Sleep Pattern Factors on Premature Skin Aging in YARSI University Medical Students, Force of 2021

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Abstract

Skin aging does not only occur in older people, but skin aging can appear when entering early adulthood or is called premature skin aging. Skin problems such as the appearance of wrinkles and fine lines on the face, apart from that hyperpigmentation can also occur and large pores, are signs of premature skin aging. Lifestyle factors greatly influence the occurrence of premature skin aging, one of which is poor sleep patterns with poor sleep quality. This study aims to test and show the relationship between sleep patterns and premature skin. Quantitative research methods were applied in this research. The research population was students from the Faculty of Medicine, YARSI University Class of 2021, aged 20-25 years. Data collection methods used questionnaires and Janus skin analyzer examination. This research analysis uses cross sectional observational analytics. Statistical analysis revealed a significant relationship between sleep patterns and premature skin aging with the Asymp value. Sig. (2-tailed) < 0.001. Signs of premature skin aging such as fine wrinkles, large pores, hyperpigmentation begin to appear at the age of 20 years. It can be concluded that insufficient sleep time and quality sleep are factors that influence the occurrence of premature skin aging.

Keywords: *Premature skin aging, Sleep Patterns, Adults.*

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A. INTRODUCTION

Skin is the largest and outermost organ in the human body. The skin covers an area of about 25 m^2 or one sixth of the total body weight of an adult. The skin functions to protect against the threat of foreign agents by detecting and fighting infections that attack the body. Apart from that, the skin also produces vitamin D and provides sensory information. Skin consists of many layers, there are seven layers of skin with the outermost layer being the epidermis (Knaggs, 2023). As we get older, the skin experiences an aging process. Skin aging can occur more quickly or is commonly called premature skin aging. Premature aging of the skin occurs due to many factors that influence it.

Premature skin aging or *premature skin aging* is a degenerative process or decline in the function of skin organs and the skin support system, in the form of changes in the structure and elasticity of the skin which are visible with the appearance of *wrinkles*, fine lines, rough, sagging, dry skin, hyperpigmentation and slow wound healing (Sanusi et al., 2020).

Skin has 2 main layers, namely the epidermis and dermis. In the aging process, the epidermis experiences thinning thickness which causes a decrease in nutrient

exchange to the epidermis. This causes the skin to be susceptible to injury due to minor trauma (Yusharyahya, 2021).

The dermis is composed of connective tissue consisting of cellular components and extracellular matrix. The extracellular matrix contains elastin, collagen and fibrillin (Wicaksana, 2016). Thinning of the dermis layer also occurs due to degenerative processes in the extracellular matrix components which affect the skin's ability to retain water. Apart from that, the skin also experiences a decrease in type 1 procollagen production which is caused by a decrease in TGF-β/Smad signals and *growth factor* in connective tissue. Elastosis is skin aging due to the accumulation of abnormal elastin tissue in the dermis layer. Exposure to UV light increases elastin expression fourfold, causing elastosis. The result of all this causes the appearance of wrinkles and fine lines on the face (Yusharyahya, 2021).

Skin health problems such as premature aging begin to appear at the age of under 30 years. 42% of women in Indonesia complain about the appearance of signs of premature aging on their faces, this causes a decrease in the attractiveness of someone with facial skin that experiences premature aging and affects social life (Nabila, Damayanti, Handayani, & Setyaningrum, 2021). Women begin to experience thickening of the skin when they reach the age of 25 years, then progressive declination of the skin layers occurs as they get older (Knaggs, 2023).

The skin aging process is influenced by many factors, namely intrinsic factors and extrinsic factors. The cumulative effect of these 2 factors can accelerate the aging process. Intrinsic factor is a natural factor caused by the accumulation of ROS obtained from metabolism and influenced by genetic factors (Clatici et al., 2017). Aging due to extrinsic factors occurs due to exposure from outside the body. Exposure to sunlight, pollution, smoking, unbalanced diet, lack of rest time, not exercising, and excessive stress are extrinsic factors that accelerate aging. Exposure to extrinsic factors causes a series of cellular and molecular processes that increase oxidative stress in the body (Situmorang, 2020).

The body needs enough hours of good quality sleep to rest every day. Everyone has different sleep needs based on age. Adults are recommended to sleep 7-8 hours per day. Continuously getting less than 7 hours of poor quality sleep can worsen health, this occurs due to disruption of the body's metabolic system which works when a person sleeps (Risdiana & Rozy, 2019).

Sleep has an important role for the body, one of which is in regulating skin physiology, such as regulating skin pH, fluid balance in the skin layers, and skin temperature. Sleeping less than 5 hours will cause the skin to lose water in the transepidermal layer or *transepidermal water loss* (TEWL), this makes the skin dry and causes wrinkles and fine lines to appear on the face (Alvim, & Anna, 2018). In addition, insufficient sleep can reduce the protective function of the skin and slow down the healing of erythema on the skin barrier due to sun exposure.

Melantonin plays a role in inducing a photoprotective effect on skin tissue by warding off free radicals caused by sunlight. Apart from that, melatonin also plays a role in inflammatory pigmentation and wound healing. Decreased melatonin

production due to lack of sleep causes disruption of physiological processes in the skin (Knaggs, 2023).

B. METHOD

This research is observational analytical, namely combining interviews and analysis which produces quantitative conclusions. This research was conducted to determine the factors of sleep patterns in the occurrence of premature skin aging which occurs at the age of 20 years. The respondents in this study were medical students at YARSI University class of 2021, aged 20-25 years who were selected based on the results of the Pittsburgh Sleep Quality Index (PSQI) questionnaire and then a skin examination was carried out using a Janus skin analyzer to determine the condition of the respondent's skin.

This research uses primary data with a purpose sampling method that meets the inclusion and exclusion criteria. Data in the form of age, PSQI score, skin age, pores, wrinkles, pigmentation and sebum in the T-zone and U-zone areas. The analytical method used is the Mann-Whitney test. This research has undergone review by the Ethics Commission of the Faculty of Medicine, YARSI University and was declared ethically appropriate according to letter number: 128/KEP-UY/EA.10/VI/2023.

C. RESULTS AND DISCUSSION

Table 1. Frequency Distribution

Category	Frequency (F)	Percentage (%)
Age		
20 years	7	18.4%
21 years	21	55.3%
22 years	9	23.7%
23 years	1	2.6%
Sleep Pattern		
Good	5	13.2%
Bad	33	86.8%
Skin Age		
Normal	16	42.1%
Aging	22	57.9%
Pores		
Normal	4	10.5%
A little large	20	52.6%
Large	12	31.6%
Very large	2	5.3%
Wrinkles		
None	17	44.7%
Thin	21	55.3%

Pigmentation		
Normal	6	15.8%
A little severe	24	63.2%
Very severe	8	21.1%
***U-zone* sebum**		
Little	31	81.6%
Normal	5	13.2%
Much	2	5.3%
***T-zone* sebum**		
Little	21	55.3%
Normal	15	39.5%
Much	2	5.3%

The clinical frequency distribution data of research respondents is presented in the form of descriptive statistics, namely frequencies and percentages for nominal and ordinal data types. This study analyzed data from 38 subjects, with a distribution of respondents aged 20-23 years (as shown in Table 1). The maximum age is 21 years. From a total population of 177 students. Those that did not meet the inclusion criteria were excluded.

The results of the PSQI questionnaire showed that 13.2% of respondents in this study had sleep patterns in the good category, and 86.8% in the poor sleep pattern category. Good criteria for this questionnaire are if the respondent has a PSQ score < 5, while a bad score for PSQ > 5.

Next, a skin examination is carried out using a *Janus skin analyzer* to check for signs of aging, such as pores, wrinkles, pigmentation, *U-zone sebum*, and *T-zone sebum*. It was found that 57.9% of respondents experienced an increase in skin age that was older than their biological age.

Each sign of aging has its own criteria pores is a criterion for the size of normal pores having a value of 3.00 – 3.99 and a large value of 6.00 – 7.99. seen from Table 1, 10.5% of respondents had skin with normal pores, then in the little large category 52.6% of respondents, in the large category 31.6% of respondents, and in the *very large category* 5.3% of respondents.

Wrinkles are classified as *none* if they have a value < 2 and *thin criteria* have a value > 2. The results of the examination found that 44.7% of respondents had *none criteria* and 55.3% of respondents *had thin criteria*.

Pigmentation has normal criteria if the value is 3.00-3.99, *a little severe* has a value of 4.00-5.99, and *very severe* has a value of > 6.00. Based on the results of skin examination, 15.8% of respondents had normal criteria, then 63.2% of respondents had *a little-severe criteria and 21.1% of respondents had very severe criteria*.

Sebum is classified based on the amount of sebum production in the *U-zone* and *T-zone areas*, namely *little,* normal, *much*. The results of *the U-zone* sebum examination showed that 81.6% of respondents had little criteria, 13.2% of respondents had normal criteria, and 5.3% of respondents had much criteria.

Furthermore, the results of *the T-zone* area sebum examination were based on *little* criteria for 55.3% of respondents, normal criteria for 39.5% of respondents, and *much criteria for* 5.3% of respondents.

Table 2. Relationship Between Sleep Patterns and Skin Age

	Mark
Mann-Whitney U	,000
Wilcoxon W	741,000
Z	-7,543
Asymp. Sig. (2-tailed)	<.001

The results of the analysis of the relationship between sleep pattern factors and skin age in table 9 show the Asymp value. Sig. (2-tailed) is < 0.001, then the Asymp. Sig. (2-tailed) < 0.05. so that H1 is accepted and H0 is rejected or there is a relationship between sleep patterns and premature skin aging, in this case the skin age is older than actual age.

Table 3. Relationship Between Sleep Patterns and Wrinkles

	Mark
Mann-Whitney U	,000
Wilcoxon W	741,000
Z	-7,510
Asymp. Sig. (2-tailed)	<.001

the Mann-Whitney analysis in table 11 show the Asymp value. Sig. (2-tailed) is < 0.001, then the value of Asymp. Sig. (2-tailed) < 0.05. So, that H1 is accepted and H0 is rejected or there is an influence of sleep patterns on *premature skin aging* , in this case the appearance of fine wrinkles on the face.

Table 4. Relationship Between Sleep Patterns and Pigmentation

	Mark
Mann-Whitney U	122,000
Wilcoxon W	863,000
Z	-6,241
Asymp. Sig. (2-tailed)	<.001

The Mann-Whitney analysis in table 12 show the Asymp value. Sig. (2-tailed) is < 0.001, then the value of Asymp. Sig. (2-tailed) < 0.05. so that H1 is accepted and H0 is rejected or there is an influence of sleep patterns on *premature skin aging* , in this case the appearance of hyperpigmentation on the face.

Table 5. Relationship Between Sleep Patterns and *U-Zone Sebum*

	Mark
Mann-Whitney U	374,000
Wilcoxon W	1115,000
Z	-3620
Asymp. Sig. (2-tailed)	<.001

The Mann-Whitney analysis in table 13 show the Asymp value. Sig. (2-tailed) is <.001, then the value of Asymp. Sig. (2-tailed) < 0.05. so that H1 is accepted and H0 is rejected or there is an influence of sleep patterns on *premature skin aging* in this case less or more sebum production in the *U-zone area*.

Table 6. Relationship Between Sleep Patterns and *T-Zone Sebum*

	Mark
Mann-Whitney U	238,000
Wilcoxon W	979,000
Z	-5,034
Asymp. Sig. (2-tailed)	<.001

The Mann-Whitney analysis in table 13 show the Asymp value. Sig. (2-tailed) is <.001, then the value of Asymp. Sig. (2-tailed) < 0.05. so that H1 is accepted and H0 is rejected or there is an influence of sleep patterns on *premature skin aging,* in this case there is less or more sebum production in the *T-zone area* .

57% of Indonesian women show signs of premature skin aging when they reach the age of 20. Problems that arise due to premature skin aging include fine wrinkles, pigmentation, large pores and sebum. The skin aging process occurs starting at the age of 30 years, but skin aging can occur earlier when you reach the age of 20 years or is called premature skin *aging* . The process of premature skin aging or *premature skin aging* is a degenerative process in the skin that causes histological changes in the layers of the skin. Skin organs contain collagen, elastin and hyaluronic acid which play a role in maintaining skin moisture and elasticity.

Testing the relationship between sleep patterns and *premature skin aging* on the criteria of skin age, pores, wrinkles, pigmentation, sebum in the *U-zone* and *T- zone areas* obtained Asymp values. Sig. (2-tailed) < 0.001 means the Asymp value. Sig. (2-tailed) < 0.05 then **H1 is accepted and H0 is rejected**. This means that it can be concluded that there is a relationship between the influence of sleep patterns on *premature skin aging*. The research results are in line with research by Clatici, VG *et al.* (2017) entitled Maedica-a Journal of Clinical Medicine Perceived Age and Life Style. The Specific Contributions of Seven Factors Involved in Health and Beauty reveals that people who don't get enough sleep will make their faces look more tired, have black eye bags, and more visible wrinkles and fine lines, this is caused by the skin losing TEWL or transepidermal water loss. higher levels, and decreased skin protection.

There are many factors that influence *premature skin aging* related to the results of this research, one of which is sun exposure which is related to *premature skin aging*. Sunlight produces *Reactive Oxygen Species* (ROS). *Reactice Oxygen Species* (ROS) are free radicals and oxidative stress. ROS can disrupt the continuity of enzymes in maintaining skin balance. As a result, disruption of skin physiology accelerates the aging process of the skin.

Prolonged exposure to UV rays can cause erythema. Recovery of erythema caused by UV exposure occurs at night while sleeping. When you don't sleep or sleep

less than 5 hours, it will affect skin recovery because exposure to UV rays will result in an increase in chronic skin inflammation, and increase inflammatory disorders due to increased pro-inflammatory cytokines. Apart from that, the skin also experiences a decrease in protection as explained in research by Addor, FAS (2018) on Beyond photoaging: Additional factors involved in the process of skin aging.

Further research is needed by considering other factors that influence the premature skin aging process, because there is still a lack of literature discussing the factors that influence premature skin aging.

D. CONCLUSION

There is a relationship between sleep patterns and the occurrence of premature skin aging in YARSI University Medical Students class of 2021, characterized by larger pores, the appearance of wrinkles and fine lines, hyperpigmentation, and disruption of sebum production in the U-zone and T-zone areas which causes an increase Skin ages older than biological age.

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