



Adherence to the Mediterranean diet in patients with psoriasis and its relationship with the severity of the disease: A case-control study

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Abstract

Background and Aim: Psoriasis is a prevalent chronic inflammatory skin condition, and the Mediterranean diet is often recommended for its health benefits, particularly its ability to mitigate chronic inflammation. This study sought to examine the extent to which psoriasis patients adhere to the Mediterranean diet and to explore its correlation with the severity of their condition

Methods: Seventy-one psoriasis patients and 71 age- and sex-matched healthy controls were enrolled the study and filled a standard questionnaire of adherence to the Mediterranean diet. The relationship between disease severity and adherence to the diet was also dealt with.

Results: The Mediterranean diet adherence score in the psoriasis group (5.25 ± 1.64) was significantly lower than the control group (6.28 ± 2.10) ($p = 0.004$). In addition, the consumption of fruit and fish in psoriasis patients was significantly lower than the control group and the consumption of red meat was significantly higher in the patient group. No significant relationship was found between the severity of the disease and the score of adherence to the Mediterranean diet ($p = 0.42$).

Conclusion: A significant difference between the two groups of psoriasis and the control group following the Mediterranean diet might be indicative of the relationship between diet and psoriasis and the potential benefits of this type of diet due to its anti-inflammatory properties.

KEYWORDS

chronic inflammation, Mediterranean diet, metabolic syndrome, PASI, psoriasis

1 | INTRODUCTION

Psoriasis is a prevalent immune-mediated condition that primarily affects the skin, nails, and joints. Nevertheless, it may also result in various systemic complications, such as cardiovascular, metabolic, and psychiatric issues.^{1–3}

In fact, psoriasis can be exacerbated by genetic factors, comorbidities, and lifestyle issues and identifying these factors are crucial for choosing the best therapeutic approach.⁴

Some previous studies have suggested the role of diet in the etiology and pathogenesis of psoriasis and a low-calorie diet has been shown to be effective in preventing and treating skin lesions.^{5,6} It also has been shown that in those with anti-glutadin antibodies, a gluten-free diet improves psoriatic lesions.⁷

Although the exact mechanism of impact of lifestyle and diet on psoriasis severity has not been yet understood, it seems that dietary-related body mass reduction and a decreased visceral adipose-tissue size might lead to a lesser inflammatory milieu in psoriatic lesions.^{8,9}

A recent study showed the beneficial effects of intermittent fasting diet on the activity and severity of psoriasis diseases,¹⁰ which might be due to decreasing the levels of several proinflammatory cytokines such as interleukin-1, tumor necrosis factor, and interleukin-6 following intermittent fasting diet.¹¹

Identifying environmental factors that triggering psoriasis can be effective in prevention and treatment. According to previous studies, the incidence of chronic diseases among people living near the Mediterranean Sea has been at the lowest rate and their life expectancy has been at the highest levels.¹² The Mediterranean diet represents a nutritious eating approach linked to a lower likelihood of developing metabolic syndrome, as well as neoplastic and cardiovascular diseases (CVD).¹³ It is high in fruits, vegetables, whole grains, fish, nuts, and pure olive oil, which is an important source of unsaturated fats and relatively low in red meat, dairy, eggs, and alcohol. An acceptable reason for the ability of this diet to reduce chronic systemic inflammation is related to the anti-inflammatory properties of the fibers, antioxidants, and polyphenols that are significantly present in this diet.¹³ Previous studies have shown a relationship between Mediterranean diet and protection of body against chronic degenerative diseases, metabolic syndrome, CVD, and psoriasis.^{14–17}

Despite the possible impression of this diet on the onset and progression of psoriasis, no research has been conducted in this field in Iran. Therefore, this study was designed to evaluate the effect of Mediterranean diet on the onset and severity of psoriasis.

2 | MATERIALS AND METHODS

This case-control study was performed on psoriatic patients referred to dermatology clinics of Babol University of Medical Sciences. Seventy-one patients with psoriasis were included in the study. Seventy-one healthy age- and sex-matched hospital staffs were selected as the control group.

The inclusion criteria consisted of those with confirmed diagnosis of psoriasis and age above 18 years.

The exclusion criteria included: (1) alcohol and drug abuse; (2) having any systemic disorder including diabetes mellitus or hyperlipidemia, except for psoriasis in patient group; and (3) taking drugs affecting carbohydrate and fat metabolism during past 6 months

The study protocol was approved by relevant ethics committee. After obtaining written informed consent, demographic information of subjects including age, sex, and body mass index (BMI) were recorded. Clinical and paraclinical features of the disease including the clinical type of psoriasis, site of involvement, severity of the disease based on PASI (Psoriasis Area Severity Index), duration of disease, and type of treatment were also recorded.

The standard questionnaire of adherence to the Mediterranean diet was used according to previous studies.¹² It contains 14 questions that assess adherence to the Mediterranean diet over the past year. Each question is given a score 0 or 1. The maximum score is 14 and the minimum score is zero. A score of 0–5 indicates a slight adherence to the Mediterranean diet, a score of 6–9 indicates an intermediate adherence, and a score of 10 and above indicates a high adherence to this diet.

Data were statistically analyzed using SPSS software version 22. Mean, standard deviation, frequency percentage, and descriptive statistical graphs were evaluated for the variables of this study. The *T* test, *U* Mann–Whitney test, analysis of variance tests, and correlation coefficient were employed to analyze the relationships among the variables, with a *p* value of less than 0.05 deemed statistically significant.

3 | RESULTS

This case-control study aimed to assess the adherence to the Mediterranean diet among patients with psoriasis and to investigate its correlation with the severity of the condition. A total of 71 individuals in the psoriasis group and 71 individuals in the control group were examined.

Table 1 presents a summary of the demographic and clinical characteristics of participants from both groups.

The mean age of the total population was 38.59 ± 12.45 years. It was 38.21 ± 12.62 years in the psoriasis group and 38.97 ± 12.34 years in the control group (*p* value: 0.61).

The mean duration of psoriasis and PASI in the case group were 111.44 ± 85.45 months and 17.12 ± 16.89 , respectively.

There was no statistically significant difference between two groups in terms of age, gender, marital status, educational level, and BMI.

Out of 71 patients with psoriasis, 41 (57.7%) had mild adherence and 30 (42.3%) had moderate adherence. In the control group, 26 (36.61%) had mild adherence, 40 (56.33%) had moderate adherence, and five (7.06%) had strict adherence to the Mediterranean diet (*p* value: 0.010).

The mean Mediterranean diet adherence score was found to be 5.25 ± 1.64 in the psoriasis group which was significantly different with the mean score among healthy controls (6.28 ± 2.10 , *p* value: 0.004).

TABLE 1 Demographic and clinical characteristics of participants in psoriasis and control groups.

Group variables	Psoriasis	Control	p Value
Sex			
Male	28 (39.4%)	24 (33.8%)	0.6
Female	43 (60.6%)	47 (66.2%)	
Educational status			
Without diploma	18 (25.4)	11 (15.5%)	0.06
Diploma	23 (32.4)	20 (28.2%)	
University degree	30 (42.3)	40 (56.3%)	
Marital status			
Single	22 (31%)	18 (25.4%)	0.57
Married	49 (69%)	53 (74.6%)	
Body mass index			
<18	2 (2.8%)	1 (1.4%)	0.16
18–25	33 (46.5%)	22 (31%)	
25–30	22 (31%)	34 (47.9%)	
≥30	14 (19.7%)	14 (19.7%)	
Age average	38.21 ± 12.62	38.97 ± 12.34	0.61

Table 2 shows the mean score of adherence to the Mediterranean diet in the case and control group according to different study variables.

We did not find any significant relationship between the severity of the disease and the score obtained by following the Mediterranean diet (p value: 0.42).

The degree of diet adherence among subjects regarding their different characteristics is demonstrated in Table 3.

4 | DISCUSSION

To the best of our knowledge, this study is the first one conducted regarding diet in Iranian patients with psoriasis. In the present study, we have shown that patients with psoriasis had less adherence to the Mediterranean diet, compared to healthy controls; However, in a comparison between patients with mild and moderate adherence to the Mediterranean diet, no difference was found between the two groups in terms of disease severity.

In Barrea et al.'s study, in patients with moderate and mild adherence, a significant difference was found between the control and psoriasis group ($p = 0.001$), but the frequency of people with severe adherence was found to be the same between the two groups ($p = 0.81$).¹⁸

In the study of Korovesi et al., the adherence to the Mediterranean diet was inversely related to the severity of psoriasis ($p = 0.03$ and $R = 0.34$).¹⁹ Similar results were also found in the study of Phan et al. ($p = 0.001$ and $R = 0.71$).¹⁷ Numerous prior studies have indicated a

TABLE 2 Comparison of the mean score of adherence to the Mediterranean diet in the case and control groups according to different study variables.

Questionnaire score in each group variables	Psoriasis	Control	p Value
Sex			
Male	5.1 ± 14.77	5.1 ± 33.88	0.001
Female	5.1 ± 33.56	6/2 ± 77/06	
Age			
<38	5.1 ± 48.70	6.2 ± 24.18	0.006
≥38	4.1 ± 89.50	6.1 ± 35.99	
Marital status			
Single	5.1 ± 31.43	6.1 ± 66.94	0.001
Married	5.2 ± 14.07	5.2 ± 17.22	
Educational status			
Without diploma	5.1 ± 26.78	6.1 ± 55.75	0.6
Diploma	5.1 ± 06.66	6.1 ± 95.76	
University degree	5.1 ± 37.56	5.2 ± 88.28	
Body mass index			
<18	3.0 ± 50.70	10	0.15
18–25	5.1 ± 61.67	6.2 ± 32.07	
25–30	5.1 ± 27.35	6.2 ± 47.27	
≥30	4.1 ± 64.86	5.1 ± 50.40	

TABLE 3 The degree of diet adherence among subjects regarding their different characteristics.

Questionnaire score in each group variables	Mild adherence	Moderate adherence	p Value
Types of lesion			
Chronic plaque	38 (55.9%)	30 (44.1%)	0.34
Guttate	2	–	–
Nail lesion	1	–	–
Types of treatment			
Systemic treatment			
Nonbiological	5 (71.4%)	2 (28.6%)	0.52
Biological	9 (60%)	6 (40%)	
Phototherapy	10 (45.4%)	12 (54.6%)	
Topical treatment			
Topical treatment	15 (68.2%)	7 (31.8%)	0.47
Without treatment	3 (60%)	2 (40%)	0.43
Severity of disease			
Mild	11 (73.3%)	4 (26.7%)	0.17
Moderate	5 (38.4%)	8 (61.6%)	
Sever	25 (58.1%)	18 (41.9%)	

negative correlation between adherence to the Mediterranean diet and the severity of psoriasis. This relationship may be attributed to the diet's capacity to diminish chronic systemic inflammation, a benefit linked to the anti-inflammatory characteristics of fibers, antioxidants, and polyphenols, which are abundantly found in this dietary pattern.¹³ The incongruent results in our study might be due to different ethnic factors or the higher PASI values of our patients, compared to previous studies. In addition, the multifactorial nature of psoriasis makes it difficult to make accurate judgments and conclusions.

In the present study, 41 (57.7%) patients had mild adherence 30 (42.3%) patients had moderate adherence and no one had a strict adherence to the Mediterranean diet which was hardly in line with previous studies conducted in other countries in this regard: In Caso et al.'s study, 66.3% of patients had a moderate adherence to the Mediterranean diet, 15.7% had a mild adherence, and 18% had a strict adherence to this diet.²⁰ In a study conducted in 2015 by Barrea et al. Only 30.6% of psoriasis patients had a mild adherence to a Mediterranean diet and the rest had moderate to severe adherence.¹⁸ These incongruities in results of these studies could be attributed to cultural and racial differences and other habits that may exist in the diets of people of various countries.

In the present study, the case and control group participants differed in the consumption of olive oil, fruit, juice, red meat, and fish products. In the psoriasis group, red meat consumption was higher while fruit and seafood consumption was lower. In the study of Barrea et al., a significant relationship was found between the consumption of red meat products and the severity of psoriasis, which is in line with our findings.¹⁸ In a study conducted in 2021 by Inkgapairoj et al., 82.5% of patients with severe psoriasis and 59.5% of patients with mild psoriasis ate more than three servings of red meat per week, which showed that the severity of psoriasis and red meat consumption has a significant correlation ($p = 0.01$) that was consistent with our results.²¹ The presence of saturated fatty acids in red meat, as well as the exacerbation of inflammatory pathways associated with transforming growth factor- β and interleukin 17 and 23 has been considered to affect inflammatory diseases such as psoriasis.^{22,23}

The limitations of our study stemmed from its small sample size, which restricted our ability to include a sufficient number of patients representing diverse clinical types and severity levels. This limitation hindered a more precise evaluation of the impact of these factors. To better investigate this matter, future prospective studies with a larger sample size are essential.

5 | CONCLUSION

In this study, we found a significant difference between the two groups of psoriasis and control following the Mediterranean diet, which could indicate the relationship between diet and psoriasis and the potential benefits of this type of diet due to its anti-inflammatory properties. Although the relationship between the severity of psoriasis and the rate of adherence to the Mediterranean diet was not

significant, but due to the multifactorial nature of psoriasis and the impossibility of eliminating psychosomatic factors affecting the severity of the disease, it is difficult to conclude and requires more detailed study with more samples.

AUTHOR CONTRIBUTIONS

Zeinab Aryanian: Conceptualization; investigation. **Mohsen Asghari:** Writing—original draft; methodology. **Parisa Pasha Zanousi:** Validation; visualization. **Reza Ghadimi:** Validation; formal analysis. **Azar Shirzadian Kebria:** Supervision; data curation. **Parvaneh Hatami:** Writing—review and editing; investigation. All authors have read and approved the final version of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Dr. Shirzadian had full access to all of the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis. The data supporting the findings of this study are available from the corresponding authors upon reasonable request.

ETHICS STATEMENT

The research design of this study was approved by the Research Ethics Committee of Babol University of Medical Sciences with the code MUBABOL.HRI.REC.1398.021.

TRANSPARENCY STATEMENT

The lead author Azar Shirzadian Kebria, Parvaneh Hatami affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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