

The dermoscopic features of facial aging among diverse ethnicity in Medan, Indonesia



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ABSTRACT

Background: Aging is an inevitable process, and skin is the body organ that most demonstrates this process. Skin aging occurs due to two continuous processes, which are intrinsic and extrinsic. Dermoscopy is a non-invasive technique that allows physicians to rapidly observe skin aging *in vivo* and visualize the morphological structures that are invisible to the naked eyes. Dermoscopic features of facial aging might differ in various ethnic groups. Medan is a multi-ethnic city; thus might show facial skin aging differently. This study investigated the dermoscopic features of facial aging among various ethnic groups in Medan, Indonesia.

Methods: This descriptive study was a cross-sectional study design with 164 subjects from 10 ethnicities in Medan. Subjects were sampled based on ethnic group by quota sampling technique with inclusion and exclusion criteria. Each subject was evaluated for dermatological history and physical examination. The assessment of facial aging is based on the Dermoscopy Photoaging Scale (DPAS) using 11 criteria. The data then processed in the SPSS program ver 23 then presented in descriptive with percentages.

Results: Most of the subjects were Javanese ethnic (30.5%). The age group 30 - 39 years old has the highest frequency (59.1%). Most of them were in married status (87.2%). DPAS criteria showed yellowish discoloration (97.0%), ephelids/lentigo (96.3%), and superficial wrinkle (96.3%) were the three most dermoscopic features. Each ethnic has its dominant dermoscopic features and various with the others ethnic.

Conclusion: Yellowish discoloration, ephelid/lentigo, telangiectasis and superficial wrinkles were the dominant dermoscopy features. Meanwhile, yellow papules, actinic keratoses and criss-cross wrinkles were rarely observed, and senile comedones were not found in this study.

Keywords: facial aging, dermoscopy, DPAS, ethnic.

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INTRODUCTION

Aging is a natural process that every individual will experience, and the skin is one of the body organs that clearly shows this process. The skin is considered a reflection of a personal appearance, so it is not wrong for many people to take care of the skin, especially facial skin, and delay the aging process.^{1,2} A youthful and attractive appearance is considered essential for self-esteem and social relations, especially for women.^{3,4}

Skin aging is a complex process consisting of two continuous processes, the intrinsic and extrinsic aging processes. The intrinsic aging process is an aging process characterized by physiological changes related to human genetics, hormonal

and biochemical changes over time. The extrinsic aging process associated with exposure to ultraviolet light, alcohol consumption, smoking, malnutrition, and other environmental factors, and under certain conditions can be avoided.^{5,6,7} Photoaging or premature skin aging is a condition used to describe clinical and histological findings due to chronic sun exposure on the skin of both adults and the elderly. Photoaging is characterized by the appearance of rough skin, wrinkles, pallor skin, telangiectasis, uneven pigmentation, and various benign, premalignant, and malignant neoplasms.^{8,9}

Dermoscopy is a non-invasive technique that allows rapid and magnified *in vivo* observation of the skin surface to visualize morphologic features invisible

to the naked eye.¹⁰ Some of the features of aging skin can be easily detected by dermoscopy. Dermoscopic assessment of skin aging will provide reliable and objective results compared to using clinical criteria alone.^{11,12} With the development of dermoscopy, Isik et al. developed a Dermoscopy Photoaging Scale (DPAS) to assess the photoaging of facial skin.¹³ Several criteria are assessed on DPAS including yellowish discoloration, yellow papules, white lines, telangiectasis, hypo-hyperpigmented macules, actinic keratoses, senile comedones, deep wrinkles, superficial wrinkles, and criss-cross wrinkles.¹²

El Sayed et al. evaluated facial skin aging in men and women in Egypt using the DPAS criteria. They reported

that yellowish papules, lentigo solaris, and superficial wrinkles were the most common DPAS findings in women.¹³ Isik et al. in 2013 study reported that the most common finding of DPAS was hypo-hyperpigmented macules in Turkey women.¹² Magdy and Sadek in Egypt reported that the most common finding of skin aging was lentigo solaris.¹⁴ On the other hand, Chung et al. evaluated photoaging in Korean society and reported the most common finding was hyperpigmented macules in women. These differences in the appearance of facial skin aging may be related to ethnic and skin color differences.¹⁵

Ethnicity and skin color are important considerations that impact the presentation and manifestation of many conditions included in dermatology practice, particularly on the appearance of aging skin.¹⁶ The appearance of facial skin aging in various ethnicities has several differences. The most significant difference between individuals of color and white skin is the melanin content. Melanin content and the melanosomal dispersion pattern is thought to protect UV radiation-induced signs of premature aging, so hypopigmentation and hyperpigmentation are common signs of photoaging in individuals of color.^{17,18,19} It has also been observed that in Asian women, pigmentation (lentigo) appears much earlier than in Caucasian women based on the same age group. In contrast, in Caucasian women, the formation of coarse wrinkles on the skin is seen earlier.^{15,20,21}

Medan is the capital city of North Sumatra, Indonesia. This city is the third-largest city in Indonesia after Jakarta and Surabaya. Medan is inhabited by people who come from various ethnicities.²² Ethnic variations in the appearance of the skin are still being studied. Various studies analyzing traits within the same ethnic group often report different results from previous literature. There is a limited study about facial aging based on ethnicity. Research on the dermoscopic picture of facial skin aging is also minimal, so the authors are interested in this research.

METHOD

This descriptive observational study with a cross-sectional design involved 164 subjects with facial aging. The study was conducted from September 2020 to February 2021. The Ethics Committee of the Faculty of Medicine, Universitas Sumatera Utara, approved this study with protocol number 261/KEP/USU/2020.

The inclusion criteria were women aged³ 30 years old, of ethnic origin from Javanese, Batak, Malay, Minang, Mandailing, Karo, Aceh, Nias, Chinese and Indian and agree to participate with informed consent. We exclude the women with criteria as followed: 1) used topical anti-aging skin creams containing retinol and its derivatives used facial skincare products containing antioxidants, vitamin C, vitamin E, hydroxy acids within the last three months; 2) used contraceptives containing estrogen or hormone replacement therapy (isotretinoin, antioxidants or vitamin C or vitamin E); 3) underwent routine facial rejuvenation treatment procedures such as chemical surgery, micro-needling, dermabrasion and microdermabrasion, botox injections, filler injection and various light and laser therapies, as well as plastic surgery and/or reconstructive surgery on their faces.

The study subjects were sampled using the quota sampling technique based on the ethnic group populations. Each of the individual subjects was evaluated for dermatological history and physical examination. Every subject's demographic data, including ethnicity, age, occupation, and marital status, were obtained during the interview. The dermoscopic examination was performed on four facial regions (forehead, right malar, left malar and chin) using a DermLite DL3N (3Gen, Inc, California, USA) dermoscopic features based on DPAS criteria by Isik et al.¹³ The signs of photoaging based on criteria assessed were yellowish discoloration, yellow papules, white lines (skin atrophy), ephelides/lentiginos, hypo-hyperpigmented macules, telangiectasis, actinic keratoses, senile comedones, deep wrinkles, superficial wrinkles and criss-cross wrinkles. The data then compiled in the SPSS program ver. 23 then presented in descriptive with percentage.

RESULTS

A total of 164 women with aging facial skin participated in this study. Based on ethnicity, as many as 50 people (30.5%) were Javanese. The majority of subjects aged 30-39 years old amounted to 97 people (59.1%). Based on the type of occupation, as many as 40 people (24.4%) were technicians and professional assistants, namely nurses, laboratory workers, radiographers and pharmacy officers. In the demographic characteristics based on marital status, 143 people (87.2%) were married (Table 1).

Dermoscopic features of facial aging according to DPAS criteria for all subjects are shown in Table 2. Yellowish discoloration, ephelid/lentigo, and superficial wrinkles were the three most common dermoscopic features of facial aging. Yellow papules, actinic keratoses, and criss-cross wrinkles were the fewest found in this study. There were no senile comedones in this study. Dermoscopic features of facial skin aging in various ethnicities in Medan are described in Table 3. In Javanese, it can be seen that all subjects have ephelides, as many as 50 people (100%). In the Batak ethnic group, there were superficial wrinkles in all research subjects, as many as 29 people (100%). In Malay, it was seen that all subjects had yellowish discoloration, ephelid/lentigo, telangiectasis and superficial wrinkles as many as 11 people (100%). In Minang, it was seen that all subjects had yellowish discoloration, ephelid/lentigo and superficial wrinkles in 12 people (100%). In Mandailing, it was seen that almost all subjects had yellowish discoloration, ephelid/lentigo and superficial wrinkles, as many as 15 people (93.8%). In Karo, it is seen that all subjects demonstrated a yellowish discoloration and ephelid/lentigo as many as 12 people (100%). In Aceh, all subjects demonstrated ephelid/lentigo and superficial wrinkles as many as seven people (100%). In Nias ethnicity, all subjects experienced yellowish discoloration, ephelid/lentigo, telangiectasis, and superficial wrinkles as many as five people (100%). Among Chinese, 17 people were demonstrated yellowish discoloration, telangiectasis, and superficial wrinkles (100%). In Indian

Table 1. The demographic characteristics

Variables	N	%
Ethnic		
Javanese	50	30.5
Batak	29	17.7
Malay	11t	6.7
Minang	12	7.3
Mandailing	16	9.8
Karo	12	7.3
Aceh	7	4.3
Nias	5	3.0
Chinese	17	10.4
Indian	5	3.0
Age (year)		
30-39	97	59.1
40-49	39	23.8
50-59	15	9.1
60-69	10	6.1
≥ 70	3	1.8
Occupation		
Professional	13	7.9
Professional technicians and assistants	40	24.4
Administrative staff	33	20.1
Service businesses and salespeople	20	12.2
Blue-collar workers	27	16.5
Unoccupied	31	18.9
Marital status		
Not married	21	12.8
Married	143	87.2

Table 2. The dermoscopic features of facial aging

DPAS criteria	n	%
Yellowish discoloration	159	97.0
White line	56	34.1
Ephelids / lentigo	158	96.3
Hypo-hyperpigmented macules	84	51.2
Telangiectasis	152	92.7
Yellow papule	5	3.0
Actinic keratoses	1	0.6
Senile comedones	0	0.0
Deep wrinkle	97	59.1
Superficial wrinkle	158	96.3
Criss-cross wrinkle	10	6.1

ethnicity, yellowish discoloration, ephelid/lentigo, telangiectasis, and superficial wrinkles were found in all subjects, as many as five people (100%).

DISCUSSION

The most ethnic groups involved in this study were the Javanese 50 (30.5%).

There are more than 300 ethnic groups in Indonesia, according to the 2010 *Badan Pusat Statistik* (BPS) data. Javanese ethnicity is the largest group in Indonesia, accounting for 41% of the total population. BPS data for Medan City in 2010 showed that 33.04% of Medan's population came from Javanese ethnicity.²²

The largest age group was 30–39 years, amounting to 97 people (59.1%), followed by the 40–49 years old group with 39 people (23.8%). The youngest subjects were 30 years old, and the oldest was 73 years old. In line with the study conducted by El Sayed et al. in Egypt on 217 subjects with aging facial skin, most research subjects were in the 30-39 year age group as many as 96 people (44.2%).¹³ Research by Isik et al. showed that 77 (17.5%) of 441 subjects were in the 30-39 year age group.¹² Meanwhile, in the research of Galzote et al. regarding the visual characteristics of facial skin in various Asian populations, it was shown that 213 subjects were from the age group of 25-40 years old. There are variations regarding the onset of skin aging. Some of the literature described that signs of skin aging begin in the third decade, while some other studies show skin aging can occur earlier.^{19,23}

Occupations are classified based on the 2014 Indonesian Standard Position Classification (KBJI 2014) by the Ministry of Manpower and BPS.²⁴ The majority of subjects came from technicians and professional assistants, as many as 40 people (24.4%). Reports on facial skin conditions and occupation are limited. A cross-sectional study in Japan, stated that higher working hours were not associated with skin aging.²⁵ Leung and Harvey in UK observed skin aging in the elderly found the majority of subjects worked as sales assistants and administrative staff (28.2%).²⁶

In this study, the married subjects were more dominant, namely 143 people (87.2%). Marriage for most ethnic groups in Indonesia, especially Batak, Karo, Mandailing, Malay, Minang, Javanese, Aceh, and so on, from ancient times, is considered a measure of a person's maturity level.²⁷ Asakura et al. described 461 women with aging facial skin in Tokyo, Japan, as many 259 (57.9%) subjects were married.²⁸ Ichibori et al. in a study of facial skin aging involving 65 twins, 55 were married couples.²⁹ In an analysis, Rexbye et al. reported a 1.9 year age difference between married and unmarried women, but this was not statistically significant.³⁰

Asians have rough, thicker, and deeper wrinkles in the forehead, perioral, and crow's feet areas than Caucasians.^{20,21,31}

This is in line with observations in this study of the Batak, Malay ethnic groups, Mandailing, Aceh, Nias, Chinese and Indian are dominated by dermoscopic images in the form of wrinkles. In Vierkotter et al. study in Germany, fine wrinkles occurred in 56 (75.6%) of 74 subjects.³² The study by Wolf et al. regarding skin wrinkling based on ethnic differences in menopausal women explains that Caucasian women have wrinkle scores twice as high as African women at the same risk factors.³³ These observations suggest the possibility of wrinkle-related genes or single nucleotide polymorphisms in specific genes, such as genes in collagen, elastin, or MMP.⁸

Although melanocyte density often decreases with aging, photoaged skin shows uneven pigmentation, especially hyperpigmentation. In Southeast Asian people, skin aging mainly appears as a change in pigment (seborrheic keratosis, hyperpigmentation, lentigo and melasma) rather than wrinkles.^{34,35} In this study, we found that the ephelid/lentigo was dominant in ethnic Javanese, Malay, Minang, Karo, Aceh, Nias, Chinese and Indian. Isik et al. in their 2013 study in Turkey, the most common dermoscopic finding were hypo-hyperpigmented macules in women.¹² Magdy and Sadek found lentigo to be the most prevalent in their Egyptian study.¹⁴ Higher levels of dopa activity in chronically irradiated melanocytes may be the basis for this condition. Galzote et al. also reported darker skin tone in subjects from Calicut India, which is geographically close to the equator and Indonesia.³⁶ This suggests a direct relationship between melanin content and the average amount of sun exposure received by the skin and supports the findings of this study.

Extrinsic aging will result in a yellowish discoloration of the skin, an early sign of elastosis.^{23,37} In this study, the dominant yellowish discoloration was found in all ethnicities. In Vierkotter et al. studied in Germany, yellowish discoloration occurred in 21 (28.4%) of 74 subjects.³² El Sayed found that 102 (47%) of 217 subjects demonstrate yellowish discoloration, especially in men who smoked. Nishimori et al. reported that skin changes, such as solar elastosis, are associated with this

Table 3. The dermoscopic features of facial aging among ethnic group

DPAS Criteria	Ethnic																			
	Javanese		Batak		Malay		Minang		Mandailing		Karo		Aceh		Nias		Chinese		Indian	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Yellowish discoloration	48	96	28	96,6	11	100	12	100	15	93,8	12	100	6	85,7	5	100	17	100	5	100
White line	14	28	10	34,5	2	18,2	3	25	9	56,2	5	41,7	4	57,1	2	40	7	41,2	0	0
Ephelids / lentigo	50	100	26	89,7	11	100	12	100	15	93,8	12	100	7	100	5	100	15	88,2	5	100
Hypo-hyperpigmented macules	28	56	14	48,3	7	63,6	7	58,3	8	50	5	41,7	4	57,1	1	20	9	52,9	1	20
Telangectasis	46	92	27	93,1	11	100	10	83,3	14	87,5	11	91,7	6	85,7	5	100	17	100	5	100
Yellow papule	1	2	1	3,4	1	9,1	1	8,3	0	0	1	8,3	0	0	0	0	0	0	0	0
Actinic keratoses	0	0	0	0	0	0	0	0	0	0	1	8,3	0	0	0	0	0	0	0	0
Senile comedones	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deep wrinkle	34	68	15	51,7	9	81,8	6	50	7	43,8	9	75	1	14,3	2	40	11	64,7	3	60
Superficial wrinkle	46	92	29	100	11	100	12	100	15	93,8	11	91,7	7	100	5	100	17	100	5	100
Criss-cross wrinkle	2	4	1	3,4	1	9,1	1	8,3	1	6,2	1	8,3	0	0	0	0	3	17,6	0	0

yellowish discoloration. Several recent studies have revealed that advanced glycation end products (AGEs) are hypothesized to be one of the causes of yellowish discoloration in aging skin. AGEs are the end product form in the glycation sequence. Glycation is a nonenzymatic chemical process that occurs in human cells. During the glycation process, reducing proteins and sugars, such as glucose will form covalent bonds. AGEs formed by glycation reactions will block normal protein activity and cellular function. Yellow-brown deposits of AGEs are thought to accumulate in the upper dermis of aging skin.^{38,39,40}

Extrinsic aging will also result in telangiectasis in the skin.²³ Vascularization of the damaged skin due to light sun exposure will show thickening of the venula walls. Meanwhile, on skin that is badly damaged by sunlight, the walls of the blood vessels will become thin with perivascular cells. The affected area displays dilation (telangiectasis).³⁷ These linear or branched vessels are usually located on the nose and cheeks. In this study, facial skin telangiectasis was more dominant in the Batak, Malay, Karo, Aceh, Nias, Chinese and Indian ethnic groups. Vierkotter et al., in a study in Germany, revealed that telangiectasis occurred in 44 (59.5%) of 74 subjects.³²

Damage to keratinocytes causes actinic keratoses clinically characterized by red, scaly or hyperkeratotic papules and plaques. Actinic keratoses are generally found on caucasian skin.²³ This supports the findings in this study that only one subject with actinic keratoses was found from Karo ethnicity.

Various factors influence the appearance of aging skin. Culture, habits, climatic factors and weather also play a role in skin aging patterns. In various locations in Asia, there is wide variation in terms of sun exposure. For example, an Asian living in the north will have less sun exposure than Southeast Asia, which is closer to the equator and where the UV index is high all year round, accompanied by 12 hours during the day all year round. Thus, the signs of skin aging may be higher for people in Southeast Asia (Indonesia, Thailand, Vietnam and others) compared to East Asia (Japan, China, Korea, Taiwan

and others). They are exposed to seasonal variations such as autumn-winter and spring. With chronic sun exposure, Southeast Asia predominantly experiences pigment disorders such as lentigo and hypo-hyperpigmented macules.⁴¹

This study has limitations on the distribution of research subjects based on age groups that are not evenly distributed in each ethnicity. This study is the first study to report on facial aging among various ethnic groups in Medan, Indonesia. We included ten different ethnicities with numerous sample sizes and we observed facial skin aging by applying the same instrument, dermoscopy.

CONCLUSION

The three most common dermoscopic facial skin were yellowish discoloration, ephelid/ lentigo, and superficial wrinkles. Yellow papules, actinic keratoses, and criss-cross wrinkles were the fewest found in this study. We did not find senile comedones on dermoscopy.

DISCLOSURE

Author Contribution

All authors have contributed to all processes in this research, including preparation, data gathering and analysis, drafting and approval for publication of this manuscript.

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Conflict of Interest

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

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