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ASSOCIATION BETWEEN PSYCHOLOGICAL STRESS AND SKIN SYMPTOMS AMONG MEDICAL STUDENTS STUDYING IN KARACHI

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ABSTRACT

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 20th September 2022 to 21st August 2023, on medical students enrolled in the MBBS programme 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. Data analysis was done on SPSS version 22, and descriptive frequencies presented as 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 analyse the data, with a mean age of 20.9 (SD =1.6). We found that 15.7% (n = 28) of the medical students were highly stressed, 77.3% (n = 310) were moderately stressed, and 7% (n = 63) were under low stress. The most common skin symptoms 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, greying of hair, troublesome sweating, and itchy rashes on the hands. Further studies and interventions should be done to assess and assist medical students.

KEYWORDS

Acne; Hair; Stress, Psychological; Students, Medical; Sweating.

INTRODUCTION

Any internal or external circumstance that threatens the homeostasis of a cell or an organism is referred to as physiological stress (PS).[1] PS is our body response to a variety of scenarios and life events in which we are confronted with something new, unexpected, or uncontrollable. Almost all biological systems are subject to stress, which is a fundamental aspect of nature. This is caused by environmental influences, self-developing stress and aging.[2] The effects on the body differ among individuals, depending on how the body reacts to stressful situations.[3] Acute stress consequences 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 severe health issues.[3,4]

Studies show medical students experience significant levels of physical health and emotional disturbances, which have 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 synaptic plasticity, expression of molecules (mRNA, 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 protective layer, 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 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 on this topic in different populations show a significant association between psychological stress and skin symptoms due to lack of literature and outdated facts regarding 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 aetiological 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 were collected from medical students of Liaquat National Medical College. The study was conducted between September 20th, 2022 to August 21st, 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 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 in 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 Mellitus), taking medication for these condition(s), and those who submitted incomplete questionnaires were excluded from our study. The data were collected between November 5, 2022, and February 15, 2023. Participation was completely voluntary and participants could discontinue their participation in the study at any stage during the study.

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 ($p \leqslant 0.05$) was considered statistically significant. In order to set the PSSQ cut-off, 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 analyse 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' characteristics

With a total of 432 participants, data from 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 (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 that among 401 students, 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 (Table 2).

Table 1
Demographic representation of sample.

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

Table 2
Psychological stress and demographic representation.

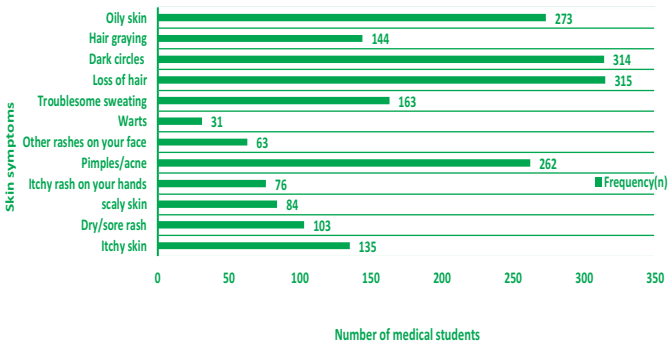
	Low stress population (n)	Moderate stress population (n)	High stress population(n)
Gender			
Males	9	79	9
Females	19	231	54
Year of medical college			
1st year	2	11	3
2nd year	11	130	29
3rd year	2	65	9
4th year	7	44	10
5th year	6	59	12
Daily Hours of sleep			
Less than 10 hours	0	15	1
More than 10 hours	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 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 reported symptoms among medical students (Figure 1 describes the skin symptoms among medical students), Students claimed that most of the skin complaints occurred early in the academic year. Figure 1 shows the prevalence of skin symptoms among medical students.

Figure 1
Graph of prevalence of skin symptoms reported using the SSCQ questionnaire among medical students.



Association between stress and skin symptoms

To determine the odds ratio, we dichotomised 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 greying (p = 0.035) were found to be statistically significant.

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 $\leqslant$ 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 under moderate to high stress. While 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 capacity to protect itself against environmental threats can be impaired by the release of inflammatory cytokines and weakened immune responses. A The 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 target 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, dark circles, hair loss, greying of the hair, troublesome sweating, and itching rashes on the hands were found to be statically significant. It also highlights the importance of psychological evaluation in the management of dermatological conditions.

ABBREVIATIONS

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

COMPETING INTERESTS

None

FUNDING

None

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ETHICAL APPROVAL

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

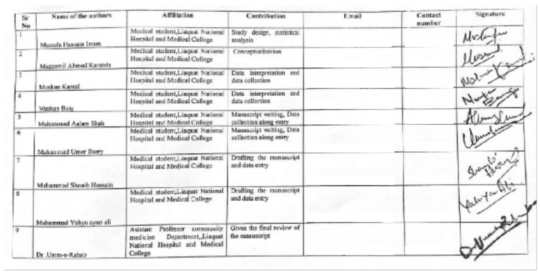
REFERENCES

1. Sharma DK. Physiology of Stress and its Management. J Med Stud Res. 2018; 1(001): 1-5.doi:10.24966/MSR-5657/100001
2. Mental Health Foundation. Stress [Internet]. 2021 [cited 2023 Aug 21]. Available from:https://www.mentalhealth.org.uk/explore-mental-health/a-z-topics/stress
3. Stephanie Watson. Common causes of Stress & Their Effect on Your Health [Internet]. WebMD;2022 [cited 2023 Aug 21]. Available from: https://www.webmd.com/balance/causes-of-stress
4. Neera Nathan M. Stress may be getting to your skin, but it's not a one-way street [Internet]. 2021[cited 2023 Aug 21]. Available from: https://www.health.harvard.edu/blog/stress-may-be-getting-to-your-skin-but-its-not-a-one-way-street-2021041422334

5. Jafri SAM, Zaidi E, Aamir IS, et al. Stress Level Comparison of Medical and Non-medical Students: A Cross Sectional Study done at Various Professional Colleges in Karachi, Pakistan. Acta Psychopathol. 2017, 3:2. doi: 10.4172/2469-6676.100080
6. Jin R, Luo L, Zheng J. The Trinity of Skin: Skin Homeostasis as a Neuro-Endocrine-Immune Organ. Life (Basel). 2022;12(5):725. doi:10.3390/life12050725
7. Law R, Clow A. Stress, the cortisol awakening response and cognitive function. Int Rev Neurobiol. 2020;150:187-217. doi:10.1016/bs.irn.2020.01.001
8. Schuurmans AAT, Nijhof KS, Cima M, Scholte R, Popma A, Otten R. Alterations of autonomic nervous system and HPA axis basal activity and reactivity to acute stress: a comparison of traumatized adolescents and healthy controls. Stress. 2021;24(6):876-887. doi:10.1080/10253890.2021.1900108
9. Bin Saif GA, Alotaibi HM, Alzolibani AA, et al. Association of psychological stress with skin symptoms among medical students. Saudi Med J. 2018;39(1):59-66. doi:10.15537/smj.2018.1.21231
10. Da Silva J, Santos D, Vilaça M, et al. Impact of Psychological Distress on Physiological Indicators of Healing Prognosis in Patients with Chronic Diabetic Foot Ulcers: A Longitudinal Study. Adv Wound Care (New Rochelle). 2023. doi:10.1089/wound.2023.0043
11. Tohid H, Shenefelt PD, Burney WA, Aqeel N. Psychodermatology: An Association of Primary Psychiatric Disorders With Skin. Rev Colomb Psiquiatr (Engl Ed). 2019;48(1):50-57. doi:10.1016/j.rcp.2017.07.002
12. Kowalewska B, Jankowiak B, Krajewska-Kułak E, Khvorik DF, Niczyporuk W. Quality of life in skin diseases as perceived by patients and nurses. Postepy Dermatol Alergol. 2020;37(6):956-961. doi:10.5114/ada.2019.86182
13. Na CH, Chung J, Simpson EL. Quality of Life and Disease Impact of Atopic Dermatitis and Psoriasis on Children and Their Families. Children (Basel). 2019;6(12):133. doi:10.3390/children6120133
14. Montero-Vílchez T, Sánchez-Díaz M, Martínez-López A, Arias-Santiago S. Quality of Life in Patients with Skin Disease and Their Cohabitants [Internet]. Health-Related Quality of Life - Measurement Tools, Predictors and Modifiers. IntechOpen; 2022. Available from: http://dx.doi.org/10.5772/intechopen.97450
15. Dean AG, Sullivan KM, Soe MM. OpenEpi epidemiologic statistics [Internet]. [cited 2023 June 30]. Available from: https://www.openepi.com/
16. Rizvi AH, Awaiz M, Ghanghro Z, Jafferi MA, Aziz S. Pre-examination stress in second year medical students in a government college. J Ayub Med Coll Abbottabad. 2010;22(2):152-155.
17. Cohen S. Perceived stress scale [Internet]. Mind garden; 1994 [cited 2024 Mar 5].Available from: https://www.mindgarden.com/documents/PerceivedStressScale.pdf
18. Dalgard F, Svensson A, Holm JØ, Sundby J. Self-reported skin complaints: validation of a questionnaire for population surveys. Br J Dermatol. 2003;149(4):794-800. doi:10.1046/j.1365- 2133.2003.05596.x
19. Sahu PK, Nayak BS, Rodrigues V, Umakanthan S. Prevalence of Psychological Distress among Undergraduate Medical Students: A Cross-Sectional Study. Int J Appl Basic Med Res.2020;10(4):270-275. doi:10.4103/ijabmr.IJABMR_100_19
20. Marek-Jozefowicz L, Czajkowski R, Borkowska A, et al. The Brain-Skin Axis in Psoriasis-Psychological, Psychiatric, Hormonal, and Dermatological Aspects. Int J Mol Sci. 2022;23(2):669. doi:10.3390/ijms23020669
21. Slominski AT, Slominski RM, Raman C, Chen JY, Athar M, Elmets C. Neuroendocrine signaling in the skin with a special focus on the epidermal neuropeptides. Am J Physiol Cell Physiol. 2022;323(6):C1757-C1776. doi:10.1152/ajpcell.00147.2022
22. Pondeljak N, Lugović-Mihić L. Stress-induced Interaction of Skin Immune Cells, Hormones, and Neurotransmitters. Clin Ther. 2020;42(5):757-770. doi:10.1016/j.clinthera.2020.03.008
23. Ferreira BR, Pio-Abreu JL, Figueiredo A, Misery L. Pruritus, Allergy and Autoimmunity: Paving the Way for an Integrated Understanding of Psychodermatological Diseases?. Front Allergy. 2021;2:688999. doi:10.3389/falgy.2021.688999
24. Woźniak E, Owczarczyk-Saczonek A, Placek W. Psychological Stress, Mast Cells, and Psoriasis-Is There Any Relationship?. Int J Mol Sci. 2021;22(24):13252. Published 2021 Dec 9. doi:10.3390/ijms222413252
25. Graubard R, Perez-Sanchez A, Katta R. Stress and Skin: An Overview of Mind Body Therapies as a Treatment Strategy in Dermatology. Dermatol Pract Concept. 2021;11(4):e2021091. doi:10.5826/dpc.1104a91

26. Mavrogiorgou P, Mersmann C, Gerlach G, Herpertz S, Juckel G. Skin Diseases in Patients with Primary Psychiatric Disorders. Psychiatry Investig. 2020;17(2):157-162. doi:10.30773/pi.2019.0193
27. Motawa SS, Fayed HR, Abdelaziz A, Elsaadouni N, Elwasify M. Prevalence of obsessive compulsive spectrum disorder in patients seeking dermatological consultation. Egypt J Psychiatr. 2020;41:97-102.
28. Schut C, Dalgard FJ, Bewley A, et al. Body dysmorphia in common skin diseases: results of an observational, cross-sectional multicentre study among dermatological outpatients in 17 European countries. Br J Dermatol. 2022;187(1):115-125. doi:10.1111/bjd.21021
29. Kanji A. Perspective on Living With a Skin Condition and its Psychological Impact: A Survey. J Patient Exp. 2019;6(1):68-71. doi:10.1177/2374373518774397
30. Clarke EN, Norman P, Thompson AR. How does self-compassion help people adjust to chronic skin conditions? A template analysis study. Front Med (Lausanne). 2022;9:974816. doi:10.3389/fmed.2022.974816

AUTHOR(S) CONTRIBUTION / UNDERTAKING FORM



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