



A Questionnaire Based Assessment of Sensitive Skin among Undergraduate Medical Students in A Tertiary Care Institute: A Cross-Sectional Study

¹Dr P Suraksha, MD, Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

²Dr Girish PN, HOD, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

³Dr Delgeena Devis Edakalathur, MD, Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

⁴Dr Padma Kalladan, MD, Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

⁵Dr Rithvik M Hegde, MD, Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

Corresponding Author: Dr P Suraksha, MD, Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

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Abstract

Introduction: Sensitive skin is a commonly encountered dermatological condition that significantly impacts the quality of life for a substantial portion of the population. It is primarily characterised by subjective symptoms such as itching, stinging, burning, or tightness. Despite its prevalence, there is a lack of standardised tools for assessing sensitive skin, leading to challenges in diagnosis, treatment and research.

Objectives: To assess the prevalence, perception, knowledge of sensitive skin among undergraduate medical students and to identify the triggers causing sensitive skin using a questionnaire.

Materials and Methods: This is a cross-sectional, hospital-based study conducted over a period of one month including 63 undergraduate medical students aged above 18 years at AJ Institute of Medical Sciences and Research centre, Mangalore. Responses for assessment of sensitive skin were collected via digital questionnaire

which were structured using Likert scales, open-ended questions, and categorical choices and statistically analysed using percentage, mean, standard deviation and chi square test.

Results: The final analysis had 63 respondents. Redness emerged as the most prevalent sensitive skin symptom, with 30.1% of respondents acknowledging it. Dryness was reported by 22.2% of participants. Among the participants who perceived sensitive skin symptoms (75.3%), only 20.3% had good perception whereas 55% of them had poor perception of symptoms. 44% of participants demonstrated limited understanding of sensitive skin triggers. However, there was no significant difference in prevalence, knowledge and perception of sensitive skin between males and females.

Conclusion: This study highlights the prevalence and perception of sensitive skin symptoms among undergraduate medical students, with redness and dryness being the most common symptoms.

Despite a high number of students perceiving sensitive skin symptoms, a significant proportion had a poor perception and limited understanding of the triggers. Notably, there were no significant differences in the prevalence, knowledge, and perception of sensitive skin between male and female students. These findings underscore the need for improved education on sensitive skin and its management.

Keywords: Sensitive skin, Skin health knowledge, Redness, dryness, Sensitive skin triggers.

Introduction

Sensitive skin or reactive skin is defined, in the words of the special interest group of the International Forum for the Study of Itch (IFSI), as "a syndrome defined by the occurrence of unpleasant sensations (stinging, burning, pain, pruritus, and tingling sensations) in response to

stimuli that normally should not provoke such sensations".

These unpleasant sensations cannot be explained by lesions that are attributable to any skin disease. The skin can appear normal or be accompanied by erythema. Sensitive skin can affect all body locations, especially the face. This condition may be very distressing and have a significant impact on the quality of life. (1)

Sensitive skin can also be defined in both subjective form and objective terms. Subjective perceptions (stinging, burning, pruritus, and tightness) of sensitive skin are noticed immediately following application of cosmetic product or it can be delayed by minutes, hours, or days. Objective perceptions of sensitive skin are based on physician evaluation and includes the entire range of cutaneous reactions. (2)

The etiology of sensitive skin is, or the underlying causes and mechanisms that contribute to its development is multifactorial and can vary among individuals. The exact etiology is not completely understood, but several factors have been identified as potential contributors to sensitive skin.

Host factors like Age and gender have a role to play. Skin of younger adult is more sensitive than that of elderly (3) Those over 50 years were more likely to perceive genital skin to be more sensitive. (5) Females are more prone to sensitive skin, and also women seem to self-report sensitive skin more often than men. This could be due to greater thickness of epidermis in males and hormonal difference that produce increased inflammatory sensitivity in females. (6) Hormonal status: Promotes sensitive skin (7) Ethnicity also influences the prevalence of sensitive skin. Asians report sensory irritation more often than Caucasians (4) Anatomical site wise face is the most common site of

sensitive skin probably due to number of products used on the face, a thinner barrier, and maximum number of nerve endings. Nasolabial fold is the most sensitive region in the face followed by malar eminence, chin, forehead, and upper lip. (8)

Environmental triggers include temperature extremes (hot or cold), wind, sun exposure, air pollution, harsh chemicals, fragrances and certain fabrics.

Disruption or dysfunction of the skin barrier is considered a significant factor in sensitive skin.

A compromised barrier allows irritants, allergens, and other substances to penetrate the skin more easily, which triggers inflammatory responses and sensitivity reactions. Moreover, the declined barrier function in sensitive skin has already been reported as the result of an imbalance of intercellular lipid of stratum corneum. (9)

Other dermatological conditions: Atopy has been linked to the phenomenon of sensitive skin. Atopic dermatitis, rosacea, contact dermatitis are known to be associated with sensitive skin. (10)

While the specific characteristics of sensitive skin can vary among individuals, some common features and symptoms are:

Sensations such as itching, tingling, stinging, burning, or tightness. These sensations can occur spontaneously or in response to triggers like temperature changes, certain skincare products, or environmental factors. (11)

The high incidence and complex nature of sensitive skin represents a challenge for an increasing demand for managing this condition. (12)

This questionnaire-based assessment of sensitive skin would be crucial for capturing subjective experiences, obtaining comprehensive data, prioritising patient centered outcomes.

Aims and objectives

1. To evaluate the prevalence of Sensitive skin among the undergraduate Medical Students.
2. To assess and evaluate relation of various triggering factors causing symptoms of sensitive skin.
3. To assess knowledge and perception of sensitive skin among undergraduate Medical Students.

Materials and methods

Source of data: This is hospital based study conducted via digital questionnaire at AJ Institute of Medical Sciences, Mangalore.

Institutional ethics committee permission was obtained prior to the start of the study. Informed consent was obtained from all the participants.

Study design: Cross sectional study

Study duration: 1 month (August 2023)

Sampling technique: Convenient sampling

Sample size: 63

On the basis of the study conducted by Monica Corazza et al, assuming $P=83.3\%$, 95% confidence interval, 10% absolute allowable error(L), the sample size estimated for the study is 57. Further assuming 10% non-response rate, the final sample size estimated for the study is 63.

Using the formula: $n = Z^2 (1-\alpha_2) (1-p) / L^2$

Informed consent was obtained from all the participants included in the study and institutional ethics committee clearance was obtained.

Approval number: AJEC/REV/201/2023, dated: 03/08/2023 of A.J Institute of Medical Sciences and Research Centre. DCGI Reg. No. EC/NEW/INST/2020/741

All procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and

with the Helsinki Declaration of 1975, as revised in 2013.

The participants were explained regarding the objectives as well as the method of study. An assurance to the patient about confidentiality of the patient's data was ensured. All the participants were screened for exclusion criteria. Only the individuals satisfying the inclusion criteria and exclusion criteria were selected. Only the qualifying participants fulfilling the inclusion criteria were sent the semi structured, digital questionnaire comprising of 30 questions via electronic medium and response was collected.

The objective of our research is to evaluate the prevalence, knowledge, perception of sensitive skin and also identify various triggers causing sensitivity skin. To achieve this, we will use the Sensitive Skin Scale (SSS), which is a validated questionnaire that measures the severity of sensitive skin. The scale will use a 5-point Likert-type response format, which ranges from "Don't agree" to "Strongly agree".

Statistical Analysis

- Data was entered in Microsoft Excel and analysed using statistical package for the social sciences (SPSS) software programme, version 23.
- Categorical data will expressed as percentage.
- Chi square test will be used to test the association of awareness and the association between various variables.
- $p < 0.05$ will be considered statistically significant.

Inclusion Criteria

1. Undergraduate Medical Students at AJ Institute of Medical Sciences, Mangalore.
2. Above 18 years of age.
3. Willingness to give consent for the study.

Exclusion Criteria

1. Age < 18years.
2. Personal history and/or clinical signs of any skin disease (such as acne, rosacea, seborrheic dermatitis, atopic dermatitis, psoriasis, and skin infections).
3. Intensive exposure to sunlight or artificial ultraviolet rays or use of any topical or systemic treatment, for any reason, within the previous month.
4. Pregnancy or breastfeeding,
5. Unwilling to give consent for the study.

Results

A total of 63 undergraduate medical students were enrolled in the study. 41 (65.1%) of them were females and 22 (34.9%) were males. [Table 1]

Prevalence of Sensitive Skin

The survey on prevalence of sensitive skin symptoms among the participant's reveals varying degrees of experiences.

Redness on skin emerged as the most prevalent sensitive skin symptom, with 30.1% of respondents acknowledging it. Followed by dryness of skin, which was reported by 22.2% of participants. The least prevalent symptom is being prone to skin rashes or hives, with only 14.3% of participants reporting it. [Table 2]

Dryness of the skin was the most frequent symptom of sensitive skin with 15.9% of them reporting it. This was followed by redness on the skin, experienced often or very often by 7.9% of participants. Itching on the skin was reported often or very often by 3.2% of respondents. Burning sensation on the skin was the least frequent sensitive skin symptom reported by 1.6% of the patients. [Table 3]

Perception of Sensitive skin symptoms

The Sensitive skin scale -10 is a validated 10 item questionnaire designed to measure the severity and perception of sensitive skin, was recently administered to a group of individuals. The SSS-10 employs a 5-point Likert response format ranging from "Don't agree" (1 point) to "Strongly agree" (5 points). [Table 4]

Among the participants who perceived sensitive skin symptoms (75.3%), total of 55.1% had good perception whereas 44.8% of them had poor perception of symptoms. 36 (57.2%) participants reported good perception of unpleasant sensations on skin with hot/dry weather, 59(93.6%) of them had good perception of symptoms on contact with water, 51(80.9%) of them had good perception of symptoms in response to physical exercise. 24(38.1%) participants had poor perception of symptoms on skin with the use of cosmetics, 39(61.9%) of them had poor perception of symptoms on exposure to smog/pollutants, 38(60.3%) of them reported poor perception of sensitive skin symptoms on skin with psychological stress.

Knowledge regarding Sensitive skin

The survey assessed the knowledge of symptoms and the impact of sensitive skin on various aspects of participants' lives. [Table 5]

Participants were asked about the severity of their symptoms (itching, burning, tingling, redness, stinging). The majority, 47.6%, reported that their symptoms were not severe at all. Another 36.5% described their symptoms as mild, and only 1.6% as very severe.

When asked about impact on skin care routine and product choices, 22.2% indicated that their skincare decisions were somewhat affected by their sensitive skin, and 12.7% felt a strong impact. In contrast, 27.0%

did not feel that their skincare choices were influenced by their sensitive skin. (Figure 1)

Out of the 63 respondents, 44.4% of them demonstrated limited understanding of triggers that caused the sensitive skin symptoms. (Figure 2)

Most participants (84.1%) did not have a family history of sensitive skin or other dermatological conditions. Despite good perceptions of the symptoms, 41.3% of the participants reported that they rarely seemed medical advice for their symptoms.

Overall, the results indicate a varied understanding and management of sensitive skin among the participants, with a significant proportion uncertain about the causes and triggers. Also, while the severity of sensitive skin symptoms is generally low among the participants, sensitive skin still significantly impacts skincare routines, clothing choices, and emotional well-being for some individuals. There was no statistically significant difference in prevalence, perception and knowledge of sensitive skin between the males and females enrolled in this study. ($p>0.05$) [Table 6]

Table 1

Gender		
	Frequency	Percent
F	41	65.1
M	22	34.9
Total	63	100.0

Table 2: Prevalence of Sensitive Skin

Don't agree	1	DA
Neutral	3	N
Somewhat agree	4	SA
Somewhat don't agree	2	SDA
Strongly agree	5	STA

	DA		SDA		N		SA		STA		Total	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
I frequently experience itching/tingling/burning/stinging sensations on my skin.	21	33.3%	8	12.7%	21	33.3%	11	17.5%	2	3.2%	63	100.0%
I notice redness or visible signs of inflammation on my skin.	21	33.3%	12	19.0%	11	17.5%	14	22.2%	5	7.9%	63	100.0%
I have dry or flaky skin.	16	25.4%	13	20.6%	20	31.7%	9	14.3%	5	7.9%	63	100.0%
I am prone to skin rashes or hives.	27	42.9%	10	15.9%	17	27.0%	6	9.5%	3	4.8%	63	100.0%

Table 3: Frequency of Sensitive skin symptoms

Never	1
Often	4
Rarely	2
Sometimes	3
Very often	5

	Never		Rarely		Sometimes		Often		Very often		Total	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
How frequently do you experience itching on your skin?	7	11.1%	31	49.2%	23	36.5%	1	1.6%	1	1.6%	63	100.0%
How frequently do you experience redness on your skin?	11	17.5%	34	54.0%	13	20.6%	4	6.3%	1	1.6%	63	100.0%
How frequently do you experience burning sensation on your skin?	17	27.0%	34	54.0%	11	17.5%	1	1.6%	0	0.0%	63	100.0%
How frequently do you experience dryness on your skin?	5	7.9%	19	30.2%	29	46.0%	9	14.3%	1	1.6%	63	100.0%

Table 4: Perception regarding sensitive skin using Sensitive Skin scale - 10

Don't agree	1	DA
Neutral	3	N
Somewhat agree	4	SA
Somewhat don't agree	2	SDA
Strongly agree	5	STA

< =3 don't agree (good perception), >3 Agree (Poor/bad perception)

	DA		SDA		N		SA		STA		Total		
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Mean	Standard Deviation
I experience unpleasant sensations on my skin with sun exposure.	19	30.1%	9	14.3%	16	25.3%	19	30.1%	0	0.0%	63	2.56	1.21
I experience unpleasant sensations on my skin with hot/dry weather.	11	17.5%	7	11.1%	18	28.6%	21	33.3%	6	9.5%	63	3.06	1.24
I experience unpleasant sensations on my skin with cold/wet weather.	17	27.0%	7	11.1%	23	36.5%	14	22.2%	2	3.2%	63	2.63	1.20
I experience unpleasant sensations on my skin with wind exposure.	23	36.5%	13	20.6%	20	31.7%	6	9.5%	1	1.6%	63	2.19	1.09
I experience unpleasant sensations on my skin with contact with water.	32	50.8%	15	23.8%	12	19.0%	3	4.8%	1	1.6%	63	1.83	1.01
I experience unpleasant sensations on my skin with physical exercise.	30	47.6%	7	11.1%	14	22.2%	12	19.0%	0	0.0%	63	2.13	1.21
I experience unpleasant sensations on my skin with use of soaps/cleansers/blades while shaving.	30	47.6%	7	11.1%	12	19.0%	13	20.6%	1	1.6%	63	2.17	1.28
I experience unpleasant sensations on my skin with use of cosmetics.	16	25.4%	8	12.7%	15	23.8%	21	33.3%	3	4.8%	63	2.79	1.28

I experience unpleasant sensations on my skin with exposure to smog/pollutants.	11	17.5%	4	6.3%	9	14.3%	24	38.1%	15	23.8%	63	3.44	1.39
I experience unpleasant sensations on my skin with psychological stress.	12	19.0%	2	3.2%	11	17.5%	23	36.5%	15	23.8%	63	3.43	1.40

Table 5: Knowledge regarding Sensitive Skin

		Count	Column N %
How severe are your symptoms (itching/burning/tingling/redness/stinging)?	Mild	23	36.5%
	Moderate	9	14.3%
	Not at all severe	30	47.6%
	Very severe	1	1.6%
	Total	63	100.0%
Sensitive skin affects my skincare routine and product choices.	Don't agree	17	27.0%
	Neutral	16	25.4%
	Somewhat agree	14	22.2%
	Somewhat don't agree	8	12.7%
	Strongly agree	8	12.7%
	Total	63	100.0%
Sensitive skin influences my clothing choices to avoid irritation.	Don't agree	26	41.3%
	Neutral	15	23.8%
	Somewhat agree	7	11.1%
	Somewhat don't agree	10	15.9%
	Strongly agree	5	7.9%
	Total	63	100.0%
Sensitive skin limits my participation in outdoor activities.	Don't agree	32	50.8%
	Neutral	11	17.5%
	Somewhat agree	6	9.5%
	Somewhat don't agree	12	19.0%

	Strongly agree	2	3.2%
	Total	63	100.0%
Sensitive skin has an impact on my emotional well being and self esteem.	Don't agree	27	42.9%
	Neutral	15	23.8%
	Somewhat agree	7	11.1%
	Somewhat don't agree	8	12.7%
	Strongly agree	6	9.5%
	Total	63	100.0%
What is the intensity of discomfort you experience from sensitive skin symptoms?	Mild discomfort	26	41.3%
	Moderate discomfort	8	12.7%
	No discomfort	26	41.3%
	Severe discomfort	2	3.2%
	Very severe discomfort	1	1.6%
	Total	63	100.0%

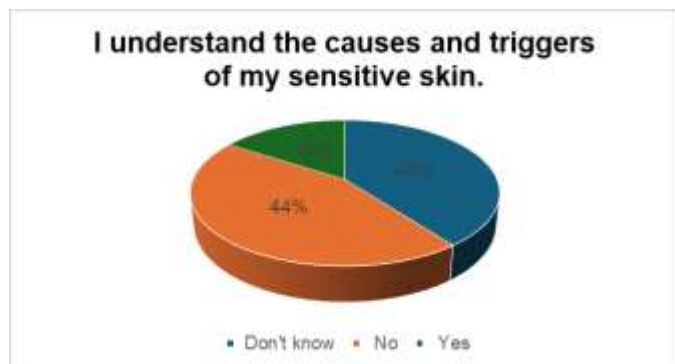
		Count	Column N %
I believe certain factors/substances trigger my sensitive skin reactions.	Don't know	24	38.1%
	No	20	31.7%
	Yes	19	30.2%
I understand the causes and triggers of my sensitive skin.	Don't know	25	39.7%
	No	28	44.4%
	Yes	10	15.9%
I feel confident in managing my sensitive skin effectively.	Don't know	22	34.9%
	No	8	12.7%
	Yes	33	52.4%
Have you been diagnosed with any other skin conditions?	No	54	85.7%
	Yes	9	14.3%
Do you have family history of sensitive skin or any other dermatological	No	53	84.1%

conditions?			
	Yes	10	15.9%
How often do you seek medical advice/treatment for your sensitive skin?	Never	24	38.1%
	Often	2	3.2%
	Rarely	26	41.3%
	Sometimes	11	17.5%

Graph 1:



Graph 2:



Discussion

The identification of sensitive skin is complex and there is still a lack of international consensus on the best method for its diagnosis. (13) Sensitive skin is characterised by a heightened reactivity and increased susceptibility to various stimuli that may not typically affect normal skin.

The face is thought to be the most common site of skin sensitivity, predictable physiologically due to the larger and multiple number of products used on the face (particularly in women), a thinner barrier in facial skin,

and a greater density of nerve endings. (14) Sensitive skin is characterised by increased sensory nerve reactivity, meaning that the nerve endings in the skin may be more easily stimulated. (15)

Our study provides insights into the prevalence, frequency, perception, knowledge of sensitive skin among the participants.

Our study found that redness (30.1%) and dryness (22.2%) are the most prevalent symptoms of sensitive skin among the participants. Similar results were reported in the study done by Misery et al. (2007) in which it was reported that a higher prevalence of redness (35%) and dryness (30%) was present in their study population. (16)

Dryness was the most frequently reported symptom in our study, with 15.9% of participants experiencing it often or very often. Redness was the next most frequent, with 7.9% of participants reporting it often or very often.

Itching was reported often or very often by 3.2% of our participants, while burning sensation was the least frequent symptom reported by only 1.6% of our participants. In contrast, Farage et al. (2008) found that itching (25%) and redness (18%) were more frequently experienced symptoms. Farage et al. (2008) noted higher frequencies for these symptoms, with dryness at 20% and burning at 12%. (17) **Seidenari et al. (1998)** found frequent reports of burning sensations in 20-30% of

participants, contrasting with the lower frequency found in our study. (18)

The Sensitive Skin Scale-10 (SSS-10) results indicate that 55.1% of participants had a good perception of their symptoms, while 44.8% had a poor perception. Draelos (2014) explained the importance of perception in managing sensitive skin and found that individuals with better understanding of their symptoms could manage their condition more effectively. (18) Our study's findings are similar, but the high percentage of poor perception highlights the need for improvement. Also, the present study contrasts with findings from the study done by Escalas-Taberner et al. (2011), which reported that 65% of participants had a poor perception of their symptoms. (20) In our study, 93.6% of participants had a good perception of symptoms related to water contact, while 61.9% had a poor perception of symptoms due to exposure to smog/pollutants. These results indicate a higher awareness and perception of environmental factors in comparison to previous studies, like the one by Frosch et al. (2002), which reported lower awareness levels. (21)

A major portion, 47.6%, reported that their symptoms were not severe at all, and 36.5% described their symptoms as mild. This is similar to the findings of the study by Jourdain et al. (2017), where 50% of participants reported mild symptoms. About 44.4% of the participants demonstrated limited understanding of triggers. While this percentage in our study is notable, it indicates a slightly better awareness compared to previous findings by Jourdain et al. (2017), which indicated a general lack of awareness regarding triggers since our study was done amongst the undergraduate medical students. (22) The impact of sensitive skin on skincare routines was noted by 22.2% of participants,

which is lower compared to 30% reported in the study done by Misery et al. (2016). (23)

There was no statistically significant difference in the prevalence, perception, and knowledge of sensitive skin between males and females in our study ($p>0.05$). This finding is consistent with the study by Misery et al. (2016), which also found that there were no significant gender differences in the prevalence and perception of sensitive skin symptoms. (22) Another study was conducted in China in 2009 among 9154 subjects from large urban areas. Xu et al. found 39.5% of the entire population (both genders) reported some degree of sensitive skin. (24)

Conclusion

This study provides insights into the prevalence, perception and knowledge of sensitive skin among the participants. It reveals that symptoms such as redness and dryness are more commonly experienced, highlighting the significance of these issues in the daily lives of individuals with sensitive skin. The data also shows that itching and burning sensations, are less frequently reported, indicating variability in symptom manifestation.

The perception of sensitive skin symptoms was evaluated using the Sensitive Skin Scale-10, which revealed that the majority of participants have a good perception of their symptoms. However, there is a significant portion of the population that still perceives their symptoms poorly, particularly in relation to environmental factors. This suggests a need for increased awareness and education about the triggers and management of sensitive skin.

The assessment of symptom frequency indicates that dry and red skin are the most frequently experienced symptoms, while burning sensations are the least

common. This information is crucial for guiding the development of targeted skincare and treatment options to address these specific concerns.

Despite a good perception of symptoms, many participants lack a comprehensive understanding of what exacerbates their condition. This underscores the importance of educational initiatives to improve the management and treatment of sensitive skin, ultimately enhancing the quality of life for those affected. The findings also suggest that both males and females experience sensitive skin similarly, emphasising the need for inclusive approaches in research and education on this condition.

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