Vol 12 No 1 Year 2027

E-ISSN: 2528-410X

RESEARCH ARTICLES

Description of Facial Skin Damage Caused by Ultraviolet Radiation among Security and Cleaning Staff at the Faculty of Medicine, Muhammadiyah University of North Sumatra

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Abstract: Long-term exposure to sunlight can cause skin disorders, both chronic and chronic, due to UV rays. Acute disorders include sunburn, which is characterized by redness, itching, pain, and a warm feeling on the skin, as well as tanning which changes skin color to darker quickly. Chronic disorders, such as skin changes that become dry, rough, pigmentation, wrinkles, and even skin cancer. Understand the description of facial skin damage due to ultraviolet radiation to security and cleanliness officers at the Faculty of Medicine, Muhammadiyah University of North Sumatra. This is an observational descriptive-analytic cross-sectional study. Involving 32 security and cleaning officers. Objective examination uses a Glogau scale and subjective examination uses tools Skin analyzer . The collected data will be analyzed using Univariate tests and Binomial hypothesis tests. The majority of the subjects' facial skin types based on the Glogau scale were type 2, with 15 subjects (46.9%). The majority of research subjects were included in the normal water content and hydration level, 14 subjects (43.8%), the fine level, 32 subjects (100%), the pore level, some large, 32 subjects (100%), the wrinkled level, 32 subjects. (100%), the level of multiple stains was 32 subjects (100%). And the hypothesis test obtained a value $p > 0.05$. There is a picture of facial skin damage due to ultraviolet radiation to security and cleaning officers at the Faculty of Medicine, Muhammadiyah University of North Sumatra **.**

Keywords: Skin damage, ultraviolet rays, glogau scale, tools skin analyzer

E-ISSN: 2528-410X

INTRODUCTION

Facial skin is the main part of the body that reflects a person's health.[1] The description of facial skin damage refers to various changes or disorders in the facial skin area that may interfere with appearance and skin health. Facial skin damage can be caused by various factors, including environmental factors, lifestyle, genetic factors, and certain health conditions. Facial skin damage caused by excessive sun exposure is very dangerous for facial skin.[2]

Indonesia is a tropical country located along the equator, which allows exposure to ultraviolet radiation with relatively high intensity. Tropical countries have a higher risk of skin damage compared to subtropical countries. Ultraviolet (UV) rays contained in sunlight have wavelengths ranging from approximately 100–400 nm. Many Indonesians work outdoors and are exposed to intense sunlight. Research has shown that field workers may receive 10%–70% UV exposure daily, whereas office workers receive less sunlight exposure, approximately 6%. UV radiation in sunlight is divided into several types, namely UVA, UVB, and UVC rays.[3]

According to the Indonesian Society of Dermatology and Venereology (Perdoski) Central Board, the dangers of sun exposure may cause skin abnormalities such as premature aging (photoaging) in up to 80% of cases.[4] Several epidemiological studies conducted in 29 studies from Australia, Europe, Japan, Mexico, the United Kingdom, and the United States estimated sun or UV exposure from childhood at age 6 to older adulthood at age 60. The average daily time spent outdoors ranged from 3–4 hours per day for boys and 2–3 hours per day for girls.[5] Although childhood and adolescence represent only 33% of the lifespan up to 60 years of age, before the age of 20 individuals receive approximately 50% of their total UV exposure accumulated by age 60. Occupations involving outdoor activities are exposed to sunlight for approximately 40%–70% of the day.[6]

The Glogau classification is considered the gold standard for assessing the severity of premature aging (photoaging) caused by sun exposure. It has several advantages because it provides a comprehensive assessment, including telangiectasia, benign tumors, wrinkle severity, pigmentation disorders, and skin malignancies.[7]

A skin analyzer is a device used to analyze an individual's skin condition and health in detail. This tool uses advanced technology to examine and measure various skin parameters, such as moisture levels, wrinkles, pigmentation, pores, and others. Skin analysis provides important information regarding an individual's skin condition and helps determine appropriate skincare treatments.[8]

Security officers are individuals responsible for maintaining security, order, and protection within a particular place or area. Most of their activities are carried out outdoors, making them frequently exposed to sunlight.[9] Cleaning staff, also known as

E-ISSN: 2528-410X

sanitation workers, are individuals responsible for maintaining cleanliness and the appearance of an area or environment. Similar to security officers, cleaning staff also frequently work outdoors and are often exposed to sunlight.[10] Based on the problems described above, the researcher is interested in conducting a study on the description of facial skin damage caused by exposure to ultraviolet radiation.

METHODS

This study was an observational descriptive-analytic study with a cross-sectional design because the research was conducted at a single point in time and only performed once, without follow-up, to determine the description of skin damage caused by exposure to solar radiation (UV rays).

The study was conducted at a dermatology and venereology specialist clinic located at Jalan Senam No. 4A, Medan.

The sample in this study consisted of 32 security officers and cleaning staff from the Faculty of Medicine, Muhammadiyah University of North Sumatra (UMSU). The research samples were selected using a consecutive sampling technique after the subjects fulfilled all inclusion and exclusion criteria.

The basis of the data collection method in this study was observation conducted during dermatological examinations. The data source consists of primary data obtained directly from respondents who met all inclusion and exclusion criteria.

The samples first underwent baseline data collection, including patient identity, history taking, body weight examination, height measurement, and dermatological examination showing the description of facial skin damage. Subsequently, the subjects were placed in a room with a temperature of 20°C according to relative humidity standards. The subjects' facial skin was ensured to be free from makeup products. The research subjects were allowed to rest for 10–20 minutes before hand to adapt to the conditions.

The examinations were carried out subjectively and objectively. Subjective examination measurements used the Glogau scale, which was classified into Type 1, Type 2, Type 3, and Type 4. Meanwhile, objective examination was performed using a Skin Analyzer device by positioning the subject's face upright into the examination instrument. The measurement results were then adjusted according to the assessment table.

RESULT

Table 1. Distribution frequency subject based on work

Work	Frequency (n)	Percentage (%)
Officer cleanliness	19	59.4
Officer security	13	40.6
Total	**32**	**100**

From table 1 above can seen in research This subject research that own work as officer cleanliness more Lots compared to with officer security , namely

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E-ISSN: 2528-410X

19 people (59.4) officers cleanliness and 13 people (40.6) officer security .

Table 2. Distribution frequency subject based on type sex

Gender	Frequency (n)	Percentage (%)
Man	22	68.8
Woman	10	31.3
Total	**32**	**100**

In table 2 above seen in research This subject study various sex man more Lots compared to with women , namely 22 people (68.8) man And 10 person (31.3) Woman.

Table 3. Distribution of frequency of facial skin damage based on the glogau scale

Type	Frequency (n)	Percentage (%)
1	13	40.6
2	15	46.9
3	4	12.5
4	0	0
Total	**32**	**100**

In table 3 it is found that subject research that has type skin face Which classified as into the type 1 as much as 13 subject (40.6%), Then Fortype 2 as much as 15 subject (46.6%), And type 3 as much as 4 subject (12.5%).

Table 4. Distribution frequency based on water content level skin face

Level hydration	Frequency (n)	Percentage (%)
Bad	4	12.5
Currently	14	43.8
Good	14	43.8
Total	**32**	**100**

On table 4 found subject study Which own level kada water skin14 subjects (43.8 %) had normal faces , then the amount that The same Also found on subject Which own level level water skin face Whichhydration as many as 14 subjects (43.8%) and as many as 4 subjects (12.5%) who hadlevel level water skin face Which dehydration .

Table 5. Distribution frequency based on level refinement skin face

Subtlety	Frequency (n)	Percentage (%)
Fine	16	50
Normal	16	50
Rough	0	0
Total	**32**	**100**

On table 5 obtained subject study Which own level refinement skin face Which classified as fine And normal The same , that is as much as 16 subject (50%).

Table 6 Distribution frequency based on level pore skin face

Pore	Frequency (n)	Percentage (%)
Small	0	0
A number of big	32	100
Very big	0	0
Total	**32**	**100**

In table 6 it appears with clear that all over subject study own level pore skin several faces big , namely as many as 32 subjects (100%).

Table 7. Distribution frequency based on level wrinkles skin face

Wrinkles	Frequency (n)	Percentage (%)
No wrinkled	0	0
Wrinkles	32	100
Lots wrinkles	0	0
Total	**32**	**100**

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E-ISSN: 2528-410X

In table 7 it is found that all over subject own level wrinkles skin face the same , namely wrinkles as many as 32 subjects (100%).

Table 8 . Distribution frequency based on level stain skin face

Stain	Frequency (n)	Percentage (%)
A little	0	0
A number of stain	32	100
Lots of stains	0	0
Total	**32**	**100**

In table 8 it is found that all over subject own level stain skin face Which The same , that is a number of stain as much as 32 subject (100%).

Table 9. Frequency distribution based on UV *damage* *level*

UV *damage*	Frequency (n)	Percentage (%)
Light	5	15.6
Currently	27	84.4
Heavy	0	0
Total	**32**	**100**

In table 9 it is found that subjects who have UV *damage* level face currently the most found , as many as 27 subjects (84.4%), while with level light as many as 5 subjects (15.6%).

DISCUSSION

Sunlight is the primary source of life and energy on this planet, but excessive exposure to solar energy is clearly detrimental to biological systems. A proper balance of UV exposure is necessary for maintaining health. This exposure varies among individuals based on skin phenotype, the presence of pathological photosensitivity, and genetic factors. For normal, healthy individuals, sunlight is necessary to promote well-being and to provide energy for vitamin D synthesis . Excessive sun exposure can lead to physiological reactions, such as wrinkles, pigmentation, erythema, *tanning* , hormonal reactions, and even skin cancer. Human skin naturally has a protective system against solar radiation, but sun exposure can cause skin damage, especially on the face. The face is a body part that is rarely covered compared to other areas. [11]

In the research This officer safety and cleanliness are between the ages of 21 and 53 years , each subject will treated same . Every the subject will also do inspection skin face in a way subjective with scale glogau and inspection in a way objective with tool *Skin analyzer* (hydration , pores , wrinkles , smoothness , blemishes , and UV *damage*). [10 , 9]

Research result carried out on officers security and officers cleanliness in the Faculty Muhammadiyah Medicine of North Sumatra, damage skin face use scale glogau show that officer security and cleanliness that have damage skin 2 more faces Lots with total of 15 subjects (46.9%), damage skin face 1 as many as 13 subjects (40.6%) and damage skin face 3 as many as 4 subjects (12.5%). According to researchers , wrinkles is something change configuration on the surface skin in the form of folds or wrinkles on the skin , most often found on the skin face and hands . Wrinkles will

E-ISSN: 2528-410X

increase Lots along with increase age someone . However , in someone who has high intensity with exposure ray sun own exception , because can result in aging early . Research result level skin water content face of the officer safety and cleanliness in the Faculty Medicine at the University of Muhammadiyah North Sumatra which was carried out inspection in a way objective , using tool *Skin Analyzer.* Obtained subject with level skin water content normal face and hydration own the same frequency and the most , namely as many as 14 subjects (43.8%), while subject with skin face dehydration as many as 4 subjects (12.5%). According to research conducted Melani , Hydration skin influenced by several factor like condition environment , namely environment with higher temperature tall will stimulate production sweat , so that can lower hydration skin , sebum secretion , and TEWL. [12] Whereas higher temperature low experience matter on the contrary . And according to Aulia , Other factors that influence condition hydration skin like age , type gender , and body mass index (BMI). [13]

Research result level refinement skin face to the officer safety and cleanliness in the Faculty Medicine at the University of Muhammadiyah North Sumatra which was carried out inspection in a way objective , using tool *Skin Analyzer.* Got it subjects who have level refinement skin face that is classified as smooth and normal are the same , namely as many as 16 subjects (50%). According to Daing , subtlety skin is condition skin that has characteristic features fine or soft , no dry , looks fresh, the color bright , chewy , holes pores No visible , surface Smooth and firm . [14] Another opinion about the meaning of smooth skin is explained by Apriyana, who states that facial skin can be considered smooth if all textures are evenly distributed. There are no bumps or pits from acne or blackheads. Therefore, when we touch it, it feels supple, smooth, and soft. [15]

In the results of the study of facial skin pore levels in security and cleaning officers at the Faculty of Medicine, Muhammadiyah University of North Sumatra, which was conducted objectively, using a *Skin Analyzer tool.* It was found that all study subjects had facial skin pore levels that were classified as quite large, namely as many as 32 subjects (100%). According to Frederic , having large skin pores does not have a significant impact on skin health. However, having large pores can cause skin aesthetic problems and is often considered as premature aging by some people. [16] According to Wahyu , the size of facial skin pores affects the level of smoothness of facial skin. This is because large skin pores will create a hollow and reduced elasticity in the skin which makes the skin appear rough to the naked eye. [17] From the statements of the two researchers, in line with the data obtained in the study, where the level of facial skin pores of all subjects was in the large group and the level of smoothness of facial skin was classified as smooth and normal.

From the results of the study of the level of facial skin wrinkles in security and

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E-ISSN: 2528-410X

cleaning officers at the Faculty of Medicine, Muhammadiyah University of North Sumatra. It was found that all research subjects were at the level of wrinkles, namely 32 subjects (100%). According to Susanti , wrinkles on the facial skin are a decrease in the function of facial skin elasticity so that the facial skin experiences slackening, and because with increasing age the skin will become thinner, drier, and facial skin will experience a decrease in flexibility and moisture. [11] Meanwhile, according to Fadillah, there are two factors that influence wrinkles on the face, namely intrinsic and extrinsic factors. Intrinsic factors include heredity (genetic), racial and hormonal. And extrinsic factors include exposure to sunlight, air humidity, and free radicals. [4] This statement is in accordance with the subjects in the study, where the subjects of this study were workers who were often outdoors. And based on the data also proved that the subjects had at least one wrinkle.

From the results of the examination of the level of facial skin blemishes on security and cleaning staff at the Faculty of Medicine, Muhammadiyah University of North Sumatra. The results obtained all study subjects had a level of blemishes on their facial skin that was classified as blemishes, namely 32 subjects (100%). According to Oktarina's research , many factors can cause blemishes on the skin such as sunlight, hormones, medications, genetics, race, cosmetic use, history of other diseases, age, and occupation. Blemishes on the skin are very easy to recognize, for example, the presence of brown hyperpigmented macules that can sometimes turn black with clear, irregular and usually symmetrical boundaries. Usually found on the cheeks, nose, lower mouth, and forehead. [18] According to research by Siska and Faud , the prevalence of field workers with blemishes on the facial skin is still unknown. Epidemiologically, blemishes on the skin are usually found in dark-skinned races, but can also be found in various other races. However, it is certain that tropical climates have a higher level of blemish formation on the skin due to more frequent sun exposure. [19]

Research result UV *damage* level skin face to the officer safety and cleanliness in the Faculty Medicine at the University of Muhammadiyah North Sumatra which was carried out inspection in a way objective , using tool *Skin Analyzer*. Got it subjects who have level UV *damage* skin light face as many as 5 subjects (15.6%) and moderate 27 subjects (84.4%) reported that sunlight significantly impacts facial skin damage, as *ultraviolet rays penetrate the layers of the skin. This disrupts a person's hormonal system* , which can lead to more serious skin damage. Field workers should use personal protective equipment, such as wearing covered clothing, applying sunscreen before work, maintaining skin hygiene, and avoiding excessive sun exposure. [20]

From the discussion on mentioned that damage skin face consequence exposure radiation ray *ultraviolet* has significant and proven influence existence , even though No found in a way visible eyes and data. A

E-ISSN: 2528-410X

person who is exposed ray the old sun will impact bad for the skin face , especially in workers outside the room he found levels facial skin due to exposure to *ultraviolet radiation* . This is in line with the researchers' hypothesis.

CONCLUSION

Based on the research results, there is a picture of facial skin damage due to exposure to ultraviolet radiation in security and cleaning staff at the Faculty of Medicine, Muhammadiyah University of North Sumatra. Based on the Glogau scale, most subjects experienced grade 2 facial skin damage, namely 15 subjects (46.9%). Assessment of facial skin hydration showed that most subjects had good and moderate skin hydration levels, each of which was 14 subjects (43.8%). In addition, the level of facial skin smoothness was dominated by the smooth and normal categories with a total of 16 subjects each (50%).

In the facial pore examination, all 32 subjects (100%) were in the "large" category. All 32 subjects (100%) were also found to have wrinkled facial skin and 32 subjects (100%) had some blemishes. Meanwhile, based on the level of UV damage to facial skin, the majority of subjects were in the "moderate" category, with 27 subjects (84.4%).

REFERENCES

1. Yuniarsih N, Meilinda Sari A. Formulasi dan Evaluasi Stabilitas Fisik Sediaan Gel Face Scrub Ekstrak Cucumis sativus L. dan Ampas Kelapa. *Maj Farmasetika*. 2021;6(Suppl 1):152. doi:10.24198/mfarmasetika.v6i0.36706
2. Kusumaningrum SD. Kajian pustaka dalam penentuan tipe dan permasalahan kulit wajah. *Kaji Pustaka Dalam Penentuan Tipe Dan Permasalahan Kulit Wajah*. 2021;1(1):17-21.
3. Sofia M, Minerva P. Hubungan Tingkat Pengetahuan Bahaya Paparan Sinar Matahari Dengan Penggunaan Sunscreen oleh Mahasiswa Kepelatihan Olahraga Angkatan 2018 Universitas Negeri Padang. *J Pendidik Tambusai*. 2021;5(3):7596-7603.
4. Fadila I, Minerva P, Astuti M. Kosmetik Perawatan Kulit Wajah Siswa Kelas Xi Jurusan Tata Kecantikan Smk Negeri 7 Padang. *Tata Rias Dan Kecantikan*. 2020;1(2).
5. Zahara NE. Paparan Sinar Matahari sebagai Faktor Risiko Pterigium pada Pekerja Sektor Agrikultur. *J Agromedicine Unila*. 2020;7(1):40-45.
6. Green AC, Wallingford SC, McBride P. Childhood exposure to ultraviolet radiation and harmful skin effects: Epidemiological evidence. *Prog Biophys Mol Biol*. 2012;107(3):349-355. doi:10.1016/j.pbiomolbio.2011.08.010
7. Putra JS. Uji Banding Mikrodermabrasi dan Kombinasi Mikrodermabrasi + Krim Tretinoin Pada Kulit Keriput. Published online 2014:p 1-51.
8. Siti Maimunah ddk. Pemanfaatan Ekstrak Daun Urtica Dioica L. *J Penelit*. 2020;25:124-134. https://journal.uny.ac.id/index.php/sain

E-ISSN: 2528-410X

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9. Wisata K, Salzburg C, Barcelona DAN, Pokok T, Dan F, Petugas P. Tugas Pokok, Fungsi dan Peranan Petugas Keamanan. *Clust Salzbg BARCELONA*. 2020;3(2):1-20.
10. Wicaksana A, Rachman T. Petugas Kebersihan di Rumah Sakit Petugas. *Angew Chemie Int Ed 6(11), 951–952*. 2018;3(1):10-27. https://medium.com/@arifwicaksanaa/pengertian-use-case-a7e576e1b6bf
11. Rahmawati R, Muflihunna A, Amalia M. Analisis Aktivitas Perlindungan Sinar UV Sari Buah Sirsak (Annona muricata L.) Berdasarkan Nilai Sun Protection Factor (SPF) Secara Spektrofotometri UV-VIS. *J Fitofarmaka Indones*. 2018;5(2):284-288. doi:10.33096/jffi.v5i2.412
12. Rakhmi Mantu M, Rakhmi Mantu Bagian Ilmu Kesehatan Anak M, Kedokteran F, et al. Profil Hidrasi Kulit dan Kerusakan Kulit Akibat Matahari pada Remaja di Panti Asuhan Pondok Kasih Agape. *J Educ Innov Public Heal*. 2023;1(3):125-138. https://doi.org/10.55606/innovation.v1i3.1514
13. Muliawati F, Krisnarto E, Kartikadewi A. Hubungan Indeks Massa Tubuh dan Kelembaban Kulit dengan Kejadian Pityriasis Versicolor pada Petugas Sampah di Purwodadi Body Mass Index and Skin Moisture Relationship to Pityriasis Versicolor Evidence of Garbage sampah meningkatkan kelembaban kulit . kerj. *Med-Art*. 2020;2(1):38-42.
14. Putria DP. Pengaruh Peeling Kulit Buah Manggis (Garciana Mangostana Linn) Terhadap Kehalusan Kulit Wajah Kasar Pada Wanita. *UNJ*. 2017;1(3):1-106.
15. Apriyana N. Hubungan Antara Suhu Lingkungan Kerja dengan Status Hidrasi pada Pekerja Bagian Produksi di Industri Kerupuk Natar Lampung Selatan. *Skripsi*. 2021;1(1):1-23.
16. Flament F, Francois G, Qiu H, et al. Facial skin pores: A multiethnic study. *Clin Cosmet Investig Dermatol*. 2015;8:85-93. doi:10.2147/CCID.S74401
17. Widiawati W. Perbedaan Hasil Penyembuhan Kulit Wajah Berjerawat antara Masker Lidah Buaya dengan Masker Non Lidah Buaya. *e-Jurnal*. 2014;03(01):217-225.
18. Oktarina P, Muslimin M. *Faktor Risiko Penderita Melasma*. Vol 1.; 2020.
19. Masyarakat JP. Penyuluhan Upaya Pencegahan Melasma Pada Pekerja Tani Wanita Di Wilayah Situmba Kecamatan Sipirok Kabupaten Tapanuli Selatan. *Pengabdia Masy*. 2022;I(I):1-5.
20. Nurlaili. *Paket Keahlian Tata Kecantikan Kulit*.; 2016.