Original Research Report

STRESS LEVELS AND SEBORRHEIC DERMATITIS IN THE CLASS OF 2020 MEDICAL STUDENTS AT A UNIVERSITY IN INDONESIA

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ABSTRACT

Seborrheic dermatitis is a common skin disease in the form of superficial inflammation with a papulosquamous morphology that often occurs in sebaceous gland-rich areas. Emotional stress is one of the contributing factors to the susceptibility of individuals to seborrheic dermatitis, while lack of sleep is associated with its exacerbation. This study aims to investigate the relationship between stress levels and seborrheic dermatitis cases among the class of 2020 students at the Faculty of Medicine, Universitas Tarumanagara, Jakarta, Indonesia. This study used an analytical-observational approach with a cross-sectional design. The sampling technique used was simple random sampling. The samples were from 114 medical students from the class of 2020 at Universitas Tarumanagara. The data were collected using an online Google Forms questionnaire and a dermatological assessment. The data were analyzed through statistical software, IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, N.Y., USA), using the Chi-square hypothesis test. The results showed a significant relationship between sex and seborrheic dermatitis cases (p=0.000). However, there was no significant relationship between stress levels and seborrheic dermatitis cases among the respondents (p=0.591). In conclusion, factors other than stress levels might contribute to the development or exacerbation of seborrheic dermatitis among the participants. Further research is needed to explore the potential underlying mechanisms and additional factors influencing the development and progression of seborrheic dermatitis.

Keywords: Stress level; seborrheic dermatitis; skin inflamation; human and health

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Highlights:
1. This research investigated a previously unexplored relationship between stress levels and seborrheic dermatitis in Indonesia.
2. It has been shown that a significant proportion of medical students are susceptible to sleep problems, which can negatively impact their academic performance and mental health.
3. This recent study found that seborrheic dermatitis affects men on average more frequently than women.

INTRODUCTION

Seborrheic dermatitis is a prevalent type of superficial inflammation with papulosquamous morphology that affects sebaceous gland-rich areas. This skin condition is characterized by a reddish color and flaky patches (Malak 2014, Enos et al. 2017, Elgash et al. 2019). This disease is a chronic condition that develops in adults and adolescents with variable degrees of severity. The symptoms of this skin condition may vanish briefly but reappear during stress (Borda et al. 2019, Piquero-Casals et al. 2019). Seborrheic dermatitis is a skin inflammation that can persist for years through recurrence and remission despite care and therapy. The face and scalp are the most affected sites, although it frequently involves multiple areas (Gary 2013, Sasseville 2018, Castillo et al. 2019).

The prevalence of seborrheic dermatitis is around 5% globally. However, nearly 50% of the world's population is affected by dandruff, a moderate and non-inflammatory form of seborrheic dermatitis (Tucker & Masood 2023). The prevalence of seborrheic dermatitis in Indonesia among the population within the age range of 12–20 years is 26.5%. This number exceeds the prevalence of seborrheic dermatitis in other Asian nations (Sahidah & Agustin 2018). Sebaceous gland activity, Malassezia colonization, epidermal barrier

integrity, host immunological response, neurogenic variables, emotional stress, and dietary factors contribute to an individual's vulnerability to acquire seborrheic dermatitis. In situations of depression and emotional stress, seborrheic dermatitis is more common. In addition, sleep deprivation and stress have been linked to the deterioration of seborrheic dermatitis (Borda & Wikramanayake 2015, Cheong et al. 2015).

A large percentage of medical students suffer from sleep disorders that have a severe effect on their academic performance and mental health. Long hours of lecture and study, clinical clerkships that include overnight duty, mental stress, lifestyle choices, and heavy use of social media, notably during the COVID-19 pandemic, contribute to the high prevalence of sleep problems among medical students (Turkmen et al. 2020, Perotta et al. 2021, Pendlebury et al. 2022). The Basic Health Research by the Minister of Health of the Republic of Indonesia (2018) estimated the prevalence of mental and emotional disorders in Indonesia to be 26 million, or 9.9%, among the population aged 15 and older. Research at an Indonesian medical school reported moderate stress levels in 57.23% of the students (Wahyudi et al. 2017). A comparable study conducted in Saudi Arabia found that the prevalence of severe stress was 33.8%. The condition was more prevalent among junior students (Saeed et al. 2016).

For medical students, chronic stress can be exhausting and lead to the gradual degradation of the immune system and individual health. Most medical students find it difficult to avoid stress, although chronic stress has a detrimental effect on their immune systems (Bekhbat & Neigh 2018, Perotta et al. 2021). It decreases the body's capability to fight against diseases and diminishes health. Chronic stress has also been shown to decrease the number and functionality of immune cells, which are essential to the body's anti-infection response (McEwen 2006, Saif et al. 2018). Therefore, the purpose of this study was to analyze the relationship between stress levels and seborrheic dermatitis among medical students, particularly the class of 2020, at Universitas Tarumanagara, Jakarta, Indonesia.

MATERIALS AND METHODS

This research was an analytical-observational study with a cross-sectional design. This study analyzed the relationship between the independent (i.e., stress levels) and the dependent (i.e., the case of seborrheic dermatitis) variables. The researchers observed the necessary variables in this study based on the specified subjects at the same time, though not all subjects had to be observed on the same day or at the same time (Spector 2019). The study was conducted at the Faculty of Medicine, Universitas Tarumanagara, Jakarta, Indonesia, from January to April 2022.

All medical students from the class of 2020 were chosen as the population of this study. In addition, the sample was collected using a simple random sampling technique (West 2016). The selection criteria for participation in this study were active undergraduate students from the class of 2020 at the Faculty of Medicine, Universitas Tarumanagara, who consented to participate in this study and signed the provided informed consent form. Subjects excluded from this study included those currently being treated for seborrheic dermatitis, those taking anti-stress medication, and those not willing to cooperate in completing the questionnaire. The sampling procedure resulted in a total of 114 participants.

The participants filled out a questionnaire, which was distributed online through Google Forms. The Depression, Anxiety, and Stress Scale (DASS-42) was used to construct the questionnaire to assess the stress levels of the participants (Habibi et al. 2017). The questionnaire results were summarized in scores according to the questionnaire answers. A score of 0–14 would indicate that the subject was at a normal stress level, while a score of 15–42 would indicate that the stress level was far from normal. Furthermore, the seborrheic dermatitis variable was assessed using a dermatological clinical evaluation that sought to quantify the magnitude of the skin condition according to the Seborrheic Dermatitis Area and Severity Index (SDASI) criteria (Emre et al. 2012). The data obtained were then analyzed using a cross-sectional assessment of the relationship between stress levels and seborrheic dermatitis. The evaluation was performed by considering both statuses at the same time (Wang & Cheng 2020).

This research utilized a questionnaire that is widely accepted and reliable for assessing similar cases. The DASS-42 measured the depression, anxiety, and stress levels comprehensively, providing a holistic view of the participants' psychological well-being (Makara-Studzińska et al. 2022). The DASS-42 questionnaire was distributed conveniently through Google Forms, facilitating efficient data collection. Similarly, the SDASI criteria offered a standardized method to evaluate the area and severity of seborrheic dermatitis (Cömert et al. 2013). The selection of these instruments aligned with the research objectives and previous studies, allowing for significant comparisons and contributing to existing knowledge.

The Chi-square test with a significance level (p) of 0.05 was employed in IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA) to process the acquired data and to determine the correlation between the two variables (McHugh 2013). The obtained p-value below 0.05 indicated a statistically significant relationship or correlation between the two variables. On the other hand, if the p-value was above 0.05, it suggested no statistically significant relationship between the variables. In the case of an observed association that happened by chance, any relationship between the variables might not be meaningful or generalizable to the population.

RESULTS

The total number of respondents or subjects in this study was 114. It was found that most of the research subjects who provided responses were female, with as many as 72 participants (63.2%). The age of the research subjects varied, with the largest proportion (69 individuals, 60.5%) being 19 years old (Table 1). In contrast, the age groups with the fewest respondents were those aged 21 and 22, with only four individuals in each group.

Table 1. Characteristics of the research subjects based on gender and age.

Characteristics	Frequency	%
Gender		
Female	72	63.2
Male	42	36.8
Age (years old)		
18	6	5.3
19	69	60.5
20	29	25.4
21	5	4.4
22	5	4.4

The number of participants with abnormal stress levels was greater (59 individuals, 51.8%) than those with normal stress levels (55 individuals, 48.2%). As many as 61 (53.5%) participants had seborrheic dermatitis, while 53 (46.5%) participants did not (Table 2).

Table 2. Distribution of the research subjects based on stress levels and seborrheic dermatitis cases.

Variables	Frequency	%
Stress level		
Normal	55	48.2
Abnormal	59	51.8
Seborrheic dermatitis		
Yes	61	53.5
No	53	46.5

It was found that the majority of participants who had seborrheic dermatitis experienced infrequent recurrences (44 individuals, 72.1%), but one participant suffered persistent symptoms (1.6%) (Table 3). Most participants with seborrheic dermatitis (86.9%) experienced mild complaints related to the skin condition, indicating manageable effects. Moderate complaints were reported by 11.5% of the participants, while only 1.6% reported severe complaints. Itching was the most commonly reported symptom, with 80.3% of the participants mentioning it. A small percentage (6.6%) reported a sensation of heat, while 13.1% did not report any specific complaints.

Table 3. Distribution of recurrence frequency, complaint severity, and symptoms of seborrheic dermatitis.

Seborrheic dermatitis	Frequency	%
Frequency of recurrence		
Seldom	44	72.1
Sometimes	12	19.7
Often	4	6.6
Always	1	1.6
Complaint severity		
Mild	53	86.9
Moderate	7	11.5
Severe	1	1.6
Symptom		
Itching	49	80.3
Burning sensation	4	6.6
Nothing	8	13.1

According to Table 4, women (58.3%) reported a higher percentage of stress occurrence compared to men (40.5%). This indicated that women in the study sample had a higher prevalence of stress. Among the age groups analyzed, individuals aged 18 had the lowest percentage of stress occurrence, with only two individuals (1.8%) reporting stress. Individuals in the 21-year-old age group had a slightly higher proportion, with three individuals (2.6%) experiencing stress. In contrast, individuals aged 20 showed a notable presence of stress, with 20 individuals (17.5%) reporting stress. The highest percentage of stress occurrences was observed among individuals aged 19, with 34 individuals (29.8%) experiencing stress. It is important to note that no occurrences of stress were reported among individuals aged 22, although this did not necessarily indicate a complete absence of stress among all individuals in that age group.

Table 4. Distribution of gender and age in the context of stress occurrences.

Variables	Stress occurrence	
	Yes (n, %)	No (n, %)
Gender*		
Men	17 (40.5)	25 (49.5)
Women	42 (58.3)	30 (41.7)
Age (years old)		
18	2 (1.8)	4 (3.5)
19	34 (29.8)	35 (30.7)
20	20 (17.5)	9 (7.9)
21	3 (2.6)	2 (1.8)
22	0 (0)	5 (4.4)

*Percentages for gender were calculated separately for men and women.

According to Table 5, it was found that the majority of the participants who had seborrheic dermatitis were in the 19-year-old age group. However, it corresponded to the large number of participants aged 19.

Table 5. Distribution of age in the context of seborrheic dermatitis occurrences.

Variable	Seborrheic dermatitis	
	Yes (n, %)	No (n, %)
Age (years old)		
18	2 (1.8)	4 (3.5)
19	39 (34.2)	30 (26.3)
20	16 (14)	13 (11.4)
21	1 (0.9)	4 (3.5)
22	3 (2.6)	2 (1.8)

Table 6 shows the relationship between gender and the occurrence of seborrheic dermatitis. It provides the number and percentage of individuals with and without seborrheic dermatitis. In the group of male participants, 24 individuals (57.1%) had seborrheic dermatitis, while 18 individuals (42.9%) did not have the condition. In the group of female participants, 37 individuals (51.4%) had seborrheic dermatitis, while 35 individuals (48.6%) did not. The Chi-square test results showed a relationship between gender and the incidence of seborrheic dermatitis (p=0.000). The likelihood of developing seborrheic dermatitis was significantly different between men and women in the study.

Table 6. Relationship between gender and the occurrence of seborrheic dermatitis.

Variables	Seborrheic dermatitis		p
	Yes (n, %)	No (n, %)	
Gender*			
Male	24 (57.1)	18 (42.9)	0.000
Female	37 (51.4)	35 (48.6)	

*Percentages for gender were calculated separately for males and females.

Table 7 demonstrates that the prevalence of seborrheic dermatitis was higher among the research participants with abnormal stress levels (33 individuals) than among those with normal stress levels (28 individuals). The results of the Chi-square test showed that there was no relationship between stress and the occurrence of seborrheic dermatitis (p=0.591).

Table 7. Relationship between stress and the occurrence of seborrheic dermatitis

Stress	Seborrheic dermatitis		p
	Yes (n, %)	No (n, %)	
Stress level			
Normal	28 (24.6)	27 (23.7)	0.591
Abnormal	33 (28.9)	26 (22.8)	

DISCUSSION

Stress levels and gender

Seborrheic dermatitis was more prevalent among women than men, indicating a relationship between gender and the frequency of cases (p=0.000). A study by Silvia et al. (2020) supported the findings of this study. The 2019 study was conducted on patients at the Dermatology and Venereology Department of Dr. H. Abdul Moeloek General Hospital, Bandar Lampung, Indonesia, with results indicating a correlation between gender and seborrheic dermatitis cases, but the male research subjects experienced the condition more frequently than the female research subjects. It aligns with the hypothesis that men and women have different skin characteristics, including differences in the number of hair follicles, sebaceous and sweat glands, and hormones. A higher concentration of the androgen hormone in men's skin results in increased perspiration and hair growth (Silvia et al. 2020).

Research by Malak (2014) from January to December 2015 at the Dermatology and Venereology Department of Prof. Dr. RD Kandou Hospital, Manado, Indonesia, yielded the same results. The study found that men (67%) were more prone to seborrheic dermatitis. However, Nabillah (2021) collected data on patients treated between 2016 and 2019 in the Dermatology and Venereology Department of Meuraxa General Hospital, Banda Aceh, Indonesia, and obtained different results. In the study, seborrheic dermatitis cases were more prevalent among female patients in 2016 (69:61) and 2017 (73:72), but more prevalent among male patients in 2018 (85:47) and 2019 (48:14).

Many variables can affect the varying results of these recent studies. On average, seborrheic

dermatitis affects men more frequently than women (Zander et al. 2019). The cause is the stimulation of higher male androgen hormone levels, which increases sebum production due to higher sebaceous gland activity. An increased sebum production can result in the expansion of *Malassezia* and seborrheic dermatitis. However, although previous studies found that genders significantly affected the prevalence of seborrheic dermatitis, there were still several confounding variables that might account for disparities in seborrheic dermatitis cases between genders. Since seborrheic dermatitis is a complex condition with various factors contributing to its etiology, its actual cause is uncertain (Borda & Wikramanayake 2015).

The results of this study determined that more subjects experienced stress above the normal limit (59 individuals) compared to those with normal or mild-to-moderate stress (55 individuals). The percentage of women who suffered from stress (58.3%) was higher than that of men (40.5%). Nasrani & Purnawati (2015) observed different results in yoga participants in Denpasar, Indonesia, with men having significantly higher normal stress levels than women (95.1% vs. 49.6%). In addition, it was found that gender affected the stress score by up to 22%. Men and women react in exceptionally different ways when faced with a dilemma. Women's brains tend to generate negative arousal in response to stressful problems. In contrast, men often embrace competition and view it as a source of good motivation.

Research by Kountul et al. (2018) on students at the Faculty of Public Health, Universitas Sam Ratulangi, Manado, Indonesia, found a correlation between gender and the students' stress levels, which supports this study's findings. It was found that 53.9% of the female students and only 34% of the male students experienced excessive stress. This was due to the vulnerability of the female participants to stress conditions regulated by oxytocin, estrogen, and other sex hormones. Men tend to be more experimental, whereas women tend to be more insecure and sensitive.

According to Graves et al. (2021), female students are also more prone to stress. Unlike men, women possess four coping techniques, i.e., self-distraction, emotional support, physical support, and venting feelings through complaining. Self-distraction has been the most common strategy because it often provides quick relief.

Stress levels and ages

The ages in this study were homogeneous (18–22 years old), given that this age range falls within the category of the beginning of maturity (18–25 years old). Consequently, the age range did not affect the prevalence of stress among the research participants. The findings of a study by (Herwandha & Prastuti 2021), carried out at a university in Malang, Indonesia, support this study's findings. The study found that age was not more significant than affection in determining the emotional maturity of the students.

It is necessary to note that the findings of this study contradicted those of Vallejo et al. (2018), who found that stress levels tend to decrease with age. The various intervals used to classify age ranges in the two studies may explain the discrepancy in the findings. Our investigation focused on a narrow age range of 18 to 22, whereas Vallejo et al. (2018) used broader age categories. This difference in age classification might have affected the observed correlations between age and stress levels.

Stress levels and seborrheic dermatitis

This study revealed that there was no relationship between stress levels and seborrheic dermatitis cases in medical students at Universitas Tarumanagara ($p=0.121$). Similar findings were reported in a study conducted by Sari (2019) on students at the Labschool Kebayoran Senior High School, Jakarta, Indonesia. In contrast, Marlina & Sinaga (2021) obtained different findings from the class of 2017 medical students at Universitas Sumatra Utara, Indonesia. They found that there was a significant correlation between stress levels and seborrheic dermatitis cases with *Pityriasis sicca* manifestations. Stress was one of the risk factors for seborrheic dermatitis, which could be caused by a number of variables.

The presence or absence of a correlation between stress levels and seborrheic dermatitis can vary across different studies. Several factors may explain this discrepancy, including methodological differences, the heterogeneous nature of seborrheic dermatitis, individual variations and confounding factors, the timing and duration of stress, and the influence of psychological factors (Sasseville 2018, Saif et al. 2018, Zander et al. 2019). Seborrheic dermatitis is a complex condition that depends on genetic, immune, lifestyle, and environmental factors. Therefore, the relationship between stress and seborrheic dermatitis is likely multifaceted and may not be consistently observed.

According to a number of studies that have been mentioned, stress may be a risk factor related to seborrheic dermatitis. The Global Burden of Skin Disease project reported that seborrheic dermatitis can also influence an individual's mental health, resulting in a lower quality of life due to increased worry (Urban et al. 2021). The body secretes

adrenaline and cortisol in response to intense or sustained stress. If the stress response is positive, the increase in these hormones is temporary, and their impact on the skin is low. However, if the stress response is negative, the increase in these hormones is persistent and will have a greater impact on the skin. Cortisol can increase sebum production, resulting in blackheads (Rao et al. 2021). In addition, the persistent stress-induced inflammatory response impairs the body's ability to heal damaged skin.

In a study conducted by Saif et al. (2018) on medical students at a Saudi Arabian university, it was found that chronic stress harmed the skin by generating neuroendocrine changes that impair the immune system. As a result of this condition, the skin can lose its ability to respond to environmental dangers. Furthermore, a specific immune system may misidentify chemicals that enter the body, leading to autoimmunity. Mast cells play a vital role in the body's exaggerated immunological response to stress and in the induction of neurogenic inflammation. Some skin diseases, such as seborrheic dermatitis, may be caused by abnormalities in the body's immune system.

A study by Gül et al. (2017) found that the prevalence of seborrheic dermatitis was higher in the group with the highest levels of stress, indicating that psychological stress could be related to skin diseases. Stress is more prevalent among educated individuals, and its negative impacts on the occurrence of diseases are more prevalent among them. Choe et al. (2018) also researched the relationship between psychological stress and skin health. They examined the effect of stress on the barrier function of the stratum corneum. In their study, stress hindered the regeneration of the skin barrier by up to seven days in both male and female rats. Administering diazepam and chlorpromazine is suggested to enhance skin barrier recovery. Stress reduction using pharmaceuticals can enhance stratum corneum formation. Changes in the microbiome of stressed individuals' skin alter the colonization rate of *Malassezia* species, hence promoting *Malassezia* infection. These may contribute to the worsening of seborrheic dermatitis in individuals with elevated stress levels.

Strength and limitations

This research benefits medical personnel and students as it provides findings on the prevalence of seborrheic dermatitis cases in conjunction with stress levels. Despite the data indicating an absence of a correlation between the variables, this study may inspire further research to elucidate the causes of seborrheic dermatitis cases among people in academia. This study provides data on the number of students who had seborrheic dermatitis, which can be a foundation for further investigation. However, this study has a limitation due to the restricted size of the sample, as it only included students from the Faculty of Medicine, which does not fully reflect the population in an academic setting.

CONCLUSION

A considerable number of medical students experienced stress, mostly at mild-to-moderate levels. Furthermore, seborrheic dermatitis was prevalent among the medical student population. However, this study did not find any significant relationship between stress levels and seborrheic dermatitis cases.

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Conflict of interest

None.

Ethical consideration

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Author contribution

E conceptualized the study, designed the methodology, conducted the investigation and formal analysis, and drafted the original manuscript. HD was responsible for the validation and supervision, the writing of reviews, the editing of the manuscript, the curation of data, and the administration of the study.

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