IMPACT OF PSYCHOLOGICAL STRESS ON SKIN HEALTH IN MEDICAL STUDENT POPULATION

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Abstract

Background: Stress has long been recognized as an important factor influencing the development and worsening of skin diseases. Medical school has long been described as an environment with many stressors that can affect students' health.

This study aimed to assess the association between stress and various skin symptoms among medical students at Northern Border University, Arar, Saudi Arabia.

Subjects and Methods: This cross-sectional research was conducted to assess the association between stress and various skin symptoms among medical students at Arar, Saudi Arabia. The questionnaire included demographic data of the students, Self- Reported Skin Complaints Questionnaire and the Kessler Psychological Distress Scale

Results: A total of 234 medical students were enrolled in the study. In this study, the prevalence of stress among the students was 75.2%. Students were classified into mild stress (17.9%), moderate stress (13.7%), and severe stress (43.6%). The most frequent skin complaints were dryness of skin and oily skin (68.4% and 65.8%, respectively). Stress was significantly associated with self-reported skin complaints among the students and corelated with the number of self-reported skin complaints.

Conclusion: Our study reveals high levels of stress among medical students. Stress was strongly linked to various skin complaints among medical students. Our study reveals high levels of stress among medical students. Stress was strongly linked to various skin complaints among medical students

Keywords: Stress, skin health, medical students

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Background

Stress plays an important role in activating and the development of many diseases, triggering a cascade of physiological changes (Eckerling et al., 2021). These changes can involve the neurological, metabolic, and immune systems, which in turn can contribute to the development or exacerbation of various diseases (Alexopoulos & Chrousos, 2016).

Stress occurs when people are exposed to mental, physical, or emotional pressures. It occurs when an individual perceives that the pressure is beyond his or her ability to cope (Chen & Lyga, 2014) Medical school has long been described as an environment with many stressors that can affect students' health. These stressors include academic, psychological, social, and environmental (Abdulghani et al., 2011).

Stress plays a significant role in the onset and exacerbation of various skin diseases. The hypothalamic–pituitary–adrenal (HPA) axis, which regulates the body's stress response, can be altered by stress, leading to changes in cortisol levels and other hormones. These changes can, in turn, affect immune function and inflammatory processes, which are key in the development of many skin conditions (Cohen et al., 2016). The skin and brain are closely connected, as both originate from the ectoderm, establishing a link between skin tissues and the nervous system. This communication affects the skin's physiology, prompting the production of substances that influence the immune and nervous systems, sending signals back to the brain (Zhang et al., 2024) The Data on stress and skin symptoms disorders in Arar are currently lacking, this study was conducted to fill this gap by identifying skin complaints and their association with stress among medical students at Northern Border University, Arar, Kingdom of Saudi Arabia.

Aims and objectives

This study aimed to assess the association between stress and various skin symptoms among medical students at Northern Border University, Arar, Kingdom of Saudi Arabia.

The specific objects are as follows

1. To determine the prevalence and extent of dermatological symptoms among the medical students.
2. To evaluate the association between the different dermatological symptoms and stress.

Subjects and Method

This cross-sectional research was designed to assess the association between stress and various skin symptoms among medical students at Northern Border University, Arar, Kingdom of Saudi Arabia, during the academic year 2024/2025.

Sample size

The minimal sample size was estimated using the Raosoft® calculator, with a 5% level of significance, 5% margin of error, 95% confidence, an expected response distribution of 50%, and the number of students at the second year to internship is 600.

Study sample

A convenient sample of medical students at Northern Border University was recruited according to the following criteria:

Inclusion criteria: Medical students at Northern Border University from the second year to internship.

Exclusion criteria: Medical students in the first grade and students who declined to take part in the research.

Data Collection Tool

The questionnaire was electronically distributed among students' social media networks. The questionnaire was available between August 2024 and January 2025.

The data collection instrument for this study was a previously validated questionnaire. This questionnaire encompasses three sections: the first one captured socio-demographic data of the students, including gender, academic year, dietary habits, smoking, living conditions, faculty attendance, and GPA.

The second section is the Self-Reported Skin Complaints Questionnaire (SSCQ), which comprises very commonly reported skin symptoms in previous studies. Students' responses were scored on a five-point Likert scale as zero to 4 corresponding to never to severe (Dalgard et al., 2004). The third section is the Kessler Psychological Distress Scale (K10), which assesses stress severity experienced by students during the preceding four weeks. It consists of 10 questions about emotional states, each with a five- point Likert scale ranging from 'none of the time' to 'all of the time, and was scored from 1 to 5, respectively.

The scoring range is from a minimum of 10 to a maximum of 50 (Kessler et al., 2002). Scores of less than 20 were classified as no/undetectable stress, 20-24 as mild stress, 25-29 as moderate stress, and 30-50 as severe stress.

Ethical considerations

This study was approved by the Local committee of bioethics (HAP-09-A- 043) at Northern Border University. Decision number: (78\24\H) dated 02/06/2024.

Informed consent and the study objectives present at the beginning of questionnaire, ensuring that participants are aware of the requested

data, privacy, confidentiality, participants' right to freely accept or decline participation. This study has no risk to participants as it is questionnaire- based.

Statistical analysis

Statistical analysis was analyzed using STATA/SE version 11.2 for Windows (STATA Corporation, College Station, Texas), and MS Excel. The data were described in terms of frequency and percentage for categorical variables and mean ± standard deviation for quantitative variables. The Chi-square test ($\chi 2$) and the Fisher Exact Test (FET) were used to compare stress levels between the different study groups. Statistical significance was considered at P<0.05.

Results

A total of 234 medical students were enrolled in the study. Females accounted for 54.7%, and 50.4% and 23.1% of students were in the 5th and 6th academic years, respectively. About 53% of students reported unhealthy dietary habits and smoking was reported by 13.7%. most students were living with their families, regularly attending their classes, and had high GPA (Table 1).

Table 1. Sociodemographic characteristics of the study participants (n.=234).

Characteristics		n.	%
Gender	Female	128	54.7
	Male	106	45.3
Academic year	2nd	2	0.8
	3rd	6	2.6
	4th	34	14.5
	5th	118	50.4
	6th	54	23.1
	Internship	20	8.5
Dietary habits	Healthy	110	47.0
	Unhealthy	124	53.0
Smoking	No	202	86.3
	Yes	32	13.7
Living condition	Alone	26	11.1
	Family	192	82.0
	Room mate	16	6.8
Attendance	Irregular	32	13.7
	Regular	202	86.3
GPA	High achiever (>4)	184	78.6
	Low achiever (<4)	50	21.4

(Figure 1) Shows frequency distribution of self-reported skin complaints by studied students. The most frequent skin complaints were dryness of skin and oily skin (68.4% and 65.8%, respectively). While only a third of students reported varying degrees of excoriation and 35.9% reported tingling of skin.

Students' stress over the past 4 weeks as recorded by the Kessler psychological distress scale (K10) are demonstrated in (Figure 2). The average scale was 27.2 (±10.1). Students were classified into mild stress (17.9%; scales of 20-24), moderate stress (13.7%; scales of 25-29), and severe stress (43.6%; scales of 30-50). While 24.8% had scales <20 and were classified as no stress.

(Table 2) shows significant association between moderate and severe stress and female gender and unhealthy dietary habits (P<0.001). The highest proportion of students with low achievement had undetectable stress

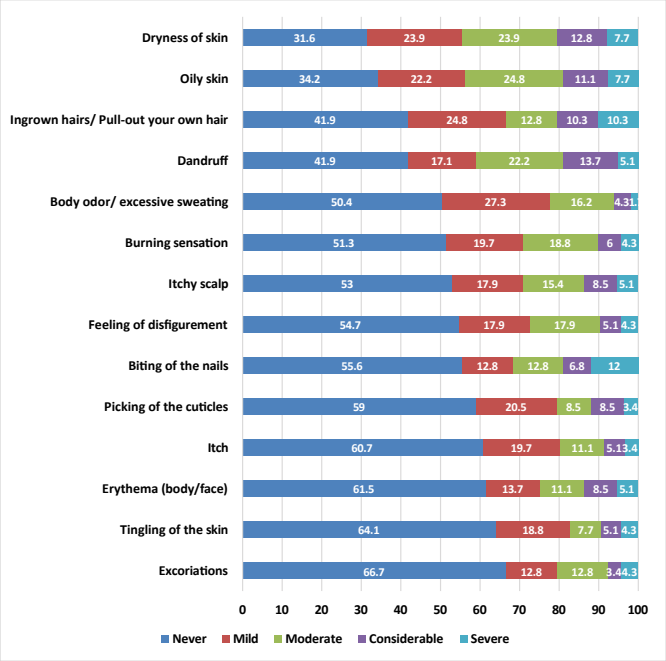


Figure 1. Self-reported skin complaints among the study participants (n.=234).

Table 2. Variations in stress level* by students' sociodemographic characteristics (n.=234).

Characteristics		No stress (n.=58)		Mild stress (n.=42)		Moderate stress (n.=32)		Severe stress (n.=102)		X^2	P
		n.	%	n.	%	n.	%	n.	%		
Gender	Female	16	27.6	18	42.9	24	75.0	70	68.6	32.89	<0.001
	Male	42	72.4	24	57.1	8	25.0	32	31.4		
Academic year	2nd	0	0.0	2	4.8	0	0.0	0	0.0	FET	0.001
	3rd	0	0.0	0	0.0	0	0.0	6	5.9		
	4th	12	20.7	4	9.5	2	6.2	16	15.7		
	5th	26	44.8	24	57.1	14	43.7	54	52.9		
	6th	10	17.2	8	19.0	14	43.7	22	21.6		
	Internship	10	17.2	4	9.5	2	6.2	4	3.9		
Dietary habits	Healthy	34	58.6	32	76.2	10	31.2	34	33.3	28.34	<0.001
	Unhealthy	24	41.4	10	23.8	22	68.7	68	66.7		
Smoking	No	52	89.7	34	80.9	26	81.2	90	88.2	FET	0.44
	Yes	6	10.3	8	19.0	6	18.7	12	11.8		
Living condition	Alone	6	10.3	8	19.0	4	12.5	8	7.8	FET	0.06
	Family	48	82.8	32	76.2	22	68.7	90	88.2		
	Room mate	4	6.9	2	4.8	6	18.7	4	3.9		
Attendance	Irregular	6	10.3	10	23.8	4	12.5	12	11.8	4.55	0.21
	Regular	52	89.7	32	76.2	28	87.5	90	88.2		
GPA	High achiever (>4)	38	65.5	36	85.7	24	75.0	86	84.3	9.40	0.02
	Low achiever (<4)	20	34.5	6	14.3	8	25.0	16	15.7		

X^2: Chi-square test, FET: Fisher Exact Test, P: Probability, statistical significance was considered at P<0.05

*The Kessler psychological distress scale (K10) scores were classified as follows: <20 wis classified as no stress, 20–24 is classified as mild stress, 25–29 as moderate stress, and 30–50 as severe stress.

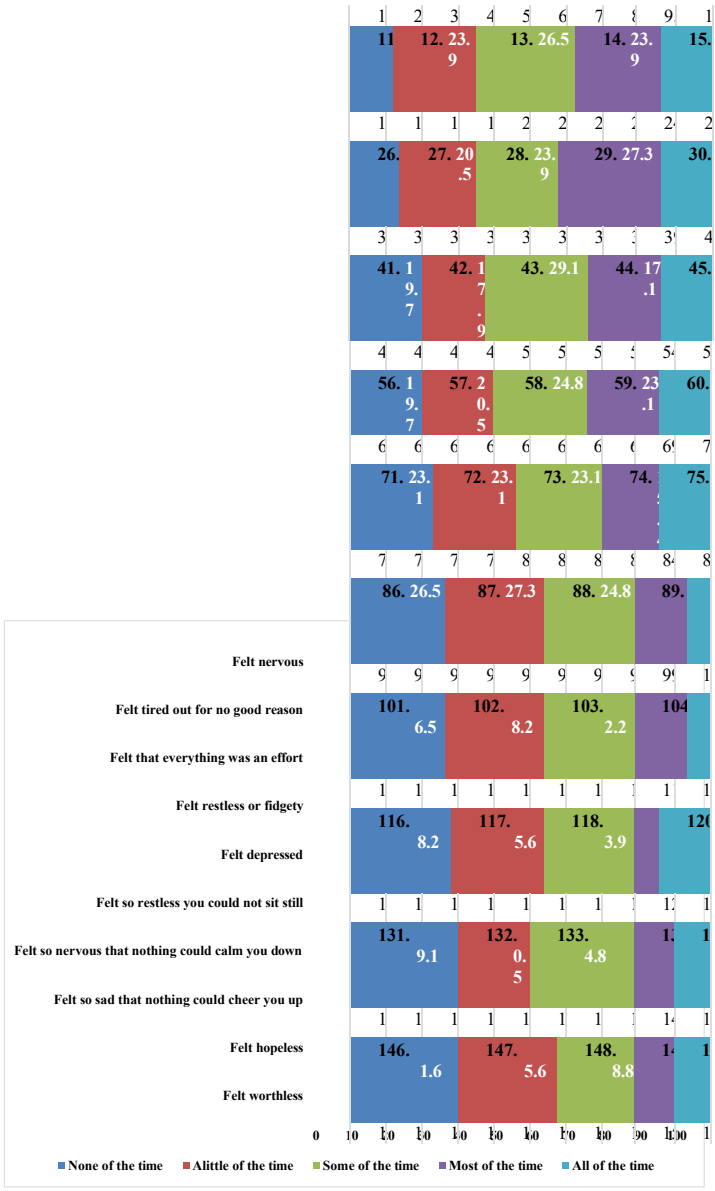


Figure 2. Students' responses to Kessler psychological distress scale (K10) (n.=234)

while stress was more frequent among high achievers (P=0.02). There were significant differences in the prevalence of stress by students' academic years (P=0.001).

X2: Chi-square test, FET: Fisher Exact Test, P: Probability, statistical significance was considered at P<0.05

(Table 3) shows relationships between stress and self-reported skin complaints among the studied medical students. Generally, stress was significantly associated with self- reported skin complaints (P<0.01). Overall, students who never had skin complaints accounted for the highest proportion of undetectable stress (24.1%) while the vast majority of those with one or more skin complaints had varying degrees of stress (P<0.001).

The number of self-reported skin complaints ranged between zero and 14 with an average of 6.7 (±4.5). The Kessler psychological distress scale was correlated with the number of self-reported skin complaints as demonstrated in Figure 3 (Spearman's rho=0.42; P<0.001).

Figure 3: Correlation between the number of self-reported skin complaints and Kessler psychological distress scale among the studied students (n.=234)

Rho: Spearman correlation coefficient; P: Probability, statistical significance was considered at P<0.05

Discussion

i. Many researches have demonstrated a significant association between psychological stress and well-being, particularly in relation to common skin disorders. Evidence shows that individuals with moderate to high stress levels have a higher prevalence of conditions such as psoriasis, eczema, acne, baldness, vitiligo, and rashes (Altalhi et al., 2023). Medical students often face academic and social stress, high demands, poor time management, and low social support, all of which can negatively impact their physical and psychological well-being (Kiupel et al., 2023).

ii. The association between psychological stress and the manifestation or exacerbation of different skin diseases is well established (Rodriguez-Vallecillo & Woodbury-Fariña, 2014)).

iii. In this study, the prevalence of stress among the students was high (75.2%). These findings agree with the findings of Abdulghani et al. (Abdulghani et al., 2011) who found the stress level among medical students was 63.7%. Moreover, many studies from other countries reported an increased level of stress among medical students(Stewart et al., 2018), (Saipanish, 2003) (Heinen et al., 2017).

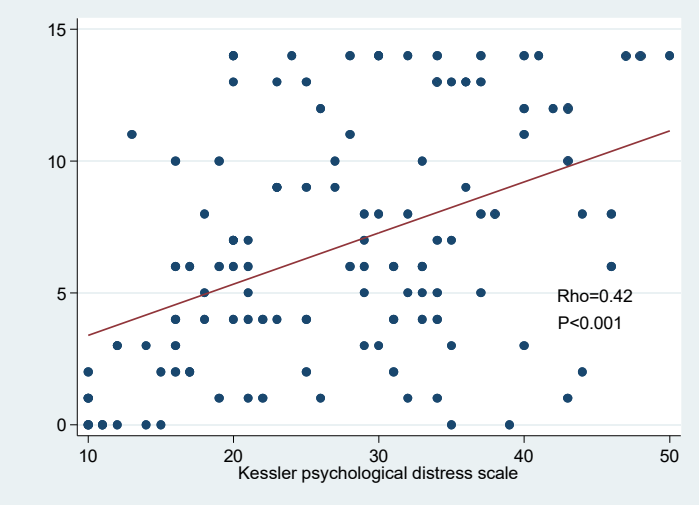
iv. The prevalence of stress in this study was higher than a study in Egypt (43.7%) (El-Gilany et al., 2008), a Malaysian study (41.9%)(Sherina et al., 2004).

Table 3. Relationships between self-reported skin complaints and stress level* among the study participants (n.=234).

Skin complaints	No stress (n.=58)		Mild stress (n.=42)		Moderate stress (n.=32)		Severe stress (n.=102)		X^2	P
	n.	%	n.	%	n.	%	n.	%		
Biting of the nails	16	27.6	24	57.1	12	37.5	52	51.0	11.81	0.008
Body odor/ excessive sweating	16	27.6	26	61.9	14	43.7	60	58.8	17.70	0.001
Burning sensation	10	17.2	16	38.1	22	68.7	66	64.7	40.47	<0.001
Dandruff	22	37.9	28	66.7	20	62.5	66	64.7	13.04	0.005
Dryness of skin	22	37.9	28	66.7	26	81.2	84	82.3	36.59	<0.001
Erythema (body/face)	8	13.8	14	33.3	18	56.2	50	49.0	24.46	<0.001
Excoriations	2	3.4	18	42.9	14	43.7	44	43.1	31.00	<0.001
Feeling of disfigurement	8	13.8	20	47.6	22	68.7	56	54.9	34.22	<0.001
Ingrown hairs/ Pull-out your own hair	22	37.9	32	76.2	16	50.0	66	64.7	18.03	<0.001
Itch	6	10.3	22	52.4	10	31.2	54	52.9	32.22	<0.001
Itchy scalp	14	24.1	20	47.6	20	62.5	56	54.9	17.82	<0.001
Oily skin	28	48.3	34	80.9	22	68.7	70	68.6	12.69	0.005
Picking of the cuticles	8	13.8	20	47.6	14	43.7	54	52.9	24.62	<0.001
Tingling of the skin	8	13.8	14	33.3	10	31.2	52	51.0	22.82	<0.001
Overall	44	75.9	42	100.0	32	100.0	98	96.1	FET	<0.001

X^2: Chi-square test, FET: Fisher Exact Test, P: Probability, statistical significance was considered at P<0.05

*The Kessler psychological distress scale (K10) scores were classified as follows: <20 wis classified as no stress, 20–24 is classified as mild stress, 25–29 as moderate stress, and 30–50 as severe stress.



a. Rho: Spearman correlation coefficient; P: Probability, statistical significance was considered at P<0.05

Figure 3. Correlation between the number of self-reported skin complaints and Kessler psychological distress scale among the studied students (n.=234)

v. Moreover, the majority of students in this study (43.6%) have severe perceived stress. Al-Ghamdi et al (AL-Ghamdi et al., 2020) and Bin Saif et al., 2018) found the majority of students have moderate levels of perceived stress. This difference could be either due to the different assessment measures used in other studies or it could be a real difference.

vi. The most reported skin complaints in this study were dryness of skin and oily skin, dandruff and pulling out own hair. Skin complaints were significantly more common among participants with high stress levels compared to those with moderate and low stress levels.

vii. Moreover, stress was significantly associated with self-reported skin complaints among the studied medical students.

viii. Recent researches have highlighted the impact of stress on skin diseases, noting significant relation, such as depression being linked to an increased risk of dermatitis and urticaria (Criado et al., 2022)

ix. Our findings supported the results of Stewart et al. (Stewart et al., 2018) and Bin seif (Bin Saif et al., 2018) which demonstrated that many skin complaints were significantly correlated with the perceived stress levels among the students.

x. Also, Bin Saif et al. (Bin Saif et al., 2018) found that the highly stressed students had multiple skin complaints more than low stressed students.

xi. In a similar study, Schut et al.(Schut et al., 2016) found that high stress levels are associated with pruritus, alopecia, oily patches on the scalp, excessive sweating, scaly skin, and itchy rash.

xii. Moreover, our results showed that the female students had a higher stress levels than males. This results supported previous studies, which show that females are more vulnerable to stress. (AL-Ghamdi et al., 2020)(Bin Saif et al., 2018)

xiii. In the current study, the fifth year students have the highest stress levels. Bin Saif et al. found that the highest levels of stress during their fourth and fifth years of medical college (Bin Saif et al., 2018)

I. Al Rasheed et al. (Al Rasheed et al., 2017) reported that stress levels increased as students progressed from the preparatory year to the fourth year, then decreased in final year students. In contrast, Schut et al. (Schut et al., 2016) found no significant association between academic years and the degree of stress.

II. AL-Ghamdi et al. (AL-Ghamdi et al., 2020) found all reported skin

symptoms were highly significant in relation to the level of stress among the students, but itchy rashes and hair pulling were not of significant correlation. Schut et al. (2016) found that high stress is correlated with itching, hair loss, oily scalp, excessive sweating, scaly skin, and itchy rash.

III. Our results are consistent with findings from other researchers who reported that many dermatological disorders are either caused or aggravated by persistent stress or are correlated with certain personality traits. Anuradha et al. (Anuradha et al., 2017) reported that the primary sources of increased stress among medical students were academic stressors, the college curriculum, fear of failure or poor test results, and a lack of leisure time.

This study was the first to investigate a wide range of skin complaints in the Northern region of Saudi Arabia. Also, this study highlights the relationship between stress encountered by medical students and their skin complaints. However, the main drawbacks were due to the cross-sectional design, which doesn't help assess causality. Also, employing self-reported skin complaints instead of clinical diagnosis may over- or under-estimate the situation. However, the Self-Reported Skin complaints questionnaire is a validated tool.

Conclusion

Our study reveals high levels of stress among medical students. Stress was strongly linked to various skin complaints among medical students.

Acknowledgment

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Recommendation

More studies are needed for stress reducing interventions for medical students.

Students should be encouraged to participate in sports and extracurricular activities, which can help reduce stress, anxiety, and burnout, as well as their impact on physical and mental health. Additionally, providing psychosocial and academic support systems is essential to alleviate students' stress.

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