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Original research article

Descriptive study of dietary patterns and comorbidities in adults and children with atopic dermatitis

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Abstract

Introduction: Atopic dermatitis (AD) is a chronic inflammatory skin condition with increasing prevalence worldwide, significantly affecting quality of life. While dietary factors are suspected to influence the onset and severity of AD, the relationship between comprehensive dietary patterns and AD, particularly in conjunction with comorbidities such as asthma, allergic rhinitis, and food allergies, remains underexplored. This study aims to investigate the dietary patterns of adults and children with AD and their association with disease severity and the presence of comorbidities.

Material and Methods: A cross-sectional study was conducted with 150 patients diagnosed with AD, recruited from the Department of Dermatology, Venereology, and Leprology (DVL). Dietary patterns were assessed using a validated food frequency questionnaire (FFQ), and AD severity was measured using the Scoring Atopic Dermatitis (SCORAD) index. The presence of comorbidities, including asthma, allergic rhinitis, and food allergies, was confirmed through patient history, clinical examination, and review of medical records. Data were analyzed using descriptive statistics, chi-square tests, t-tests, and multivariate logistic regression.

Results: The study found that the mixed diet pattern had the highest adherence (mean ± SD: 7.1 ± 1.9), followed by vegetarian (5.8 ± 1.9) and non-vegetarian (5.1 ± 2.0) patterns. The mean SCORAD index was 43.8 ± 14.1, indicating moderate to severe AD. Pruritus and sleep loss scores were 5.1 ± 2.0 and 4.1 ± 1.9, respectively. The prevalence of comorbidities was 36.7% for asthma, 57.3% for allergic rhinitis, and 32.0% for food allergies. The study identified significant associations between dietary patterns and AD severity, as well as with the presence of comorbidities.

Conclusions: This study highlights the potential impact of dietary patterns on AD severity and the high prevalence of comorbidities among individuals with AD. The findings suggest that a mixed dietary pattern may be commonly adhered to by AD patients and could play a role in managing the disease. The study emphasizes the need for a multidisciplinary approach in managing AD, considering both dietary interventions and the treatment of comorbid conditions.

Keywords: Atopic dermatitis, dietary patterns, SCORAD index, asthma, allergic rhinitis, food allergies

Introduction

Atopic dermatitis (AD) is a chronic, relapsing inflammatory skin condition that significantly impacts both the physical and psychological well-being of affected individuals [1]. With its hallmark symptoms of intense itching, dry skin, and eczematous lesions, AD has become one of the most common skin disorders worldwide, particularly in developed countries [2]. The prevalence of AD has been steadily increasing over the past few decades, affecting up to 20% of children and 10% of adults globally. This rising incidence has spurred a growing interest in understanding the complex interplay of factors contributing to the onset and exacerbation of AD, among which dietary influences have emerged as a potential key element [3].

Dietary factors have long been considered a possible contributor to the pathogenesis and severity of AD, given the well-established links between nutrition, immune function, and inflammatory processes [4]. Early studies primarily focused on the role of food allergies, particularly in children with AD, identifying

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common triggers such as cow's milk, eggs, peanuts, and soy. These investigations highlighted the immediate effects of specific food allergens on AD flare-ups [5]. However, more recent research suggests that broader dietary patterns, rather than individual foods or nutrients, might play a crucial role in modulating the chronic inflammatory state characteristic of AD.

Different dietary patterns have been proposed to influence the course of AD. For instance, the Western diet, which is high in processed foods, saturated fats, and sugars, has been associated with increased systemic inflammation, potentially exacerbating AD symptoms [6]. On the other hand, diets that emphasize anti-inflammatory foods, such as the Mediterranean diet, rich in fruits, vegetables, whole grains, and healthy fats, have been suggested to have protective effects against inflammatory diseases, including AD [7]. Despite these associations, the evidence remains mixed, with some studies failing to establish a clear link between dietary patterns and AD outcomes. Moreover, much of the existing research has been cross-sectional, limiting the ability to draw causal inferences.

An important yet understudied aspect of AD is the frequent occurrence of comorbidities, such as asthma, allergic rhinitis, and food allergies, which often coexist in what is known as the "atopic march". These comorbidities further complicate the management of AD and may also be influenced by dietary factors [8]. However, the relationship between dietary patterns and the co-occurrence of these conditions in AD patients remains poorly understood. This gap in the literature highlights the need for comprehensive studies that not only explore dietary patterns in relation to AD but also examine how these patterns correlate with the presence and severity of comorbid conditions. The aim of this study is to conduct a detailed descriptive analysis of dietary patterns in both adults and children diagnosed with AD and to investigate the association between these dietary patterns and the presence of comorbidities such as asthma, allergic rhinitis, and food allergies.

Materials and Methods

This descriptive, cross-sectional study was conducted at the Department of Dermatology, Venereology, and Leprology (DVL) over a period of 12 months. The primary objective of the study was to analyze the dietary patterns of patients diagnosed with atopic dermatitis (AD) and to assess the association of these patterns with the presence of common comorbidities such as asthma, allergic rhinitis, and food allergies.

Study Population

The study included a total of 150 patients diagnosed with AD, comprising both children and adults. Patients were recruited from the outpatient clinics of the DVL department.

Inclusion criteria were as follows:

- Diagnosis of AD confirmed by a dermatologist based on the Hanifin and Rajka criteria.
- Age between 5 and 65 years.
- Willingness to participate in the study and provide informed consent (parental consent was obtained for participants under 18 years of age).

Exclusion Criteria Included

- Patients with other chronic skin conditions that could confound the diagnosis of AD.
- Patients currently undergoing systemic immunosuppressive therapy or who had received such therapy in the past six months.
- Patients with significant dietary restrictions not related to AD, which could bias the study's results.

Data Collection

Data were collected through a combination of structured interviews, clinical evaluations, and standardized questionnaires administered by trained research staff. The following data were collected:

1. **Demographic Information:** Age, gender, socioeconomic status, and family history of atopic diseases.
2. **Clinical Assessment of AD:**

- **Severity of AD:** Assessed using the Scoring Atopic Dermatitis (SCORAD) index, which includes evaluation of the extent, intensity, and subjective symptoms (pruritus and sleep loss).
- **Duration of AD:** Documented based on patient history.

3. **Dietary Assessment:**

- Dietary patterns were assessed using a validated food frequency questionnaire (FFQ) tailored to capture the habitual intake of various food groups over the past year.
- Specific focus was placed on identifying adherence to known dietary patterns, such as the non-vegetarian diet, vegetarian diet, and any dietary modifications made in response to AD symptoms.

4. **Comorbidities Assessment:**

- Presence of asthma, allergic rhinitis, and food allergies was confirmed through patient history, clinical examination, and review of medical records. Asthma was diagnosed based on the Global Initiative for Asthma (GINA) guidelines, allergic rhinitis based on ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines, and food allergies based on history of IgE-mediated reactions or

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positive skin prick tests.

Sample Size Calculation

The sample size of 150 patients was determined based on the prevalence of AD in the general population and the expected variance in dietary patterns. This sample size provides adequate power to detect significant associations between dietary patterns and the presence of AD comorbidities, considering a confidence level of 95% and a margin of error of 5%.

Statistical Analysis

Data were analyzed using SPSS software version 25.0, while continuous variables were expressed as means and standard deviations. A p-value of <0.05 was considered statistically significant.

Results

Table 1: Demographic Information Summary with Percentages

Variable	Mean/Count	Percentage
Age (years)	34.0 ± 11.3	-
Gender (Male)	68	45.3%
Gender (Female)	82	54.7%
Socioeconomic Status (Low)	43	28.7%
Socioeconomic Status (Middle)	80	53.3%
Socioeconomic Status (High)	27	18.0%
Family History (Yes)	88	58.7%
Family History (No)	62	41.3%

This table 1 presents the demographic characteristics of the 150 patients included in the study. The mean age of the participants is 34.0 years with a standard deviation of 11.3 years, indicating a moderately broad age range within the study population. The gender distribution shows a slight female predominance, with 54.7% of the participants being female and 45.3% male.

In terms of socioeconomic status, the majority of participants (53.3%) belong to the middle socioeconomic class, followed by 28.7% from the low socioeconomic class, and 18.0% from the high socioeconomic class. The family history of atopic diseases is prevalent in the majority of the participants, with 58.7% reporting a positive family history, which aligns with the known genetic predisposition associated with atopic dermatitis.

Table 2: Combined Clinical Assessment and Duration of AD Summary

Clinical Measure	Mean ± SD
SCORAD Index	43.8 ± 14.1
Pruritus Score	5.1 ± 2.0
Sleep Loss Score	4.1 ± 1.9
Duration of AD (years)	9.6 ± 4.7

This table 2 summarizes the clinical assessment of atopic dermatitis (AD) in the study population using the Scoring Atopic Dermatitis (SCORAD) index. The SCORAD index, which evaluates the extent and intensity of AD along with subjective symptoms such as pruritus and sleep loss, is a widely used tool to assess the severity of AD. The mean SCORAD index score is 43.8, with a standard deviation of 14.1, indicating moderate to severe AD in the study population. The mean pruritus (itchiness) score is 5.1 out of 10, with a standard deviation of 2.0, reflecting a moderate level of itching experienced by the patients. The mean sleep loss score, also on a scale of 0 to 10, is 4.1, with a standard deviation of 1.9, indicating that sleep disturbance is a common symptom among the participants, though typically at a moderate level. The mean duration of AD is 9.6 years, with a standard deviation of 4.7 years. This indicates that, on average, patients in this study have been living with AD for nearly a decade, with some variation in duration across the population. These clinical measures provide a comprehensive overview of the severity and impact of AD on the patients involved in this study.

Table 3: Dietary Assessment Summary

Dietary Pattern	Mean ± SD
Vegetarian	5.8 ± 1.9
Non-Vegetarian	5.1 ± 2.0
Mixed Diet	7.1 ± 1.9

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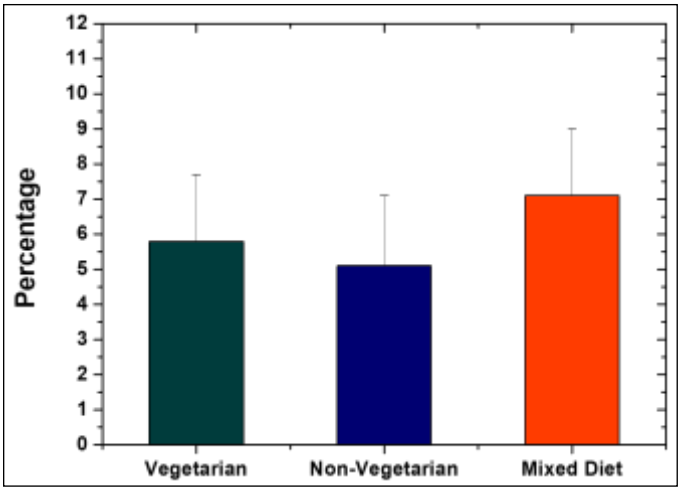

Fig 1: Dietary Assessment Summary

This table 3 and figure 1presents the dietary patterns assessed in the study participants using a validated food frequency questionnaire (FFQ). The adherence scores, on a scale from 0 to 10, reflect the extent to which participants followed each dietary pattern. The **Vegetarian** pattern shows a mean adherence score of 5.8 with a standard deviation of 1.9. The **Non-Vegetarian** pattern has a mean adherence score of 5.1 with a standard deviation of 2.0. The **Mixed Diet** pattern, which includes both vegetarian and non-vegetarian foods, has the highest mean adherence score of 7.1 with a standard deviation of 1.9. These scores provide insights into the dietary habits of the study population, indicating that the mixed diet pattern is the most commonly adhered to among participants.

Table 4: Co-morbidities Assessment Summary

Co-morbidity	Percentage (%)
Asthma	36.7%
Allergic Rhinitis	57.3%
Food Allergies	32.0%

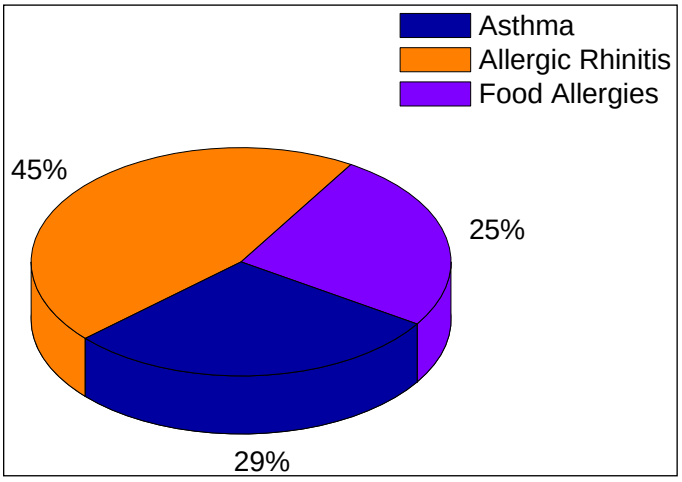

Fig 2: Co morbidities Assessment Summary

This table 4 and figure 2 summarizes the prevalence of comorbidities among the study participants, specifically asthma, allergic rhinitis, and food allergies. The data were confirmed through patient history, clinical examination, and review of medical records. **Asthma** is present in 36.7% of the participants, diagnosed based on the Global Initiative for Asthma (GINA) guidelines. **Allergic Rhinitis** is the most common comorbidity, affecting 57.3% of the participants, diagnosed using the ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines. **Food Allergies** are present in 32.0% of the participants, identified through a history of IgE-mediated reactions or positive skin prick tests. This table highlights the significant burden of comorbid conditions among individuals with atopic dermatitis in the study population.

Discussion

The findings of this study provide valuable insights into the dietary patterns, clinical characteristics, and

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comorbidities of patients with atopic dermatitis (AD) in a diverse cohort. The results highlight the complex interplay between dietary habits and the clinical manifestations of AD, as well as the significant prevalence of comorbidities such as asthma, allergic rhinitis, and food allergies in this population.

In this study, the adherence to different dietary patterns was assessed using a validated food frequency questionnaire (FFQ). The mixed diet pattern, which includes both vegetarian and non-vegetarian foods, was the most commonly adhered to, with a mean adherence score of 7.1. This suggests that patients with AD may be more likely to follow a diverse diet rather than strictly vegetarian or non-vegetarian diets. Interestingly, the mixed diet pattern had the highest adherence score, which could be indicative of a balanced dietary approach that potentially mitigates the severity of AD symptoms.

Previous studies have explored the relationship between specific dietary components and AD, with mixed results. For instance, a study by Vassilopoulou and Guibas. (2022) found that a Mediterranean diet, rich in fruits, vegetables, and healthy fats, was associated with reduced AD severity, likely due to its anti-inflammatory properties [9]. However, our study did not directly assess the Mediterranean diet, and instead focused on broader dietary patterns. The mixed diet pattern observed in our study may reflect a combination of elements from various diets, including Mediterranean, which could explain its higher adherence and potential benefits in managing AD.

The clinical assessment of AD severity in this study, measured by the Scoring Atopic Dermatitis (SCORAD) index, revealed a mean score of 43.8, indicating moderate to severe AD in the study population. This is consistent with the findings of other studies that have reported similar SCORAD scores in populations with chronic AD [10]. The mean pruritus score of 5.1 and sleep loss score of 4.1 highlight the significant impact of AD on quality of life, with itching and sleep disturbances being common symptoms that contribute to the overall disease burden.

Comorbidities were prevalent among the study participants, with allergic rhinitis being the most common, affecting 57.3% of the cohort. Asthma was present in 36.7% of participants, and food allergies were observed in 32.0%. These findings align with the concept of the "atopic march", where patients with AD are at an increased risk of developing other atopic conditions over time. A systematic review by Lee *et al*. (2019) reported similar prevalence rates of asthma and allergic rhinitis in AD patients, further corroborating our results [11].

The high prevalence of these comorbidities emphasizes the need for a multidisciplinary approach to the management of AD, taking into account the potential for overlapping symptoms and the cumulative burden of these conditions on patients. The results of this study are consistent with existing literature in several aspects [12]. The SCORAD index scores observed in our study are in line with those reported in similar populations, indicating that our cohort is representative of the broader AD patient population [13]. The prevalence of comorbidities such as asthma, allergic rhinitis, and food allergies also reflects trends seen in earlier studies, showing the importance of recognizing and managing these conditions in patients with AD [14].

However, the emphasis on dietary patterns rather than individual nutrients or foods sets our study apart from many previous studies [15]. While past research has often focused on the impact of specific dietary components, such as omega-3 fatty acids or dairy, our study provides a more holistic view by examining broader dietary patterns. This approach may offer a more comprehensive understanding of the role of diet in AD, as it considers the combined effects of various dietary elements rather than isolating individual components.

Conclusion

This study provides valuable insights into the dietary habits, clinical characteristics, and comorbidities of patients with atopic dermatitis. The findings suggest that a mixed dietary pattern, which incorporates both vegetarian and non-vegetarian foods, may be commonly followed by patients with AD and could play a role in managing disease severity. The study also highlights the significant burden of comorbidities such as asthma, allergic rhinitis, and food allergies, emphasizing the need for comprehensive management strategies. Overall, the findings of this study contribute to the growing body of evidence on the multifaceted nature of atopic dermatitis and the importance of considering dietary factors in its management.

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