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Original Articles

Awareness of the Effect of Environmental Factors on Skin Among Students at Jouf University, Saudi Arabia

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Summary

Background: Skin health is fundamental to all age groups, particularly the youth. **Aim:** To investigate the level of awareness of university students about the effects of environmental factors on the skin and to examine their skin care practices. **Method:** An online questionnaire was distrubuted to all students attending Jouf University. **Results:** 506 students agreed to participate in the study. There was high participation from the health sector colleges (56.7%), and 82.4% and 80.4% of participants, respectively, agreed that pesticides and detergents could harm the skin. Only 50.4% believed that stress affects skin sensitivity. For skin protection, 85.57% chose the use of sunscreen. More than 50% of participants have positive attitudes towards the importance of skin care and follow good practices, while 72.3% have satisfactory knowledge (3.25 out of 4). However, only 40.5% reached the high practice level (27.67 out of 44). There was a significant association between female gender and the use of sunscreen ($p < 0.001$). Nonetheless, nearly 40% of participants do not care for their skin regularly. **Conclusion:** There is a good level of awareness among university students regarding the effect of environment factors on skin; however, this level remains unsatisfactory considering the importance of this issue. Educational campaigns are required to improve skin care practices among the youth.

Keywords: Environmental Exposure, Health Knowledge Attitudes Practice, Health Promotion, Saudia Arabia, Skin Care, Skin Diseases, Students, Sunscreening Agents, Ultraviolet Rays, Universities.

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INTRODUCTION

Skin is the body's first line of defence and a host to various microbes of the normal flora [1]. Exposure to harsh environmental factors and pollutants disrupts the epithelial layer of the stratum corneum (SC) of the skin, resulting in the loss of the skin's hydration and integrity [2-6]. The sun's ultraviolet (UV) rays are one such culprit, as they stimulate the release of various cytokines which results in acute inflammation (sunburn), pigmentation, photo-aging, and erythema. UV rays are considered lethal to the skin [2,3], with chronic exposure to UV radiation causing degeneration of collagen fibres, acceleration of the aging process, wrinkles, susceptibility to various skin issues, and even skin cancer [2]. In addition to sun damage, oxidation caused by air pollutants and changing humidity levels causes damage to skin by altering its hydration. Low humidity leads to dryness, while high moisture levels generally cause excessive sweating [4].

Several studies have proved that environmental factors and psychological stress associated with urbanisation and industrialisation have deleterious effects on the integrity of the skin's epithelial barrier [7-9]. Environmental factors disrupt the barrier's integrity by degrading proteins at intercellular junctions, activating cytokines (IL-25, IL-33, and thymic stromal lymphopoietin), augmenting the permeability, and aggravating the immune reaction. This leads to numerous chronic illnesses and allergies [7]. In addition, sun exposure has been shown to enhance IL-1ra/IL-1α, BCL2-associated protein X (Bax), and tumour necrosis factor [TNF]-α in the SC, while the application of sunscreen led to a marked decrease in their levels [2].

Pujos M et al. (2025) researched the effect of psychological stress on skin aging markers, and noted that high levels of stress hormones, mainly cortisol and epinephrine, cause a marked decrease in fibroblast growth factor 7 and an increase in DNA damage, leading to impaired skin texture, slow wound healing, and reduced proteins (filaggrin, loricin) involved in the maintenance of skin barrier functions [9].

Caring for the skin's integrity and elasticity should be a fundamental daily practice. This is achievable by using products that protect against harmful UV rays, and following a balanced diet and a healthy lifestyle to avoid skin diseases [5]. While the regular application of skin care products is universal, their effects on skin health are still unclear to a large proportion of the community [1]. It is essential to increase public awareness of the importance of skin health and how it can be achieved; however, the awareness and practices of the community should first be evaluated in order to design the appropriate educational program.

Few studies in northern Saudi Arabia have examined the intersection of environmental awareness and skin care practices among university students. Thus, the current study aims to evaluate awareness levels among Jouf University students regarding the effects of environmental factors on skin health, and to determine their skin care practices.

RESEARCH METHODOLOGY

Study Design and Setting

This was a cross-sectional study that utilised an online questionnaire distributed to all students at Jouf University, Saudi Arabia, through social media and WhatsApp groups.

Sample Size

The sample size was calculated using an online tool (Calculator.net). Based on a 95% confidence level and a 5% margin of error, the required sample size was determined to be 385 participants. To avoid bias, the study enrolled 506 students. Postgraduate students were excluded, and convenience sampling was used.

Data Collection Tool

The study used a self-constructed questionnaire to assess awareness, attitudes, and practices surrounding skin care. It was reviewed by a panel

of 5–7 experts in the fields of infection prevention and control and public health, to ensure content validity and clarity. The survey was prepared in English and translated into Arabic using forward–backward translation, and language accuracy was verified by bilingual experts. A pilot study was conducted among approximately 10% of the total sample (n=50 out of 506) to assess clarity and usability; reliability was evaluated using Cronbach's alpha (=0.83). Minor wording and formatting modifications were made based on feedback, and pilot data were excluded from the final analysis. Factor analysis was done, and some items were removed to finalise the tool for use. The questionnaire comprises four sections: Section 1, a short brief on the research and consent to participate in the study; Section 2, covering sociodemographic data (such as age, marital status, residence, and college); Section 3, questions assessing participants' knowledge of skin health, based on a 3-point Likert scale (Disagree, Do not know, Agree); and Section 4, fourteen questions related to attitudes and practices, using a 5-point Likert scale (Never, Seldom, Sometimes, Most of the time, Always). The total KAP scores were calculated, and participants were categorised into low, moderate, and high levels based on the ≥ 70% threshold for the maximum score in each domain.

Statistical Analysis

The data were analysed using IBM SPSS software (Version 23). Categorical data were summarised as numbers and percentages. A chi-square test was used to examine the association between sociodemographic variables and the categorised KAP levels, with a p-value <0.05 considered statistically significant. No missing responses were recorded.

Ethical Approval

The research proposal was approved by the Ethics Committee of Jouf University (No. 6-10-45, dated 28 May 2024), and informed consent was obtained from each subject (participants gave their consent by selecting the agreement option before starting the questionnaire).

RESULTS

Sociodemographic Data

The pilot study was conducted among 50 students; participants reported that the questionnaire was clear, understandable, and required about 2 minutes to complete. The current study enrolled 506 students, with considerable participation from 12 colleges at Jouf University, particularly the health sector colleges (56.7%) (Table 1).

Table 1. Participants' Sociodemographic Data

Demographic Data		Number (Total 506)	Percent
Gender	Female	379	74.9%
	Male	127	25.1%
Age (years)	18–20 years	232	45.8%
	21–30 years	274	54.2%
College/ Faculty	Applied Medical Sciences	42	8.3%
	Computer Science	62	12.3%
	Dentistry	30	5.9%
	Education	44	8.7%
	Engineering	28	5.5%
	Faculty of Business	8	1.6%
	Law and Sharia Faculty	10	2.0%
	Medicine & Surgery	108	21.3%
	Nursing	49	9.7%
	Pharmacy	55	10.9%
	Physiotherapy	3	0.6%
	Science	57	11.3%
Marital status	Single	388	76.7%
	Married	95	18.8%

	Divorced	16	3.2%
	Widow	7	1.4%
City of residence	*Dumat Al-Jandal*	72	14.2%
	Qurayyat	80	15.8%
	Sakaka	354	70.0%

Knowledge of Skin Health

The survey results revealed that 82.4% (417/506) and 80.4% (407/506) of participants, respectively, agreed that pesticides and detergents have harmful effects on the skin. However, 50.4% (255/506) believed that stress affects skin sensitivity. 70.8% (358/506) agreed that the sun's rays are beneficial to skin health except during the afternoon. Regarding potential contributing factors that affect skin health, 83.79% (424/506) chose weather changes, and for measures used to protect the skin, 85.57% (433/506) chose the use of sunscreen. Concerning symptoms related to skin diseases, the most selected was itching, followed by discoloration, redness, and thinning of the skin, respectively (Table 2).

Attitudes and Practices Regarding Skin Care

Evaluation of the participants' attitudes and practices showed that more than 50% have positive attitudes towards the importance of skin care and follow good practices. Regarding the frequency of use of protective measures, 70%, 63.4%, and 72.7% of participants use sunscreen, wear glasses, and use moisturising creams, respectively. Nonetheless, nearly 40% of participants do not care for their skin regularly (Table 3).

Knowledge, Attitude, and Practice (KAP) Scoring

The mean knowledge score was 3.25 ± 0.94 out of a maximum of 4, equivalent to 81.3% of the maximum possible score. This reflects a generally high level of awareness. Conversely, the mean practice score was 27.67± 8.16 out of a maximum of 44, corresponding to 62.9% of the maximum. This lower percentage highlights a notable gap between knowledge and implementation of care (Table 4). A statistically significant association was found between female gender and the use of sunscreen (Table 5).

Table 2. Participants' knowledge regarding skin health

Questions	Answers	Number (Total 506)	Percent
Are the sun's rays beneficial to skin health?	Agree	358	70.8%
	Disagree	105	20.8%
	Do not know/Neutral	43	8.5%
Stress does not affect skin sensitivity.	Agree	185	36.6%
	Disagree	255	50.4%
	Do not know/Neutral	66	13.0%
Are pesticides harmful to the skin?	Agree	417	82.4%
	Disagree	56	11.1%
	Do not know/Neutral	33	6.5%
Is using a detergent without gloves harmful?	Agree	407	80.4%
	Disagree	51	10.1%
	Do not know/Neutral	48	9.5%
When are the sun's rays most harmful?	In the morning	85	16.8%
	Midday-afternoon	272	53.8%
	Afternoon	149	29.4%
What are the potential contributing factors that affect skin health? (choosing more than one answer was allowed)	Tension and nervousness	397	78.46%
	Weather changes	424	83.79%
	Eating spicy food	282	55.73%
	Nothing	48	9.5%
	Use of sunscreen	433	85.57%

What are the measures used to protect the skin? (choosing more than one answer was allowed)	Wearing a hat	321	63.44%
	Wearing gloves	329	65.02%
	Wearing sunglasses	280	55.34%
What are the symptoms related to skin diseases? (choosing more than one answer was allowed)	Discolouration	386	76.28%
	Thinning of the skin	334	66.01%
	Redness	348	68.77%
	Itching	399	78.85%

Table 3. Participants' attitudes and practices regarding skin care

Attitudes and practices towards skin care	Always	Most of the time	Sometimes	Seldom	Never
Wear glasses	33.4%	30.2%	20.6%	10.3%	5.5%
Use sunscreen	41.5%	28.9%	18.2%	8.5%	2.9%
Wear a sun hat	20.3%	20%	21.3%	18.8%	19.6%
Use moisturising creams	47.8%	24.9%	20%	1.4%	5.9%
Wear protective clothing	32.8%	27.8%	35.2%	1%	3.2%
Eat fresh fruits and vegetables	29.8%	26.3%	38%	2.7%	3.2%
Drink 6 to 8 glasses of water every day	26.1%	27.7%	41.3%	1%	3.9%
Do 150 minutes of exercise per week	25.3%	23.7%	40.2%	2.8%	8%
Visit a doctor if a skin problem is noticed	36.5%	23.3%	36%	1.1%	3.1%
Cover skin in winter	34.6%	25.7%	32.8%	1.9%	5%
Use protective equipment when using pesticides	48%	23.5%	22.1%	1.1%	5.3%

Table 4. Distribution of knowledge and practice levels

Level	Knowledge (N=506)	Practice (N=506)
High (> 70% score)	366 (72.3%)	205 (40.5%)
Moderate (60-70%)	68 (13.4%)	182 (35.9%)
Low (< 60%)	72 (14.2%)	119 (23.5%)

Table 5. Association between key demographic variables and KAP levels

Variable	Outcome	χ^2	*p*-value
Gender	Knowledge level	1.95 (2)	0.377
Gender	Practice level	104.91 (2)	<0.001*
College sector (health/non-health)	Practice level	2.22 (2)	0.329

χ^2: chi-square test. * significance level < 0.05

DISCUSSION

Our results revealed that 82.4% and 80.4% of participants, respectively, agreed that pesticides and detergents have harmful effects on the skin. However, only 50.4% believed that stress affects skin sensitivity. Notably, the impact of environmental exposure and psychological stress

linked to urbanisation and industrialisation has potentially deleterious effects on the skin and epithelial barriers [7,9].

Moreover, 70.8% of participants agreed that the sun's rays are beneficial to skin health except during the afternoon. While 85.57% selected the use of sunscreen as the best skin protection measure, only 70.4% use sunscreen regularly (responded as Always and Most of the time). This illustrates a gap between awareness (85.57%) and actual practice (70.4%). Concerning symptoms related to skin diseases, participants selected itching, discoloration, redness, and thinning of the skin, respectively. Knowledge, Attitude, and Practice (KAP) scoring revealed a mean knowledge score of 3.25 (Max 4), with 72.3% of students having high knowledge. This aligns with Alsharif et al, who reported good knowledge of skin care among the Saudi population, and especially among females [10].

It is worth noting that there is a considerable participation from those in the health sector colleges (56.7%). In addition, females represented 74.9% of participants. This is in agreement with studies by Alsharif et al [10], Al Dhafiri et al [11], Assiri et al [12], and Bahashwan [13], in which most of the participants were female. AlJasser et al found that females were ten times more likely than males to use sunscreen [14]. This reflects their higher interest in skin care than that of males, their desire to keep up to date on the subject of skin care, and the social standards that apply to them.

Regarding practices and attitudes, more than 50% of participants had positive attitudes towards skin care practices; specifically, 70% used sunscreen, 63.4% wore sunglasses, and 72.7% applied moisturisers. However, about 40% reported that they did not maintain regular skin care routines. This may be due to ignorance of the consequences of neglecting skin care. KAP scoring showed a mean practice score of 27.67 (Max 44), with only 40.5% reaching the high practice level. Statistical analysis revealed a statistically significant association between female gender and good practice. This aligned with a study by AlJasser et al, who reported that females are more compliant with the use of sunscreen [14].

Similar findings have been reported globally [14-16]. In Spain, Iglesias-Puzas et al reported that nursing students had strong knowledge of the risks of sun exposure but showed low adherence to protective practices [15]. In Saudi Arabia, AlJasser et al reported that many participants failed to reapply sunscreen regularly [14], while Bahashwan reported that although 74% of Saudi adults used sunscreen, only 16% applied it consistently [13]. Similarly, Assiri et al found that although over half of the Jazan population had good knowledge about sun protection, only 12.83% used sunscreen regularly. The most common obstacles were allergic reactions and uncomfortable textures [12]. Thus, promoting sunscreens that are safe for all skin types and with suitable textures would positively influence their use [11].

There is an urgent need to correct many false beliefs and practices regarding skin care. Almudimeegh A et al reported a significant impact of online platforms on skin care and cosmetic procedures, mostly among the female population [16].

The current study's results highlight the importance of dispelling myths and promoting good skin care practices. Education campaigns should be a key step towards ensuring young adults are more informed about protective practices, and promoting good skin habits.

Finally, the results presented in the discussion above indicate a significant knowledge-practice gap, reiterating the importance of implementing health education programs to improve awareness regarding skin care practices.

The main limitation of the current study is that data were collected from only one university, and male participation was lower than expected. The higher proportion of female participants may have been due to their greater interest in the topic; male perceptions remain a topic for exploration. To

widen the scope of the research, it is recommended that further studies include all regions in Saudi Arabia.

CONCLUSION

There is a good level of awareness among Jouf University students about the harmful effects of environmental factors on skin health. However, the level of skin care practices remains unsatisfactory, emphasising the need to bridge the gap between knowledge and practice, and implement skin care routines in the lives of young adults. Educational campaigns are essential to increase such practices.

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