STUDY THE SERUM LEVELS OF IL-17, IL-23, TLR-4 ,TLR-7 ROLE IN IMMUNOPATHOGENESIS IN PATIENTS WITH PSORIASIS

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Abstract

Objective: The purpose of this study is to examine the relationship between immunological markers (IL-17, IL-23, TLR-4, and TLR-7) and several socio-demographic parameters, including age, sex, disease severity, stress, smoking behaviors, BMI classification, and dietary preferences, in patients with psoriasis.

Methods: This study investigates the incidence of psoriasis among patients at Imam Al-Hussein City Hospital in Karbala, Iraq, during the period spanning from December 2022 to April 2023. The study encompassed a heterogeneous sample of individuals, comprising both individuals in optimal health and those who had recently received a diagnosis but had not yet commenced therapy. The research employed a case-control design with convenience sample and evaluated four anatomical regions using the Psoriasis Area and Severity Index (PASI) scoring system. The sandwich enzyme-linked immunosorbent assay (ELISA) technique was employed to conduct an inquiry on immunomarkers.

Results: The analysis reveals a higher prevalence of psoriasis patients (50%) compared to the control group (40%), with no significant differences in age or gender. The female population had a numerical superiority, accounting for 56% of the total, while the male population had 35%. There was a significant difference in body mass index (BMI) values between healthy controls and psoriasis patients, but statistically distinguishable differences. Smoking prevalence was significantly higher in psoriasis patients compared to the general population. Both groups exhibited adherence to a nutritionally balanced diet, with most patients presenting moderate intensity symptoms. Immunological markers, including IL-17, IL-23, TLR-4, and TLR-7, were found to be elevated in psoriasis patients compared to healthy individuals, suggesting a potential association between these markers and the disease's aetiology.

Conclusion: Psoriasis patients make up a significant part of the study population, with higher smoking, stress, and healthy food habits. There's no significant difference in BMI, disease severity, or immunological markers.

Keywords: *Interleukin-17, Interleukin-23, Toll-like receptors-4, Toll-like receptors-7, and Psorisis*

INTRODUCTION

Psoriasis is an autoimmune disease with a prevalence of roughly 2-3% among the worldwide populace (1). Extensive research efforts have been dedicated to investigating this intricate illness; nonetheless, a comprehensive understanding of its precise aetiology and pathophysiology is still lacking. The role of immunological dysregulation in the pathogenesis and advancement of psoriasis has been well acknowledged. Several cytokines and innate immune receptors have been identified as significant contributors within the complex network of immune responses associated with this condition (2,3).

Adults have a more considerable prevalence (0.91–8.5%) than children (0–2.1%), and there are two peaks in incidence: ~30–39 years and ~60 years in comparison. In keeping with the favorable effects of UV radiation exposure and clinical amelioration of psoriasis, a geographical trend shows a higher incidence in nations closer to the equator than the more distant ones (4).

Epidermal acanthosis, rete ridge elongation and clubbing, supra-papillary plate thinning, parakeratotic hyperkeratosis, hypogranulosis, and Munro's microabscess are all key histopathological findings in psoriasis diagnosis. The abnormal generation of cytokines by T-lymphocytes significantly contributes to the development of psoriasis. Cytokines are classified as tiny glycoproteins that influence immune cell activity by attaching to specific receptors, as anti-inflammatory or pro-inflammatory possible. A dysfunctional balance between these two classes has been linked to allergy, autoimmune disorders, and aberrant inflammatory responses caused by dysregulated cytokine production (5,6).

Psoriasis has been related to interleukin-17 (IL-17) in recent years. T-helper-17 (Th17) lymphocytes mainly produce IL-17 and stimulate macrophages, endothelial cells, fibroblasts, and epithelial cells, leading to the secretion of the pro-inflammatory cytokines tumor necrosis factor-alpha (TNF-α), interleukin (IL-16), interleukin (IL)-1, chemokines, and metalloproteinases. Natural killer T cells (Tγδ) and Th17 cells are key producers of IL-17. Psoriasis patients may benefit from using IL-17 inhibitors. Biological therapy has been effective in clinical trials examining the IL-17 pathway, such as anti-IL-17 agents like ixekizumab, which have yielded significant improvements in moderate to severe psoriasis symptoms (7,8).

Psoriasis pathogenesis is widely believed to entail an unbalanced cytokine profile, with IL-17 playing a pivotal role. Biological treatments targeting the IL-17 pathway have demonstrated encouraging results in treating psoriasis (9).

Various chemicals activate the innate immune cells, namely plasmacytoid dendritic cells (pDCs) expressing Toll-like receptors (TLR) 7/9 and myeloid dendritic cells (mDCs) expressing TLR3/8. Complexes of self-nucleic acids (DNA and RNA from damaged cells) and antimicrobial peptides (AMPs) like LL-37, DEFB4, hBD3, lysozyme 9, and IL-26 are effective against a wide variety of bacteria and other microbes (a Th17-derived cytokine). Thymic stromal lymphopoietin (TSLP), generated by keratinocytes (KCs), and chemerin, produced by fibroblasts, mast cells, and endothelial cells, also contribute to the activation process (10,11).

After being stimulated, these immune cells differentiate into the more inflammatory cutaneous dendritic cells and secrete inflammatory cytokines such interferon-gamma (IFN-γ; via pDCs), interleukin-23 (IL-23), tumor necrosis factor (TNF), nitric oxide (NO), and interleukin-20 (IL-20) (by mDCs). These cytokines indicate the beginning of psoriatic disease progression by setting off a chain reaction of pathogenic inflammation. The characteristic pathologic cell underpinning psoriatic pathophysiology is the IL-17+ T-cell phenotype (Th17, Tγ17), promoted by interactions between IL-23-producing dendritic cells and T cells in the dermis. Dendritic cells that produce IL-23 also stimulate T cells, ILC3, mast cells, macrophages, dendritic cells, and neutrophils, all of which produce IL-17 (12).

The study conducted in recent years has focused on the importance of Interleukin-17 (IL-17) and Interleukin-23 (IL-23) due to their pivotal role in the regulation of immunological responses and their association with the onset of autoimmune illnesses, specifically psoriasis (13).

In addition to IL-17 and IL-23, Toll-like receptors (TLRs), specifically TLR-4 and TLR-7, are essential components of the innate immune system. They are responsible for the identification of pathogen-associated molecular patterns (PAMPs) and damage-associated molecular patterns (DAMPs). There is a growing body of evidence suggesting that these receptors might be involved in the immunopathogenesis of Psoriasis through the initiation of atypical immune responses to endogenous ligands. The involvement of Toll-like receptor 4 (TLR-4) and Toll-like receptor 7 (TLR-7) activation has been associated with the stimulation of inflammatory cytokine synthesis, hence playing a role in the perpetuation of chronic inflammation evident in psoriatic lesions (14,15).Study a role of immunomarker IL-17 , IL-23 , TLR-4 ,TLR-7 triggers and related with severity of psoriasis disease

Patients and Methods

The present study is a sequential sample observational case-control study with a cohort of 40 individuals classified as healthy controls and 50 individuals diagnosed with psoriasis. The participants in this study are individuals who are

experiencing Psoriasis and are receiving treatment in the Dermatology unit at the Hospital of Imam Al-Hussein City in Karbala province, Iraq, during the period from December 2022 to April 2023. The study was authorised by the postgraduate committee of the Clinical Laboratories Department, College of Applied Medical Sciences at Kerbala University in Karbala, Iraq. The participants in this study were selected subsequent to receiving a diagnosis from a dermatologist. The participants were allocated into two distinct groups. All participants provided informed consent to participate in this study, adhering to ethical guidelines. The study enrolled individuals who met specific inclusion criteria, which included being in good health, having just received a diagnosis of Psoriasis, and not currently receiving any form of treatment. The pregnant women, patients with chronic disorders (including celiac and autoimmune conditions), and patients who have undergone treatment for psoriasis were excluded based on the specified criteria.

The data that was gathered was subjected to analysis using the Statistical Packages for Social Sciences- version 28 (SPSS-28), which is a commonly utilised software application for statistical analysis. Statistical tests, such as the Student's t-test, were utilised to assess the significance of mean differences in quantitative data, specifically for independent means. In contrast, the paired t-test was employed to analyse paired observations or dependent means. The chi-square test was employed to analyse qualitative data. The Spearman's rank correlation coefficient, also known as Spearman rho, was computed in order to assess the correlation between the variables. The utilisation of the scattering distribution curve was employed as a means to visually represent the pattern of correlation. When evaluating statistical significance, a p-value of less than or equal to 0.05 was regarded as the critical threshold (16).

Results and Discussion

Demography
In the current study, a case-control study was conducted to study the moderate and severe of a total of 50 (56%) psoriasis patients and 40 (44%) healthy individuals (control) in Karbala Providence. Patients had moderate and severe, according to PASI scores. The results of the age distribution for control subjects included in this study are listed in table (1).

The results showed that the psoriasis patients had higher numbers and percentages than the control. The mean age range of psoriasis patients was higher than the control without any significant difference, as shown in figure (1). The age range of control subjects was more comprehensive than the psoriasis patients.
The Sex distribution of control subjects and psoriasis patients showed that the frequency and percentage of females were higher than males, as shown in figures (2) and (3). No significant difference was found between the Sex for both studied groups.

Table (1): Age distribution of control subjects and psoriasis patients.

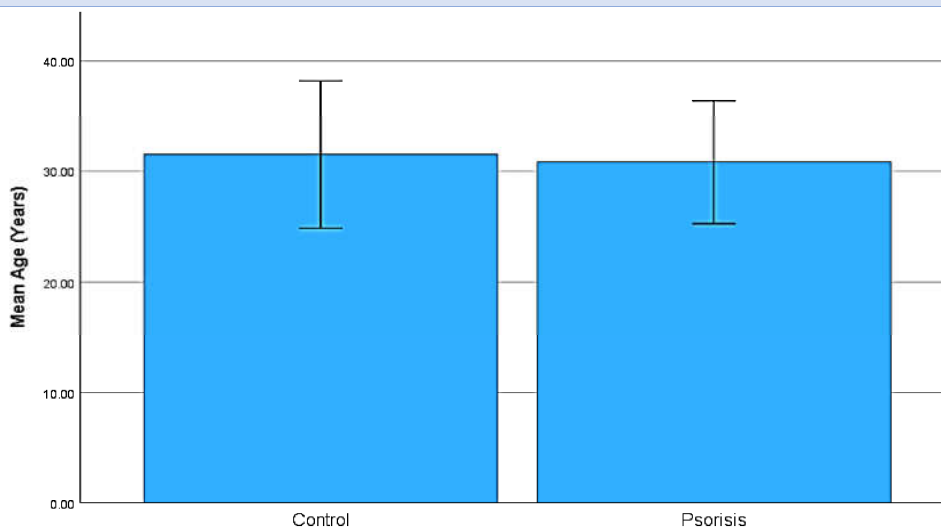|		Control	Psoriasis	*p*-value
Age		34.37 ± 2.42	36.62 ± 2.09	0.850
sex	Male	14 (35.0%)	19 (38.0%)	0.058
	Female	26 (65.0%)	31 (62.0%)	0.090
	p-value		0.850	
* Independent T-Test is significant at the 0.05 level				

Figure (1): Comparison between the control and psoriasis patients for age

The information states there were no significant difference between the mean age of psoriasis patients and the control. This implies that the age difference between the two groups was not statistically significant despite the higher mean age in the psoriasis patients. The age range of the control subjects was broader than that of the psoriasis patients. This means that the control group included individuals of a broader range of ages than the psoriasis patients, who likely fell within a narrower age range.

In this study, a recruited control from a more extensive age range to ensure that all age groups were well represented. This more excellent age range in the control group may have resulted in a broader age distribution compared to the psoriasis patients. The selection criteria for people with psoriasis and control participants may have affected the age distribution. Due to the study's intention to include only newly diagnosed patients, the age range of psoriasis patients may be shorter than that of control people. In general, psoriasis were a chronic skin disorder that grows and persists over time. This might result in a more significant proportion of elderly psoriasis patients compared to the control. The size of the study's sample might affect the observed disparities in age distribution. A bigger sample size might offer a more precise depiction of the population's age distribution.

Psoriasis often begins before age 40, with around one-third of instances appearing before the age of 20 years, as mentioned by (17). Griffiths & Barker, 2007 (18) and Neimann et al and Kampe et al, (19,20) found that type I psoriasis is most significant before age 40, accounting for roughly 75% of all psoriasis cases. Although psoriasis may manifest at any age, most patients appear before the age of 35 years (21).

Although psoriasis may occur at any age, it is far less common in children than adults. Age at the beginning seems to display two peaks: one between 30 and 39 years and another between 50 and 69 years (17). In addition, the average age of onset for Japanese patients is almost 39 years older than the worldwide norm (22). In the United States, psoriasis is known to occur at various ages, with the typical age of onset for the first occurrence lying between 15 and 20 years (23).

Studies showed that psoriasis may occur throughout a person's lifespan, with a higher prevalence in some age groups, particularly before age 40 and throughout the early and middle adult years. Understanding the age range of psoriasis onset assists healthcare practitioners in developing age-specific diagnostic, therapeutic, and management techniques (21).
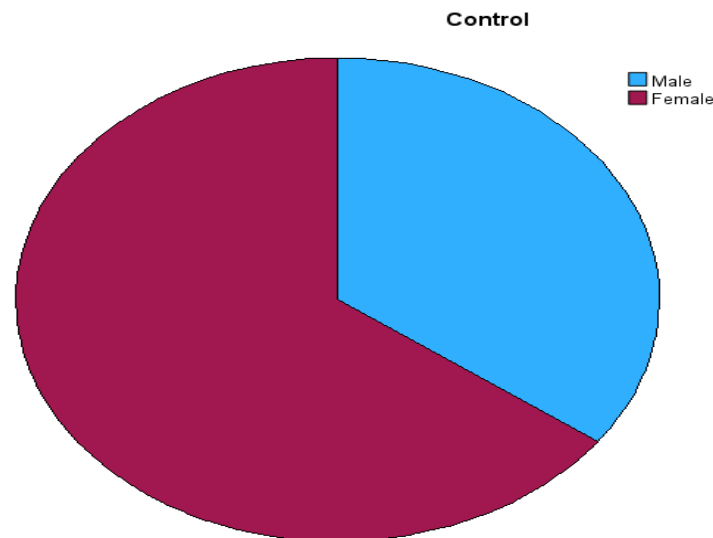

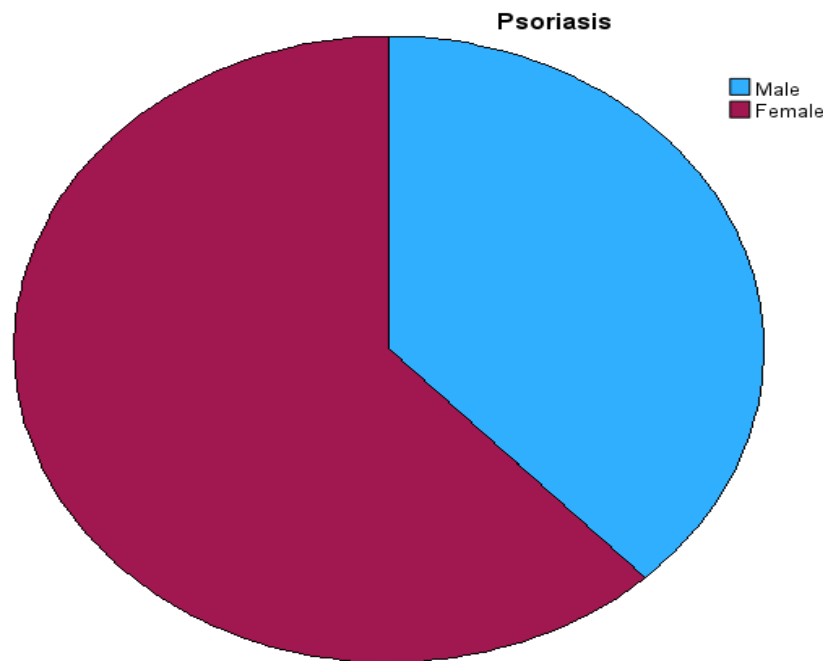**Figure (2): Comparison between the female and males for control subjects**

Figure (3): Comparison between the female and male psoriasis patients

Variables were such as the demography of the study population, the prevalence of psoriasis, and the overall distribution of the sexes in the study population, may account for these data. Multiple variables, including the demographics of the community from which study participants were recruited, might impact the sex distribution of a study. It was possible that the fact that in this study was performed in an area or region with a larger number of females contributed to a higher frequency and percentage of females in both the control and psoriasis patient groups.

Results recognized that psoriasis affects both men and females. Its incidence might vary between patients with psoriasis and control. The prevalence of psoriasis in similar study population is comparable across males and females, and there may be a similar number of males and female psoriasis patients. The inclusion and exclusion criteria for participant selection were not impacted by sex.

Psoriasis has a significant global prevalence, impacting roughly 125 million people globally. The illness is prevalent in the Caucasian population, with men and women being equally affected (23). In addition, the prevalence of psoriasis in the general population is between 2% and 3% and is evenly divided across men and women (24). In addition, Thomas et al. underlined that psoriasis affects both sexes equally (21).

In the context of the study alluded to by Abbas et al., the patient cohort consisted of 36 females (51.4% of the total) and 34 males (48.6% of the total), resulting in a female-to-male ratio of 1:1. (25) investigation confirmed the continuous male-to-female ratio found among psoriasis patients. In addition, several studies in Western countries have consistently shown no significant Sex differences in the incidence of psoriasis among patients (25).

In 2022, a study conducted by Carole Guillet *et al.* agreed with this study. Their primary purpose was to examine possible sex-dependent variations in the presentation of psoriasis among patients. This investigation aimed to determine whether there were differences in the incidence, prevalence, and clinical symptoms of psoriasis on the skin between persons of different sexes. The studies used a rigorous technique that included enrolling a broad sample of male and female psoriasis patients. Various sources, including medical records, clinical exams, and patient self-reports, were used to obtain data.

The incidence and prevalence of psoriasis did not vary significantly between men and females, according to the study's conclusions, which were based on a thorough examination of the collected data. Both sexes were equally susceptible to getting skin diseases. In addition, the cutaneous manifestations and clinical aspects of psoriasis were the same in male and female patients. These results show that, in this particular investigation, Sex did not substantially alter the skin-related elements of psoriasis (26).

BMI Classification

The classification of body mass index (BMI Kg/m^2) is as follows: Below 18.5 is classified as Underweight, 18.5 – 24.9 was classified as healthy weight, 25.0 – 29.9 is classified as overweight, and 30.0 and above is classified as Obesity. The results of BMI in this study were shown in table (2). The BMI analysis shows a highly significant difference between the classifications underweight, healthy weight, overweight, and obesity for control and psoriasis patients. For control, it was

shown that 58.82% of them were obese, 23.53% of them were overweight, 8.82% of them were healthy, and the same percentage were underweighted, as presented in figure (4).

Thirty four percent were obese among psoriasis patients, 30% of them were overweight, 26% of them were healthy, and 10% of them were underweight, as presented in Figure (5). No significant difference was reported between the BMI of control subjects and psoriasis patients at p–value 0.955.

The BMI data analysis revealed a very significant difference between the BMI classes (underweight, healthy weight, overweight, and obesity) for both control and psoriasis patients. This suggested that the distribution of BMI categories varied significantly between the two groups. Despite the considerable variation in BMI category distribution, statistical analysis revealed no significant difference in BMI between control and psoriasis patients. In other words, the average BMI of controls and psoriasis patients didn't vary considerably.

The absence of a statistically significant difference in average BMI between control participants and psoriasis patients shows that, on average, both groups had comparable body weight features. Even though the percentage distribution of BMI categories varied between the two groups, the total BMI values did not change substantially. The lack of a statistically significant difference in average BMI does not always indicate that BMI is unrelated to psoriasis. Additional study and analysis may be required to investigated possible links between BMI and psoriasis.

Consistent with a 2017 study by Sobhan et al., data supported the hypothesis that overweight and obesity were more frequent among persons with different skin disorders, including psoriasis, than healthy ones. Their study aimed to examine the possible relationship between obesity and psoriasis severity. The study analyzed the body mass index (BMI), waist circumference, age, and sex of psoriasis patients classified as mild, moderate, or severe. Comparing the mean values of BMI, waist circumference, age, and sex across patients with mild, moderate, and severe psoriasis did not indicate any statistically significant differences. These results suggested that these specific factors did not display major differences between psoriasis severity levels (27).

Table (2): Body mass index (BMI Kg/m²) of control subjects and psoriasis patients.

| Groups	Classifications	Mean	Standard Deviation	Minimum	Maximum	p-value
Control	Underweight	17.8383	0.06033	17.78	17.96	<0.001*
	Healthy Weight	20.3030	0.60718	19.10	21.05	
	Overweight	28.0864	0.51638	25.00	29.30	
	Obesity	34.8533	1.02718	30.04	49.03	
	Total	30.4759	1.20775	17.78	49.03	
Psoriasis	Underweight	17.3292	0.48003	15.42	17.96	<0.001*
	Healthy Weight	22.9075	0.39035	19.10	24.61	
	Overweight	27.0825	.25721	25.26	29.30	
	Obesity	35.4755	1.43207	30.04	49.03	
	Total	27.0369	0.90965	15.42	49.03	
*One-way ANOVA test at a significant difference level of ≤0.05.						
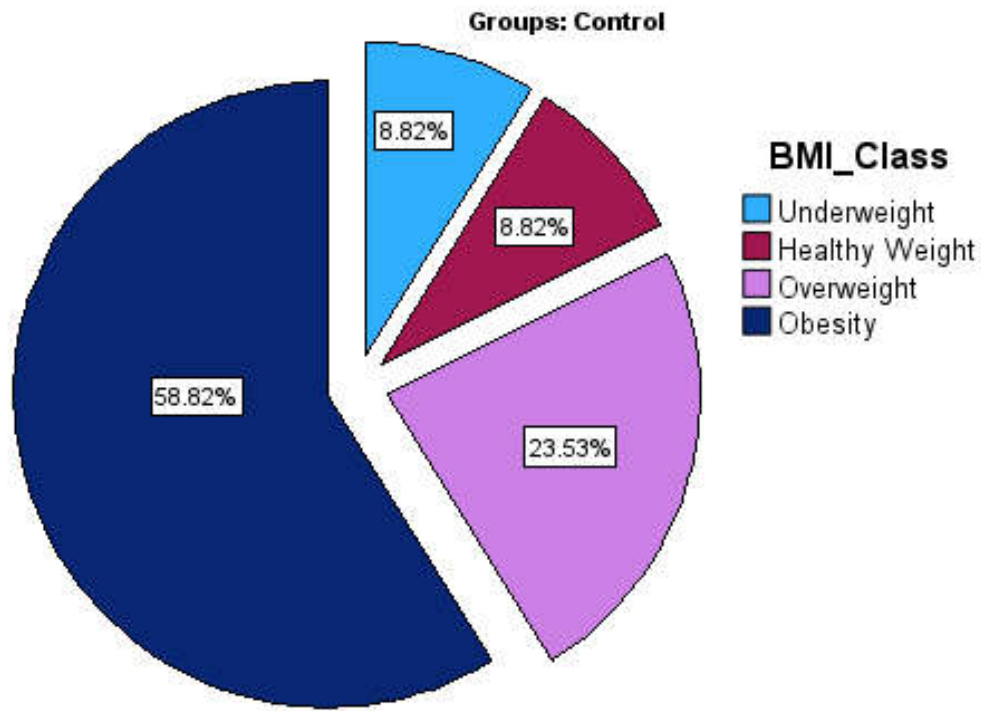
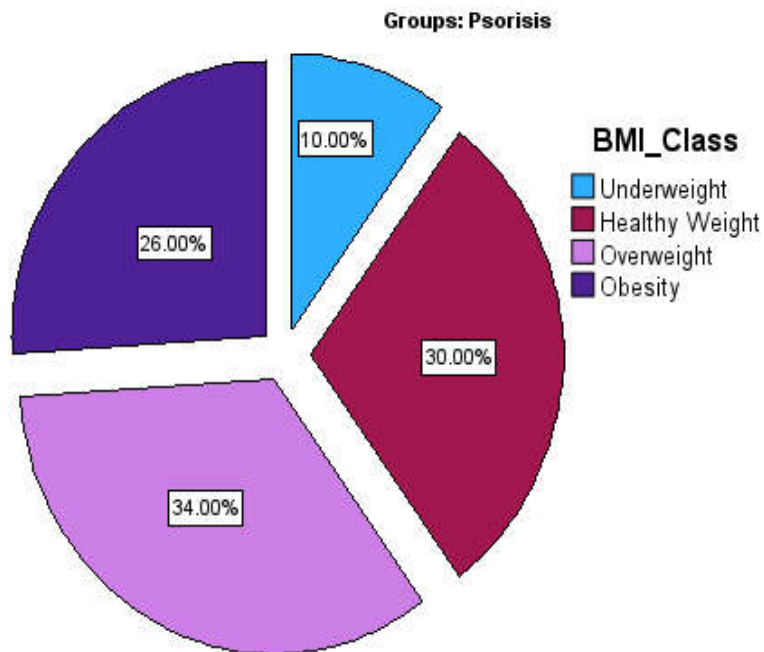**Figure (4): Comparison between the BMI classifications for control subjects**

Figure (5): Comparison between the BMI classifications for psoriasis patients

Smoking

For all the subjects in this study, the non-smoker was significantly higher than the smoker patients (26.67% and 73.33%, respectively) at p–value <0.001. The percentage of non-smokers for control was 31.11%, while 42.22% for psoriasis patients. Furthermore, the percentage of smokers of control and psoriasis patients was 13.33% equally, as shown in figure (6).
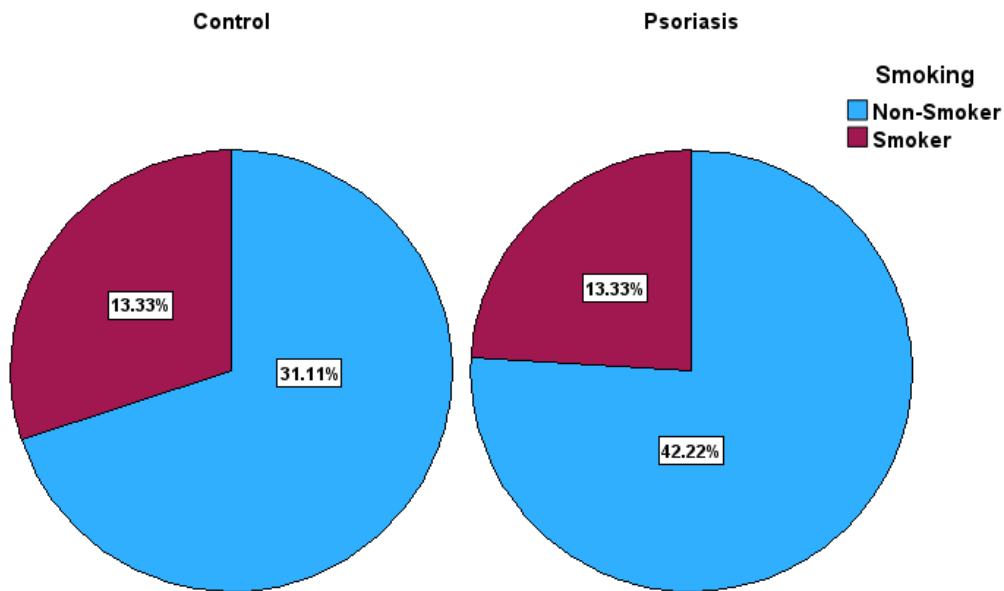
Figure (6): Comparison between the smoking habits of controls and psoriasis patients

The findings of this study revealed that the individuals' smoking habits varied significantly. There were more non-smokers than smokers within the patient group. The statistical analysis revealed a significant difference in smoking status between patients who did not smoke and those who did. The same percentage of smokers in the control group and psoriasis patients demonstrates that smoking prevalence is comparable between these two groups. Still, the significant difference in non-smoker percentages indicated that psoriasis patients were likely to have a more considerable number of non-smokers.

Several causes mentioned by (28) meta-analysis may be responsible for these results. People with psoriasis may be inspired to adopt better lifestyle behaviors, such as stopping smoking, to control their symptoms and improve their overall health. In addition, individuals with psoriasis may become more health-conscious, resulting in a more significant percentage of non-smokers among psoriasis patients. Smoking exacerbates inflammatory disorders such as psoriasis, as is well-established. Concerns about the effects of smoking on the advancement of psoriasis may inspire psoriasis patients to stop smoking.

4.4 Stress
Stress was shown to be much more prevalent among the control of this study, constituting 74% of the participant population, than among those who did not report experiencing stress, who accounted for 26% of the sample, as shown in Figure (7). The statistical analysis found a significant difference between stress-exposed and stress-free people, with a p-value ≤0.001.

When comparing the stress levels of the control and psoriasis patients, the proportion of stressed psoriasis patients was somewhat more significant (38 %) than that of the control group (36 %). In contrast, 14 % of respondents in the control group were not stressed, compared to 12 % of people with psoriasis.

These findings showed a significant prevalence of stress among study participants, with a greater percentage of those feeling stress than those who reported no stress. The variations in stress levels between the control and psoriasis patients indicated that stress may be linked to the condition. Nonetheless, it is essential to interpret these results with care since stress is a complicated psychological construct impacted by various variables, including individual coping methods, life circumstances, and social support.

The findings on stress levels in both the control group and psoriasis patients highlighted the need to evaluate psychological health in the context of psoriasis therapy. Stress has been identified as a possible psoriasis exacerbation trigger and may contribute to disease progression. Therefore, treating and managing stress via suitable treatments, such as counseling, relaxation methods, and stress reduction programs, might be advantageous for psoriasis patients to enhance their overall health and well-being.
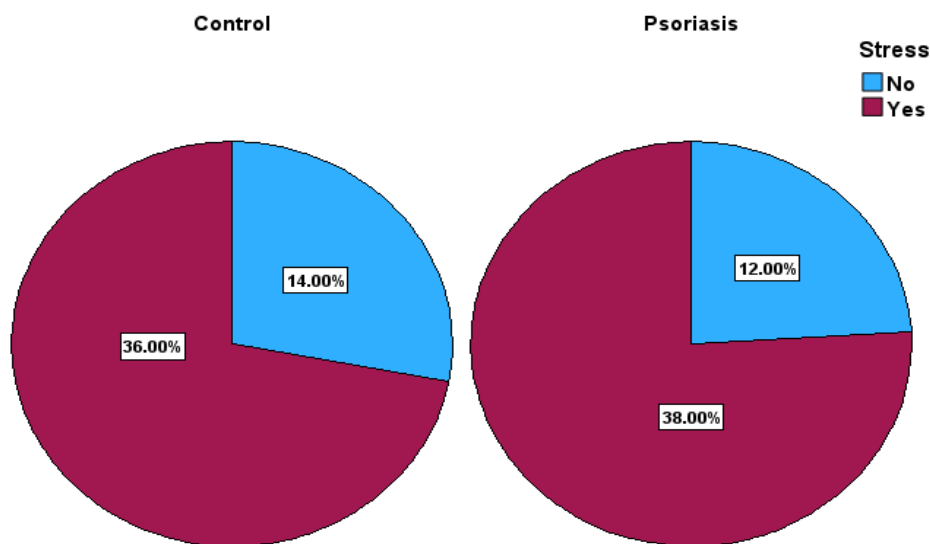
Figure (7): Comparison between the stressfulness of controls and psoriasis patients

The pathogenesis of the prevalent inflammatory skin disorder psoriasis vulgaris was not fully understood. It has been proposed that environmental and genetic variables have a crucial role in its development. In recent years, mental health and its effect on various diseases, including psoriasis, have garnered more attention (2,29).

Psoriasis pathophysiology includes intricate connections among the neurological, endocrine, and immune systems. However, prolonged stress has emerged as a possible mechanism affecting hormonal alterations, including decreasing systemic cortisol levels, which may promote autoimmune processes (30).

Whereas the precise processes driving psoriasis vulgaris remain obscure, this reviewed highlights the expanding knowledge of mental health, chronic stress, and the function of mast cells (MCs) in determining the pathophysiology of the illness. By investigating these paths in more depth, Researchers may discover unique pharmaceutical strategies to address the complexity of psoriasis and improve patient care. Continuing work in this area is vital for expanding our knowledge and establishing more effective techniques for treating this problematic skin disease (31).

Consuming artificial food
In this study, a substantial % of control and psoriasis patients were reported to be following a healthy diet, 31.11 and 32.22 %, respectively. On the other hand, a lower proportion of control respondents (13.33%) and psoriasis sufferers (23.33%) reported consuming artificial food, as shown in figure (8)

These results highlighted the possible significance of dietary choices concerning psoriasis and general health. The predominance of persons choosing a healthy diet in both categories indicated an increasing knowledge of the relationship between food and health. In contrast, including people who consume artificial foods merits consideration since their dietary choices may affect illness management and overall health.

This study findings underscored the relevance of examining dietary aspects in psoriasis, suggesting that supporting good dietary behaviors as part of comprehensive patient treatment may be essential. However, further study was required to investigate the precise food patterns and their effect on psoriasis symptoms and disease development. Understanding the relationship between nutrition and psoriasis might provide light on treating and preventing this chronic inflammatory skin disorder. Clinicians might contribute to increased outcomes and quality of life for psoriasis patients by supporting the adoption of appropriate dietary habits.
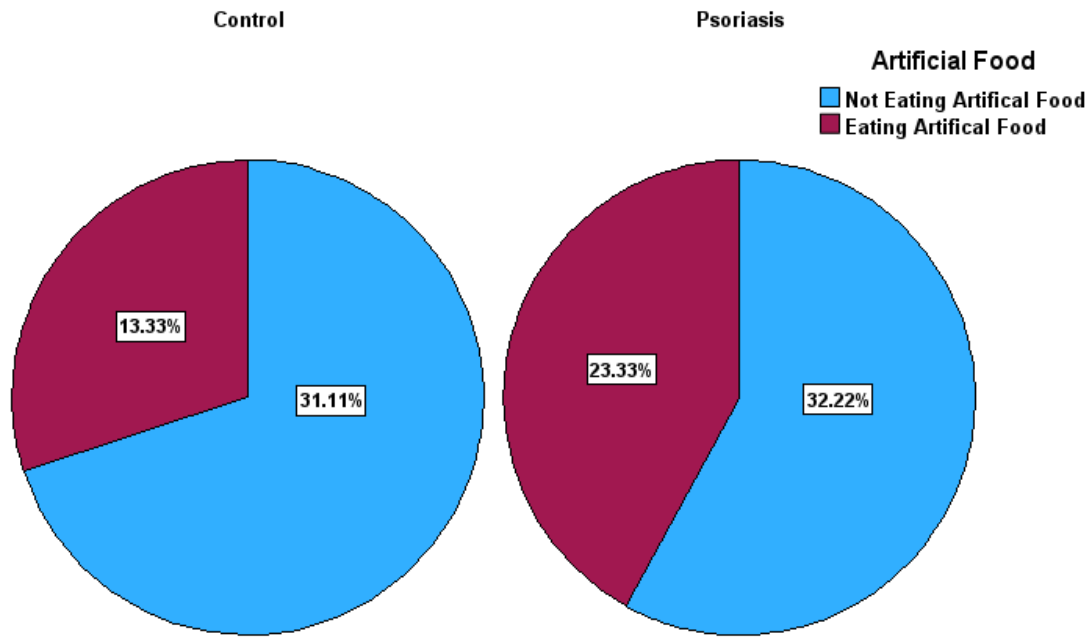
Figure (8): Comparison between the controls and psoriasis patients for those who consumed artificial food.

Severity of Psoriasis

The statistical analysis indicated a significant variation in disease severity among psoriasis patients, with the majority (54.44%) exhibiting moderate symptoms and the remainder (45.56%) displaying severe signs, as shown in figure (9). Despite this disparity in illness severity distribution, the study revealed a statistically significant difference between the two groups ($p = 0.0461$). These results had important implications for comprehending the severity range of psoriasis in afflicted people. The substantially more significant proportion of moderate instances highlighted the prevalence of milder symptoms, which may had significant consequences for patient management and treatment strategies. On the other hand, severe instances necessitate heightened vigilance since patients with more severe symptoms may need more intense and specialist treatment.

Analyzing several variables that may have contributed to this result was crucial. A bigger sample size might gave more solid insights into the illness severity distribution. In addition, the psoriasis patients variety of psoriasis symptoms complicates the categorization of individuals into various severity categories, resulting in the possibility of overlapping symptomatology.

In addition, the absence of statistical significance does not undermine the clinical importance of the observed heterogeneity in illness severity. It is essential to recognize the possible effect of other variables on psoriasis severity, including genetic predisposition, environmental triggers, lifestyle, and treatment history. Unaccounted-for confounding factors may have contributed to the reported results (32).
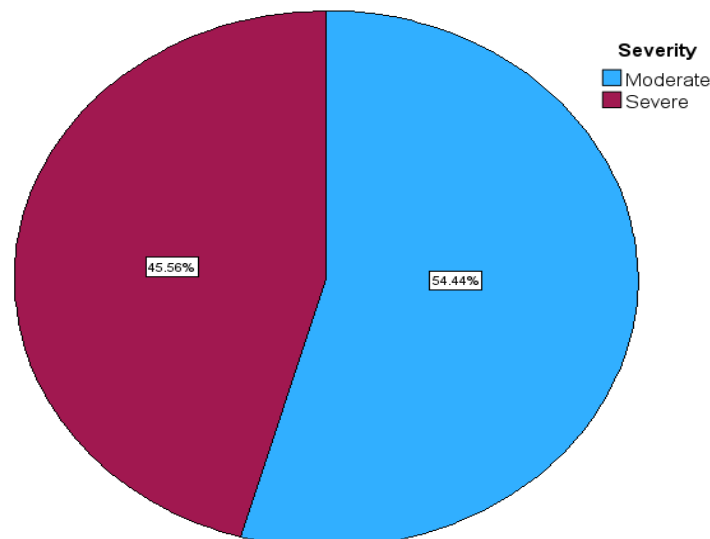
Figure (9): Comparison between the severity of psoriasis patients

Immune Markers

This work is essential to evaluating immune markers, notably IL-17, and IL-23, TLR-4, and TLR-7. Table (3) displays the comparative study of these characteristics between the control group and psoriasis patients. Figures illustrate (10), (11), and (12) illustrate that psoriasis patients had considerably more significant levels of these immune marker markers than the control participants (13). All the immune marker markers were within the normal range.

These results suggest that these immune marker variables may play a role in the etiology of psoriasis. The greater levels reported in individuals with psoriasis may reflect their role in disease genesis and progression. The discovery of higher IL-17, and IL-23, TLR-4, and TLR-7 levels in psoriasis patients are relative to healthy controls implies that these proteins may serve as disease biomarkers. In addition, these findings provide light on the immunological systems and genetic factors that contribute to psoriasis.

In this research, an examination of immune marker variables found that psoriasis patients had substantially elevated levels of IL-17, and IL-23, TLR-4, and TLR-7 compared to healthy controls. These results add to the expanding body of information about the immunopathogenesis of psoriasis. More study is required to define the exact functions of these immune marker markers and their interactions in psoriasis to further our knowledge and treatment of this complicated illness.

Table (3): Comparison between control subjects and psoriasis patients for TLR 7, TLR 4, IL 17, and IL 23.

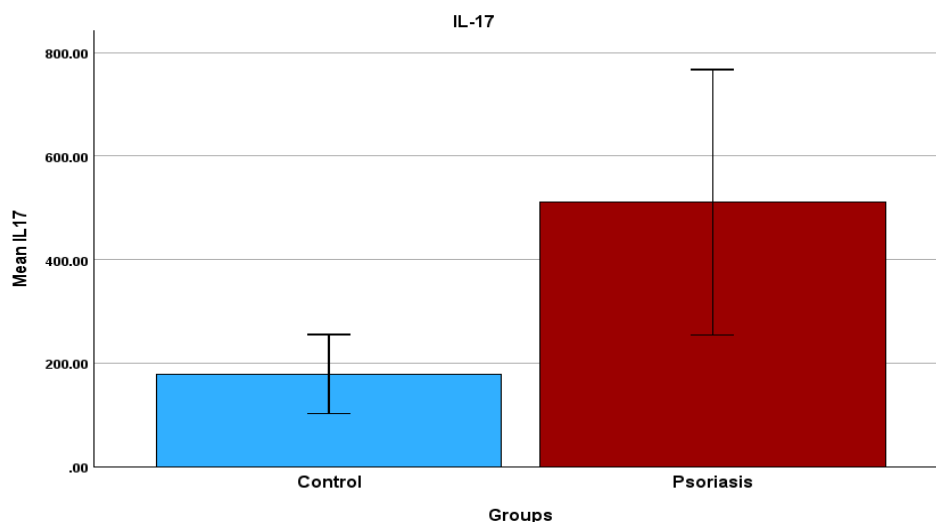| Markers	Groups	Mean	Std. Deviation	*p*-value
TLR-4	Control	233.7154	35.71082	<0.001*
	Psoriasis	647.5158	139.30081	
TLR-7	Control	1.4736	0.24200	0.003*
	Psoriasis	3.3694	0.62321	
IL17	Control	178.8261	38.17535	<0.001*
	Psoriasis	510.4492	128.29269	
IL23	Control	344.2801	52.64646	<0.001*
	Psoriasis	764.7995	130.29179	
* Independent T-Test is significant at the 0.05 level				

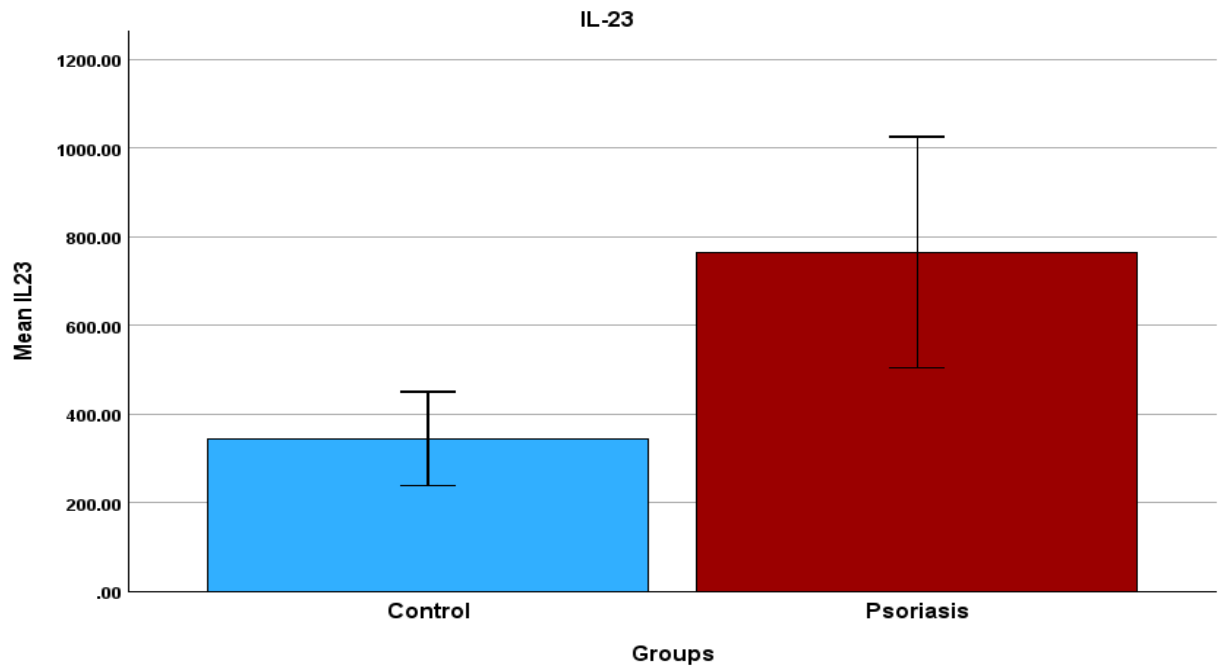**Figure (10): Comparison between control subjects and psoriasis patients for IL 17.**

Figure (11): Comparison between control subjects and psoriasis patients for IL 23.
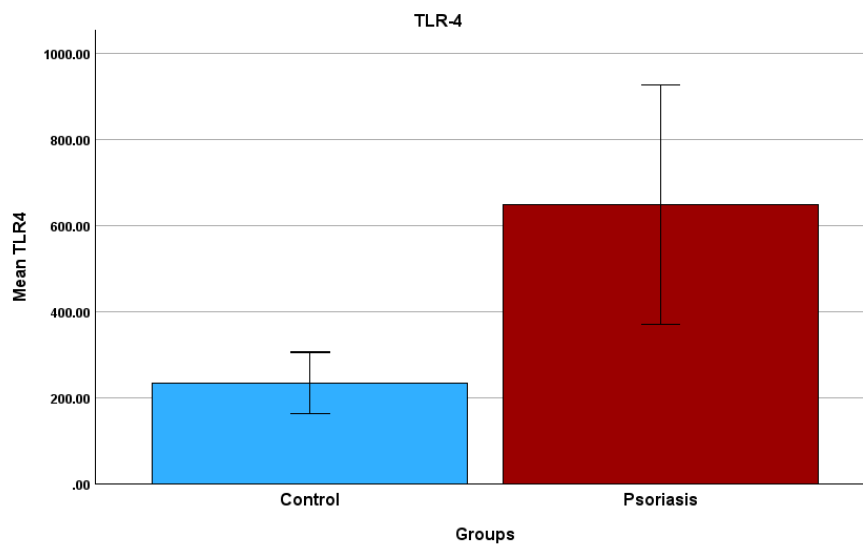

Figure (12): Comparison between control subjects and psoriasis patients for TLR – 4
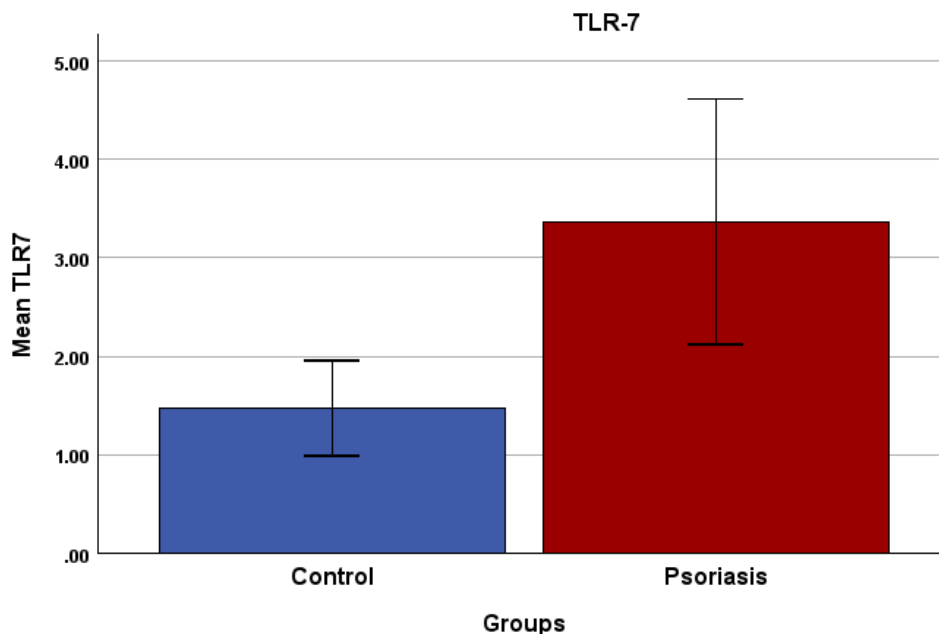
Figure (13): Comparison between control subjects and psoriasis patients for TLR-7.

The results of this study support the hypothesis that IL-23 plays an essential role in the onset of psoriasis and is connected with the activation of innate immunity. The blood levels of IL-23 in psoriasis patients and controls have produced contradictory findings in prior study, indicating that IL-23 may have a localized impact on psoriatic lesions. Cyclosporine, NB-UVB, and MTX have been demonstrated to reduce IL-23 levels, showing their potential to modulate the IL-23/Th17 axis and its contribution to the pathogenic processes of psoriasis.

The elevated levels of IL-17, and IL-23, TLR-4, and TLR-7 in psoriasis patients imply that these biomarkers may have a role in the etiology of the illness. These higher levels may reflected their role in the origin and evolution of psoriasis, suggesting that they are possible biomarkers for the disease. This study proposed insight maybe into the interaction between immune systems and genetic variables contributing to psoriasis's onset and presentation.

This results reveals that the a considerable rising in IL-17, and IL-23, TLR-4, and TLR-7 levels relative to healthy controls in psoriasis patients. This study maybe increased understanding of the immunopathogenesis of psoriasis, hence directing the creation of individualized therapy options.

Conclusion:

The study found that psoriasis patients had a higher prevalence of the disease than control participants, with no significant difference in mean age, gender, BMI categories, or stress levels. Both groups reported maintaining a balanced diet, but a fraction consumed artificial foods. These immune markers may play a crucial role in modulating the effects of socio-demographic factors on psoriasis. Further research is needed to understand the influence of these factors on psoriasis. Patients with psoriasis had substantially elevated levels of immunological markers (IL-17, IL-23, TLR-4, TLR-7) compared to healthy controls. These results suggest that these immunological markers may play a role in the genesis and development of psoriasis.

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