. The pigmentation pattern can indicate the pigment's depth and provide clear therapeutic implications expected to give better results because the pigment components can be visualized objectively.⁹

In dermatology, skin color is an important consideration in the

presentation and clinical manifestation of certain conditions such as melasma and plays a role in determining therapy.⁴ Constitutive skin color and skin sensitivity are classified according to skin phototype, namely Fitzpatrick Skin Type is divided into phototypes I-VI. Another alternative to objectively determine skin color is a color bar survey tool, which is used by choosing the color closest to the color of the inner skin, and the results can help determine skin. This tool functions economically and does not require a power source, calibration or software, making it easier to use in the field.¹⁰

It is said that melasma is prone to occur in brown-colored skin individuals, but research on dermoscopy images determined by color bar survey has not been carried out, especially in Indonesia, which is a tropical area and has various ethnicities. Therefore, researchers are interested in examining the dermoscopy picture of melasma on various skin colors. This study aims to determine the dermoscopic appearance of melasma on various skin colors.

METHOD

This study is a descriptive observational study with a cross-sectional approach involving 50 subjects with melasma. Sampling was carried out from February 2021 to March 2021. This study was carried out after obtaining approval from the Faculty of Medicine Ethics Commission, University of North Sumatra, number 53/KEP/USU/2021.

Inclusion criteria were women with melasma aged >18 years willing to participate in the study by signing informed consent. Exclusion criteria were women who were pregnant and breastfeeding, Patients with the use of depigmentation drugs on the face. Sampling was carried out using a consecutive sampling technique, which was done by selecting samples that met the research criteria for a certain period so that the number of samples was met. All of the data were analyzed using SPSS ver. 22.

RESULTS

Table 1 provides an overview of the demographics of the participants in the

study. This study included 50 melasma patients in total. Most participants (n=23, or 46 %) were between the ages of 36 and 45. Thirty-five participants (or 70%) were employed in administrative and sales roles. Melasma ran in the family for 35 out of the 60 participants in the study.

The distribution of types of clinical features, skin color and dermoscopy features of melasma are shown in **Table 2**. Based on clinical features, 42 subjects (84%) presented with centrofacial pattern. Based on skin color in melasma, the highest skin color was found on color bar 3, with 26 subjects (52%), and based on dermoscopy description of melasma, the majority were epidermal type, found in 41

subjects (84%).

Dermoscopy features of melasma based on skin color are described in **Table 3**. In epidermal type melasma, 21 subjects (42%) were associated with color bar 3, followed by 17 subjects (34%) in color bar 2, 2 subjects (4%) in color bar 4 and 1 subject in color bar 1 (2%). In dermal type melasma, color bar 3 is found in 2 subjects (4%) and color bar 2 in 1 subject (2%). In mixed-type melasma, three subjects (6%) were found in color bar 3, then followed by two subjects in color bar 2 (4%) and one subject (2%) in color bar 4. In this study, there were no subjects in color bar 5 and color bar 6.

Table 1. Demographic characteristics of research subjects

Age (years)	n	%
18-25	0	0
26-35	12	24
36-45	23	46
46-55	13	26
56-65	2	4
Occupation		
Administrative staff	15	30
Administrative services and sales staff	35	70
Family History		
Mother	23	46
Siblings	12	24

Table 2. Clinical features, dermoscopic features and wood's lamp examination in melasma

Clinical features	n	%
Centrofacial	42	84
Malar	8	16
Mandibular	0	0
Skin color		
Color bar 1	1	2
Color bar 2	20	40
Color bar 3	26	52
Color bar 4	3	6
Color bar 5	0	0
Color bar 6	0	0
Dermoscopic features		
Epidermal type	41	55.3
Dermal type	3	7.9
Mixed type	6	36.8

Table 3. Dermoscopy features of melasma based on skin color

Skin color	Dermoscopy					
	Epidermal		Dermal		Mixed	
	n	%	n	%	n	%
Color bar 1	1	1	0	0	0	0
Color bar 2	17	34	1	2	2	4
Color bar 3	21	42	2	4	3	6
Color bar 4	2	4	0	0	1	2
Color bar 5	0	0	0	0	0	0
Color bar 6	0	0	0	0	0	0

DISCUSSION

The largest age group in this study was 36-45 years, and the least was in the 56-65 years group. Jusuf *et al.* reported the highest age group, namely 31-40 years and 41-50 years. These are the age group where melasma is most commonly found.⁶ Sundara *et al.* in India reported that the 30-39 year age group was most commonly affected by melasma.¹¹ Research conducted by Manjunath *et al.* showed that among 50 melasma patients with an average age of 39 years.⁹ Meanwhile, in a study by Nanjundaswamy *et al.*, the age of occurrence of melasma in Indian tribes was 33 years.¹³ Ortonne *et al.* and Tamega *et al.* reported a mean age of melasma was found in ages 34.0 and $27,5 \pm 7.8$ years.¹² Melasma is commonly found in women of reproductive age.^{4,12}

Occupations are grouped based on the 2014 Indonesian Standard Job Classification (KBJI 2014) by the ministry of human resources and the Central Statistics Agency (BPS).¹³ Most of the subjects came from the sales and service administration group. It is like the study of Nanjundaswamy *et al.*, in which 64% of working housemaids had significant sun exposure. The study showed that sun exposure was one of the most frequent causes of melasma exacerbations.¹⁴ In our study, most occupations were housemaids and household assistants enjoy outdoor and indoor activities. So, it is likely that sun exposure contributes to the development of melasma. However, a study by Yalamanchili *et al.* found that most occupations were agriculture.¹⁵

Most subjects reported a history of melasma in the family, namely 35 subjects. This is in line with a previous study by Suntatoyo *et al.* at the Hasan Sadikin

Central General Hospital (RSUP) Hasan Sadikin Bandung in melasma patients who had a family history of melasma as many as 44.8%.¹⁶ Research by Ortonne *et al.* of 156 subjects had at least one relative with melasma, i.e., 145 subjects had closest relatives, and 11 subjects had more distant relatives with melasma.¹² The Handel *et al.* study found that people with melasma reported a family history of at least one relative with melasma, 97% of whom were close relatives.¹⁷ According to research by Ikino *et al.*, as many as 49.02% have a family history of suffering from melasma.¹⁸ Family history is a predisposing factor for melasma, but until now, there has not been scientific evidence to support the genetic relationship with the occurrence of melasma.

The centrofacial type was the most common type of clinical picture found in this study, followed by the malar type. This study is the same as that seen in the study of Mahdalena *et al.* The most common clinical picture is the centrofacial type 52.9% and the malar type 47.1%.¹⁹ The study by Jusuf *et al.* showed that the centrofacial pattern was the most dominant.⁶ However, in Asditya *et al.* research, it is said that the most dominant malar pattern is 58.2%, followed by centrofacial, which is 49.7%.⁵ A study conducted by Nanjundaswamy *et al.* They. Found that the malar pattern was the most common.²⁰ Furthermore, the study by Yalamanchili *et al.* showed malar predominance in patients with melasma.¹⁵ In this study, none of the patients had a mandibular pattern. The area most frequently exposed to the sun's rays is the centrofacial area. Exposure to sunlight causes an increase in the number of melanocytes, resulting in hyperpigmentation

In the group of melasma subjects, the

highest skin color was found in color bar 3, followed by skin color in color bar 2. For skin color bar 4, there are three subjects and skin color bar 1 only has one subject. The results obtained from this study are in line with the research of Oluwatobi *et al.*, which stated that melasma is more common in women and darker skin color types. Especially more common with light brown skin types. Melasma can occur in all ethnicities and usually occurs in individuals with darker skin Fitzpatrick skin types III-IV.²¹

In the dermoscopy picture, melasma was mostly in the epidermal type in as many as 42 subjects, followed by the mixed type, and the last one was the dermal type in as many as three subjects. In line with research by Novarina *et al.* in the Medical Cosmetics Division of URJ Skin and Sexual Health, RSUD Soetomo Surabaya, it was found that most types were mixed, followed by dermal type, then epidermal type.²² Dermoscopy can diagnose melasma, and color intensity indicates the location of melanin. Dermoscopy can also be used to differentiate ochronotic.

Based on the dermoscopy image with skin color, it was found that epidermal melasma was seen with color bar 3, followed by color bar 2 and color bar 3, and the least is in color bar 1. In dermal type melasma, two subjects were found color bar 3, then one in color bar 2. In mixed-type melasma, three subjects were found in color bar 3, followed by two subjects in color bar 2 and 1 subject in color bar 4. In this study, no skin color was found in color bar 5 and color bar 6. The prevalence of melasma was higher in middle skin (Fitzpatrick III-IV). The low incidence of melasma in other skin phototypes indicates the stability or homogeneity of the pattern of pigment formation in reaction to sunlight. The melasma area has intensive melanogenesis and melanosome transport with a larger proportion of eumelanin.^{21,23}

CONCLUSION

The dermoscopy appearance of melasma in various skin tones has a similar skin tone. Color bar 3 is the most dominant skin color. No subjects showed color bar 5 and color bar 6 in this study.

ETHICAL STATEMENT

This study was carried out after obtaining approval from the Faculty of Medicine Ethics Commission, University of North Sumatra, number 53/KEP/USU/2021.

ACKNOWLEDGEMENT

We thank the Chairperson of the Department of Dermatology and Venereology, University of North Sumatra and the Hospital of the University of North Sumatra.

AUTHORS' CONTRIBUTION

All authors have contributed to this research process, including preparation, data collection, analysis, compilation, and approval to publish the manuscript.

FUNDING

The author is responsible for all funding without external sources of guidance.

CONFLICT OF INTEREST

The authors declare no conflict of interest regarding the article's publication.

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