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ASSESSING THE IMPACT OF PSYCHOLOGICAL STRESS ON SKIN HEALTH: A CROSS-SECTIONAL STUDY AMONG THE POPULATION OF SAUDI ARABIA

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Abstract

Introduction: The brain and skin have similar embryonic origins, suggesting a relationship between psychological stress and skin diseases. Psychological stress, characterized by negative emotional experiences and neuroendocrine responses, is known to exacerbate a variety of skin problems. Stress can affect the skin through decreased immunity, poor barrier function, and skin imbalance. While the relationship between stress and skin diseases such as psoriasis and eczema are well-established, few studies have examined this relationship in the general population in Saudi Arabia.

Objectives: The study aimed to assess the impact of psychological stress on skin health among the population in Saudi Arabia.

Methodology: From July to December 2024, a cross-sectional study was conducted in Saudi Arabia. Participants were selected from among Saudi and non-Saudi citizens residing in the Kingdom of Saudi Arabia who are at least eighteen years old via social networking sites such as Facebook, Instagram, WhatsApp, X, and Snapchat. After examining relevant studies, a structured questionnaire was created and made available in both Arabic and English. First, a pilot study was conducted with twenty participants to evaluate the comprehensiveness and clarity of the questions. Answers were entered into Microsoft Excel after data collection, and SPSS version 25 was subsequently used for statistical analysis**.**

Results: In this cross-sectional study involving 1,045 participants in Saudi Arabia, significant findings emerged regarding the impact of psychological stress on skin health. The sample, predominantly young and female (81.4%), revealed high levels of perceived stress, with 77.7% reporting moderate stress and 9.2% experiencing high stress. Notably, there was a significant prevalence of skin conditions, including acne (36.7%) and hair loss (39.6%). The analysis indicated that perceived stress levels were significantly related to age, marital status, education, and occupational status, while self-reported skin complaints correlated with marital status and treatment status, highlighting the need for targeted health interventions in this demographic. **Conclusion:** The high prevalence of dermatological conditions, particularly among younger individuals and females, highlights the need for targeted interventions that address both psychological and dermatological health

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Keywords: Saudi Arabia, Dermatology, Skin health, psychological stress.

Introduction:

The skin is the greatest and most innervated organ in the human body. It has been shown that brain and skin have similar embryonic origins, suggesting a relationship between psychological stress (PS) and skin health [1]. Moreover, psychological stress (PS) characterized by negative emotional experience that leads to a cascade of reactions in neuroendocrine and regulatory systems [2]. PS is a complex process that includes stressors, brain reactions, and physiological responses. It has been shown to worsen a variety of skin problems by impacting the neuroendocrine responses that regulate the physiology of the skin.
[3]. However, numerous harmful effects of physiological stress on the skin include: diminished epidermal innate immunity, longer wound healing, damaged permeability barrier, affected antibacterial capabilities of the epidermal protective layer, and potential negative effects on cutaneous homeostasis [4].
Heinroth coined “psychosomatic” in 1818 for mind-body influence, and Jacobi later defined “somatopsychic” for body-mind effects. Stress exacerbates psycho-physiologic dermatological disorders like psoriasis and eczema, explained by the neuro-immuno-cutaneous-endocrine model [5]. Psychological stress can negatively impact skin diseases, increasing eosinophil counts and IgE levels in atopic dermatitis patients. Relaxation can improve symptoms, indicating a significant link between mental state and skin health [6].Stress has a substantial impact on skin disorders and exacerbates long-term ailments like eczema and psoriasis. It alters the action of the hypothalamic-pituitary-adrenal (HPA) axis, which can make skin disorders worse [7].
Numerous skin conditions related to stress were reported by the Saudi public. Numerous prevalent problems with the skin, including eczema, acne, and hair loss, are linked with psychological stress [8]. In the mild-to-extremely-severe stress group, more women reported pre-aging skin symptoms; the top three were "dull skin" (43.5%. vs. 29.2%), "slow metabolic rate" (28.8% vs. 14.2%), and "rough skin" (39.3% vs. 24.1%) [9]. An estimated 27.2% of learners in medicine reported having depression or depressive symptoms, while 11.1% reported having suicidal thoughts. Psychological stress has numerous detrimental effects on the skin [10].
Our study aims to determine the association between skin symptoms and psychological stress in the general population of KSA.

Objectives:

The study set out to assess the impact of psychological stress on skin health among the population in Saudi Arabia.

Methodology:

Study design and Setting:

This cross-sectional study was carried out in Saudi Arabia from July 2024 to December 2024. based on a self- administrated questionnaire, this study evaluates the impact of psychological stress on skin health among the population of Saudi Arabia.

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Subject: Participants, recruitment and sampling procedure:
Participants adults (18 years of age and older), Saudi and non-Saudi citizens, both males and females and from various regions of Saudi Arabia. They undergo screening for medical issues, psychological stress, and pharmaceutical use.
Sample size:
Considering a confidence interval (CI) of 95% and, an anticipated frequency of 50%, The minimum target sample size is 384.
We determined the sample size using the Raosoft sample size calculator.
The formula for estimating sample size was used:
$n = P(1-P) * Z\alpha\ 2 / d\ 2$ with a 95% confidence level.
n: Calculated sample size.
Z: The z-value for the selected level of confidence (1- a) = 1.96.
P: An estimated prevalence of knowledge. Q: (1 – 0.50) = 50%, i.e., 0.50.
D: The maximum acceptable error = 0.05.
Therefore, the calculated minimum sample size was: n = (1.96)2 X 0.50 X 0.50/ (0.05) 2 = 384.
Inclusion and Exclusion criteria:
Inclusion criteria are all residents of the KSA, males and females, ages 18 years old and above, from all regions of the Kingdom of Saudi Arabia who agreed to participate in the study. Exclusion criteria are males, and females under 18 years old, outside Saudi Arabia, or who reported being diagnosed with psychiatric conditions, skin disease, hormonal imbalance disease (PCOS, Diabetes Mellitus), taking medication for these conditions, and those who refused to participate in the study.

Method for data collection, instrument and score system:
A structured questionnaire (in English and Arabic) used as a study tool. This tool was developed after consulting relevant studies conducted in Saudi Arabia and elsewhere [8,9]. However, some modifications were made to the sections on demographic data, and the self-reported skin complaints (SSCQ). The final version of the questionnaire consisted of 41 questions. 3 sections were included (Socio-demographic data, Cohen's perceived stress scale (PSS), and self-reported skin complaints questionnaire (SSCQ). The questionnaire distributed via an online platform in KSA.
Pilot test:
For the pilot study, we distributed the questionnaires to 20 individuals to fill with their feedback for simplicity and clarity in understanding the questions level before populating the questionnaires. The result of this pilot study was removed from the final analysis of the study.
Analyzes and entry method:
Data was entered into the device by using the "Microsoft Office Excel Software" Windows (2021). The obtained data was then sent to the Statistical Package of Social Science Software (SPSS) application, version 25 (IBM SPSS Statistics for Microsoft Windows, Version 25) to be statistically analyzed.

Results:

Table (1) displays various demographic parameters of the participants with a total number of (1045). Notably, the age distribution reveals a significant concentration of younger individuals, with 47.8% aged 22 or younger, highlighting a potential focus for preventive health initiatives targeting skin conditions prevalent in this demographic. Gender disparities are also evident, with females representing a substantial 81.4% of the sample, suggesting that research and interventions may need to

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cater specifically to this group's unique health needs. Most participants are Saudi nationals (97.3%), which may influence the epidemiology of skin conditions within this cultural context. Education levels reveal a highly educated population, with 74.7% possessing a bachelor's degree; this could correlate with expectations regarding health literacy and treatment adherence. Furthermore, the data indicates a high prevalence of acne (36.7%) and eczema (17.0%), underscoring significant public health considerations. The findings related to psychiatric diagnoses and hormonal imbalances also warrant further exploration, given their potential relationship with skin conditions.

Table (1): Sociodemographic characteristics of participants and history of skin conditions (n=1045)

Parameter		***No.***	***Percent (%)***
Age (Mean: 27.8, STD:10.8)	20 years or less	228	21.8
	21 to 22 years	272	26.0
	23 to 25	188	18.0
	26 to 30	77	7.4
	31 to 44	160	15.3
	45 years or more	120	11.5
Gender	Female	851	81.4
	Male	194	18.6
Nationality	Saudi	1017	97.3
	Non-Saudi	28	2.7
City	Northern Region	20	1.9
	Southern Region	482	46.1
	Central Region	233	22.3
	Eastern Region	91	8.7
	Western Region	219	21.0
Social status	Single	707	67.7
	Married	316	30.2
	Divorced	19	1.8
	Widowed	3	.3
Education level	Primary school	4	.4
	Middle school	13	1.2
	High school	216	20.7
	Bachelor's degree	781	74.7
	Postgraduate degree	31	3.0
Occupational status	Student	602	57.6
	Employee	268	25.6
	Unemployed	118	11.3
	Retired	23	2.2
	Others	34	3.3
Monthly income	< 3000	628	60.1
	3000 - 7000	134	12.8

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	7001 - 12000	100	9.6
	> 12000	183	17.5
Can you tell us about the history of your skin condition?	Psoriasis	35	3.3
	Alopecia	21	2.0
	Vitiligo	13	1.2
	Eczema	178	17.0
	Acne	383	36.7
	Seborrheic dermatitis	26	2.5
	Other	66	6.3
	None	484	46.3
You have been diagnosed with any psychiatric condition(s)	No	931	89.1
	Yes	114	10.9
You take medications for mental illness	No	976	93.4
	Yes	69	6.6
You have been diagnosed with a skin disease	No	863	82.6
	Yes	182	17.4
You take medications for skin diseases	No	915	87.6
	Yes	130	12.4
You have been diagnosed with a hormonal imbalance disease, such as PCOS or Diabetes Mellitus.	No	892	85.4
	Yes	153	14.6
You take medications for hormonal imbalance or PCOs	No	954	91.3
	Yes	91	8.7

As shown in figure 1, The data presented indicates a significant distribution of responses regarding individuals' ability to control irritation in their lives. Specifically, 111 respondents, representing approximately 10.3%, reported never managing irritation, while a substantial 202 individuals, or about 18.6%, indicated they almost never felt in control. A notable portion, constituting 383 respondents (approximately 35.4%), reported sometimes being able to manage irritation, suggesting that this is a common experience. Additionally, 240 individuals, accounting for about 22.1%, acknowledged fairly often succeeding in this regard. Lastly, 109 respondents, or roughly 10.2%, stated that they very often control their irritation.

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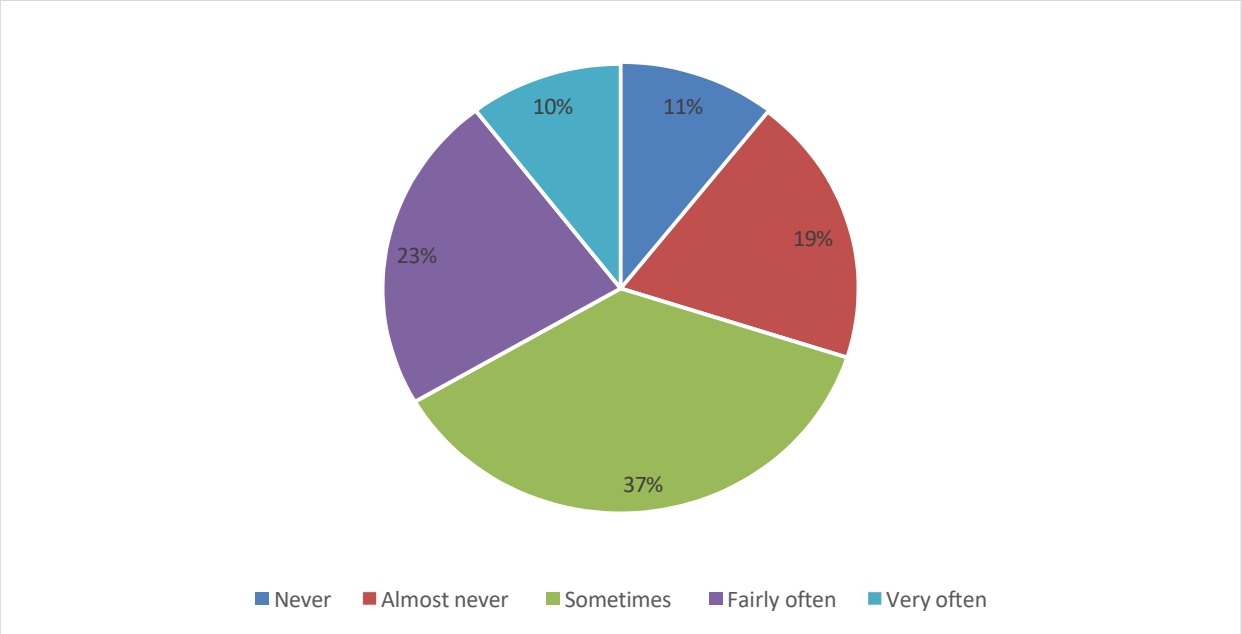
Figure (1): Controlling irritation as a stress marker among participants.



As illustrated in table (2), The data presented provides insightful reflections on the psychological perceptions of stress among a sample of 1,045 respondents, utilizing Cohen's Perceived Stress Scale (PSS). The responses reveal a significant prevalence of moderate to high perceived stress levels across various parameters, indicating that many individuals occasionally struggle with feelings of stress and lack of control. Notably, for the question regarding whether individuals felt "on top of things," a substantial 34.9% reported experiencing this sentiment sometimes, while only 12.8% indicated they felt this way very often. This pattern suggests that a large portion of the population oscillates between managing stress effectively and feeling overwhelmed. Furthermore, the data highlights that 37.5% of respondents feel nervous and stressed sometimes, emphasizing the pervasive nature of stress in their lives.

Table (2): Parameters related to Cohen's perceived stress scale (PSS) (n=1045).

Parameter		***No.***	***Percent (%)***
Have you felt that you were on top of things?	Never	102	9.8
	Almost never	180	17.2
	Sometimes	365	34.9
	Fairly often	264	25.3
	Very often	134	12.8
Have you felt that things were going your way?	Never	90	8.6
	Almost never	168	16.1
	Sometimes	399	38.2
	Fairly often	277	26.5
	Very often	111	10.6
Have you been able to control irritation in your life?	Never	111	10.6
	Almost never	202	19.3

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	Sometimes	383	36.7
	Fairly often	240	23.0
	Very often	109	10.4
Have you felt confident about your ability to handle your personal problems?	Never	89	8.5
	Almost never	166	15.9
	Sometimes	317	30.3
	Fairly often	332	31.8
	Very often	141	13.5
Have you felt nervous and stressed?	Never	123	11.8
	Almost never	185	17.7
	Sometimes	392	37.5
	Fairly often	243	23.3
	Very often	102	9.8
Have you been angered because of things that were outside your control?	Never	150	14.4
	Almost never	210	20.1
	Sometimes	394	37.7
	Fairly often	216	20.7
	Very often	75	7.2
Have you been upset because of something that happened unexpectedly?	Never	137	13.1
	Almost never	215	20.6
	Sometimes	401	38.4
	Fairly often	224	21.4
	Very often	68	6.5
Have you felt difficulties were piling up so high that you could not overcome them?	Never	191	18.3
	Almost never	284	27.2
	Sometimes	340	32.5
	Fairly often	175	16.7
	Very often	55	5.3
Have you felt that you were unable to control the important things in your life?	Never	213	20.4
	Almost never	269	25.7
	Sometimes	356	34.1
	Fairly often	149	14.3
	Very often	58	5.6
Found that you could not cope with all the things that you had to do?	Never	224	21.4
	Almost never	228	21.8
	Sometimes	385	36.8
	Fairly often	144	13.8
	Very often	64	6.1

As shown in figure (2), The data presented reveals significant insights into individuals' experiences regarding their capacity to manage various responsibilities. Specifically, 224 respondents, representing 21.3% of the total, indicated that they "Never" felt overwhelmed, while a slightly higher proportion, 228 individuals or 21.4%, reported feeling this way "Almost never." In contrast, a substantial 385 participants, accounting for 36.5%, stated they felt overwhelmed "Sometimes."

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Additionally, 144 respondents, or 13.6%, expressed feelings of being unable to cope "Fairly often," and 64 individuals, making up about 6.0%, reported this sentiment "Very often." These results suggest that a majority of the population experiences some level of stress in managing their tasks.

Figure (2): Coping with stress among participants.

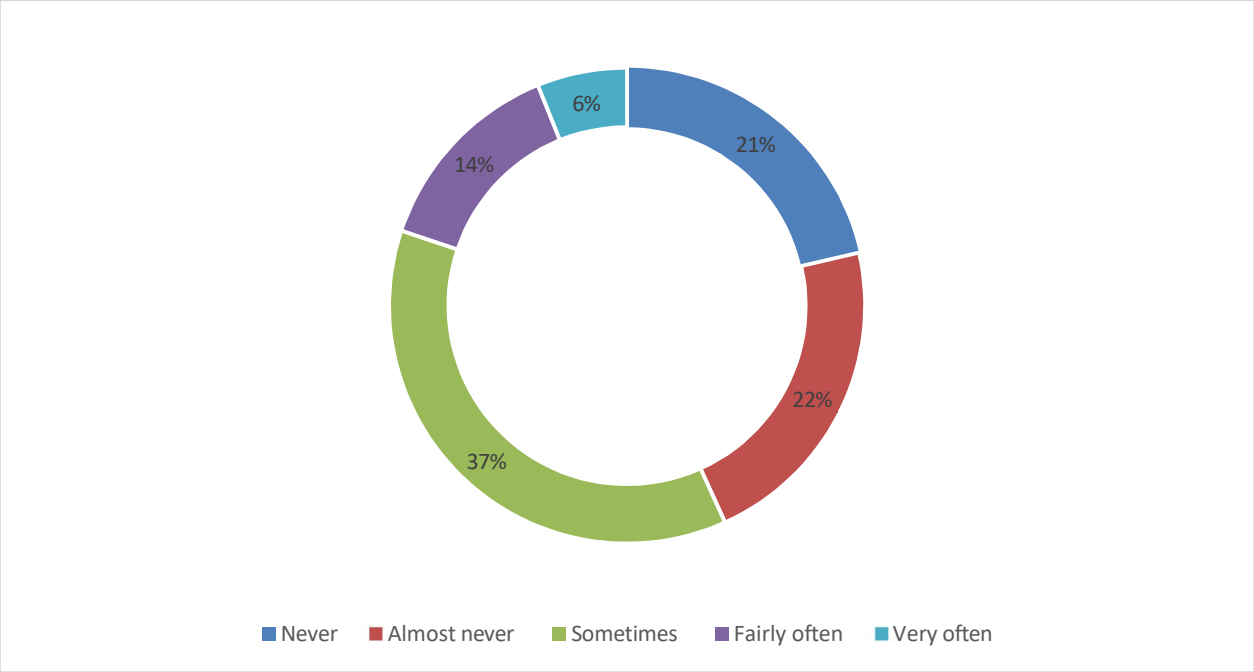

Table (3) reveals a comprehensive overview of various dermatological concerns among respondents. Notably, the prevalence of hair loss is significant, with 39.6% reporting some level of hair thinning, while 10.8% express experiencing it quite a lot, indicating potential underlying issues that merit further research. Similar patterns are observed with scalp conditions; for instance, 45.2% of participants report some degree of scaly scalp, suggesting a prevalent problem that could impact quality of life and self-esteem. Itching and inflammatory responses feature prominently as well, with 49.7% of respondents acknowledging itchy scalps, signifying the potential for associated dermatological conditions. The data also reflects a marked concern regarding skin integrity, as illustrated by 67.1% of participants reporting no issues with scaly skin, yet 32.9% indicate varying degrees of scaly skin, including 2.6% who face severe challenges.

Table (3): participants' self-reported skin complaints questionnaire (SSCQ) (n=1045).

Parameter		***No.***	***Percent (%)***
Loss of hair	No	631	60.4
	Yes, a little	249	23.8
	Yes, quite a lot	113	10.8
	Yes, very much	52	5.0
Scaly scalp	No	573	54.8
	Yes, a little	309	29.6
	Yes, quite a lot	115	11.0

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	Yes, very much	48	4.6
Itchy scalp	No	526	50.3
	Yes, a little	347	33.2
	Yes, quite a lot	121	11.6
	Yes, very much	51	4.9
Pimples	No	567	54.3
	Yes, a little	273	26.1
	Yes, quite a lot	133	12.7
	Yes, very much	72	6.9
Scaly skin	No	701	67.1
	Yes, a little	222	21.2
	Yes, quite a lot	95	9.1
	Yes, very much	27	2.6
Troublesome sweating	No	594	56.8
	Yes, a little	251	24.0
	Yes, quite a lot	128	12.2
	Yes, very much	72	6.9
Nail biting	No	716	68.5
	Yes, a little	147	14.1
	Yes, quite a lot	95	9.1
	Yes, very much	87	8.3
Skin rash on your hand	No	812	77.7
	Yes, a little	134	12.8
	Yes, quite a lot	70	6.7
	Yes, very much	29	2.8
Itchy skin	No	625	59.8
	Yes, a little	252	24.1
	Yes, quite a lot	119	11.4
	Yes, very much	49	4.7
Dry/sore rash	No	811	77.6
	Yes, a little	126	12.1
	Yes, quite a lot	72	6.9
	Yes, very much	36	3.4
Hair pulling	No	774	74.1
	Yes, a little	127	12.2
	Yes, quite a lot	84	8.0
	Yes, very much	60	5.7
Warts	No	815	78.0
	Yes, a little	153	14.6
	Yes, quite a lot	51	4.9
	Yes, very much	26	2.5
Hair shedding	No	302	28.9
	Yes, a little	304	29.1
	Yes, quite a lot	259	24.8

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	Yes, very much	180	17.2
Facial scales	No	728	69.7
	Yes, a little	204	19.5
	Yes, quite a lot	82	7.8
	Yes, very much	31	3.0
Facial rash	No	858	82.1
	Yes, a little	98	9.4
	Yes, quite a lot	70	6.7
	Yes, very much	19	1.8
Poor skin elasticity	No	786	75.2
	Yes, a little	151	14.4
	Yes, quite a lot	67	6.4
	Yes, very much	41	3.9
Dark eye circles	No	321	30.7
	Yes, a little	324	31.0
	Yes, quite a lot	212	20.3
	Yes, very much	188	18.0
Wrinkles	No	667	63.8
	Yes, a little	234	22.4
	Yes, quite a lot	84	8.0
	Yes, very much	60	5.7
Changing skin type (dry or oily)	No	627	60.0
	Yes, a little	244	23.3
	Yes, quite a lot	105	10.0
	Yes, very much	69	6.6

The data presented in Table 4 regarding Cohen's Perceived Stress Scale (PSS) scores reveals a noteworthy distribution of perceived stress levels among the surveyed population. With a total sample size of 1,045 respondents, 9.2% reported experiencing high perceived stress, indicating a relatively small subset of individuals facing significant stressors that may warrant further investigation or intervention. In contrast, a substantial majority, 77.7%, categorized themselves as experiencing moderate stress, highlighting a prevalent level of stress that could potentially impact overall well-being and quality of life. Finally, 13.1% of respondents indicated low stress levels, suggesting that while a minority of individuals may be managing stress effectively, a considerable portion of the population is situated within the moderate range.

Table (4): Shows Cohen's perceived stress scale (PSS) score results.

	Frequency	**Percent**
High perceived stress	96	9.2
Moderate stress	812	77.7
Low stress	137	13.1
Total	1045	100.0

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The data presented in Table 5, which outlines the results of the self-reported skin complaints questionnaire (SSCQ), reveals a considerable prevalence of low-level skin complaints among the surveyed population. With a striking 78.6% of respondents indicating minimal issues, it highlights a significant majority experiencing relatively few skin-related concerns. Conversely, only a marginal 2.6% reported extreme complaints, while 18.9% fell within the moderate complaint category.

Table (5): Shows self-reported skin complaints questionnaire (SSCQ) score results.

	Frequency	**Percent**
Extreme complaint	27	2.6
Moderate complaint	197	18.9
Low level of complaint	821	78.6
Total	1045	100.0

Table (6) shows that perceived stress scale has statistically significant relation to age (P value=0.0001), region (P value=0.0001), marital status (P value=0.0001), education level (P value=0.023), and occupational status (P value=0.002). It also shows statistically insignificant relation to gender, nationality, monthly income, if participants were diagnosed with skin diseases and if participants are receiving any treatment for skin diseases.

Table (6): Relation between stress level and sociodemographic characteristics.

Parameters		***Stress level***		***Total (N=1045)***	***P value****
		High or moderate stress	**Low stress**		
Gender	Female	733	118	851	0.129
		80.7%	86.1%	81.4%	
	Male	175	19	194	
		19.3%	13.9%	18.6%	
Age	20 years or less	212	16	228	0.0001
		23.3%	11.7%	21.8%	
	21 to 22 years	248	24	272	
		27.3%	17.5%	26.0%	
	23 to 25	159	29	188	
		17.5%	21.2%	18.0%	
	26 to 30	63	14	77	
		6.9%	10.2%	7.4%	
	31 to 44	125	35	160	
		13.8%	25.5%	15.3%	
	45 years or more	101	19	120	
		11.1%	13.9%	11.5%	
Nationality	Saudi	881	136	1017	0.130
		97.0%	99.3%	97.3%	
	Non-Saudi	27	1	28	
		3.0%	0.7%	2.7%	

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Region	Northern region	12	8	20	0.0001
		1.3%	5.8%	1.9%	
	Southern region	402	80	482	
		44.3%	58.4%	46.1%	
	Central region	214	19	233	
		23.6%	13.9%	22.3%	
	Eastern region	83	8	91	
		9.1%	5.8%	8.7%	
	Western region	197	22	219	
		21.7%	16.1%	21.0%	
Marital status	Single	641	66	707	0.0001
		70.6%	48.2%	67.7%	
	Married	250	66	316	
		27.5%	48.2%	30.2%	
	Divorced	14	5	19	
		1.5%	3.6%	1.8%	
	Widowed	3	0	3	
		0.3%	0.0%	0.3%	
Educational level	Primary school	3	1	4	0.023
		0.3%	0.7%	0.4%	
	Middle school	8	5	13	
		0.9%	3.6%	1.2%	
	High school	181	35	216	
		19.9%	25.5%	20.7%	
	Bachelor's degree	690	91	781	
		76.0%	66.4%	74.7%	
	Postgraduate degree	26	5	31	
		2.9%	3.6%	3.0%	
Occupational status	Student	545	57	602	0.002
		60.0%	41.6%	57.6%	
	Employee	218	50	268	
		24.0%	36.5%	25.6%	
	Unemployed	97	21	118	
		10.7%	15.3%	11.3%	
	Retired	19	4	23	
		2.1%	2.9%	2.2%	
	Others	29	5	34	
		3.2%	3.6%	3.3%	
Monthly income in SAR	< 3000	557	71	628	0.064
		61.3%	51.8%	60.1%	
	3000 - 7000	110	24	134	
		12.1%	17.5%	12.8%	
	7001 - 12000	89	11	100	
		9.8%	8.0%	9.6%	

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	> 12000	152	31	183	
		16.7%	22.6%	17.5%	
You have been diagnosed with a skin disease	No	742	107	849	0.312
		81.7%	78.1%	81.2%	
	Yes	166	30	196	
		18.3%	21.9%	18.8%	
You take medications for skin diseases	No	802	113	915	0.053
		88.3%	82.5%	87.6%	
	Yes	106	24	130	
		11.7%	17.5%	12.4%	

P value was considered significant if ≤ 0.05.

Table (7) shows that self-reported skin complaints has statistically significant relation to marital status (P value=0.023), education level (P value=0.0001), occupational status (P value=0.001), if participants were diagnosed with skin diseases (P value=0.0001) and if participants are receiving any treatment for skin diseases (P value=0.0001). It also shows statistically insignificant relation to gender, age, region, nationality, and monthly income.

Table (7): Self-reported skin complaints in association with Sociodemographic characteristics.

Parameters		***Self-reported skin complaints***		***Total (N=1045)***	***P value****
		Extreme or moderate complaint	**Low level of complaint**		
Gender	Female	186	665	851	0.487
		83.0%	81.0%	81.4%	
	Male	38	156	194	
		17.0%	19.0%	18.6%	
Age	20 years or less	44	184	228	0.236
		19.6%	22.4%	21.8%	
	21 to 22 years	61	211	272	
		27.2%	25.7%	26.0%	
	23 to 25	36	152	188	
		16.1%	18.5%	18.0%	
	26 to 30	11	66	77	
		4.9%	8.0%	7.4%	
	31 to 44	42	118	160	
		18.8%	14.4%	15.3%	
	45 years or more	30	90	120	
		13.4%	11.0%	11.5%	
Nationality	Saudi	220	797	1017	0.350
		98.2%	97.1%	97.3%	
	Non-Saudi	4	24	28	
		1.8%	2.9%	2.7%	
Region	Northern	4	16	20	0.694

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	region	1.8%	1.9%	1.9%	
	Southern region	111	371	482	
		49.6%	45.2%	46.1%	
	Central region	43	190	233	
		19.2%	23.1%	22.3%	
	Eastern region	21	70	91	
		9.4%	8.5%	8.7%	
	Western region	45	174	219	
		20.1%	21.2%	21.0%	
Marital status	Single	142	565	707	0.023
		63.4%	68.8%	67.7%	
	Married	72	244	316	
		32.1%	29.7%	30.2%	
	Divorced	8	11	19	
		3.6%	1.3%	1.8%	
	Widowed	2	1	3	
		0.9%	0.1%	0.3%	
Educational level	Primary school	0	4	4	0.0001
		0.0%	0.5%	0.4%	
	Middle school	10	3	13	
		4.5%	0.4%	1.2%	
	High school	58	158	216	
		25.9%	19.2%	20.7%	
	Bachelor's degree	150	631	781	
		67.0%	76.9%	74.7%	
	Postgraduate degree	6	25	31	
		2.7%	3.0%	3.0%	
Occupational status	Student	142	460	602	0.001
		63.4%	56.0%	57.6%	
	Employee	61	207	268	
		27.2%	25.2%	25.6%	
	Unemployed	9	109	118	
		4.0%	13.3%	11.3%	
	Retired	2	21	23	
		0.9%	2.6%	2.2%	
	Others	10	24	34	
		4.5%	2.9%	3.3%	
Monthly income in SAR	< 3000	134	494	628	0.484
		59.8%	60.2%	60.1%	
	3000 - 7000	31	103	134	
		13.8%	12.5%	12.8%	
	7001 - 12000	16	84	100	
		7.1%	10.2%	9.6%	
	> 12000	43	140	183	

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		19.2%	17.1%	17.5%	
You have been diagnosed with a skin disease	No	150	699	849	0.0001
		67.0%	85.1%	81.2%	
	Yes	74	122	196	
		33.0%	14.9%	18.8%	
You take medications for skin diseases	No	165	750	915	0.0001
		73.7%	91.4%	87.6%	
	Yes	59	71	130	
		26.3%	8.6%	12.4%	

P value was considered significant if ≤ 0.05.

Discussion:

The present study aimed to assess the impact of psychological stress on skin health among the population of Saudi Arabia, utilizing a cross-sectional design with a sample size of 1,045 participants. The findings revealed a significant association between psychological stress and various dermatological conditions, particularly among younger individuals and females. This discussion contextualize these findings within the existing literature, highlight the implications for public health, and address the limitations of the study.

Psychological stress has been increasingly recognized as a significant factor influencing skin health. The results of this study align with previous research indicating that stress can exacerbate dermatological conditions such as acne and eczema [11,12]. For instance, a study by Alshahwan demonstrated a high prevalence of anxiety and depression among dermatology patients in Saudi Arabia, suggesting a strong link between psychological distress and skin disorders [11]. Furthermore, the findings of this study, which reported that 36.7% of participants experienced acne and 17.0% reported eczema, echo the global burden of skin diseases highlighted by Hay et al., who noted that skin conditions are among the most prevalent health issues worldwide [13]. This correlation underscores the necessity of integrating psychological assessments into dermatological care, as untreated psychological stress may lead to worsening skin conditions and overall health deterioration.

The demographic analysis of our study revealed that a significant portion of participants were young adults, with 47.8% aged 22 or younger. This finding is particularly relevant given that younger populations are often more susceptible to psychological stress due to various factors, including academic pressures and social media influences [14, 15]. The relationship between stress and skin health in younger demographics has been supported by other studies, which found that young adults frequently report higher levels of stress and associated skin issues, such as acne [15,16]. Additionally, the predominance of female participants (81.4%) in our study aligns with findings from other studies indicating that women are more likely to experience psychological stress and its dermatological manifestations [11,12].

Moreover, the study's results indicated that 37.5% of respondents experienced feelings of nervousness and stress occasionally, highlighting the pervasive nature of psychological stress in the population. This finding is consistent with the work of Evers et al., who noted that stress can significantly affect the skin through mechanisms such as the activation of the hypothalamic-pituitary-adrenal (HPA) axis, leading to increased cortisol levels and subsequent skin inflammation [17,18]. The implications of these findings are profound, as they suggest that addressing psychological stress could be a critical

component of managing skin health, particularly in populations vulnerable to stress-related skin disorders.

The self-reported skin complaints questionnaire (SSCQ) revealed that 78.6% of respondents experienced minimal skin-related issues, yet the significant prevalence of conditions such as hair thinning (39.6%) and itchy scalps (49.7%) indicates that even minor complaints can have substantial impacts on quality of life and self-esteem [11,19]. This aligns with the findings of Pärna et al., who demonstrated that chronic skin conditions are often associated with emotional distress and reduced quality of life [16]. The psychological impact of dermatological conditions cannot be overstated, as they can lead to social withdrawal and decreased self-worth, further perpetuating the cycle of stress and skin health deterioration [20].

Despite the robust findings of this study, several limitations must be acknowledged. First, the cross-sectional design limits the ability to establish causality between psychological stress and skin health. Longitudinal studies would be beneficial to elucidate the temporal relationship between these variables. Additionally, the reliance on self-reported measures for both psychological stress and skin complaints may introduce bias, as participants may underreport or overreport their symptoms based on social desirability or lack of awareness [21,22]. Furthermore, the study's sample was predominantly composed of Saudi nationals, which may limit the generalizability of the findings to other populations with different cultural and socio-economic backgrounds.

Another limitation is the potential for confounding factors that were not controlled for in the analysis. Variables such as lifestyle factors, dietary habits, and environmental exposures could significantly influence both psychological stress and skin health but were not assessed in this study [23,24]. Future research should aim to incorporate a more comprehensive set of variables to better understand the multifaceted relationship between psychological stress and skin health.

Conclusion:

The findings of this study underscore the critical relationship between psychological stress and skin health among the population of Saudi Arabia. The high prevalence of dermatological conditions, particularly among younger individuals and females, highlights the need for targeted interventions that address both psychological and dermatological health. Integrating mental health support into dermatological care could improve patient outcomes and enhance the overall quality of life for individuals suffering from stress-related skin disorders. Further research is warranted to explore the underlying mechanisms of this relationship and to develop effective strategies for prevention and management.

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Ethical approval:

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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There was no external funding for this study.

Conflict of interests:

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

Data and materials availability:

All data associated with this study are present in the paper.

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