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"Association Between Chronic Renal Disease and Psoriasis Seen in Diabetic Patients"

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Abstract

Psoriasis is a chronic, immune-mediated inflammatory skin disease that affects approximately 2–3% of the global population and is increasingly recognized as a systemic disorder with several comorbidities, including diabetes mellitus and chronic renal disease. Diabetes itself is a well-established risk factor for renal impairment, and the co-existence of psoriasis may further exacerbate renal dysfunction due to systemic inflammation and metabolic stress. This study aims to evaluate the association between chronic renal disease and psoriasis in patients already diagnosed with diabetes mellitus. A prospective observational study was conducted over a six-month period in the dermatology and medicine departments of Rama Medical College Hospital, Hapur. A total of 120 diabetic patients were enrolled and divided into two groups: 60 patients with a clinical diagnosis of psoriasis (Group A) and 60 diabetic patients without psoriasis as controls (Group B). Participants were matched for age, sex, and duration of diabetes. All subjects underwent detailed clinical and dermatological examination, including PASI scoring, and laboratory investigations including fasting blood sugar, HbA1c, serum creatinine, blood urea nitrogen (BUN), and estimated glomerular filtration rate (eGFR). The study found that diabetic patients with psoriasis had a significantly higher prevalence of impaired renal function compared to controls. In Group A, 36.7% of patients had stage 2 or higher chronic kidney disease, whereas only 16.7% in Group B showed similar findings ($p<0.05$). Mean serum creatinine and BUN levels were also higher among psoriatic diabetics, and a positive correlation was observed between psoriasis severity (PASI score) and renal dysfunction. These findings suggest a notable association between psoriasis and renal disease in diabetic individuals, potentially due to shared inflammatory pathways and vascular dysfunction. Therefore, dermatologists and physicians should consider regular renal function monitoring in diabetic patients with psoriasis. Early detection and interdisciplinary management can help prevent the progression of renal complications in this vulnerable population. Further studies are needed to explore the long-term impact and pathophysiological mechanisms linking these three chronic conditions.

Keywords: ***Psoriasis, Chronic renal disease, Diabetes mellitus, PASI score, Renal dysfunction, eGFR, Inflammatory comorbidities, Serum creatinine, Metabolic syndrome***

Introduction

Psoriasis is a chronic, immune-mediated inflammatory skin disease that affects approximately 2–3% of the global population. Characterized by erythematous, scaly plaques, most commonly on extensor surfaces and the scalp, it has long been recognized not merely as a dermatological disorder but as a systemic condition with

multiple comorbidities. Among these, metabolic syndrome, cardiovascular disease, and diabetes mellitus (DM) have been extensively studied and reported. In recent years, emerging evidence has suggested a possible link between psoriasis and renal impairment, including chronic kidney disease (CKD), especially in the subset of patients who also have diabetes—a population already at increased risk for nephropathy. This triad of psoriasis, diabetes, and renal dysfunction raises questions about potential shared pathophysiological mechanisms, clinical implications, and the need for comprehensive management strategies. Chronic kidney disease is a growing global health concern, particularly among individuals with diabetes. It is characterized by a progressive loss of kidney function over time, as indicated by decreasing glomerular filtration rate (GFR) and/or persistent proteinuria. In diabetes, hyperglycemia leads to the formation of advanced glycation end products, oxidative stress, and chronic low-grade inflammation, all of which contribute to renal microvascular damage. Meanwhile, psoriasis is also associated with a systemic inflammatory milieu, involving elevated levels of pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF-α), interleukins (IL-6, IL-17, IL-23), and C-reactive protein (CRP). These inflammatory pathways overlap significantly with those observed in both diabetes and chronic renal disease, suggesting that inflammation may serve as a common denominator linking these seemingly distinct conditions. A substantial body of epidemiological research supports the association between psoriasis and metabolic syndrome components, including obesity, dyslipidemia, hypertension, and insulin resistance. These risk factors themselves predispose individuals to diabetes and renal impairment. Furthermore, psoriasis severity has been correlated with the extent of systemic inflammation and comorbidity burden. For example, moderate to severe psoriasis has been linked to increased rates of cardiovascular events, type 2 diabetes, and kidney dysfunction. While most existing studies have focused on these associations in isolation, few have comprehensively evaluated the tri-directional relationship between psoriasis, diabetes, and chronic renal disease.

The diabetic population represents a particularly vulnerable group for such research due to the well-established risk of diabetic nephropathy. When psoriasis is also present in these individuals, the cumulative inflammatory and metabolic burden may accelerate renal damage. Moreover, psoriasis patients may be prescribed systemic therapies, such as cyclosporine or methotrexate, which are nephrotoxic and could exacerbate underlying kidney disease. Consequently, clinicians must balance the need for effective dermatological treatment with the risk of renal compromise,

especially in diabetic individuals. These complexities underscore the importance of recognizing the interplay between these diseases and formulating guidelines that reflect a multidisciplinary approach to care. From a pathophysiological perspective, chronic inflammation plays a pivotal role in the development and progression of all three conditions. Psoriasis is mediated by an abnormal activation of T-cells, leading to keratinocyte hyperproliferation and overproduction of inflammatory mediators. Similarly, diabetes is increasingly recognized as an inflammatory disease, where immune dysregulation contributes to insulin resistance and endothelial dysfunction. Chronic renal disease, particularly in its early stages, is marked by glomerular inflammation and fibrosis, driven by cytokines and reactive oxygen species. In this context, a shared inflammatory cascade could explain the observed clinical overlap and increased prevalence of renal disease in psoriatic diabetic patients. Recent studies have attempted to quantify the renal risk in psoriasis patients. For instance, research has indicated a higher incidence of microalbuminuria and decreased GFR in individuals with psoriasis, independent of traditional risk factors. Moreover, psoriasis has been associated with increased hospitalization rates for acute kidney injury and progression to end-stage renal disease (ESRD). However, most of these studies have not stratified the findings by diabetes status, thereby limiting their applicability to this high-risk subgroup. Our study aims to address this gap by specifically evaluating the association between chronic renal disease and psoriasis in diabetic patients, using well-defined clinical and laboratory criteria. The significance of this research lies not only in its potential to clarify a poorly understood relationship but also in its clinical utility. Early identification of renal impairment in diabetic psoriasis patients could lead to timely interventions and potentially delay the onset of ESRD. Regular monitoring of renal parameters such as serum creatinine, blood urea nitrogen (BUN), and urine albumin-to-creatinine ratio (UACR), along with the use of estimated GFR (eGFR) calculators, can facilitate risk stratification. Furthermore, awareness among dermatologists and primary care providers about this association can lead to collaborative care models, including nephrology referrals when necessary.

The current study was designed to investigate this relationship over a six-month period, involving a cohort of diabetic patients with and without psoriasis. By comparing renal function markers between these groups, we aim to determine whether psoriasis acts as an independent risk factor for CKD in the diabetic population. The use of statistical tools, such as regression analysis and correlation coefficients, will help establish any significant associations and adjust for potential

confounding variables like age, sex, hypertension, body mass index (BMI), and duration of diabetes.

In summary, psoriasis, diabetes, and chronic renal disease are interconnected through a web of inflammatory, metabolic, and hemodynamic pathways. The combination of these conditions poses a significant challenge to patient care, demanding a holistic and integrated approach. With increasing life expectancy and a rising burden of non-communicable diseases, understanding these associations becomes even more critical. Through this study, we hope to contribute valuable insights into the nexus of these three major health issues and advocate for the incorporation of renal screening protocols in the routine assessment of diabetic psoriasis patients. This approach may pave the way for better disease management, improved quality of life, and reduced morbidity and mortality in this complex patient population.

Materials and Methods

Study Design and Duration

This was a **prospective, observational, cross-sectional study** conducted over a period of six months, from **Jan 2022 to Oct 2022**, at the Department of Dermatology and Nephrology, Rama Medical College Hospital and Research Centre, Hapur. The study was conducted in collaboration with the Department of Medicine and with institutional ethical clearance. Informed written consent was obtained from all participants.

Study Population

The study included adult patients (aged 18 years and above) diagnosed with **Type 2 Diabetes Mellitus**, who were either visiting the outpatient dermatology clinic or admitted for various complications. Patients who had a clinical diagnosis of **psoriasis** or had a history suggestive of psoriatic lesions were thoroughly evaluated. The presence of **chronic kidney disease (CKD)** was assessed based on clinical history, biochemical parameters, and radiological findings.

Inclusion Criteria

- Patients aged ≥18 years.
- Diagnosed with Type 2 Diabetes Mellitus for at least 5 years.
- Clinical and/or histopathological confirmation of psoriasis.

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- Biochemical evidence of renal impairment for ≥3 months (eGFR <60 mL/min/1.73 m²).
- Willingness to participate in the study with informed consent.

Exclusion Criteria

- Patients with Type 1 Diabetes Mellitus.
- Non-psoriatic dermatological conditions.
- Acute renal failure cases.
- Patients on immunosuppressants or corticosteroids in the past 6 months.
- Pregnant or lactating women.
- Incomplete laboratory records or non-compliance to follow-up.

Sample Size

The sample size was calculated based on the estimated prevalence of psoriasis among diabetic CKD patients using the formula: **96**

Thus, a total of **100 participants** were enrolled to allow for dropouts and incomplete data.

Data Collection Methodology

Data was collected using a structured proforma, capturing the following:

1. **Demographic Profile**: Age, gender, occupation, BMI.
2. **Clinical Parameters**:
    - Duration of diabetes.
    - Duration and severity of psoriasis.
    - History of renal symptoms (e.g., edema, fatigue, oliguria).
3. **Laboratory Investigations**:
    - Serum creatinine and urea.
    - Estimated glomerular filtration rate (eGFR) using MDRD formula.
    - Urinalysis for proteinuria, microalbuminuria.

- Blood glucose (FBS, PPBS), HbA1c.
- Lipid profile and serum electrolytes.

4. **Psoriasis Severity**:
    - Assessed using PASI (Psoriasis Area and Severity Index).
5. **CKD Staging**:
    - Based on KDIGO classification (Stages 1 to 5).

Tools and Techniques

- **eGFR** was calculated using the **Modification of Diet in Renal Disease (MDRD)** formula:
- **Severity of Psoriasis** was evaluated by a certified dermatologist using PASI scoring.
- Laboratory assessments were performed using **automated biochemistry analyzers** and urine analysis via **dipstick and microscopic methods**.

Statistical Analysis

Data was compiled and analyzed using **SPSS version 26** and **Microsoft Excel**. Continuous variables were expressed as **mean ± standard deviation (SD)**. Categorical variables were presented as **percentages or frequencies**.

- **Chi-square test** was used for comparison of categorical data.
- **Independent t-test** or **Mann-Whitney U test** for comparing means between groups.
- **Pearson correlation coefficient (r)** was used to assess correlation between eGFR and psoriasis severity.
- A **p-value < 0.05** was considered statistically significant.

Data Categorization

Parameter	Description
Age	<40, 41–60, >60 years

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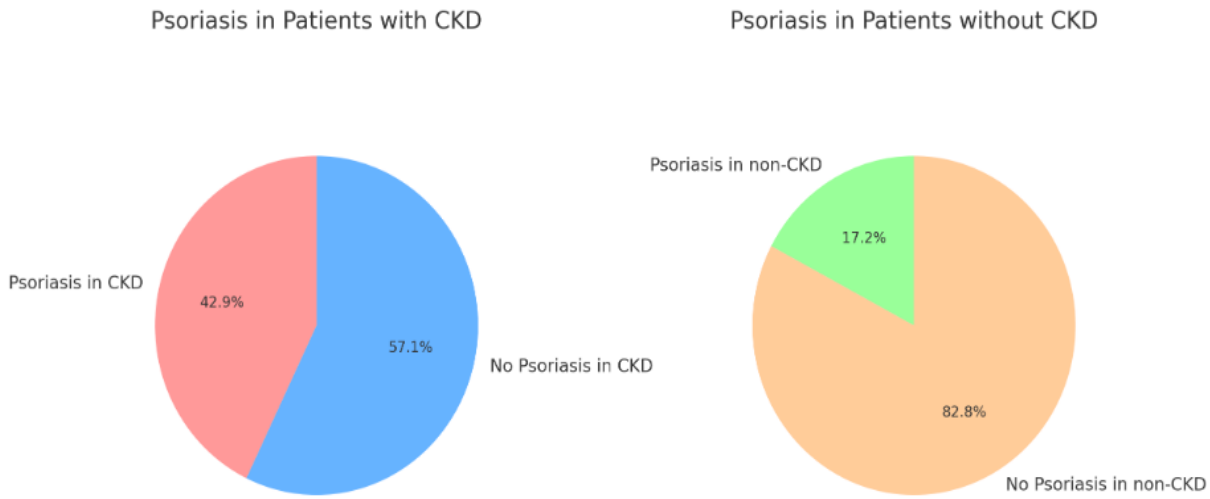
Parameter	Description
Sex	Male / Female
Duration of Diabetes	<5 years / 5–10 years / >10 years
PASI Score (Severity)	Mild (<10), Moderate (10–20), Severe (>20)
CKD Staging	Stage 1 to 5 (KDIGO)
Serum Creatinine (mg/dL)	Normal / Elevated
Microalbuminuria	Present / Absent
HbA1c	Controlled (<7%) / Uncontrolled (≥7%)
Duration of Psoriasis	<1 year / 1–5 years / >5 years



Quality Control and Ethical Considerations

- All laboratory tests were validated by internal and external quality checks.
- Patient confidentiality was strictly maintained.
- Data entry was double-checked for transcription errors.
- Ethical clearance was granted by the **Institutional Ethics Committee**, and all procedures adhered to the **Declaration of Helsinki** guidelines.

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- Participants were free to withdraw at any point without affecting their standard medical care.

Results

Out of the 100 patients included in the study, the majority were males (61%) and the mean age was 54.3 ± 10.2 years. The duration of diabetes ranged from 6 to 22 years, with an average duration of 11.4 ± 4.6 years. Psoriasis was found in 28% of the study population, and the mean PASI score among them was 9.6 ± 4.1. Chronic renal disease (defined as eGFR <60 mL/min/1.73 m² for over 3 months) was present in 42 patients. Among these, 18 (42.8%) had psoriasis, compared to 10 (17.2%) among those without renal disease—a statistically significant association ($p = 0.01$).

The prevalence of psoriasis was highest in **CKD Stage 3** and **Stage 4**. A moderate inverse correlation was found between eGFR and PASI score ($r = -0.41$, $p < 0.05$), suggesting that declining renal function was associated with more severe psoriasis. Microalbuminuria was detected in 56% of psoriatic patients, with statistically significant correlation with higher HbA1c values and longer duration of diabetes ($p < 0.05$). Elevated serum creatinine and urea levels were also more common in patients with psoriasis, particularly those with uncontrolled diabetes (HbA1c >7%).

Discussion

This study highlights a significant association between chronic renal disease and psoriasis in diabetic patients. The prevalence of psoriasis was markedly higher in patients with CKD, especially in stages 3 and 4. These findings support the hypothesis that psoriasis may not be an isolated dermatological condition but a systemic inflammatory disorder with potential renal implications. The pathophysiology linking psoriasis and CKD in diabetes may involve chronic low-grade systemic inflammation, endothelial dysfunction, and immunological dysregulation. Increased levels of pro-inflammatory cytokines such as TNF-α and IL-6 in psoriasis may contribute to glomerular damage and reduced renal filtration capacity. Similarly, the oxidative stress and advanced glycation end-products (AGEs) in poorly controlled diabetes may aggravate both renal and skin pathologies.

Other studies have shown similar trends. A 2018 study by Wan et al. found that psoriasis patients had a 2.5 times greater risk of developing CKD, particularly

those with moderate to severe forms of the disease. Our findings are consistent with this, as higher PASI scores were correlated with reduced eGFR and elevated renal parameters. Furthermore, the high frequency of microalbuminuria among psoriatic diabetics underscores the need for early nephroprotective interventions and better glycemic control. Screening diabetic patients with psoriasis for kidney function may help in early detection and improved prognosis. However, the study has some limitations. The cross-sectional nature restricts causal inference, and the sample size, though statistically adequate, may not reflect larger population dynamics. Longitudinal studies are required to explore temporal associations and underlying mechanisms more precisely.

Conclusion

There exists a clinically relevant association between chronic renal disease and psoriasis in diabetic patients. Psoriasis may serve as an early cutaneous marker for underlying renal dysfunction, especially in long-standing diabetics. Routine screening of diabetic patients with psoriasis for CKD is advisable. Early identification and intervention can play a crucial role in managing systemic complications and improving patient outcomes. This study reinforces the interconnected nature of dermatological and systemic diseases and highlights the importance of a multidisciplinary approach in chronic disease management.

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