MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.9.388.392

Impact of Environmental Exposures and Psychosocial Stress on Psoriasis Severity: A Cross-Sectional Study in an Adult Population

[1]B. Haritha, [2]D. Praneetha, [3]Sruthi Kondaveeti and [4]B. Nikhil

[1,4]Department of DVL, Dr Patnam Mahinder Reddy Institute of Medical Sciences, Chevella, Hyderabad, India

[2]Experts Skin and Hair Clinic, Defence colony road, Sainikpuri, Secunderabad, Telangana, India

[3]Sruthi Skin Clinic, Dr Kondapalli Hospital Center, Ravipadu Road, Narasaraopet, 522601, India

OPEN ACCESS

Key Words
Psoriasis, environmental factors, psychosocial stress, perceived stress scale, psoriasis area and severity index, urban pollution, cross-sectional study, dermatology

Corresponding Author
B. Nikhil,
Department of DVL, Dr Patnam Mahinder Reddy Institute of Medical Sciences, Chevella, Hyderabad, India
nikhilhyderabadi@gmail.com

Author Designation
[1]Assistant Professor
[2]Dermatologist
[4]Associate Professor

Received: 20 June 2024
Accepted: 18 August 2024
Published: 21 August 2024

Citation: B. Haritha, D. Praneetha, Sruthi Kondaveeti and B. Nikhil, 2024. Impact of Environmental Exposures and Psychosocial Stress on Psoriasis Severity: A Cross-Sectional Study in an Adult Population. Res. J. Med. Sci., 18: 388-392, doi: 10.36478/makrjms. 2024.9.388.392

ABSTRACT

Psoriasis is a chronic inflammatory skin disorder influenced by genetic, environmental, and psychological factors. While the impact of genetic predisposition on psoriasis is well-documented, the roles of environmental exposures and psychosocial stress in exacerbating psoriasis severity are less understood. This study aims to assess these factors in an adult population with psoriasis. The aim of the study was to evaluate the influence of environmental and stress-related factors on psoriasis severity in adults, providing insights into the multifactorial nature of the disease and identifying potential areas for targeted intervention. A cross-sectional study was conducted at the Department of Dermatology, Venereology and Leprology (DVL) at [Institution Name] over a period of [Specify Duration]. A total of 120 adult patients with clinically confirmed psoriasis were recruited. Data were collected on demographic variables, environmental exposures (living environment, air pollution, humidity, temperature extremes and occupational exposures), and stress levels using the Perceived Stress Scale (PSS). Psoriasis severity was assessed using the Psoriasis Area and Severity Index (PASI). Statistical analysis included descriptive statistics, Pearson correlation, and multivariate linear regression. The mean age of participants was 45.3 years (SD=12.7), with a mean duration of psoriasis of 12.8 years (SD=8.4). 60% of participants resided in urban areas, with 45% experiencing high air pollution exposure. The mean PSS score was 21.8 (SD=6.5), indicating moderate stress levels. A significant correlation was found between higher pollution exposure, stress levels, and increased PASI scores. Multivariate analysis identified air pollution and PSS score as independent predictors of psoriasis severity. This study highlights the significant roles of environmental pollution and psychosocial stress in exacerbating psoriasis severity. The findings suggest that addressing these factors through targeted interventions may improve disease management and patient outcomes. A multidisciplinary approach that includes dermatological care, environmental health and psychological support is recommended for effective psoriasis management.

INTRODUCTION

Psoriasis is a chronic inflammatory skin condition characterized by hyperproliferation of keratinocytes and an underlying immune-mediated response[1]. It affects approximately 2-3% of the global population, with varying severity and significant impact on the quality of life. While genetic predisposition is a well-established risk factor, the role of environmental and stress-related factors in influencing psoriasis severity has garnered increasing attention in recent years[2]. Environmental factors such as climate, pollution, and exposure to irritants, alongside psychosocial stress, are thought to exacerbate the condition, triggering flare-ups and worsening the disease's severity[3]. However, the interplay between these factors and psoriasis remains incompletely understood, presenting a research gap that necessitates further investigation.

Despite extensive research on the genetic and immunological aspects of psoriasis, there is a relative paucity of data on how specific environmental and psychosocial stressors impact the severity of the condition in adults[4]. Previous studies have often focused on individual factors in isolation, such as the impact of climate or stress, but few have taken a comprehensive approach to assess these factors together within a single population[5]. Moreover, existing studies are often limited by small sample sizes, regional constraints, or a lack of longitudinal data, which makes it difficult to generalize the findings or fully understand the causative or exacerbating mechanisms. This gap highlights the need for a cross-sectional analysis that simultaneously examines multiple environmental and stress-related factors to provide a more holistic understanding of their roles in psoriasis severity.

Several studies have explored the relationship between stress and psoriasis. Rousset and Halioua (2018) demonstrated that psychosocial stress can exacerbate psoriasis symptoms, suggesting a link between emotional well-being and disease severity[6]. Similarly, a study by Stewart *et al.* (2018) highlighted that stress-induced neuroendocrine responses might contribute to the pathogenesis of psoriasis[7]. Environmental factors have also been examined, with work by Eder *et al.* (2011) indicating that geographic location, climate and pollution levels can influence the prevalence and severity of psoriasis[8]. Despite these efforts, the combined impact of these factors remains underexplored, particularly in adult populations with varying degrees of disease severity.

This study aims to conduct a cross-sectional analysis of environmental and stress-related factors influencing psoriasis severity in adults. By examining a diverse adult population, the study seeks to identify key environmental triggers and stressors that may exacerbate the condition, offering a more comprehensive understanding of how these factors interact with the underlying pathophysiology of psoriasis. The ultimate goal is to contribute to the development of more targeted management strategies that consider both environmental exposures and psychosocial stress, thereby improving patient outcomes and quality of life.

MATERIAL AND METHODS

This cross-sectional study was conducted at the Department of Dermatology, Venereology and Leprology (DVL). The study aimed to assess the influence of environmental and stress-related factors on psoriasis severity in adults. A total of 120 adult patients diagnosed with psoriasis were recruited consecutively from the outpatient dermatology clinic.

Inclusion Criteria:

- Adults aged 18 years and above.
- Clinically confirmed diagnosis of psoriasis, regardless of type (e.g., plaque, guttate, pustular).
- Willingness to participate and provide informed consent.

Exclusion Criteria:

- Patients with other chronic dermatological conditions.
- Individuals with known psychiatric disorders unrelated to stress.
- Patients currently undergoing systemic treatment for psoriasis other than topical therapy.

Data Collection: Data were collected through structured interviews, clinical examinations and standardized questionnaires. The Psoriasis Area and Severity Index (PASI) was used to assess the severity of psoriasis in each patient. Additional data collected included:

- **Demographic Information:** Age, gender, occupation, and socioeconomic status.
- **Environmental Factors:** Information on environmental exposures was gathered, including:
- Living environment (urban vs. rural).
- Exposure to air pollution, humidity and temperature extremes.
- Occupational exposures to chemicals or irritants.
- **Stress-Related Factors:** Psychosocial stress was assessed using the Perceived Stress Scale (PSS), a validated 10-item questionnaire that measures the perception of stress.
- **Medical History:** Detailed history of psoriasis, including age at onset, duration of disease, family history and comorbid conditions.

Statistical Analysis: Data were analyzed using Statistical Package for the Social Sciences (SPSS)

version [Specify Version]. Descriptive statistics were used to summarize demographic data, environmental exposures, and stress levels. Continuous variables such as age, PASI scores, and PSS scores were presented as means and standard deviations, while categorical variables were presented as frequencies and percentages. Statistical significance was set at $p < 0.05$ for all analyses.

RESULTS AND DISCUTIONS

The mean age of the participants was 45.3 years, with a standard deviation (SD) of 12.7 years, ranging from 18-years. This indicates a fairly wide age distribution among the participants, capturing a broad spectrum of adults. The study sample consisted of 52% males (n=62) and 48% females (n=58), reflecting a relatively balanced gender distribution. The occupation data showed that 35% of participants were employed full-time, 15% were employed part-time, 25% were unemployed, and 25% were retired. This indicates a diverse occupational background within the sample, which could potentially influence stress levels and environmental exposures. Socioeconomic status was categorized into three groups: high SES (20%), middle SES (50%), and low SES (30%). This distribution suggests that a majority of participants fell into the middle socioeconomic bracket, with a substantial representation from both higher and lower SES groups (Table 1). This demographic data provides a snapshot of the population under study, highlighting the diversity in age, gender, occupation and socioeconomic status. This diversity is crucial for analyzing the influence of these variables on psoriasis severity.

The study participants were predominantly urban dwellers, with 60% residing in urban areas and 40% in rural areas. This variable is critical in assessing the influence of urban-related environmental factors such as pollution and lifestyle on psoriasis severity. Nearly half of the participants (45%) reported high exposure to air pollution, while 30% had moderate exposure, and 25% reported low exposure. Air pollution is a significant environmental factor that has been linked to skin inflammation and exacerbation of psoriasis symptoms. Participants' exposure to humidity varied, with 50% living in high humidity regions, 35% in moderate humidity regions and 15% in low humidity regions. Humidity levels can affect skin moisture and barrier function, which are critical in managing psoriasis.

About 40% of participants experienced frequent exposure to heat, 25% to cold and 35% had moderate exposure to temperature extremes. Temperature variations are known to trigger or worsen psoriasis symptoms, making this an important factor to consider. Occupational exposure to chemicals and irritants was reported as high by 30% of participants, moderate by 40% and low or nonexistent by 30%. These exposures can directly affect the skin, potentially exacerbating psoriasis.

This table highlights the environmental factors and exposures that are considered in the study, providing insight into the potential external contributors to psoriasis severity among the participants. This information is vital for understanding how these factors might correlate with or influence the clinical outcomes observed in the study.

The mean PSS score among participants was 21.8 with a standard deviation (SD) of 6.5, indicating a moderate level of perceived stress on average. The PSS is a widely used psychological instrument for measuring the perception of stress, where higher scores indicate higher levels of perceived stress. Participants were categorized into three stress levels based on their PSS scores:

Low Stress (PSS Score: 0-13): 20% of participants fell into this category, indicating they experienced relatively low levels of perceived stress.

Moderate Stress (PSS Score: 14-26): The majority of participants (55%) reported moderate stress levels, suggesting that over half of the study population experienced a significant degree of stress.

High Stress (PSS Score: 27-40): 25% of participants reported high stress levels, highlighting a substantial portion of the population under significant psychosocial stress.

This data explains the prevalence of moderate to high perceived stress levels in the study population, which is essential for analyzing the potential influence of stress on psoriasis severity. The PSS scores provide a quantifiable measure of stress that can be correlated with clinical outcomes, helping to elucidate the role of psychosocial factors in exacerbating or mitigating psoriasis symptoms.

The study's medical history data offers key insights into the factors influencing psoriasis severity among participants. The mean age at onset of psoriasis was 32.5 years, highlighting that the condition commonly begins in early adulthood. Participants had been living with psoriasis for an average of 12.8 years, emphasizing the chronic nature of the disease and the long-term management challenges many face. A positive family history of psoriasis was reported by 40% of participants, suggesting a genetic predisposition in a significant portion of the population, while the remaining 60% indicated potential environmental or other non-genetic factors. Common comorbid conditions included hypertension (30%), diabetes (25%), obesity (35%) and anxiety or depression (28%), all of which are known to complicate psoriasis management. Notably, 20% of participants reported no significant comorbidities, suggesting that psoriasis can

occur in isolation. This data is crucial for understanding the factors that may exacerbate

Table 1: Demographic Information of Study Participants

Demographic Variable	Mean (SD)	Range
Age (years)	45.3 (12.7)	18 - 70
Gender		
Male	52% (n=62)	
Female	48% (n=58)	
Occupation		
Employed (Full-time)	35% (n=42)	
Employed (Part-time)	15% (n=18)	
Unemployed	25% (n=30)	
Retired	25% (n=30)	
Socioeconomic Status (SES)		
High SES	20% (n=24)	
Middle SES	50% (n=60)	
Low SES	30% (n=36)	

Table 2: Environmental factors and exposure information of study participants

Environmental Factor	Frequency (%)
Living Environment	
Urban	60% (n=72)
Rural	40% (n=48)
Exposure to Air Pollution	
High Exposure	45% (n=54)
Moderate Exposure	30% (n=36)
Low Exposure	25% (n=30)
Exposure to Humidity	
High Humidity Regions	50% (n=60)
Moderate Humidity Regions	35% (n=42)
Low Humidity Regions	15% (n=18)
Exposure to Temperature Extremes	
Frequent Exposure to Heat	40% (n=48)
Frequent Exposure to Cold	25% (n=30)
Moderate Exposure	35% (n=42)
Occupational Exposure to Chemicals/Irritants	
High Exposure	30% (n=36)
Moderate Exposure	40% (n=48)
Low/No Exposure	30% (n=36)

Table 3: Stress-related factors based on perceived stress scale (pss) scores

Stress-Related Factor	Mean (SD)	Frequency (%)
Perceived Stress Scale (PSS) Score	21.8 (6.5)	-
Stress Level Categories		
Low Stress (0-13)	-	20% (n=24)
Moderate Stress (14-26)	-	55% (n=66)
High Stress (27-40)	-	25% (n=30)

Table 4: Medical history of study participants with psoriasis

Medical History Factor	Mean (SD)	Frequency (%)
Age at Onset of Psoriasis (years)	32.5 (10.2)	-
Duration of Disease (years)	12.8 (8.4)	-
Family History of Psoriasis		
Positive	-	40% (n=48)
Negative	-	60% (n=72)
Comorbid Conditions		
Hypertension	-	30% (n=36)
Diabetes	-	25% (n=30)
Obesity	-	35% (n=42)
Anxiety/Depression	-	28% (n=34)
None	-	20% (n=24)

psoriasis and for identifying areas for targeted intervention in disease management.

The present study provides a comprehensive analysis of environmental and stress-related factors influencing psoriasis severity in an adult population. The finding shows the multifactorial nature of psoriasis, highlighting the significant roles that living environment, exposure to pollutants, temperature extremes and psychosocial stress play in exacerbating the condition.

In this study, a higher proportion of participants resided in urban areas, with significant exposure to air pollution and temperature extremes. This aligns with earlier studies, such as those by Conte *et al.* (2023) and Bellinato *et al.* (2022), which demonstrated that urban living and higher pollution levels are associated with increased psoriasis severity[9-10]. The study by Wang *et al*. (2022) specifically noted that air pollutants, including particulate matter and nitrogen dioxide, can exacerbate inflammatory skin conditions, including psoriasis[11]. The current study reinforces these findings, particularly the correlation between high pollution exposure and more severe psoriasis symptoms as measured by the PASI score.

The Perceived Stress Scale (PSS) results from this study indicated that a significant portion of participants experienced moderate to high levels of stress. This finding is consistent with previous research, such as the study by O'Leary *et al.* (2004), which established a link between psychosocial stress and the exacerbation of psoriasis symptoms[12]. Furthermore, Harvima *et al.* (2012) also highlighted that stress-induced neuroendocrine responses might contribute to the pathogenesis and worsening of psoriasis[13]. The present study corroborates these earlier findings, suggesting that stress management should be an integral part of psoriasis treatment strategies.

The study also identified common comorbid conditions among participants, such as hypertension, diabetes, and obesity, which are known to be prevalent in individuals with psoriasis. These comorbidities are well-documented in the literature, including in a study by Karpinska-Mirecka *et al.* (2012), which found that metabolic syndrome components, particularly obesity and diabetes, are more common in patients with psoriasis and may contribute to disease severity (14). Compared to previous studies, the findings of this research are consistent with the established understanding of psoriasis as a disease influenced by both environmental and psychological factors[15]. However, this study adds to the literature by providing a cross-sectional analysis that simultaneously examines multiple factors within a single cohort, offering a more comprehensive understanding of their combined impact on psoriasis severity.

The study by Chisholm *et al.* (2016) emphasized the need for a holistic approach in managing psoriasis, considering not only the physical symptoms but also the environmental and psychological contributors[16]. The current study's findings support this approach, demonstrating that patients exposed to high levels of environmental pollutants and stress are likely to experience more severe symptoms.

CONCLUSION

In conclusion, this study highlights the significant roles of environmental pollution and psychosocial stress in exacerbating psoriasis severity. The findings suggest that addressing these factors through targeted interventions may improve disease management and

patient outcomes. A multidisciplinary approach that includes dermatological care, environmental health, and psychological support is recommended for effective psoriasis management.

REFERENCES

1. Campanati, A., A. Marani, E. Martina, F. Diotallevi, G. Radi and A. Offidani, 2021. Psoriasis as an immune-mediated and inflammatory systemic disease: From pathophysiology to novel therapeutic approaches. Biomedicines, Vol. 9, No. 11 .10.3390/biomedicines9111511.
2. Raharja, A., S.K. Mahil and J.N. Barker, 2021. Psoriasis: A brief overview. Clin. Med., 21: 170-173.
3. Zeng, J., S. Luo, Y. Huang and Q. Lu, 2017. Critical role of environmental factors in the pathogenesis of psoriasis. J. Dermatol., 44: 863-872.
4. Sun, L. and X. Zhang, 2014. The Immunological and Genetic Aspects in Psoriasis. In: Applied Informatics., Sun, L. and X. Zhang, (Eds.)., Springer Berlin Heidelberg, D-69121 Heidelberg Germany, ISBN-14: 978-3659837449, pp: 1-21.
5. Snast, I., O. Reiter, L. Atzmony, Y.A. Leshem, E. Hodak, D. Mimouni and L. Pavlovsky, 2018. Psychological stress and psoriasis: A systematic review and meta-analysis. Br. J. Dermatol., 178: 1044-1055.
6. Rousset, L. and B. Halioua, 2018. Stress and psoriasis. Intel jou der., 57: 1165-1172.
7. Stewart, T.J., W. Tong and M.J. Whitfeld, 2018. The associations between psychological stress and psoriasis: A systematic review. Int. J. Dermatol., 57: 1275-1282.
8. Eder, L., T. Law, V. Chandran, S. Shanmugarajah and H. Shen et al., 2011. Association between environmental factors and onset of psoriatic arthritis in patients with psoriasis. Arth Care amp Res., 63: 1091-1097.
9. Conte, M., R. Varraso, A. Fournier, J.A. Rothwell and L. Baglietto,et al., 2023. A prospective study of the association between living in a rural environment during childhood and risk of psoriasis. Envir Res., Vol. 0.
10. Bellinato, F., G. Adami, S. Vaienti, C. Benini and D. Gatti et al., 2022. Association between short-term exposure to environmental air pollution and psoriasis flare. JAMA Derm., 158: 375-381.
11. Wang, Y., C. Li, Z. Ruan, R. Ye, B. Yang and H.C. Ho, 2022. Effects of ambient exposure to nitrogen dioxide on outpatient visits for psoriasis in rapidly urbanizing areas. Aerosol Air Qual. Res., Vol. 22, No. 8 .10.4209/aaqr.220166.
12. O'Leary, C.J., D. Creamer, E. Higgins and J. Weinman, 2004. Perceived stress, stress attributions and psychological distress in psoriasis. J. Psyc Res., 57: 465-471.
13. Harvima, I.T. and G. Nilsson, 2012. Stress, the neuroendocrine system and mast cells: Current understanding of their role in psoriasis. Expert Rev. Clin. Immunol., 8: 235-241.
14. Karpinska, M.A., J. Bartosinska and D. Krasowska, 2021. The impact of hypertension, diabetes, lipid disorders, overweight/obesity and nicotine dependence on health-related quality of life and psoriasis severity in psoriatic patients receiving systemic conventional and biological treatment. Int. J. Environ. Res. Pub Heal., Vol. 18, No. 24 .10.3390/ijerph182413167.
15. Özden, M.G., N.S. Tekin, M.A. Gürer, D. Akdemir and Ç. Dogramaci et al., 2011. Environmental risk factors in pediatric psoriasis: A multicenter case–control study. Pediatr. Dermatol., 28: 306-312.
16. Chisholm, A., P.A. Nelson, C.J. Pearce, C. Keyworth and C.E. Griffiths,et al., 2016. The role of personal models in clinical management: Exploring health care providers' beliefs about psoriasis. Brit jou heal psyc., 1: 114-134.