Prevalence and association of renal disorders in Saudi adult patients with psoriasis and psoriatic arthritis: a tertiary-center retrospective cross-sectional study

Mishari T. Alrubaiaan,[1,2] Abdullah D. Alhobabi,[1,2] Raghad M. Alharthi,[2,3] Saad A. Alsulaiman,[1,2] Abdullah N. Altasan,[1,2] Ibrahim M. Momen,[1,2] Mohammad Almohideb[1-3]

[1]College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, Riyadh; [2]King Abdullah International Medical Research Center, Riyadh; [3]Department of Dermatology, Ministry of National Guard-Health Affairs, Riyadh, Saudi Arabia

Abstract

Psoriasis, a chronic inflammatory skin disease, is connected to psoriatic arthritis, a chronic inflammatory arthritis. Recent studies have also linked psoriasis and psoriatic arthritis to various renal disorders. This research aims to determine the prevalence and association of renal disorders in adult patients with psoriasis and compare those findings with adult patients with psoriatic arthritis. This retrospective cross-sectional study included 485 participants with psoriasis. The study evaluated demographics, psoriasis type, the presence of psoriatic arthritis, and related comorbidities, excluding individuals under the age of 18 or those with no verified diagnosis. Medical records were reviewed for renal problems, and a multivariate logistic regression was used to investigate the relationship between psoriasis and psoriatic arthritis. Overall, 10.1% of individuals with psoriasis had psoriatic arthritis. The mean age at diagnosis was 41.59±15.58 years, with 54.2% being female. Plaque psoriasis was identified in 87.2% of patients, with 46% classified as obese (body mass index [BMI]≥30). Chronic renal failure was seen in 6.2% of psoriasis patients and 6.1% of psoriatic arthritis patients. In our study, chronic renal failure rates were similar in psoriasis and psoriatic arthritis. Psoriatic arthritis was associated with an increased risk of acute kidney damage, transplantation, and dialysis.

Correspondence: Mishari Tariq Alrubaiaan, King Abdullah International Medical Research Center, P.O. Box 3660, 11481 Riyadh, Saudi Arabia.
Tel.: +966530428222
E-mail: misharitariq@gmail.com

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Introduction

Psoriasis is a chronic inflammatory skin disease that has a prevalence of 2% worldwide. It is characterized by abnormal keratinocyte proliferation, altered differentiation, and skin inflammation.[1-3] The etiology of psoriasis involves strong genetic predisposition and autoimmune pathogenic factors, driven primarily by pathogenic T-cells and innate immune systems, which produce interleukin 23 (IL-23) to increase the levels of interleukin 17 (IL-17).[4] Besides genetics and impaired immune functions, there are multiple risk factors such as Crohn's disease, multiple sclerosis, use of certain drugs (lithium and β-blockers), and environmental triggers such as infection and stress that may contribute to psoriasis.[5] Moreover, psoriasis is associated with multiple comorbidities, including psoriatic arthritis, stroke, obesity, diabetes, and kidney disease.[6]

Psoriatic arthritis is a condition that is characterized by chronic inflammation of joints. Psoriatic arthritis affects 0.1%-1% of the general population and is present in about 20% of patients with psoriasis.[7] It can manifest in different forms, including arthritis in the peripheral and axial joints.[8] Occasionally, patients with psoriatic arthritis may present with nail disease or uveitis.[9] In general, symptoms of psoriatic arthritis involve swelling and inflammation of tendons and/or joints, potentially leading to new bone growth and joint injury.[10]

Globally, renal failure and end-stage renal disease are quite prevalent and rising over time, leading to significant morbidity and mortality.[11] The correlation of psoriasis and psoriatic arthritis with renal disease is less clear as compared to cardiovascular and metabolic comorbidities.[12] A Taiwanese cross-sectional study has indicated that individuals with psoriasis exhibit a higher risk of developing chronic renal disease.[13] Furthermore, another Taiwanese cohort study suggests that psoriasis significantly increases the risk of developing chronic renal failure in 2.4% of individuals with these conditions.[14] In contrast, studies have sug-

gested a correlation between renal disorders and psoriatic arthritis. According to a recent study conducted in Spain, it is found that there is a higher prevalence of chronic renal failure among individuals with psoriatic arthritis.[15]

There is a notable gap in the literature in Saudi Arabia regarding the occurrence and association of psoriasis and psoriatic arthritis with renal disorders among adult patients. Given the significant impact of psoriasis and psoriatic arthritis on dermatologists, rheumatologists, and patients, understanding the prevalence and association of renal comorbidities is crucial for effective management. Additionally, this knowledge may offer insights into the pathogenesis of these conditions.

This study aims to explore the prevalence and association of kidney disorders in adult patients with psoriasis and compare the findings with those in adult patients with psoriatic arthritis.

Materials and Methods

In this retrospective cross-sectional study, individuals diagnosed with psoriasis were retrospectively identified through the BESTCare System within the timeframe spanning from 2015 to 2023 at King Abdulaziz Medical City, Riyadh. The utilization of the BESTCare System guarantees comprehensive inclusion of nearly all clinically recognized psoriasis cases, enabling access to their detailed medical records for the purpose of this study.

Selection criteria

This study included participants aged 18 years or older with a confirmed diagnosis of psoriasis by a board-certified dermatologist. Patients under the age of 18 or lacking a verified diagnosis of psoriasis by a board-certified dermatologist were excluded from the study to ensure a cohort with well-defined and confirmed psoriatic cases. After applying the defined inclusion and exclusion criteria, the study successfully enrolled 485 patients with a verified diagnosis of psoriasis.

Data collection and analysis

The study group retrieved data from the BestCare system, encompassing information on all patients diagnosed with psoriasis, after obtaining approval from the Institutional Review Board at King Abdullah International Medical Research Center. Demographic details, clinical manifestations, psoriasis type, presence of psoriatic arthritis, associated medical comorbidities, and information regarding renal disorders for each participant were systematically collected using a standardized computerized data abstraction sheet. The determination of psoriasis type was based on a physician's diagnosis and/or description of characteristic lesions recorded in the medical records. The identified psoriasis types included chronic plaque psoriasis, guttate psoriasis, sebopsoriasis, pustular psoriasis, erythrodermic psoriasis, and inverse psoriasis. Where the medical records did not specify the type of psoriasis, chronic plaque psoriasis was assumed.[16]

The study evaluated the prevalence of several comorbidities, including smoking, obesity, diabetes mellitus, hypertension, and hyperlipidemia, among patients with psoriasis and psoriatic arthritis. Smoking status was defined as either current or never smoked. Hypertension was defined by two or more blood pressure readings exceeding 140 mmHg systolic and/or 90 mmHg diastolic, a physician's diagnosis of hypertension, or the use of antihypertensive agents.[17] Diabetes mellitus was diagnosed by at least two measurements of fasting plasma glucose ≥126mg/dL, a 2-hour plasma glucose level ≥200mg/dL, or a documented history of diabetes mellitus or treatment with hypoglycemic agents. Individuals with hyperlipidemia had total cholesterol levels of ≥5.2 mmol/L or used lipid-lowering agents. Patients with a body mass index (BMI)≥30kg/m^2 were classified as obese.[17]

Moreover, medical records of patients with psoriasis and psoriatic arthritis were evaluated for a possible diagnosis of any renal disorder. Only patients who were diagnosed with a renal disorder by a nephrologist were included in the study. Confirmed cases of renal diagnosis were categorized into the following six groups: 1) chronic renal failure, 2) acute kidney injury, 3) kidney transplantation, 4) dialysis, 5) renal stones, and 6) other kidney diseases. The study also explored possible associations between renal disorders and different subgroups, specifically psoriasis and psoriatic arthritis.

Statistical analysis

SPSS version 12.0 for Windows (SPSS Inc.) was the analytical tool throughout all statistical analyses. For continuous variables, descriptive statistics, including the mean and standard deviation, were used, and frequency distributions were used for discrete variables. Subjects with missing data for a specific feature were excluded from the percentage calculations related to that particular feature. The chi-square and Fisher's exact tests were employed to assess the differences between groups. The threshold for statistical significance was set at $p<0.05$. A multivariate logistic regression model was employed to compare patients with psoriasis and those with psoriatic arthritis with renal disorders. Two-tailed $p<0.05$ were considered statistically significant.

Results

The study included 485 patients initially diagnosed with psoriasis between 2015 and 2023, among whom 49 (10.1%) subsequently developed psoriatic arthritis.

Table 1 presents the clinical characteristics of 485 patients with psoriasis along with stratification into two groups on the presence or absence of psoriatic arthritis. At the time of the first diagnosis of psoriasis, the mean age ± standard deviation for all patients was 41.59±15.58 years, with 263 (54.2%) females and 222 (45.8%) males. The majority of patients (87.2%) were diagnosed with plaque psoriasis, followed by guttate psoriasis (6.6%), pustular psoriasis (1.6%), inverse psoriasis (1.6%), erythrodermic psoriasis (1%), parapsoriasis (0.6%), and sebopsoriasis (0.6%). Additionally, 46% of patients were classified as obese (BMI≥30), 10.9% were smokers, 31.5% had diabetes mellitus, 28% had hypertension, and 48.2% had hyperlipidemia.

The analysis of the subgroup indicates the difference between the patients with psoriasis alone and those who developed psoriatic arthritis post-psoriasis onset. The gender distribution was almost similar in the group with psoriasis alone (47.7% males, 52.3% females); in the psoriatic arthritis group, a significant difference emerged, with 28.6% males and 71.4% females (p=0.015). Furthermore, despite no significant differences in diabetes mellitus, hypertension, or smoking, 217 (49.8%) psoriasis patients had hyperlipidemia, compared to 17 (34.7%) psoriatic arthritis patients (p=0.050). Although not statistically significant, a higher percentage of patients with psoriatic arthritis were classified as obese (59.2%) compared to those with psoriasis alone (44.5%) (p=0.069).

The association of psoriasis and psoriatic arthritis with renal disorders

After the adjustment of age and gender, multivariate logistic analysis was performed; the results are shown in Table 2. In total, 27 (6.2%) individuals who were diagnosed with psoriasis and 3 (6.1%) individuals who were diagnosed with psoriatic arthritis had chronic renal failure, with an odds ratio (OR) of 0.089 (95% CI: 0.573-2770.385; multivariate p-value, 0.089). Additionally, 14 (3.2%) patients with psoriasis and 3 (6.1%) patients with psoriatic arthritis required dialysis, with an OR of 0.032 (95% CI: 0.00007-12.552; multivariate p-value, 0.258). Furthermore, 2 (0.4%) individuals were diagnosed with psoriasis, and 4 (8.2%) individuals who were diagnosed with psoriatic arthritis had kidney transplantation, with an OR of 0.007 (95% CI: 0.00003-1.754; multivariate p-value, 0.078). Acute kidney injury was identified in 1 (0.2%) patient with psoriasis and 7 (14.3%) patients with psoriatic arthritis with an OR of 1.268 (95% CI: 0.145-11.115; multivariate p-value, 0.046). Renal stones were not present in psoriatic arthritis patients; however, they were present in 14 (3.2%) patients who had psoriasis, resulting in an OR of 0.000032 (95% CI: 0.000-0.045; multivariate p-value, 0.995). An OR of 1.643 (95% CI: 0.225-12.014; multivariate p-value, 0.625) indicated that 36 (8.2%) individuals with psoriasis and 4 (8.2%) individuals who were diagnosed with psoriatic arthritis had other renal disorders.

Table 1. Demographics of the total study population.

Demographics of the total study population	Total n=485 (100%)	Psoriasis n=436 (89.9%)	Psoriatic arthritis n=49 (10.1%)	p-value
Gender, n (%)				
Male	222 (45.8)	208 (47.7)	14 (28.6)	0.015
Female	263 (54.2)	228 (52.3)	35 (71.4)	
Age at diagnosis of psoriasis (mean±SD)	41.59±15.58	41.58±14.69	41.71±14.70	0.516
Current age (mean±SD)	46.72±15.68	46.55±15.86	48.31±13.99	0.650
Type of psoriasis, n (%)				
Plaque	424 (87.2)	377 (86.5)	47 (95.9)	0.845
Guttate	32 (6.6)	30 (6.9)	2 (4.1)	
Sebopsoriasis	3 (0.6)	3 (0.7)	0 (0)	
Pustular	8 (1.6)	8 (1.8)	0 (0)	
Erythrodermic	5 (1.0)	5 (1.1)	0 (0)	
Inverse	8 (1.6)	8 (1.8)	0 (0)	
Parapsoriasis	3 (0.6)	3 (0.7)	0 (0)	
Obesity, BMI n (%)				
BMI<30	262 (54)	242 (55.5)	20 (40.8)	0.069
BMI>30	223 (46)	194 (44.5)	29 (59.2)	
Smoking, n (%)				
Yes	53 (10.9)	49 (14.6)	4 (8.2)	0.635
No	432 (89.1)	387 (85.4)	45 (91.8)	
Diabetes mellitus, n (%)				
Yes	153 (31.5)	137 (31.4)	16 (32.6)	0.872
No	332 (68.5)	299 (68.6)	33 (67.3)	
Hypertension, n (%)				
Yes	136 (28)	124(28.4)	12 (24.5)	0.618
No	349 (72)	312 (71.6)	37 (75.5)	
Hyperlipidemia, n (%)				
Yes	234 (48.2)	217 (49.8)	17 (34.7)	0.050
No	251 (51.8)	219 (50.2)	32 (65.3)	

BMI, body mass index; n, number; SD, standard deviation.

Table 2. Multivariate logistic regression model adjusted for age and gender.

Variable	Psoriasis n=436 (89.9%)	Psoriatic arthritis n=49 (10.1%)	OR (95% CI)	Multivariate p-value
Chronic renal failure	27 (6.2)	3 (6.1)	39.835 (0.573-2770.385)	0.089
Dialysis	14 (3.2)	3 (6.1)	0.032 (0.00007-12.552)	0.258
Kidney transplantation	2 (0.4)	4 (8.2)	0.007 (0.00003-1.754)	0.078
Acute kidney injury	1 (0.2)	7 (14.3)	1.268 (0.145-11.115)	0.046
Renal stones	14 (3.2)	0 (0)	0.000032 (0.000-0.045)	0.995
Other kidney disease	36 (8.2)	4 (8.2)	1.643 (0.225-12.014)	0.625

n, number; SD, standard deviation; CI, confidence interval.

Discussion

This research conducted a comprehensive examination into the overall prevalence and association of renal disorders in patients with psoriasis and further compared those findings with patients who have developed psoriatic arthritis. Notably, 49 (10.1%) patients diagnosed with psoriasis eventually developed psoriatic arthritis over the course of their lives. This observation aligns closely with a previous study conducted in Saudi Arabia, where 17 (13.28%) of their psoriatic patients were identified to have developed psoriatic arthritis.[18]

Upon comparing the two groups – those with psoriasis alone and those who subsequently developed psoriatic arthritis – no significant gender difference was found. However, a substantial gender difference emerged among those with psoriatic arthritis, where only 14 (28.6%) were males, while 35 (71.4%) were females.

A limited number of studies have explored the potential role of hormones in psoriasis and psoriatic arthritis. According to recent research of 33 females diagnosed with psoriasis, during times of low estrogen levels, female patients were more likely to experience disease flares and develop psoriatic arthritis.[19] Thumboo *et al.* discovered that women diagnosed with psoriasis who experienced pregnancy showed a reduced likelihood of developing psoriatic arthritis attributed to elevated estrogen levels.[20] These research outcomes indicate a potential role of estrogen in the prevention of the occurrence of psoriatic arthritis. Thus, it could explain why females were less likely to suffer from psoriatic arthritis than males in our study.

When comparing the comorbidities between the two cohorts, no significant differences in medical comorbidities between individuals diagnosed with psoriasis and individuals diagnosed with psoriatic arthritis were observed. However, there were notable associations with specific comorbidities: hyperlipidemia was more likely to be associated with psoriasis, while obesity was more prevalent in patients with psoriatic arthritis.

A higher prevalence of cardiac and metabolic disorders was associated with individuals with psoriatic arthritis.[21] In addition, it was found that metabolic and cardiovascular comorbidities in psoriatic arthritis are correlated with increased disease severity and reduced probability of responding to treatment.[21] Notably, obesity and hyperlipidemia have been previously identified as contributing factors to the development of psoriatic arthritis.[21] However, given the retrospective nature of this study, it is essential to acknowledge that it is not possible to determine whether cardiometabolic comorbidities preceded or followed the onset of psoriasis and psoriatic arthritis.

In terms of renal disorders, individuals with psoriasis and those with psoriatic arthritis exhibited a similar prevalence of chronic renal failure. However, though not statistically significant, individuals with psoriatic arthritis showed a greater frequency of acute kidney injury, kidney transplantation, and dialysis, while those with psoriasis had a higher rate of renal stones. Previous studies support these observations. A retrospective cohort study by Sebastian Yu *et al.* in 2017, involving 3,502 patients diagnosed with psoriasis, reported a 3.1% prevalence of chronic renal failure.[13] Similarly, in a cohort study conducted by Liu KL *et al.* in 2020, 2,912 patients diagnosed with psoriasis were enrolled. The study demonstrated that 2.4% of patients with psoriasis had chronic renal failure.[14] Likewise, in a cross-sectional study carried out by Friedland *et al.* in 2022, it was reported that 3.59% of their psoriatic patients had chronic renal failure, and a further 0.3% of patients necessitated dialysis, while 0.08% had undergone kidney transplantation.[22]

However, studies addressing renal disorders in patients with psoriatic arthritis are limited. Munera-Campos *et al.* conducted a cross-sectional study involving 558 patients with psoriasis or psoriatic arthritis, revealing a slightly higher prevalence of chronic renal failure in psoriatic arthritis compared to those with psoriasis alone (18.8% *vs.* 9.5%).[15] Furthermore, Chi *et al.* in 2015 reported in their cohort study that among 4,633 patients affected by psoriasis, 347 had psoriatic arthritis in a cross-sectional study involving 558 patients with psoriasis or psoriatic arthritis, revealing a slightly higher prevalence of chronic renal failure in psoriatic arthritis compared to those with psoriasis alone (18.8% *vs.* 9.5%).[23]

Despite these findings, it is essential to acknowledge the limitations of this study. Being retrospective, it is susceptible to detection, reviewer bias, and variations in physician documentation. Larger prospective studies are warranted. Furthermore, the absence of body surface area (BSA) percentage and Psoriasis Area Severity Index (PASI) in the study may limit the representation of disease severity, making it challenging to correlate psoriasis severity with its association with renal disorders accurately.

Conclusions

This cross-sectional study demonstrated that psoriasis and psoriatic arthritis both share a comparable prevalence rate for chronic renal failure. However, although no statistical significance was observed, individuals with psoriatic arthritis experienced a higher frequency of acute kidney injury. These findings emphasize the importance of careful renal function assessment when delivering medical care to individuals with psoriasis or psoriatic arthritis.

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