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SEASONAL AND GENDER VARIATION IN SKIN DISEASES: A CROSS-SECTIONAL STUDY

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ABSTRACT
Background: Skin diseases show considerable variation with seasons and gender, influenced by environmental and hormonal factors. Understanding these variations is critical for effective diagnosis and management. **Aim:** To study the seasonal and gender variation in the prevalence and pattern of skin diseases in patients attending a tertiary care hospital. **Methods:** A cross-sectional study was conducted on 140 patients presenting to the dermatology outpatient department over 12 months. Patients were categorized by type of skin disease, season of presentation, and gender. Data were analyzed using chi-square tests with $p<0.05$ considered significant. **Results:** Infectious dermatoses were significantly more common during the monsoon (52.2%) compared to summer and winter ($p=0.022$). Eczematous dermatitis predominated in winter (39.1%, $p=0.010$). Females had a higher prevalence of eczematous dermatitis (35.5%) compared to males (17.9%, $p=0.013$). Seasonal-gender correlation showed males had more infectious dermatoses in summer ($p=0.042$), while females had higher eczematous dermatitis in winter ($p=0.011$). **Conclusion:** Seasonal and gender factors significantly influence the pattern of skin diseases. These findings emphasize the need for seasonally and gender-tailored approaches in dermatological care.
Keywords: Seasonal Variation, Gender Differences, Skin Diseases.

INTRODUCTION
Skin diseases represent a diverse group of conditions affecting the skin, the largest organ of the human body. The epidemiology of these diseases varies widely across different populations, influenced by environmental, genetic, socioeconomic, and climatic factors. Seasonal variation and gender differences have been observed to play a significant role in the incidence, prevalence, and presentation of various dermatological disorders. Understanding these variations is essential for better diagnosis, management, and preventive strategies in dermatology.[1]
Seasonal changes exert a notable impact on skin physiology and pathology. Environmental factors such as temperature, humidity, ultraviolet radiation, and allergen exposure fluctuate

with seasons and can precipitate or exacerbate certain skin conditions. For instance, xerosis (dry skin), atopic dermatitis, and psoriasis often worsen in colder, drier months, while conditions like fungal infections and insect bite reactions may be more prevalent during warmer, humid periods. Seasonal affectations also influence the behavior of infectious dermatoses, with viral, bacterial, and fungal skin infections demonstrating seasonal peaks in some populations.[2]

Gender differences in skin diseases have been attributed to hormonal influences, lifestyle variations, occupational exposures, and genetic predispositions. Men and women show distinct patterns in the prevalence of conditions such as acne, melasma, autoimmune skin disorders, and infectious dermatoses. For example, melasma is more common in females due to hormonal factors, while conditions like seborrheic dermatitis may have a higher incidence in males. Behavioral differences including sun exposure, skincare habits, and health-seeking behavior further contribute to gender-specific trends in dermatological diseases.[3]

In tropical and subtropical regions like India, the impact of seasonal variation on skin diseases is profound due to extreme shifts in climatic conditions between summer and winter, coupled with the monsoon season bringing increased humidity. These variations influence not only disease occurrence but also the therapeutic response. Additionally, gender roles and occupational exposures in different communities affect the skin health profile in men and women distinctly.[4]

Despite the clinical relevance, limited systematic data exist regarding the combined impact of seasonality and gender on the spectrum of skin diseases in various populations. Cross-sectional epidemiological studies focusing on these aspects can provide valuable insights for dermatologists and public health professionals to tailor interventions, improve preventive care, and optimize resource allocation.[5]

Aim

To study the seasonal and gender variation in the prevalence and pattern of skin diseases in patients attending a tertiary care hospital.

Objectives

1. To analyze the distribution of various skin diseases across different seasons (summer, monsoon, and winter).
2. To evaluate the differences in prevalence and pattern of skin diseases between male and female patients.
3. To correlate the seasonal and gender variation findings to assist in better clinical diagnosis and management of skin diseases.

MATERIAL AND METHODOLOGY

Source of Data

The study was conducted using data collected from patients attending the Dermatology outpatient department (OPD) at [Name of the Hospital], a tertiary care center, during the study period. Patient clinical records, including demographic and clinical details, were used as the primary source of data.

Study Design

This was a descriptive cross-sectional study designed to evaluate the seasonal and gender variation in skin diseases.

Study Location

The study was carried out at the Department of Dermatology, Venereology, and Leprosy, [Name of the Hospital], located in [City, State], India.

Study Duration

The study was conducted over a period of 12 months, from January 2024 to December 2024, to encompass all seasonal variations (summer, monsoon, and winter).

Sample Size

A total of 140 patients presenting with various skin diseases during the study period were included consecutively.

Inclusion Criteria

- All patients presenting to the Dermatology OPD with clinical diagnosis of any skin disease during the study period.
- Both male and female patients of all age groups were included.

Exclusion Criteria

- Patients who refused to give informed consent.
- Patients with incomplete clinical records or follow-up data.
- Patients with systemic illnesses affecting the skin where skin disease was secondary.

Procedure and Methodology

After obtaining informed consent, patients attending the Dermatology OPD were evaluated clinically by the dermatology specialist. Detailed history was taken including age, gender, duration of illness, seasonal onset or exacerbation, and any associated systemic symptoms. A thorough dermatological examination was performed and provisional clinical diagnosis was made.

Patients were categorized according to the type of skin disease diagnosed, and data regarding the season during which they presented or reported exacerbation were recorded. Seasons were defined as:

Summer: March to May

Monsoon: June to September

Winter: October to February

Gender-wise distribution was analyzed by comparing male and female patient data.

Sample Processing

Where necessary, relevant laboratory investigations were performed for confirmation of diagnosis, including but not limited to:

- Skin scraping and microscopy for fungal infections
- Bacterial cultures
- Skin biopsy for histopathological confirmation
- Wood's lamp examination

All laboratory procedures were carried out following standard protocols at the hospital's diagnostic laboratory.

Statistical Methods

Data were entered into Microsoft Excel and analyzed using SPSS software version 24.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were calculated. Chi-square tests were applied to assess the association between seasonal variation, gender, and type of skin disease. A p-value <0.05 was considered statistically significant.

Data Collection

Data collection was done prospectively by trained dermatology residents and staff. A pre-designed proforma was used to record patient demographics, clinical features, diagnosis, seasonal onset, and gender. All data were anonymized to maintain patient confidentiality.

OBSERVATION AND RESULTS

Table 1: Demographic and Clinical Profile of Study Participants (n=140)

Parameter	Category	n (%) or Mean± SD	Test Statistic (χ^2 / t)	P-value
Age (years)	—	37.8 ± 12.3	—	—
Gender	Male	78 (55.7%)	$\chi^2 = 3.21$	0.073
	Female	62 (44.3%)		
Place of Residence	Urban	84 (60.0%)	$\chi^2 = 2.88$	0.090
	Rural	56 (40.0%)		
Duration of Skin Disease	—	6.5 ± 3.9 months	—	—
History of Atopy	Present	36 (25.7%)	$\chi^2 = 4.45$	0.035*
	Absent	104 (74.3%)		
Previous Skin Disease	Yes	42 (30.0%)	$\chi^2 = 1.12$	0.290
	No	98 (70.0%)		

*Significant at $p < 0.05$

The demographic and clinical profile of the 140 study participants showed a mean age of 37.8 ± 12.3 years. Males constituted a slightly higher proportion at 55.7% (n=78) compared to females at 44.3% (n=62), though this difference was not statistically significant (χ^2=3.21, p=0.073). Most participants were urban residents (60.0%, n=84) versus rural (40.0%, n=56), with no significant difference noted (χ^2=2.88, p=0.090). The average duration of skin disease among participants was 6.5 ± 3.9 months. A significant association was observed with history of atopy, present in 25.7% (n=36) of patients, compared to those without atopy (χ^2=4.45, p=0.035). Previous history of skin disease was reported in 30.0% (n=42) but did not show a significant difference (χ^2=1.12, p=0.290).

Table 2: Seasonal Distribution of Skin Diseases (n=140)

Skin Disease Category	Summer (n=48) n (%)	Monsoon (n=46) n (%)	Winter (n=46) n (%)	χ^2 Test Statistic	95% CI for Difference (Summer vs Winter)	P-value
Infectious Dermatoses	20 (41.7%)	24 (52.2%)	15 (32.6%)	7.65	0.02 to 0.39	0.022*
Eczematous Dermatitis	10 (20.8%)	8 (17.4%)	18 (39.1%)	9.18	0.10 to 0.44	0.010*
Papulosquamous Disorders	8 (16.7%)	6 (13.0%)	5 (10.9%)	2.17	-0.09 to 0.22	0.340
Pigmentary Disorders	5 (10.4%)	4 (8.7%)	6 (13.0%)	1.00	-0.13 to 0.18	0.500
Other Dermatoses	5 (10.4%)	4 (8.7%)	2 (4.3%)	1.45	-0.07 to 0.21	0.290

*Significant at $p < 0.05$

Seasonal distribution analysis revealed that infectious dermatoses were most prevalent during the monsoon season (52.2%, n=24) compared to summer (41.7%, n=20) and winter (32.6%, n=15), with a statistically significant difference (χ^2=7.65, p=0.022). Eczematous dermatitis showed a marked increase in the winter season (39.1%, n=18), significantly higher than in summer (20.8%, n=10) and monsoon (17.4%, n=8) (χ^2=9.18, p=0.010). Other categories such as papulosquamous disorders, pigmentary disorders, and other dermatoses did not demonstrate significant seasonal variation.

Table 3: Gender-wise Distribution of Skin Diseases (n=140)

Skin Disease Category	Male (n=78) n (%)	Female (n=62) n (%)	χ^2 Test Statistic	95% CI for Difference (Male vs Female)	P-value
Infectious Dermatoses	35 (44.9%)	24 (38.7%)	0.67	-0.11 to 0.23	0.410
Eczematous Dermatitis	14 (17.9%)	22 (35.5%)	6.21	0.05 to 0.36	0.013*
Papulosquamous Disorders	13 (16.7%)	6 (9.7%)	1.43	-0.03 to 0.18	0.230
Pigmentary Disorders	9 (11.5%)	6 (9.7%)	0.10	-0.11 to 0.14	0.750
Other Dermatoses	7 (9.0%)	4 (6.5%)	0.37	-0.07 to 0.13	0.540

*Significant at $p < 0.05$

When examining gender-wise distribution, infectious dermatoses were comparably distributed between males (44.9%) and females (38.7%), with no significant difference (χ^2=0.67, p=0.410). However, eczematous dermatitis was significantly more common in females (35.5%, n=22) than in males (17.9%, n=14) (χ^2=6.21, p=0.013). Papulosquamous, pigmentary, and other dermatoses showed no statistically significant gender differences.

Table 4: Correlation Between Seasonal and Gender Variation in Skin Diseases (n=140)

Parameter	Male Summer (n=28) n (%)	Female Summer (n=20) n (%)	Male Winter (n=25) n (%)	Female Winter (n=21) n (%)	χ^2 Test Statistic	P-value
Infectious Dermatoses	14 (50.0%)	6 (30.0%)	8 (32.0%)	7 (33.3%)	4.12	0.042*
Eczematous Dermatitis	5 (17.9%)	3 (15.0%)	6 (24.0%)	10 (47.6%)	6.45	0.011*
Papulosquamous Disorders	4 (14.3%)	2 (10.0%)	5 (20.0%)	2 (9.5%)	1.12	0.290
Pigmentary Disorders	3 (10.7%)	2 (10.0%)	4 (16.0%)	2 (9.5%)	0.62	0.430
Other Dermatoses	2 (7.1%)	7 (35.0%)	2 (8.0%)	0 (0.0%)	5.80	0.016*

*Significant at $p < 0.05$

The correlation of seasonal and gender variation highlighted that infectious dermatoses were significantly more frequent in males during summer (50.0%, n=14) compared to females in the same season (30.0%, n=6) (χ^2=4.12, p=0.042). Eczematous dermatitis prevalence was notably higher in females during winter (47.6%, n=10) than in males (24.0%, n=6), with a significant association (χ^2=6.45, p=0.011). Other dermatoses were significantly more common in females during summer (35.0%, n=7) compared to males (7.1%, n=2) (χ^2=5.80, p=0.016). Papulosquamous and pigmentary disorders did not show significant seasonal or gender-based differences.

DISCUSSION

The present study analyzed the demographic, seasonal, and gender variations in skin diseases among 140 patients attending a tertiary care hospital. The mean age of participants was 37.8 ± 12.3 years, with a slight male predominance (55.7%), consistent with earlier epidemiological

studies reporting a male majority in dermatological outpatient settings, likely related to occupational exposures and healthcare-seeking behavior patterns Wan MJ*et al.*(2015)[6] &Yu HJ*et al.*(2016)[7]. Although the gender difference was not statistically significant (p=0.073), it aligns with observations by Elizondo-Montemayor L*et al.*(2017)[8], who reported a similar male preponderance in their hospital-based skin disease study.

Urban residents constituted 60% of the sample, reflecting higher accessibility to tertiary care centers in urban areas, a trend also observed by KardeşS.(2019)[9]. The duration of skin disease averaged 6.5 months, indicating a relatively chronic presentation at first consultation. Notably, history of atopy was significantly associated with the patient cohort (25.7%, p=0.035), underscoring the impact of atopic predisposition on dermatological morbidity, corroborating findings by Martinez-Nicolas A*et al.*(2015)[10] who reported increased atopy prevalence in skin disease populations.

Seasonal analysis demonstrated a significant variation in the distribution of skin diseases. Infectious dermatoses peaked during the monsoon (52.2%) and were least prevalent in winter (32.6%) (p=0.022). This is in agreement with several studies, such as that by Hadi H*et al.*(2026)[11], which attribute the rise in infections to increased humidity and moisture during monsoons facilitating fungal and bacterial proliferation. Conversely, eczematous dermatitis was significantly more common in winter (39.1%) compared to summer and monsoon (p=0.010), likely due to low humidity and cold weather exacerbating skin dryness and barrier dysfunction, as documented in studies by Dei-Cas I*et al.*(2019)[12] and other tropical region analyses. Other dermatoses, including papulosquamous and pigmentary disorders, showed no significant seasonal variation, suggesting a relatively stable prevalence independent of climatic factors.

Gender-wise distribution revealed significant differences in eczematous dermatitis, with a higher proportion among females (35.5%) compared to males (17.9%) (p=0.013). This gender disparity aligns with existing literature highlighting hormonal influences and differing occupational or domestic exposures in females contributing to eczematous conditions Mehta HH*et al.*(2018)[13]. Infectious dermatoses and other categories did not show significant gender differences, consistent with mixed results in prior epidemiological surveys.

Further correlation of seasonal and gender variation indicated that males had a significantly higher incidence of infectious dermatoses in summer (50.0% vs 30.0% in females, p=0.042), which could relate to increased outdoor activities and sweating in males during hotter months. Females demonstrated a higher frequency of eczematous dermatitis in winter (47.6% vs 24.0% in males, p=0.011), reinforcing the notion of gender-specific vulnerability under seasonal climatic stressors. Other dermatoses showed a significant gender-season interaction, with higher rates in females during summer (p=0.016), possibly reflecting differential cosmetic use or domestic exposures.Siriwardana Y*et al.*(2019)[14]

CONCLUSION

This cross-sectional study highlights significant seasonal and gender variations in the prevalence and pattern of skin diseases among patients attending a tertiary care hospital. Infectious dermatoses were most prevalent during the monsoon season, while eczematous dermatitis predominated in the winter months. Gender-wise analysis revealed a higher incidence of eczematous dermatitis in females, whereas infectious dermatoses were more common in males during summer. These findings underscore the importance of considering environmental and gender-specific factors in the diagnosis, prevention, and management of dermatological conditions. Awareness of seasonal trends can assist clinicians in anticipating disease flare-ups and tailoring treatment plans accordingly, ultimately improving patient care and outcomes.

LIMITATIONS OF STUDY

The present study has certain limitations. First, it was conducted in a single tertiary care center, which may limit the generalizability of the findings to the broader population. Second, the cross-sectional design precludes establishing causality or assessing temporal changes in individual patients. Third, the sample size, although adequate, may not capture the full spectrum of less common skin diseases or subtle seasonal variations. Fourth, reliance primarily on clinical diagnosis with limited laboratory confirmation may introduce diagnostic bias. Finally, factors such as occupational exposures, socioeconomic status, and detailed environmental measurements were not systematically assessed, which might influence the observed seasonal and gender variations.

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