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Correlation between Stress Level and Hair Loss in Students

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ABSTRACT

Background: Hair loss is one of the most commonly reported problems in dermatology One of the causes of hair loss is high stress levels. The effects of stress can impact hair condition, which in turn can affect appearance. **Purpose:** This study was to determine the relationship between stress levels and the incidence of hair loss among students at Syiah Kuala University. **Methods:** This research employed an observational analytic study using approach, utilizing cross-sectional data. The number of subject used in this study was 100 students who were taken by the simple random sampling method. The data analysis used was bivariate analysis to see the relationship between stress levels and the incidence of hair loss. **Result:** Out of 100 subjects of students with normal, mild, moderate, severe, and very severe stress levels, 59% of them experienced pathological hair loss. By using a significance value of 95%, the relationship between stress levels and the incidence of hair loss in Syiah Kuala University students showed a significance value, or p-value, of 0.024. **Conclusion:** This study shows that there is a relationship between stress levels and the incidence of hair loss among students at the University of Syiah Kuala.

Keywords: hair loss, stress level, student.

BACKGROUND

Every individual experiences constant stimuli or stressors. These stimuli or stressors can lead to a state of stress-a widely occurring phenomenon that continues to occur throughout life.[1] An individual can benefit from a mild amount of stress, as it can enhance motivation, adaptation, and responses to environmental challenges. However, an excessive amount of stress can cause serious problems to both the body and the psyche of the individual involved.[2]

Stress has been associated with hair growth and loss problems for a long time. Three levels of interaction distinguish the relationship between psychoemotional stress and hair loss: (1) acute or chronic stress as the primary inducer of hair loss, (2) stress as a factor that exacerbates hair loss caused by other causes, and (3) stress as a secondary problem caused by hair loss.[3]

However, this study will focus on the relationship between stress levels and the incidence of hair loss.

Hair loss of approximately 120 strands per day is the definition of hair loss.[4] Hair loss is the most common hair problem that patients complain about to dermatologists. The human scalp generally has 100,000 hair follicles, of which 90% are in the anagen phase (growth phase), often referred to as anagen hair. The subcutaneous layer firmly anchors anagen hair, making it difficult to pull out. After completing the anagen phase, the hair will enter the catagen phase for two weeks, where the process of apoptosis occurs. Only then will the hair enter the resting phase (telogen) for 3 months. Approximately 10% of hair is in the telogen phase, compared to anagen hair.[5] Therefore, the normal amount of hair loss per day is about 100 strands.

A variety of contributing factors can cause hair loss, making the underlying cause highly dependent on its

pathogenesis. Medical history, medication history, hair styling practices, and psychoemotional states can trigger different hair loss processes.[5]

Stressful situations can trigger the activation of the HPA axis which can secrete cortisol and other neurohormones and neurotransmitters in various parts of the body.[1] These hormones can affect the phase shift of hair from the growth phase (anagen) to the resting phase (telogen).[6] In addition to depression and chronic stress, acute stress can also initiate this process, leading to hair loss that manifests 1-3 months later.[7]

Researchers frequently choose students as research participants because they consistently face diverse stressors in their everyday routines. Students experience stress due to pressures to excel academically, uncertainties about the future, and the ongoing adjustment to university regulations and educational methods.[8]

METHODS

We conducted this analytical and observational study using cross-sectional data to determine the relationship between stress level, as measured by the DASS 42 questionnaire, and the incidence of hair loss in Syiah Kuala University students. The study was carried out between 7 November and 25 December of 2020.

We conducted the stress level examination by asking respondents to complete the Depression Anxiety Stress Scale (DASS 42) questionnaire. The population in this study consisted of all students at Syiah Kuala University, estimated to be 22,578. The probability sampling method in this study selected a subjects of 100 active students using the simple random sampling type, adhering to the inclusion and exclusion criteria. The Slovin formula calculated the sample size.

The inclusion criteria stipulated that the age range for inclusion was 18–22 years old. The exclusion criteria encompassed students or families who had a history of alopecia or other scalp diseases, were currently undergoing hair loss treatment, had a history of endocrine and autoimmune disorders, were pregnant or postpartum within 3 months, were undergoing chemotherapy or radiotherapy, and were on medication.

Hair loss is categorized as normal and pathological. It is considered normal if the number of hairs that fall out in a day is 50-100 strands, or when a pull test is performed, the number of hairs that fall out is equal to or less than two strands, whereas abnormal or pathological hair loss occurs when the number of hairs that fall out during a pull test is more than two strands.

To perform the self-pull test, take approximately 50-60 strands of hair from the top of the head and hold them between the thumb, index finger, and middle finger near the hair root (scalp). Pull the bunch of hair slowly but firmly (until you feel a tug on the scalp) all the way to the end of the hair shaft. Once you reach the end of the hair shaft, count the number of hairs that have fallen out and remain between the fingers you used to pull the bunch.

We used univariate data analysis in this study to describe data in the form of frequencies and percentages. We also conducted a bivariate analysis of the data to ascertain the correlation between stress levels and the incidence of hair loss. The bivariate analysis used in this study was the Kruskal-Wallis statistical test with a significance limit (α) = 0.005 and a confidence interval of 95%. This research has been reviewed by the Ethics Committee at Zainoel Abidin General Hospital with number 278/EA/FK-RSUDZA/2020.

RESULT

Table 1. Respondent's general characteristics

Respondent characteristics	Frequency (n)
Gender	
Man	16
Woman	84
Age (years)	
18	10
19	23
20	25
21	31
22	10
23	1
Faculty	
Faculty of Economy	27
Faculty of Social and Political Science (FISIP)	3
Faculty of Nursing	19
Faculty of Veterinary and Medicine	4
Faculty of Teacher Training and Education (FKIP)	13
Faculty Marine Science and Fishery (FKP)	3
Faculty of Mathematics and Natural Sciences (FMIPA)	9
Faculty of Law	4
Faculty of Medicine	2
Faculty of Agriculture	3
Faculty of Engineering	13
Total	100

The researcher managed to collect 332 respondents to fill out the research questionnaire. Among these respondents, 202 respondents met the inclusion criteria, hile 130 respondents did not meet the inclusion criteria, so they were not used as respondents. We then randomly selected 202 of these respondents, resulting in a sample of 100 respondents.

Table 1 displays the general characteristics of respondents at Syiah Kuala University.

Table 2 provides an overview of respondents' stress levels.

Table 2. Respondent's stress level

Stress Level	Frequency (n)	Persentation
Normal	61	61%
Mild	20	20%
Moderate	10	10%
Severe	5	5%
Very Severe	4	4%
Total	100	100%

Table 2. This study found that the respondents experienced the highest frequency of normal stress (61%) and the lowest at the level of very severe stress (4%).

Table 3 presents an overview of the incidence of hair loss among respondents.

Table 3. Respondent's hair loss events

Hair Loss	Frequency (n)	Persentation
Normal	41	41%
Pathologic	59	59%
Total	100	100%

Table 3. The frequency distribution of respondents hair loss was at the pathological (59%) and normal (41%) levels.

Table 4. In this study, the frequency of hair loss that occurred in respondents from all general descriptions, the highest frequency of answers was 0 for increase in the amount of hair that falls out, formation of an oval pattern that is no longer covered with hair, hair loss in areas of the body other than the scalp, thinning of hair volume, and the habit of playing with and pulling out one's own hair.

Table 4. General description of hair loss incidence among respondents

General description	Frequency of respondents' answers			
	0	1	2	3
Increase in the amount of hair that falls out	24	39	16	21
Formation of an oval pattern that is no longer covered with hair	86	10	3	1
Hair loss in areas of the body other than the scalp	83	15	2	0
Thinning of hair volume	47	29	13	11
The habit of playing with and pulling out one's own hair	61	26	8	5

Table 5. Respondents' Pull Test self-examination Results

Amount of hair loss	Frequency (n)	Persentation
Less than two (normal)	48	48%
More than two (pathologic)	52	52%
Total	100	100%

Table 5. The highest frequency in examining the amount of hair loss of respondents was at the pathological level (52%).

Table 6 shows the relationship between stress level and the incidence of hair loss

Table 6. Relationship between stress level and hair loss incidence

Stress Level	Hair loss				Total		P value
	Pathologic		Normal				
	n	%	n	%	n	%	
Very Severe	3	75	1	25	4	100	0.024
Severe	3	60	2	40	5	100	
Moderate	10	100	0	0	10	100	
Mild	12	60	8	40	20	100	
Normal	31	50,8	30	49,2	61	100	
Total	59	59	41	41	100	100	

Table 6. The highest frequency of the relationship between stress levels and hair loss incidence was at the pathological level at 59%.

DISCUSSION

Most of the respondents are female, with a percentage of 84% compared to the number of men, with a percentage of 16%. The dominance of women in the overall population could explain this. While both men and women can experience hair loss problems, women are more likely to experience and report these issues.[9] Furthermore, women tend to report hair loss issues more frequently for aesthetic reasons.[10]

In addition, this study found that the sample consisted mostly of 21-year-old students (31%). The respondents included a variety of student groups who experienced hair loss issues and high levels of stress. This result aligns with a study by Peters EMJ et al., which found that students in their senior year, typically around the age of 21, are more susceptible to high stress levels and hair loss complaints.[11]

The respondents included a variety of student groups who experienced hair loss issues and high levels of stress. This result aligns with a study by Peters EMJ et al., which found that students in their senior year, typically around the age of 21, are more susceptible to high stress levels and hair loss complaints. This study found that the faculty of economics had the largest sample, accounting for 27%, followed by faculty of nursing with 19%.

This study found that the respondents experienced the highest frequency of normal stress (61%) and the lowest at the level of very severe stress (4%). Measurement using the DASS 42 questionnaire can distinguish and classify respondents into groups with depression, anxiety, and stress problems. This study concentrates on the issue of stress, using the following question items to assess respondents' stress levels: 1, 6, 8, 11, 12, 14, 18, 22, 27, 29, 32, 33, 35, and 39.

Respondents experiencing high levels of stress answered each stress-related question with a dominant score of 3. These items described the respondents' distress, irritability, and tendency to overreact to unpleasant things.[12] The items described the respondents' state of sadness and ongoing worthlessness (depression), while the items for anxiety described the respondents' state of physical complaints, panic attacks, and excessive fear. [12]

University students in Pakistan are prone to high levels of stress due to exposure to diverse stressors from their environment, according to research.[8] These stressors can take the form of demands for satisfactory academic performance, adaptation to dynamic academic policy changes, fear and uncertainty about the future, etc. We collected data for this study during the implementation of the online learning policy in November-December. Abdelmatloub R.'s research suggests that this change in the learning policy may lead to heightened stress levels in students, as they adjust to the unusual changes and grapple with feelings of uncertainty.[13]

The results of the questionnaire and the pull test show that respondents generally tend to experience hair loss problems. Items number 1 and 4 in the questionnaire had the highest frequency of answer 3 compared to other items, which illustrates that the hair loss faced by respondents leads to hair loss problems caused by high levels of stress.[9] While the lowest respondent answers were seen in items number 2 and 3. These two statement items refer to hair loss problems that are by hormonal abnormalities.[14] The item number 5 pertains to hair problems that arise from the habit of pulling one's own hair.

In this study, respondents who hoose items related to the problem of hair loss caused by hormonal abnormalities had the lowest frequency, indicating that the hair loss that occurs is not due to hormonal influences. In addition to changes in the hair growth cycle, an individual's stress-induced habit of playing, twisting, and pulling their own hair can also lead to hair loss. According to the study's results, the frequency of the fifth statement was also relatively high.

A study conducted in Pakistan used the pull test to assess whether respondents had hair loss problems.[15] The findings indicated that respondents experiencing hair loss issues displayed abnormal results. This study also revealed that 52% of the overall population displayed abnormal results.

Based on the results of the cross tabulation in Table 6, it can be seen that respondents with very severe stress levels have a tendency to experience hair loss, namely a total of 3 people (75%) and the rest do not have hair loss problems as many as 1 person (25%). Among the 61 respondents with normal stress levels, 31 individuals (50.8%) have hair loss problems, while the remaining 30 individuals (49.2%) do not have any hair loss issues.

After conducting the Kruskal-Wallis statistical test using a meaning value of 95%, the significance value or p-value is 0.024. This significance value is smaller than $\alpha < 0.05$. The significance value that is smaller than the α value indicates that there is a relationship between stress level and the incidence of hair loss in Syiah Kuala University students.

All samples in this study had varying levels of stress, ranging from normal to very severe. The results obtained after assessing each respondent's stress levels showed that respondents with high stress levels tended

to experience hair loss problems. Thus, stress levels have a significant relationship with the occurrence of hair loss. A 2017 study in California found that medical students experiencing high levels of stress due to academic stressors maintained higher levels of hair cortisol for 4-6 months.[6] Hair cortisol is a common cause of hair loss triggered by high stress levels.[11]

The research findings suggest that the group with normal stress levels has a higher frequency of pathological hair loss. This may be due to residual concentrations of hair cortisol still present in the scalp tissue, which can cause abnormal hair loss problems. [6] Changes in the learning system due to the COVID-19 pandemic can induce stress, leading to the release of hair cortisol, whose lingering concentration can still impact hair loss. Although respondents no longer experience an increase in stress levels when filling out the questionnaire, residual hair cortisol from stress conditions that occurred 4-6 months ago can still have an impact in the form of hair loss.[1]

The normal hair growth cycle in humans is divided into three phases: anagen, catagen, and telogen.[16] The frequency of hair loss problems among respondents with normal stress levels may be high due to their predominance in the telogen phase, which can lead to more hair loss than usual.[17] This study did not observe which phase the respondents' hair was in, but each individual does not have the same specific hair cycle, allowing for the possibility of some respondents being in the telogen phase and showing signs of more hair loss than usual. Meanwhile, respondents with mild, moderate, severe, and very severe stress levels exhibit an increasing dominance of pathological hair loss incidents, which corresponds to their increasing stress levels. Respondents with mild, moderate, severe, and very severe stress levels sequentially reported experiencing hair loss problems at 60%, 100%, 60%, and 75%, respectively.

Eight months after the transition to online learning, this study examined the impact of this change in academic policy on the stress levels of student groups. In addition to worries about changes and adaptation processes, students are also confronted with ongoing concerns about the pandemic. These fears and concerns trigger the activation of the HPA axis, leading to the release of hair cortisol and resulting in inflammation processes in hair follicles.[17] Additionally, psychoemotional stress triggers the release of chemical stress mediators, which in turn decreases the functioning of the nervous system and causes hair follicle bleeding, ultimately leading to pathological hair loss.[19]

The COVID-19 pandemic posed a research obstacle, forcing the researchers to conduct this study online. The researchers then independently conducted a questionnaire and a pull test examination to determine hair loss issues, without the need for supplementary examinations from a specialist doctor. The study's limitation in this research is 100 samples. The data, analysis, and discussion of the research findings lead to the following conclusions. Students at Syiah Kuala University typically do not exhibit an increase in stress levels, which is considered normal., Students at Syiah Kuala University predominantly exhibit pathological hair loss issues., There is a relationship between stress levels and hair loss among students at Syiah Kuala University.

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