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THE ASSOCIATION OF DEMOGRAPHIC AND RISK FACTORS WITH THE DEGREE OF PHOTOAGING BASED ON THE GLOGAU CLASSIFICATION IN PATIENTS WITH PHOTOAGING

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ABSTRACT
Skin aging is influenced by intrinsic biological processes and extrinsic factors, including ultraviolet (UV) radiation, pollution, smoking, and dietary habits. In tropical countries such as Indonesia, chronic exposure to intense sunlight accelerates photoaging and increases the risk of skin damage. However, studies using standardized photoaging classifications in Indonesian populations, particularly in Surabaya, remain limited. This study aimed to analyze the association between demographic characteristics and risk factors with the degree of photoaging based on the Glogau classification among patients attending the dermatology outpatient clinic of Dr. Soetomo General Hospital, Surabaya, from January 2018 to December 2024. A retrospective descriptive-analytic study was conducted using medical records of patients diagnosed with photoaging. Total sampling was applied, and of 326 identified cases, 231 met the inclusion criteria and were included in the analysis. Data collected included age, sex, occupation, UV exposure, smoking status, coffee and alcohol consumption, clinical manifestations, Glogau classification, and treatment modalities. Data were analyzed descriptively using frequencies and percentages, while associations between demographic characteristics, risk factors, and photoaging severity were evaluated using Chi-square, Fisher's Exact, and Linear-by-Linear Association tests with a significance level of $p < 0.05$. Most patients were female (97.8%), aged 20–<45 years (51.9%), and indoor workers (97.4%). Significant UV exposure was reported by 92.2% of patients, whereas smoking (5.2%) and alcohol consumption (0.4%) were uncommon. Pigmentary changes (87.0%) and wrinkles (67.5%) were the most frequent clinical features, and Glogau II was the most prevalent classification (42.9%). Age and smoking were significantly associated with increased photoaging severity, while sex, occupation, coffee intake, and alcohol consumption showed no significant associations. These findings highlight the importance of early prevention, adequate sun protection, and smoking cessation to reduce the risk of photoaging in tropical populations.

Keywords: dermatology; glogau scale; keratosis; photoaging; pigmentation; ultraviolet exposure; wrinkles

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INTRODUCTION

As the largest organ of our body, skin serves as the body's defense system against pathogens, UV light, chemicals, and mechanical injury (Yousef et al., 2020). It exhibits evident and visible signs of aging as individuals grow older (Zhang & Duan, 2018). The process of skin aging involves a decline in skin quality over time, resulting from the synergistic effects of chronological aging, photoaging, hormonal changes, and environmental factors (Chaudhary et al., 2020). It is induced by both internal and external factors. Intrinsic aging is a natural process which results in thin, dry skin, fine wrinkles, and gradual loss of skin volume, while extrinsic aging is influenced and accelerated by environmental factors such as air pollution, smoking, poor nutrition, and sun exposure (Mora Huertas et al., 2016). "Photoaging" is a term used to refer to the process of skin aging caused by the

ultraviolet (UV) radiationwhich may be worsened by air pollution, visible/infrared light, and hormonal influences. Clinically, a notable characteristic is reduced skin elasticity (solar elastosis) accompanied by the formation of wrinkles, although the severity and onsetmay differ based on skin type, ethnicity, and gender(Huang & Chien, 2020). The global population is experiencing rapid aging. Between 2015 and 2050, the proportion of individuals aged 60 and older is expected to more than double, with around 1.5 billion people projected to be 65 or older by 2050. In Indonesia, high UV exposure due to the tropical climate accelerates skin aging, with signs observed in 57% of individuals as young as 25, despite aging typically becoming apparent around 30 years of age (Anggriani, 2023). A study at Dr. Soetomo General Hospital Surabaya found that the highest prevalence of skin aging occurred in individuals aged 45–59, accounting for 45.5% of cases (Wikassa et al., 2022). Premature aging due to sun exposure is also observed in younger populations. A cross-sectional study of 136 frmale saged 16 – 21 in Jakarta reported that 57.4% showes signs of early skin aging (Dewiastuti & Hasanah, 2017). Longitudinal research further indicates that photoaging severity has increased over time, with severe cases rising from 42% in 1992 to 88% in 2007 (Hughes et al., 2021).

Visible skin aging can negatively impact self-esteem and social perception, leading some individuals to use cosmetic products or procedures. While these interventions may temporarily improve confidence, they can also contribute to body image concerns, social withdrawal, and anxiety, particularly among women (Asyi et al., 2023; Gupta & Gilchrest, 2005). Additionally, excessive exposure to ultraviolet (UV) radiation can increase the risk of developing skin cancer. Cutaneous melanoma, a highly aggressive form, has been closely linked to intermittent sun exposure (Dennis, 2022). Its occurrence has grown over the past decades, with 351,880 new cases reported in 2015 and approximately 96,000 diagnosed in 2019 (Naik, 2021). Currently, there is no universally agreed standard for evaluating photoaging. However, the Glogau scale remains a commonly applied tool in both clinical and research settings to classify the severity of photoaging and to assess the outcomes of anti-aging treatments (Respati et al., 2022; Sukma et al., 2024). Introduced by Glogau in 1996, this system categorizes photoaging according to chronological age, visible clinical features, and the habitual use of cosmetic foundation. Although it was initially developed for Caucasian skin, its practicality and reliability have led to widespread use among Asian populations (Sukma, 2023). Studies in coastal Indonesian populations have applied the Glogau scale alongside the sun index to quantify UV exposure and photoaging patterns (Respati et al., 2022; Sukma et al., 2024).

Located along the equator, Indonesia experiences prolonged periods of sunlight and elevated ultraviolet (UV) radiation. In Surabaya, the average UV index ranges between 6 and 7, representing a significant risk to the population. Despite this, studies examining photoaging in the area are scarce. Therefore, this study aims to provide further insight into photoaging in Surabaya, contributing to improved management and the development of local photoaging profiles. Previous studies have demonstrated that photoaging is influenced by both demographic and lifestyle factors. Age and gender has been reported to have an important role in determining the degree of photoaging, as hormonal imbalances and cumulative UV exposure over time accelerate structural and biochemical changes (Chien et al., 2018). In addition to that, extrinsic factors such as UV radiation, smoking history, and alcohol consumption have been shown to significantly contribute to premature skin aging (Hussein et al., 2025). These factors vary widely among individuals and populations, leading to differences in photoaging degree.

Skin aging is influenced by intrinsic biological processes and extrinsic factors, including ultraviolet (UV) radiation, pollution, smoking, and dietary habits. In tropical countries such as Indonesia, chronic exposure to intense sunlight accelerates photoaging and increases the risk of skin damage. Although several studies have evaluated the prevalence of photoaging in Indonesia, only a few have analyzed the correlation between demographic characteristics and risk factors with the degree of

photoaging using a standardized assessment tool. Therefore, this study aimed to investigate the association between demographic characteristics and risk factors with the degree of photoaging based on the Glogau classification among patients attending the dermatology outpatient clinic of Dr. Soetomo General Hospital, Surabaya, where UV exposure levels are consistently high, from January 2018 to December 2024.

METHOD

This study employed an analytic observational approach with a retrospective design, using secondary data from medical records of patients diagnosed with photoaging at the Dermatology Outpatient Clinic of Dr. Soetomo General Hospital, Surabaya, between 2018 and 2024. The research was conducted at the Faculty of Medicine, Universitas Airlangga, and Dr. Soetomo General Hospital, over six months from May 2025 to September 2025, encompassing stages of preparation, ethical clearance, data collection, analysis, and publication. The study population consisted of all clinically diagnosed photoaging patients during this period, selected through consecutive sampling. The minimum required sample size was determined using the Lemeshow formula for descriptive studies with categorical variables, resulting in a minimum of 96 subjects. Inclusion criteria included patients of all ages and both sexes diagnosed with ICD-10 code R23 (Other Skin Changes) within the specified period, while exclusion criteria involved incomplete medical records lacking essential data such as name, age, gender, occupation, anamnesis, physical examination, Glogau scale, or therapy. The study variables comprised demographic and clinical characteristics, including age, gender, occupation, anamnesis, physical examination findings, Glogau scale, and therapy. Age was measured in years, gender was classified as male or female, and occupation was categorized as indoor or outdoor. Risk factors included ultraviolet exposure, smoking, alcohol, and coffee consumption, while physical findings encompassed pigment changes, lentigines, dyschromia, telangiectasia, keratosis, wrinkles, and acne scars. The Glogau scale was used to assess the severity of photoaging, and recorded therapies included AHA 8%, Tretinoin 0.05%, sunscreen, oral agents, peeling, and others. Statistical analysis was performed to determine the relationship between demographic or risk factors and the severity of photoaging based on the Glogau classification, using Chi-square, Fisher's Exact, and Linear-by-Linear Association tests with a significance level of $p < 0.05$.

RESULT

This research has been conducted from May 2025 to September 2025. The data collecting has been done by extracting the data from patients anamnesis card in the Dermatology Outpatient Clinic at Dr. Soetomo General Hospital Surabaya from January 2018 to December 2024. 231 photoaging patients had met the inclusions that were already determined.

Table 1.
Table of photoaging patients' profiles and anamnesis (n = 231)

Profiles and Anamnesis		Category	f	%
Profile	Gender	Male	5	2.20%
		Female	226	97.80%
	Age	10 – <20 (Adolescents)	12	5.20%
		20 – <45 (Mid-adulthood)	120	51.90%
		45 – <60 (Late adulthood)	77	33.30%
		>60 (Elderly)	22	9.50%
	Occupation	Indoor	225	97.40%
		Outdoor	6	2.60%
Anamnesis	History of UV Exposure	Yes	213	92.20%
		No	18	7.80%
	History of Smoking	Smokers	12	5.20%
		Non-Smokers	219	94.80%
	Coffee Consumption	Coffee Consumers	22	9.50%
		Non-Consumers	209	90.50%
	Alcohol Consumption	Alcohol Consumers	1	0.40%
		Non-Consumers	230	99.60%

Other Relevant Anamnesis Factors	Present	35	15.20%
	Absent	196	84.80%

The majority of photoaging patients at the Dermatology Outpatient Clinic of Dr. Soetomo General Hospital Surabaya were female, accounting for 226 individuals (97.8%), while only 5 males (2.2%) were recorded, indicating a markedly higher prevalence among women. Patients were categorized into four age groups adolescents (10–19 years), early to mid-adults (20–44 years), late adults (45–59 years), and elderly (≥60 years) to illustrate the distribution by age. Most patients (97.4%) had indoor occupations, with only a small proportion (2.6%) working outdoors. A large majority (92.2%) had a history of UV exposure, confirming its strong association with photoaging. Conversely, lifestyle risk factors were less common, as only 5.2% of patients reported smoking, 9.5% consumed coffee, and 0.4% consumed alcohol. Additionally, 15.2% of patients had other relevant anamnesis factors, while the remaining 84.8% reported none, indicating that UV exposure remains the predominant contributing factor in this population.

Photoaging Patients Profile Based on Physical Examination

The physical examination data collected in this study evaluated clinical signs associated with photoaging. The range of physical examination included in this study are pigment changes, lentigines, dyschromia, telangiectasia, keratosis, wrinkles, as well as acne scars. Documenting these observable skin changes assists in quantifying the severity and type of photoaging present in the photoaging patients.

Table 2.
Table of photoaging patients' physical examination

Physical Examination	Category	f	%
Pigment Changes	Present	201	87.00%
	Absent	30	13.00%
Lentigines	Present	25	10.80%
	Absent	206	89.20%
Dyschromia	Present	25	10.80%
	Absent	206	89.20%
Telangiectasia	Present	23	10.00%
	Absent	208	90.00%
Keratosis	Present	61	26.40%
	Absent	170	73.60%
Wrinkles	Present	156	67.50%
	Absent	75	32.50%
Acne Scar	Present	16	6.90%
	Absent	215	93.10%

The physical examination findings revealed that most photoaging patients exhibited pigment changes (87.0%), while only 13.0% showed none. Other manifestations such as lentigines, dyschromia, and telangiectasia were relatively uncommon, each observed in around 10% of patients. Keratosis was found in 26.4% of cases, whereas wrinkles were more frequent, affecting 67.5% of patients. Meanwhile, acne scars were rare, appearing in only 6.9% of individuals. Overall, pigment alteration and wrinkles were the most prominent clinical features among photoaging patients in this study.

Profile of Photoaging Patients According to the Glogau Scale

The Glogau Scale is used to evaluate the degree of photoaging, which can vary between patients. According to the scale, each patient is classified based on the presence and severity of skin lesions. Patients are grouped into Glogau Scale I, Glogau Scale II, Glogau Scale III, or Glogau Scale IV categories. The distribution of patients across these classifications is reflected in the Table 3 below.

Table 3.
Table of photoaging patients' profile based on Glogau scale

Glogau Scale	f	%
I	66	28.60%
II	99	42.90%

III	61	26.40%
IV	5	2.20%
Total	231	100%

According to the Table, among the 231 photoaging patients in this study, the majority were classified as Glogau Scale II, with 99 individuals representing 42.9% of the total population. Conversely, the smallest group consisted of patients classified as Glogau Scale IV, with 5 individuals accounting for 2.2%. The remaining patients were distributed between Glogau Scale I and III, with 66 patients (28.6%) and 61 patients (26.4%) respectively.

Treatments Administered to Photoaging Patients

Patients with photoaging at the Dermatology Outpatient Clinic of Dr Soetomo General Hospital Surabaya are given treatments tailored to their specific diagnosis. The treatment modalities provided include Topical Therapy, AHA 8%, Tretinoin, Sunscreen, Oral Medications, Peeling, and other interventions.

Table 4.
Treatments administered to photoaging patients

Treatments Administered to Photoaging Patients	Category	Frequency	Percent
AHA 8%	Yes	190	82.30%
	No	41	17.70%
Tretinoin	Yes	218	94.40%
	No	13	5.60%
Sunscreen	Yes	217	93.90%
	No	14	6.10%
Oral Medications	Yes	1	0.40%
	No	230	99.60%
Peeling	Yes	20	8.70%
	No	211	91.30%
Other Therapy	Yes	170	73.60%
	No	61	26.40%

Most photoaging patients in this study received topical treatments, with 82.3% using AHA 8%, 94.4% receiving tretinoin, and 93.9% prescribed sunscreen as part of their regimen. Only 0.4% of patients were given oral medication, and 8.7% underwent peeling procedures. Additionally, 73.6% received other types of therapy, while 26.4% did not. These findings indicate that tretinoin, sunscreen, and AHA 8% were the most commonly administered treatments for photoaging at the Dermatology Outpatient Clinic of Dr. Soetomo General Hospital.

Association Between Patient Profiles and Glogau Photoaging Scale

The detailed distribution and characteristics of each Glogau category are presented in Table 5.

The analysis showed that gender was not significantly associated with photoaging severity, as both male and female patients displayed similar distributions across Glogau categories ($p = 0.933$). In contrast, age demonstrated a strong relationship with photoaging severity ($p = 0.000$), with older patients showing higher Glogau classifications, indicating that photoaging severity increases with age. Occupation type did not show a significant association ($p = 0.083$), although outdoor workers tended to have more severe photoaging. Ultraviolet exposure showed a borderline association with photoaging severity ($p = 0.405$; Linear-by-Linear $p = 0.098$; Exact Sig. 0.032), suggesting a possible contributory role. Smoking history was significantly related to photoaging severity ($p = 0.029$), with smokers tending to have more severe classifications, while coffee and alcohol consumption showed no significant association ($p = 0.975$ and $p = 0.571$, respectively). Overall, the study found that age and smoking were significantly associated with greater photoaging severity, while UV exposure showed a weak but suggestive correlation.

Table 5.
Association between patient profiles and Glogau photoaging scale

Variable	Total	Glogau Scale				P Value
		I	II	III	IV	
Gender						
Male	5	2 (40.0%)	2 (40.0%)	1 (20.0%)	0 (0.0%)	1,000
Female	226	64 (28.3%)	97 (42.9%)	60 (26.5%)	5 (2.2%)	
Age						
Adolescents (10 – 19)	12	11 (91.7%)	1 (8.3%)	0 (0.0%)	0 (0.0%)	0.000
Mid-adulthood (20 – 44)	120	48 (40.0%)	66 (55.0%)	5 (4.2%)	1 (0.8%)	
Late Adulthood (45 – 59)	77	5 (6.5%)	30 (39.0%)	39 (50.6%)	3 (3.9%)	
Elderly (>60)	22	2 (9.1%)	2 (9.1%)	17 (77.3%)	1 (4.5%)	
Occupation						
Indoor	225	63 (28.0%)	98 (43.6%)	60 (26.7%)	4 (1.8%)	0.083
Outdoor	6	3 (50.0%)	1 (16.7%)	1 (16.7%)	1 (16.7%)	
Anamnesis						
UV Exposure						
Yes	213	58 (27.2%)	92 (43.2%)	58 (27.2%)	5 (2.3%)	0.487
No	18	8 (44.4%)	7 (38.9%)	3 (16.7%)	0 (0.0%)	
Smoking Status						
Smokers	12	6 (50.0%)	5 (41.7%)	0 (0.0%)	1 (8.3%)	0.029
Non-Smokers	219	60 (27.4%)	94 (42.9%)	61 (27.9%)	4 (1.8%)	
Coffee Consumption						
Coffee Consumers	22	7 (31.8%)	9 (40.9%)	6 (27.3%)	0 (0.0%)	0.975
Non-Consumers	209	59 (28.2%)	90 (43.1%)	55 (26.3%)	5 (2.4%)	
Alcohol Consumption						
Alcohol Consumers	1	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.571
Non-Consumers	230	65 (28.3%)	99 (43.0%)	61 (26.5%)	5 (2.2%)	
Other Relevant Anamnesis Factors						
Present	35	11 (31.4%)	14 (40.0%)	10 (28.6%)	0 (0.0%)	0.942
Absent	196	55 (28.1%)	85 (43.4%)	51 (26.0%)	5 (2.6%)	

DISCUSSION

According to the result of this study, the relation between age and Glogau classification was statistically significant ($p = 0.000$), indicating that increasing age is strongly related to greater severity of photoaging. Increased age is related to a slower regeneration process and the decline of skin protective function, therefore increasing the vulnerability of older adults compared to younger individuals (Yusharyahya, 2021). This finding is also aligned with a research conducted within the coastal population in Indonesia which found a positive correlation between the increasing age and the higher severity of photoaging according to Glogau scale ($r = 0.673$, $p < 0.001$) (Sukma et al., 2024). Another study in Argentina which evaluated the impact of exposome on skin aging revealed that among 1346 participants, 28% of the participants had higher Glogau scale age than the chronological age (Claros et al., 2023). Furthermore, the Glogau scale itself categorizes photoaging severity according to characteristic age ranges, with type I generally corresponding to individuals in their 20s to early 30s, type II to those in their late 30s and 40s, type III to the 50–65year age group, and type IV to individuals above 60 years of age (Sukma et al., 2024).

The presence of patients diagnosed with Glogau I in the Adolescent age group (10–<20 years), which typically corresponds to the 28–35year age range (Glogau, 1996), indicates early manifestations of skin aging. This finding suggests that external factors such as ultraviolet exposure, lifestyle, and individual habits may contribute to the premature onset of photoaging (Brar et al., 2025; Green et al., 2011), although age remains an important determinant of its progression

and severity. Overall, these findings affirm the validity of the Glogau scale as a reliable measure of photoaging severity that correlates closely with chronological age, underscoring the importance of early intervention and tailored prevention strategies to mitigate age-related skin damage.

Based on the data analysis in this study, there was no statistically significant association between occupation and Glogau photoaging scale ($p = 0.083$, Fisher's Exact Test). Although the result was not significant, a descriptive tendency was observed in which outdoor workers appeared to have higher Glogau grades compared to indoor workers. This finding suggests a possible influence of occupational UV exposure on photoaging severity, but the small number of outdoor workers in the sample limits the statistical power to confirm this association.

Previous research supports the idea that outdoor occupations are linked with increased photoaging. A study assessing 52 outdoor workers exposed to natural UV radiation reported a higher prevalence of photoaging characteristics compared to the general population (Łastowiecka-Moras et al., 2014). Moreover, outdoor workers are known to have greater risks of developing squamous cell and basal cell carcinomas due to chronic ultraviolet radiation (UVR) exposure (Slavinsky et al., 2023). Similarly, Sukma et al. (Sukma et al., 2024) identified a moderate positive correlation ($r = 0.536$, $p = 0.002$) between the Glogau classification and the Dermoscopy Photoaging Scale among coastal populations exposed to high UV levels, supporting the Glogau scale's reliability in assessing photoaging severity among individuals with substantial sun exposure (Sukma et al., 2024).

Nevertheless, there are limitations in using occupation as a proxy for UV exposure. Duration of daily exposure, the use of protective measures (clothing, sunscreen), skin phototype, and individual behavior (such as breaks, shade seeking) can modulate the actual UV dose (Janda et al., 2014). Some outdoor workers may use sun protection diligently and reduce damage, while others may have intermittent or irregular exposure patterns that reduce cumulative effect (Peters et al., 2016). The need for effective interventions to improve sun protection among outdoor workers is evident. Designing these interventions requires understanding workers' risk perceptions and attitudes toward sun safety, as these factors significantly influence their sun protection behaviors at work. Tailoring strategies to address these psychological components can enhance adherence to protective measures and reduce harmful UV exposure (Symanzik & John, 2022).

This study found a statistically significant association between smoking history and increased photoaging severity as measured by Glogau scale ($p = 0.029$). Despite the small sample size of smokers, the results indicate that smoking may contribute to more severe photoaging. This finding is aligned with another research conducted by Nadia (Nadia, 2019) on the association between smoking and photoaging based on the Glogau scale, which found that respondents with moderate to heavy smoking habits most frequently exhibited Glogau type III (advanced) photoaging, occurring in 25% of the individuals (Nadia, 2019).

Furthermore, Amer et al. (Amer et al., 2018) conducted a study involving 40 patients and found a statistically significant increase in the frequency of wrinkles at rest among the smoking group compared to the aging (non-smoking) group (Amer et al., 2018). Wrinkles at rest are included as one of the parameters defining Glogau type III (Claros et al., 2023), therefore, the increased occurrence of wrinkles at rest among the smoking group suggests that smoking contributes to a more advanced photoaging ($p = 0.016$).

In our study, although patients with a history of UV exposure tended to show more severe photoaging (higher distributions in Glogau II and III), the association between UV exposure and photoaging severity was not statistically significant ($p = 0.405$). Nevertheless, the Linear-by-Linear Association test suggested a borderline significance ($p = 0.098$; Exact Sig. 1-sided = 0.032), which indicates a weak linear relationship between UV exposure and the severity of photoaging.

Nonetheless, a study conducted by Lestari et al. (Lestari et al., 2023) indicates a substantial association between sun exposure and the severity of photoaging (p = 0.016) (Lestari et al., 2023). Recent studies also reaffirmed the role of UV exposure as the major driving factor of photoaging, leading to cumulative damage which manifests as dyschromia, telangiectasias, hyperkeratosis, textural changes, volume loss, elastosis, rhytids, collectively contributing to a prematurely aged appearance exceeding skin's chronological age (Kaltchenko & Chien, 2025). Moreover, UV-induced inflammation and immune alterations have been identified as key mechanisms accelerating photoaging severity (Ansary et al., 2021).

The discrepancy between our findings and prior research may be explained by the limited number of patients in the non-exposed group (n=18), which reduced statistical power. Additionally, occupation and length of UV exposure may not fully capture UV dose, as factors such as daily exposure duration, use of sunscreen and skin phototype substantially modify cumulative exposure (Brar et al., 2025; Grandahl et al., 2019). These variables may have diluted the associations in our study, despite the observed trend.

This study examined the association between demographic and risk factors with the degree of photoaging based on the Glogau classification among patients at the Dermatology Outpatient Clinic, Dr. Soetomo General Hospital, Surabaya, from 2018 to 2024. The findings revealed that photoaging predominantly affected female patients in the mid-adulthood age group, most of whom had indoor occupations and a history of ultraviolet (UV) exposure. Pigmentary changes, wrinkles, and keratosis were the most frequent clinical features, with the majority of patients categorized as Glogau Scale II. Age demonstrated a significant association with photoaging severity, indicating that chronological aging remains the most influential factor in skin photoaging progression. Smoking also showed a significant correlation with higher Glogau grades, supporting its role as an accelerative extrinsic factor. In contrast, gender, occupational exposure, and UV history did not show statistically significant associations.

CONCLUSION

These findings underscore the multifactorial nature of photoaging and highlight the importance of preventive dermatological education, particularly regarding sun protection and smoking cessation. Future research should incorporate larger cohorts and quantitative assessments of UV exposure duration and intensity to enhance the precision of risk factor evaluation and strengthen the predictive. There are several limitations to this study that should be considered when interpreting the results. First, because the research used a retrospective and descriptive design, the data were obtained entirely from medical records. Some files were incomplete or inconsistently documented, which may have affected the accuracy of the information. Second, the number of subjects in each age group, sex category, and Glogau classification was not evenly distributed. This imbalance could reduce the strength of statistical comparisons and limit how well the results represent the broader patient population. Third, the evaluation of photoaging severity relied on existing written documentation rather than direct clinical assessment, which may have introduced subjective differences in classification. In addition, the study was carried out at a single tertiary referral hospital, the findings may not fully reflect conditions in other regions or healthcare settings. Lastly, a significant limitation of this study was the limited detail of the available data. Information on risk factors such as UV exposure, smoking, and alcohol consumption was obtained from patient records, which did not include specific details such as duration, frequency, or intensity of exposure. This condition may have influenced the depth of analysis regarding the characteristics of each risk factor.

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