

**ORIGINAL ARTICLE:
ASSOCIATION BETWEEN PSYCHOLOGICAL STRESS AND SKIN SYMPTOMS AMONG
MEDICAL STUDENTS STUDYING IN KARACHI**

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OBJECTIVE

To determine any association between psychological stress and skin symptoms in medical students.

DESIGN OF STUDY

It is a cross-sectional study

PLACE AND DURATION

The study was conducted over a period of 12 months, from September 30,2022 to August 1, 2023 on medical students enrolled in MBBS program at Liaquat National Hospital and Medical College.

METHOD

We studied medical students through self-reported, validated questionnaires that inquired about socio-demographic information, perceived stress, and skin complaints. All data analysis is done on SPSS version 22. Descriptive frequencies are presented in the form of the mean and standard deviation. Associations were assessed by applying the chi-square test among the variables.

RESULTS

A total of 401 questionnaires were used to analyze the data, with a mean age of 20.9 SD 1.6. We found out that 15.7% (n = 28) of the medical students were highly stressed, 77.3% (n = 310) were moderately stressed, and 7% (n = 63) were found to be under low stress. The most common skin symptoms found among medical students were hair fall (76.6%) (n = 315) and dark circles (77.3%) (n = 314). Individuals with high PS levels were more likely to develop skin symptoms such as itchy skin on the hands (p = 0.005), pimples or acne (p = 0.049), troublesome sweating (p = 0.04), dark circles (p = 0.01), and hair greying (p = 0.035).

CONCLUSIONS

Psychological stress is associated with skin symptoms reported by medical students, especially dark circles, loss of hair, hair greying, troublesome sweating, and itchy rashes on the hands. Further studies and interventions should be done to assess and assist medical students.

KEYWORDS

Dark circles, Hair greying, Medical students, Loss of hair, Psychological stress, Skin symptoms

INTRODUCTION

Any internal or external circumstance that threatens the homeostasis of a cell or an organism is referred to as physiological stress (PS). (1) Psychological stress (PS) is our body's response to a variety of scenarios and life events in which we are confronted with something new, unexpected, or largely uncontrollable. (2) Almost all biological systems are subject to stress, which is a fundamental aspect of the natural world. This caused due to environmental influences, stress self-development and aging. (2) The effects on the body are differs to each individual, depending on how the body reacts to stressful situations. (3) Acute stress's effects subside within a few hours, but chronic stress, which occurs when your stress response is activated for an extended period of time, can cause or exacerbate more severe health issues. (3,4)

Studies indicate that medical students experienced significant levels of physical health and emotional disturbances, which had an adverse effect on their cognitive and learning abilities, About 75.6% medical students have attributed their high stress levels to studies which is more than twice that of students of other professions.(5) PS is one of the fundamental stimuli for the hypothalamic-pituitary-adrenal (HPA) and sympathetic nervous systems (6). Activation of such neurobiological stress systems leads to alterations in alternative circuits synaptic plasticity, expression of molecules (m RNA, transcription factors), triggers of neuronal homeostasis, and serum hormone levels (particularly cortisol). (7,8)

PS has a number of detrimental effects on the skin, including decreased stratum corneum cohesion, distorted permeability barrier, altered antimicrobial properties of the epidermal barrier, slowed wound healing, reduced epidermal innate immunity, and possible adverse effects on cutaneous homeostasis.(9,10) Certain dermatological problems are brought on by sustained psychological stress, linked to personality factors, or a consequence of a psychiatric condition like in psoriasis, acne, atopic dermatitis, vitiligo, and alopecia areata.(10) The skin, one of a person's most precious possessions, requires significant studies, with an exponential rise in mental illnesses, especially among young adults.(11) A skin condition can drastically alter one's life.(12) Skin conditions can present a variety of difficulties, from the initial diagnosis to managing the daily skincare routine.(13) Eczema, psoriasis, or vitiligo, are examples of widespread skin conditions that can cause embarrassment, humiliation, and other negative body image experiences.(10,14)

Our study will help to identify and aid in the prevention of chronic consequences of psychological stress (PS). Studies conducted in on this topic on different population shown a significant association between psychological stress and skin symptoms due to a lack of literature and outdated facts of our population, this study needed to be revised.(9) There is been no study done which related lifestyle factors with the high level of PS which could be an important etiological study of this association.

Thus, the aim of our study is to determine any association between psychological stress and skin symptoms.

METHOD

In this study, we adopted a cross-sectional study design. The data was collected from medical students of Liaquat National Medical College. The study was conducted between September 20, 2022 to 1 August 21, 2023. The estimated sample size was calculated using the open software Open Epi version 3.01 (15). With anticipated frequency of 12.8% (16) keeping confidence level at 95% the estimated sample size was 172 however, our study included 401 participants. The ethical review approval was taken from Liaquat National Hospital and Medical College's institutional review board and ethical review board (reference number # 0823-2022LNH-ERC).

Medical students of Liaquat National Hospital and Medical College studying MBBS from the age range of 17 to 25 (years) and those who gave consent were included in the study. Those who reported being diagnosed with psychiatric condition(s), skin disease, hormonal imbalance disease (PCOS, Diabetes myelitis), taking medication for these condition(s), and those who submitted incomplete questionnaires were excluded from our study. The data was collected between November 5, 2022, and February 15, 2023. Participation was completely voluntary and participants were allowed to discontinue their participation in the study at any time, at any stage during the study. The ethical review approval was taken from Liaquat National Hospital and Medical College's ethical review board (reference number # 0823-2022LNH-ERC).

The consent form accompanying this research included a description of the purpose, potential risks, and benefits of participation in the research. It also ensured the participants confidentiality, keeping participation entirely voluntary. We also provided a questionnaire with a total of 52 items that they were given ample time to complete to guarantee participants' anonymity. The first section of the questionnaire provides socio-demographic information (gender, age, ethnicity, year of education, GPA, and BMI), after which they are required to fill-out the perceived stress scale questionnaire (PSSQ) and the self-reported skin complaints questionnaire (SSCQ). Perceived stress scale questionnaire (PSSQ) (17): A 10 item validated questionnaire is

used to assess how much an individual’s life has been chaotic, out of their control, and overloaded over the last month on a 5 point Likert scale in various conditions 0=Never ,1=Almost Never ,2=Sometimes ,3=Fairly Often and 4=Very Often. Self-reported skin complaints questionnaire (SSCQ) A validated self-reported skin questionnaire with 10 items is used to evaluate adult skin morbidity on a 4 point Likert scale 1=No, 2=Yes, a little, 3=Yes, quite a lot and 4=Yes, very much (18). We modified the SSCQ by including two conditions (oily skin and hair greying) to see whether these conditions are prevalent among medical students.

The SPSS-22 version is used for all data analysis. The mean and standard deviation are used to represent descriptive statistics. A p-value of 0.05 or below ($P \leq 0.05$) was considered statistically significant. In order to set the PSSQ cutoff, we split the percentile values into three categories: low PS (less than 25th), moderate PS (between 25th and 75th), and high PS (over 75th). In order to analyze the means (or averages) of several groups, the results of the SSCQ are compared with the degree of stress experienced by each PS group using the chi-square test. The odds ratio is calculated to determine how likely it is for an individual with a high PS to experience skin problems compared to a person with a low PS.

RESULTS

Participants characteristic

With a total of 432 collected data, 401 (92.8%) were used for the analysis. The minimum age was 17 years, and the maximum age was 25 years (mean age: 20.94 SD 1.6). The ratio of male to female participants was 1:3, as shown in Table 1. Most responses were collected from 2nd (42.4%) and 5th (19.2%) year medical students.

Perceived stress level among medical students

We found out that out of 401 (100%) people, 15.7% (n = 63) were highly stressed and 7% (n = 28) had a low stress level. Most females were highly stressed, with a ratio of 1:6 with males. Most medical students in their 2nd year (n = 29) were in high PS. There was no statistically significant association found among students with high PS who had different sleep duration, smoking habits, fluid consumption, daily sun exposure, or BMI. Shown in Table 2.

Table 1 Represents demographic representation of population.

Characteristics	Frequencies (n)	Percentage (%)
Gender		
Male	97	24.2
Female	304	75.8
Academic standing		
1 st year	16	4
2 nd year	170	42.4
3 rd year	76	19
4 th year	61	15.2
5 th year	77	19.2

Table 2 Represent the psychological stress and demographic representation.

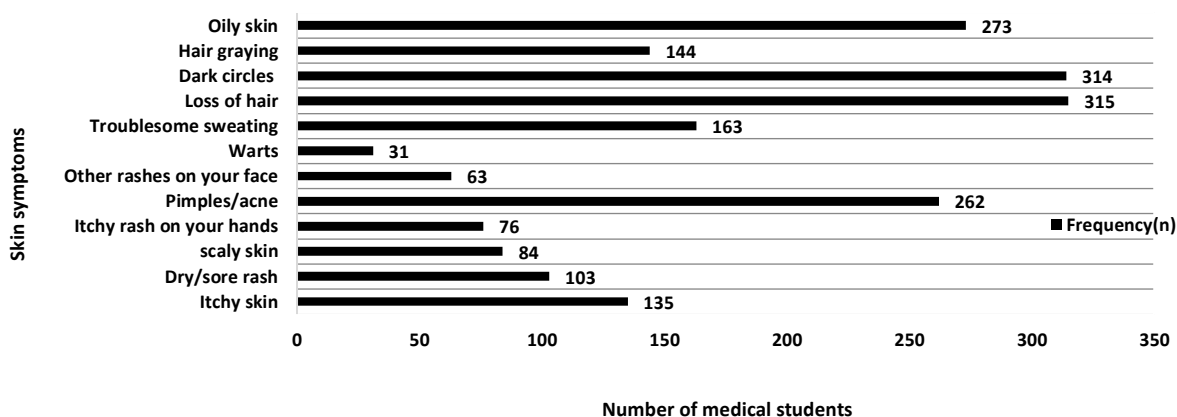
	Low stress population (n)	Moderate stress population (n)	High stress population(n)
Gender			
Males	9	79	9
Females	19	231	54
Year of medical college			
1st year	2	11	3
2nd year	11	130	29
3rd year	2	65	9
4th year	7	44	10
5th year	6	59	12
Daily Hours of sleep			
Less than 10 hours	0	15	1
More than 10 hours	28	295	62
Smoking habits			
Yes	1	25	2
No	27	285	61
Daily intake of fluid			
Less than 8 glass	26	247	56
More than 8 glass	2	63	7
Daily direct sun exposure			
Less than 20 min	19	160	24
More than 20 min	9	150	39
BMI			
Under weight	1	18	7
Normal	18	162	29
Over weight	3	57	8
Obese	1	12	1

Results measurement are shown in frequency (n)

Skin symptoms among medical students

The dermatological symptoms that were found most prevalent among medical students were loss of hair (78.6%, n = 315), followed by dark circles (78.3%, n = 314), oily skin (68.1%, n = 273), and pimples or acne (65.3%, n = 262). Whereas warts (7.7%, n = 31) and other rashes on faces (15.7%, n = 63) were the least prevalent symptoms among medical students (figure 1.3 describes the skin symptoms among medical students), Students claimed that the majority of the skin complaints occurred early in the academic year. **Graph 1** shows the prevalence of skin symptoms among medical students.

Figure 1 Graphical representation of prevalence of skin symptoms reported using SSCQ questionnaire among Medical students.



*Skin Symptoms are represented with frequencies (n)

Association between stress and skin symptoms

To determine the odds ratio, we dichotomized the perceived stress population into low and high stress groups and applied the chi-square test shown in **Table 3** and found that itchy skin on the hands ($p = 0.005$), pimples or acne ($p = 0.049$), troublesome sweating ($p = 0.04$), dark circles ($p = 0.01$), and hair graying ($p = 0.035$) were found to be statistically significant.

Table 3 Representation of Prevalent Skin Symptoms (SSCQ) with Perceived Psychological stress level (PSS)

Skin symptoms	Low to moderate stress percentage (%)	Highly stress percentage (%)	P-value	Odds ratio
Itchy skin	34	31.7	0.725	0.902
Dry/sore rash	26	23.8	0.71	0.888
scaly skin	19.5	28.6	0.105	1.648
Itchy rash on your hands	16.6	31.7	0.005*	2.342
Pimples/acne	63.3	76.2	0.049*	1.854
Other rashes on your face	16	14.3	0.452	0.877
Warts	7.7	7.9	1.00	1.034
Troublesome sweating	37.6	57.1	0.004*	2.215
Loss of hair	77.5	84.1	0.24	1.537
Dark circles	75.4	93.7	0.001*	4.801
Hair graying	33.7	47.6	0.035*	1.786
Oily skin	66.6	76.2	0.133	1.607

Note: The prevalence of perceived psychological stress among skin symptoms is represented as percentages (%), and post-test results are shown as p-values and odds ratios (*p values ≤ 0.05 are significant; p values > 0.05 are non-significant).

DISCUSSION

The study revealed a stronger association between psychological stress and skin symptoms. Higher levels of PS were associated with an increased likelihood of developing skin conditions, which raises the possibility that psychological stress might serve as an initiating factor or aggregator in the emergence of various skin disorders.

We observed a high prevalence of PS among medical students. Most of the students were found to be under moderate to high stress. While it appears that women experience higher levels of PS, our findings add further evidence that the persistent PS endured by medical students is potentially harmful to their skin's health. People who experience psychological stress are 4.8 times more likely to develop dark circles, 2.3 times more likely to develop itchy rashes, and 2.25 times more likely to experience hair loss.

Several previous studies have also reported such associations, like acne being found to be closely associated with academic stress .(19) Similarly, PS was also found to be associated with many other conditions like oily, waxy patches or flakes on the scalp, dry or sore rash, warts, pimples, itchy skin, hands itchy rash, hair loss, pulling out own hair, scaly skin, troublesome sweating, nail biting, and other rashes on the face in a study conducted in the College of Medicine, King Saud University (KSU), Riyadh, Saudi Arabia (8).

The HPA axis and the autonomic nervous system, which are components of the neuro-endocrine system, play an integral part in the genesis of skin pathology (20). The HPA axis and the autonomic nervous system are activated by PS, which causes the release of stress mediators such as hormones, neuropeptides, and cytokines.(21) Numerous immune-mediated and skin cells have receptors for these mediators.(22) A peripheral HPA axis found in the skin itself contributes to the local synthesis of chemicals linked to stress. The skin's capacity to protect itself against environmental threats can be impaired by the release of inflammatory cytokines and weakened immune responses. A Th2 immune profile is frequently associated with adaptive

immunity, which is promoted by long-term PS. The altered immune response may also cause the body to begin targeting its own proteins, a process known as autoimmunity (23,24). These mechanisms work together to cause and exacerbate dermatological problems in people who are under PS.(25)

There is a frequent association between depression, psoriasis, and atopic dermatitis (26).OCD patients were found to have skin excoriations, with trichotillomania being a common reported skin condition (27). Hyperhidrosis, alopecia, and vitiligo are found to be associated with BDD symptoms (28).Coping strategies are essential for people with skin conditions and mental health issues. Adaptive coping mechanisms, includes self-care, stress management, support, education, positive self-talk, and self-compassion, can help people with skin conditions and mental health issues cope with their condition and improve their quality of life (29,30).

This study highlights the importance of a psycho-dermatological approach when managing a dermatological condition. In order to treat both the physical and psychological elements of skin disorders, psych-dermatology combines psychological approaches into the dermatological course of treatment, improving outcomes and enhancing quality of life.

Our study highlighted the skin conditions that are prevalent in our society. For all of the components of our study (PSCQ and SSCQ), we adopted validated, standard tools and had high response rates. In order to identify any additional associations, we also studied the skin symptoms in relation to lifestyle variables.

LIMITATIONS

Skin complaints should be evaluated clinically or physically in the presence of a physician to remove self-reported biases. For better data analytics, research populations should be larger. Since our study design is cross-sectional, which only captures relationships among the variables in a single instance, there should be more studies tracking the changes over time and highlighting cause-and-effect relationships.

CONCLUSION

The study identified a relationship between perceived psychological stress and skin symptoms, out of various symptoms studied dark circles, hair loss, graying of the hair, troublesome sweating, and itching rashes on the hands were found to be statically significant. Highlights the importance of psychological evaluation in the management of dermatological conditions.

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ABBREVIATIONS

PS: Perceived stress, PSS: Perceived stress scale, SSCQ: Self-reported skin complaints questionnaire, HPA: hypothalamic-pituitary-adrenal

COMPETING INTERESTS

The authors of this study declare any competing interests.

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INSTITUTIONAL REVIEW APPROVAL

We took our institutional review approval from Liaquat National Hospital and medical College's institutional review board. With letter reference number #R.C-LNH-Med-Students-07/2022/80.

ETHICAL APPROVAL

We took our ethical review approval from Liaquat National Hospital and medical College's ethical review board. With letter reference number # 0823-2022LNH-ERC.

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