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SERUM URIC ACID LEVELS IN PATIENTS WITH PSORIASIS

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Abstract

Psoriasis is a chronic inflammatory skin disorder often associated with systemic comorbidities. Recent studies have suggested a link between psoriasis and elevated serum uric acid levels, potentially due to increased keratinocyte turnover and systemic inflammation. This hospital-based case-control study aimed to assess serum uric acid levels in psoriasis patients and compare them with healthy controls. 40 clinically and/or histo-pathologically diagnosed psoriasis patients and 40 age- and gender-matched healthy controls were enrolled. Serum uric acid was measured using the Uricase method, and disease severity in psoriasis cases was assessed using the Psoriasis Area Severity Index (PASI). The mean serum uric acid level in psoriasis cases was 5.1 ± 1.5 mg/dL, significantly higher than 4.0 ± 0.5 mg/dL in controls ($p = 0.0001$). However, there was no statistically significant difference in serum uric acid levels between patients with mild (PASI <10) and moderate-to-severe psoriasis (PASI >10), with a p-value of 0.9323. These findings suggest that while serum uric acid levels are elevated in psoriasis patients, they do not correlate with clinical disease severity. The consistent elevation of serum uric acid in psoriasis may indicate a potential role in the systemic inflammatory profile of the disease, independent of PASI score. Monitoring serum uric acid could be beneficial for identifying metabolic risks in psoriasis patients.

Keywords: Psoriasis, Serum uric acid, PASI score, Systemic inflammation, Metabolic comorbidity, Case-control study.

INTRODUCTION

Psoriasis is a chronic papulosquamous, inflammatory dermatosis that manifests clinically as erythematous papules and plaques with silvery scales. It affects approximately 1-3% of the world population (1). Hypertension, atherosclerotic heart disease, and metabolic syndrome are more frequent in patients with psoriasis, probably because they share a common genetic background of systemic inflammation (2). With elevated markers of inflammation, psoriasis is a systemic inflammatory disorder leading to impaired endothelial dysfunction and a higher risk of atherosclerotic heart disease (3)Rapid epidermal turnover in psoriasis might lead to an increased purine breakdown and thus, influence uric acid levels (4), so relationship can be expected between hyper uricemia and extent of psoriatic skin involvement. Recent studies report that hyperuricemia is independently associated with hypertension, atherosclerosis, renal disease, and metabolic syndrome(3,5)Hyperuricemia has been proposed to enhance oxidative stress and inflammationwhich, in turn, lead to endothelial dysfunction, promoting atherosclerosis(5-8)Several studies report hyperuricemia in patients with psoriasis(9-11).

MATERIALS AND METHODS

A hospital-based, case-control study were included 40 patients clinically and or Histopathologically diagnosed with psoriasis and 40 age and gender matched controls attending the outpatient DVL clinic of our hospital. A written informed consent was obtained from each participant willing to included in the study. After a complete history was taken and general, systemic and cutaneous examinations were performed. Psoriasis severity index (PASI) was calculated in patients with Psoriasis.

All the cases were subjected to the following investigations: C - reactive protein Complete Blood Picture, and Serum Uric Acid, Serum urea.

1. Study design: Case control study.

2. Study setting: DVL Outpatient department, PESIMSR,Kuppam.

3. Study period: 18 months

4. Study population: Patients clinically and or Histopathologically diagnosed with psoriasis and matched controls (age and gender matched) attending the outpatient department of DVL, PESIMSR, Kuppam.

5. Sampling method: Purposive sampling.

6. Sample size: Based on the Isha vkjain et al (2011) study the sample size calculation minimum take in each group=40.(12)
27 males,13 females in each group.

Assumption
Mean difference between both the groups (δ) = 0.7
Standard deviation for both the groups (σ) = 1.12
α (two-sided) = 0.05; β = 0.80

Formula
$n = [2 \times (Z_{1-\alpha/2} + Z_{1-\beta/2})^2 \times \sigma^2] / \delta^2$

Calculation
$n = [2 \times (1.96 + 0.84)^2 \times 1.12^2] / 0.7^2 = 40$

7. Inclusion & Exclusion Criteria:
Inclusion criteria:

Cases: Patients clinically and or Histopathologically diagnosed with psoriasis, age 18 years and above. Those who were willing to given written informed consent were included.

Controls: Healthy volunteers (age and gender matched). Those who were willing to given written informed consent were included.

Exclusion Criteria:
Cases: Patients with psoriasis currently on systemic therapy, or who have been taking systemic therapy for the past 1 month. Those who were not willing to given written informed consent were not included.
Patients receiving allopurinol, thiazide - type diuretics at the start of the study.
Patients with a history of hypertension, or other cardiovascular diseases, Gout, Immune disorders. Active infection, or overt malignancy, Known liver, and renal diseases.
Patient smoking tobacco, or using non-smoking tobacco products.
Pregnant women.
Recent injuries, on Nonsteroidal anti -inflammatory drug medication.

Controls: Individual with hypertension, or other cardiovascular diseases, Gout, Immune disorders, Active infection,or overt malignancy, Known liver and renal diseases.
Pregnant women. recent injuries.
On medications allopurinol, thiazide-type diuretics, Nonsteroidal anti-inflammatory drugs.
Smoking tobacco, or using non-smoking tobacco Products.
Those who were not willing to given written informed consent were not included.

8. Tools used in the study: Blood investigations serum uric acid test by Uricase method, C-Reactive Protein by Latex agglutination method, Complete Blood Picture by Horiba xl80 analyzer impedance and calorimetry method, Serum urea by urease enzymatic method were done.

9. Procedure for data collection: Demographic data was collected, a detailed history was taken, dermatological examination, Systemic Examination were 28 performed, and the PASI score calculated. Skin biopsy was performed in doubtful cases to confirm the diagnosis of psoriasis. Diagnosed cases of psoriasis fulfilling the inclusion and exclusion criteria were investigated for C-Reactive Protein, Serum uric Acid, Complete Blood Picture and Serum urea.

10. Statistical Analysis of data: The data was entered into MS excel 2019 version and further analyzed using SPSS (version 23.0;SPSSInc,ChicagoIL,USA.) Descriptive Statistics, the categorical variables were analyzed by using frequency and percentage and the continuous variables were analyzed by calculating mean+- standard Deviation .For inferential statistics the numerical data was analyzed using —t test —,The categorical data was analyzed using Chi' square test. A probability value of P<0.05 Was considered as statistically significant.

Ethical clearance & approval:
Ethical clearance was obtained from the Institutional Human Ethics Committee, PESIMSR, Kuppam. Before collecting data an explicit participant information sheet had been prepared in both regional language and English.
This document made thesubject to understand all details of the study before providing consent.Written informed consent was obtained from the participants before the study.
The name, identity were not disclosed. Thus personal data about every subject was kept confidential

RESULTS AND DISCUSSION
Distribution of Age:

TABLE 1: Comparison between the Age among Group of the participants

Variable	Group		t-value	'p' value	Sig*
	Case Mean±SD	Control Mean±SD			
Age	44.5±13.4	44.5±13.4	0.000	1.000	NS

*P<0.05 statistically significant

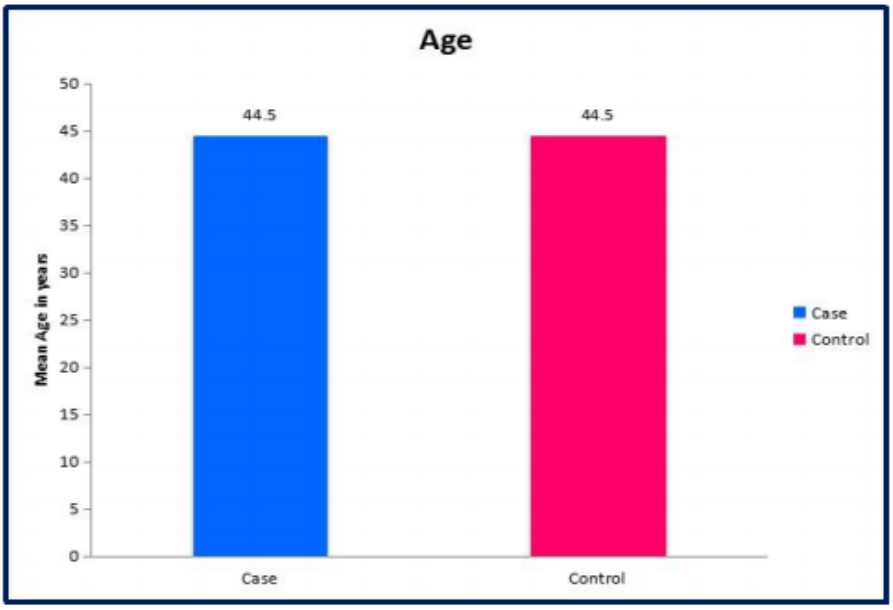

Fig 1: Comparison between the Age and Group of the participants

Interpretation:

Both the Case group and the Control group have the same mean age of 44.5 years,with a standard deviation of 13.4. This means the average age and the variability of age within both groups are identical. The p-value of 1.000 suggests that the observed difference (or lack thereof) is not statisticallysignificant.

Gender distribution

TABLE 2: Comparision between the Gender and Group of the participants

Gender	GROUP				X^2 value	'p' value	Sig*
	Case		Control				
	n	%	n	%			
Male	27	67.5%	27	67.5%	0.000	1.000	NS
Female	13	32.5%	13	32.5%			
Total	40	100%	40	100%			

*P<0.05 statistically significant

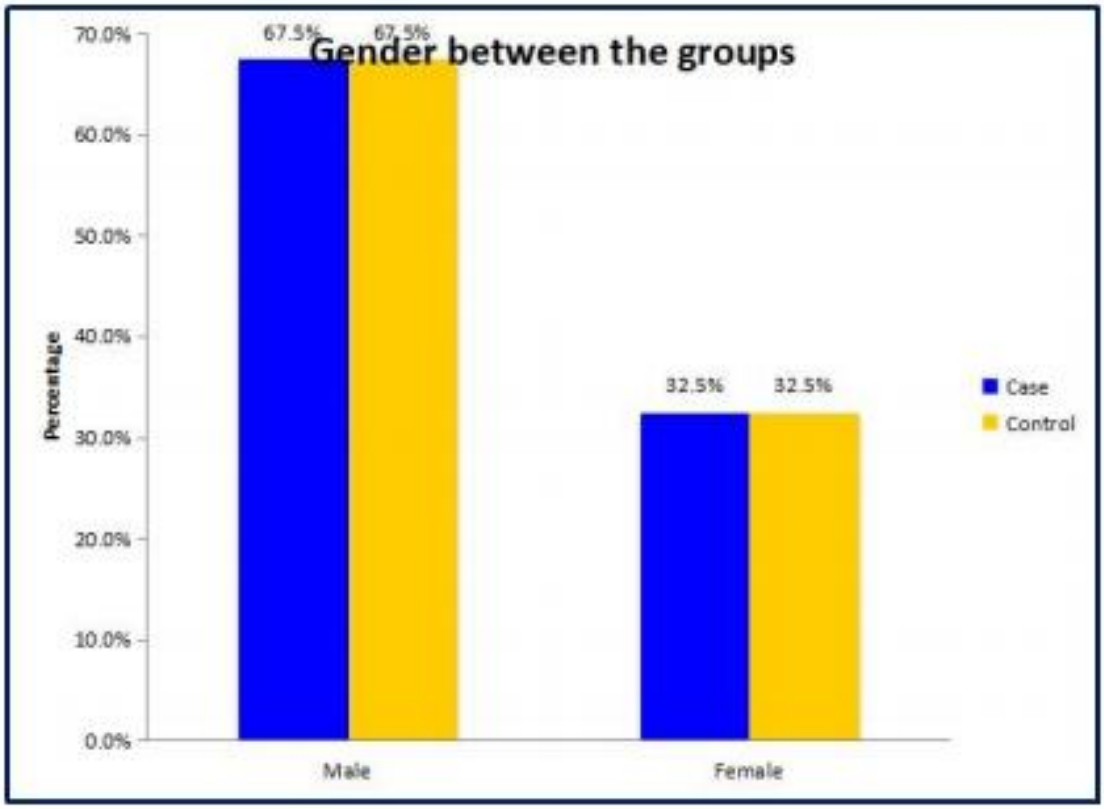

Fig 2: Comparision between the Gender and Group of the participants

Interpretation: Both the Case and Control groups have the exact same gender distribution: 67.5% Male and 32.5% Female in both groups. There are 27 males and 13 females in each group, indicating identical gender compositions. The p-value of 1.000indicates that the result is not statistically significant**.**

TABLE 3: Comparision between the Background and Group of the participants

Background	GROUP				X^2 value	'p' value	Sig*
	Case		Control				
	n	%	n	%			
Rural	27	67.5%	22	55.0%	1.3167	0.251	NS
Urban	13	32.5%	18	45.0%			
Total	40	100%	40	100%			

*P<0.05 statistically significant

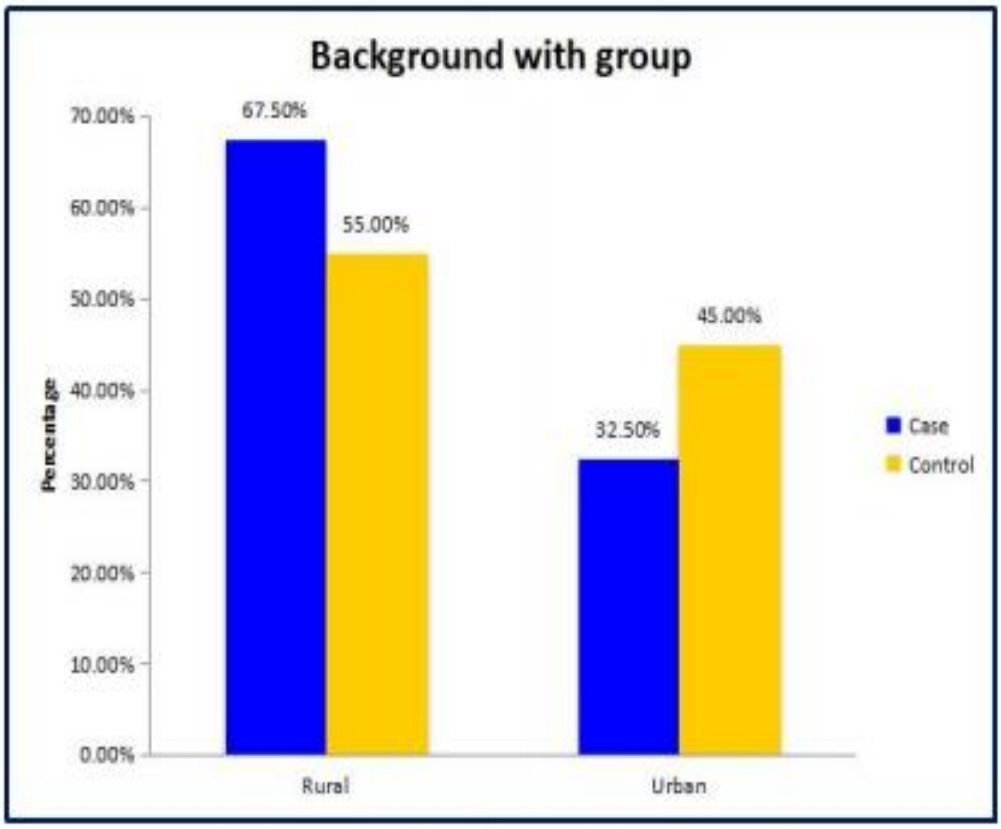

Fig 3: Comparision between the Background and Group of the participants

Interpretation:
In the Case group, 67.5% of participants are from a Rural background, and 32.5% are from an Urban background. In the Control group, 55.0% of participants are from a Rural background, and 45.0% are from an Urban background. The p-value of 0.251 indicates that this difference in background distribution between the Case and Control groups is not statistically significant.

TABLE 4: Distribution of patients according to type of psoriasis.

Type of Psoriasis	Number of patients	percentage
Chronic Plaque Psoriasis	30	75%
Erythro Dermic	1	2.5%
Guttate Psoriasis	4	10.0%
Palmo Plantar Psoriasis	1	2.5%
Scalp Psoriasis and palmoplantar	4	10.0%
total	40	100%

Interpretation:
Chronic Plaque Psoriasis: The majority of cases (75.0%) fall under this category, Erythrodermic Psoriasis: Very few cases (2.5%) were observed. Guttate Psoriasis 4 cases 10%,both scalp and palmoplantar psoriasis in 4 cases(10%), indicating it is lessthan Chronic Plaque Psoriasis but more common than Erythrodermic.only Palmo Plantar Psoriasis: in 2.5% of cases, similar to Erythrodermic.

TABLE 5: Comparision between the Nail Pitting and Group of the participants

Nail Pitting	GROUP				X^2 value	'p' value	Sig*
	Case		Control				
	n	%	n	%			
Present +	8	20.0%	-	-	-	-	-
Absent -	32	80.0%	-	-			
Total	40	100%	40	100%			

Interpretation:
Positive for Nail Pitting (+): 20.0% of the cases exhibit nail pitting, indicating that a minority of subjects in the case group present this condition.
Negative for Nail Pitting (-): 80.0% of the cases do not show nail pitting, suggesting that the majority do not have this symptom.

PASI SCORE:

TABLE 6: Mean PASI score of patients with Psoriasis

Variable	Cases Mean±SD
PASI SCORE	16.8±10.1

Interpretation:

In the Case group, the mean PASI score is 16.8 with a standard deviation (SD) of 10.1.

TABLE 7: Sub grouping of cases as per PASI score

PASI Score	Cases	Percentage
<10	5	12.5%
>10	35	87.5%
Total	40	100%

Interpretation:
PASI Score <10: 5 subjects (12.5%) have a PASI score less than 10, indicating a relatively mild level of psoriasis among cases.

PASI Score >10: 35 subjects (87.5%) have a PASI score greater than 10, suggesting a moderate to severe level of psoriasis among the majority of the cases.

SERUM URICACID:

TABLE 9: Comparison between the serumuricacid and Group of the Participants

Variable	Group		t-value	'p' value	Sig*
	Case Mean±SD	Control Mean±SD			
serumuricacid	5.1±1.5	4.0±0.5	4.0963	0.0001*	S

*P<0.05 statistically significant

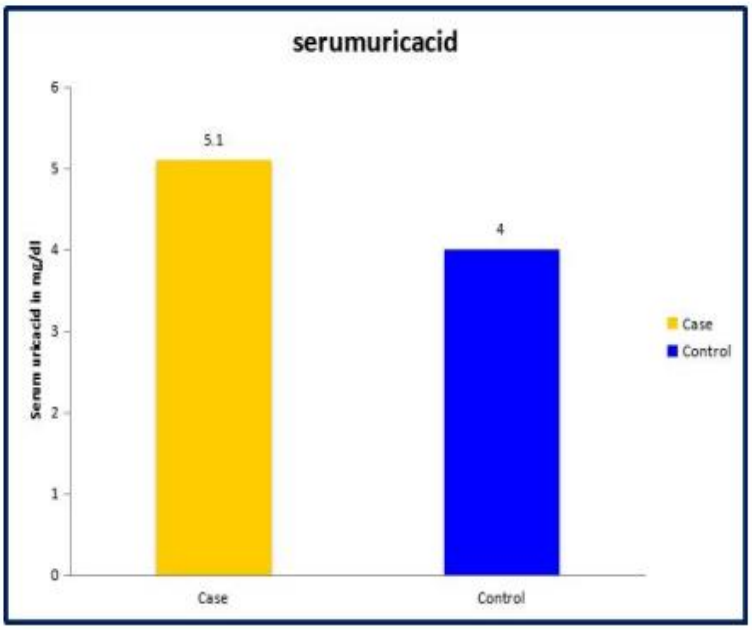

Fig 5: Comparison between the serumuricacid and Group of the Participants

Interpretation:
Case Group: The mean serum uric acid level is 5.1 with a standard deviation (SD) of 1.5. This indicates a moderate level of serum uric acid, with some variability in the measurements among individuals in this group.

Control Group: The mean serum uric acid level is 4.0 with a standard deviation (SD) of 0.5. This suggests a lower level of serum uric acid compared to the Case group.
P-value: The p-value is 0.0001, which is significantly less than the 36 conventional threshold of 0.05. This indicates that the difference in serum uric acid levels between the Case and Control groups is statistically significant.

SERUM URIC ACID AND PASI SCORE:

TABLE 12: Comparison between the serumuricacid and PASI score grouping among cases

Variable	Group		t-value	'p' value	Sig*
	PASI <10 Mean±SD	PASI >10 Mean±SD			
serumuricacid	5.16±1.1	5.09±1.6	0.0855	0.9323	NS

*P<0.05 statistically significant

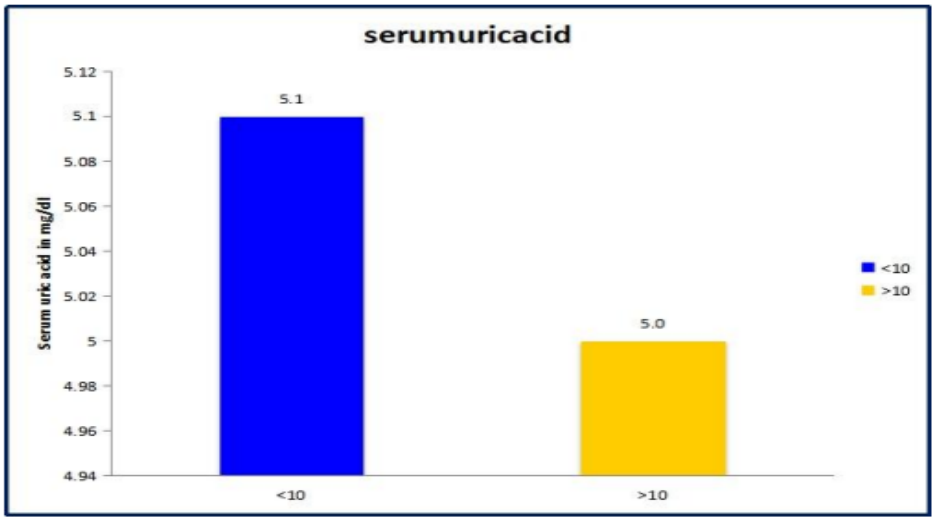

Fig 8: Comparison between SUA and PASI score grouping among cases

Interpretation:

Group PASI <10: The mean serum uric acid level is 5.16 mg/dL with a standard deviation (SD) of 1.1 mg/dL. This indicates a moderate level of serum uric acid, with some variability in the measurements.

Group PASI >10: The mean serum uric acid level is 5.09 mg/dL with a standard deviation (SD) of 1.6 mg/dL. This suggests that the group PASI >10 has a similar serum uric acid level but with greater variability**.** p-value**:** The p-value is 0.9323**,** which is significantly higher than the conventional threshold of 0.05. This indicates that the difference in serum uric acid levels between the Cases PASI<10 and PASI>10 group is not statistically significant

CLINICAL PHOTOGRAPHS:

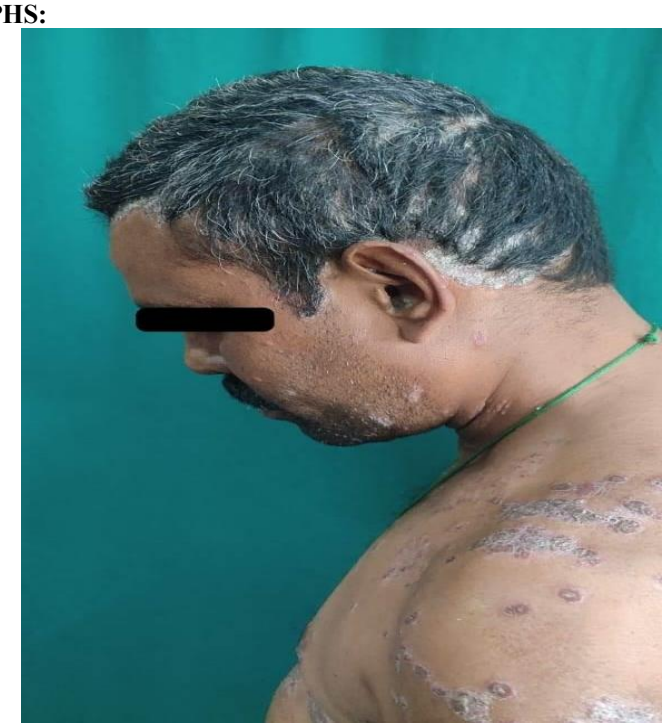

IMAGE 1: Scalp psoriasis and chronic plaque psoriasis over chest, shoulder

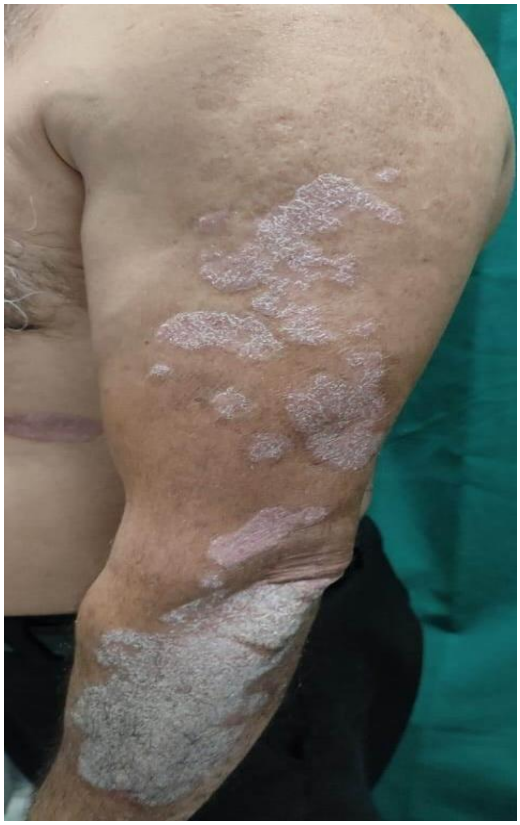

IMAGE 2: Chronic plaque psoriasis over left arm, elbow and forearm

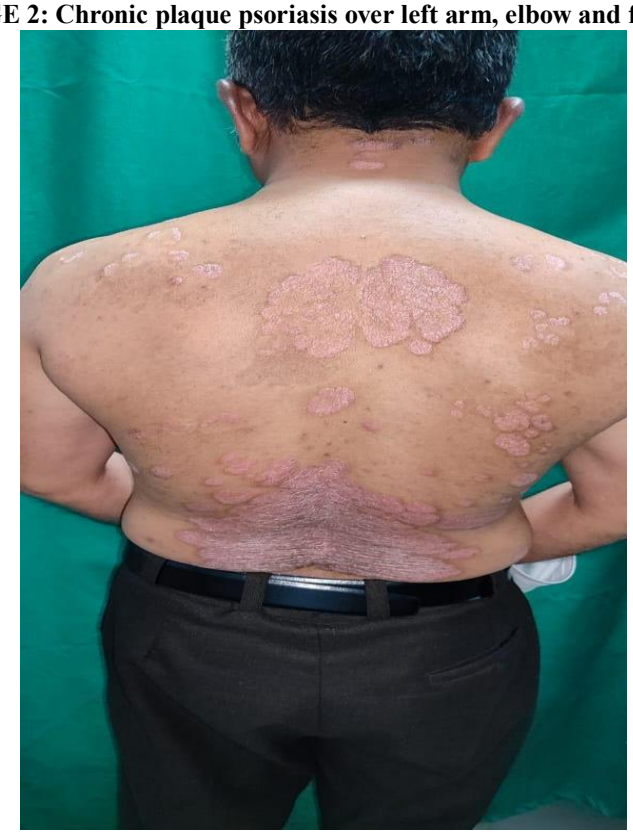

IMAGE 3: Chronic plaque psoriasis over back of trunk, nape of neck

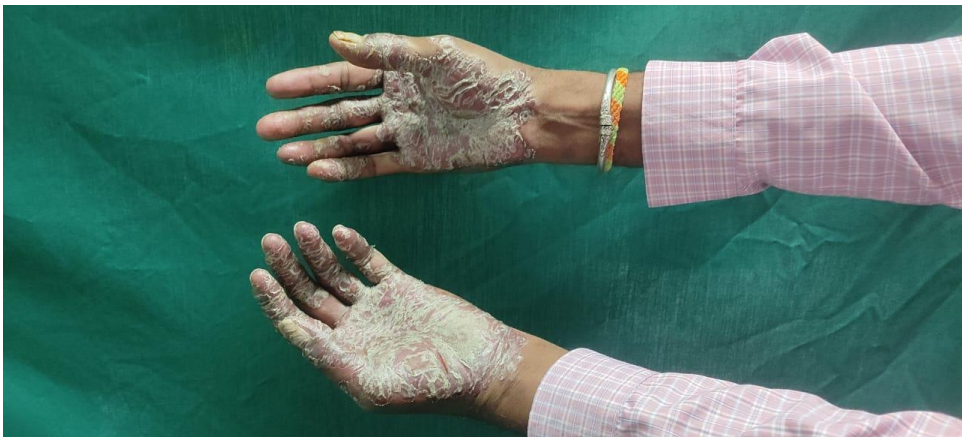

IMAGE 4: Palmar psoriasis

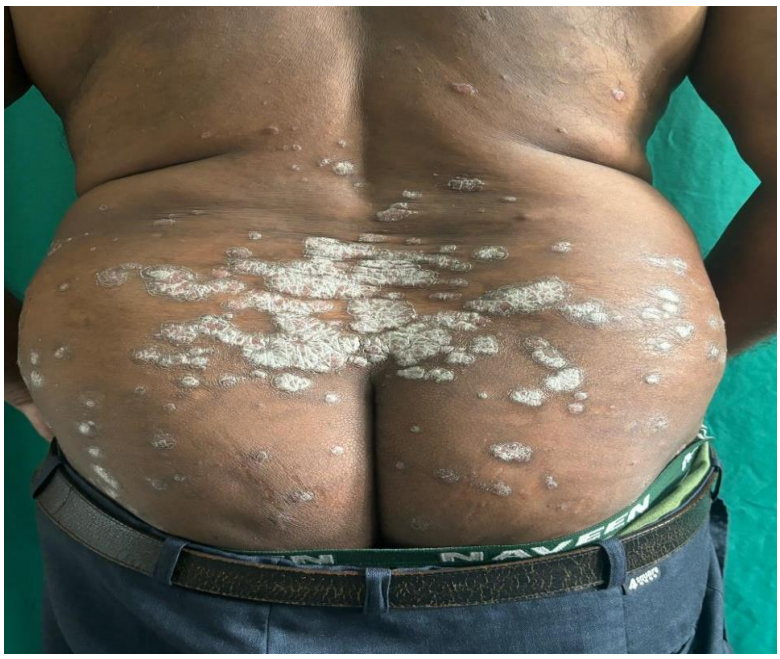

IMAGE 5: Chronic plaque psoriasis over mid, lower back of trunk, gluteal region

DISCUSSION

Present study was conducted as a case control study in the department of Dermatology, Venereology and Leprosy at P.E.S. Institute of Medical Science and Research, Kuppam, over period of 18 months. Present study included 40 cases and 40 controls age and gender matched.In present study, the age range for both psoriasis cases and controls was between 18 and 83 years, with a mean age of 44.5 ± 13.4 years for both groups. This finding is consistent with several other studies. For instance, Asha Ramay Vadakayil et al. reported a mean age of 44.71 ± 10.84 years for both cases and controls (13).

In present study, the demographic distribution included 27 male genders and 13 femalegenders in both the psoriasis cases and controls,this finding is consistent with the study by Sayami et al., which reported a male-tofemale ratio of 1.7:1, as well as with V.K. Jain et al., who found a ratio of 2.12:1.(14,12)

Among 40 psoriasis cases, chronic plaque psoriasis(75%) is the most common type followed by cases with both scalp psoriasis and palmoplantar psoriasis(10%),guttate psoriasis(10%). Other types of presentation were palmoplantar

psoriasis (2.5%) and erythrodermic psoriasis (2.5%). A similar study by Swayamsidda Mishra et al. had also reported chronic plaquepsoriasis was also the most common type, found in 77.8% of patients, followed by guttate and scalppsoriasis at 6.7% each, which aligns with our findings(15)

In contrast, the studies conducted by Hilal Gokalp and Asha Ramay Vadakayil et al. reported that 100% of their cases were chronic plaque psoriasis, which differs from our results.(16,13)Among psoriasis cases 8(20%) had nail involvement while the remaining 32(80%) did not. In present study, the PASI scores ranged from 4.8 to 62.8, with a mean score of 16.8 ± 10.1. This is similar to the findings of Asha Ramay Vadakayil et al., who reported a mean PASI score of 18.15 ± 12.208. (68) Likewise, the study by Hilal Gokalp et al. found a mean PASI score of 15.86 ± 8.95,which is comparable to our results(16). In present study of 40 psoriasis patients, 5 (12.5%) had a PASI score of less than 10, while 35 (87.5%) had a PASI score greater than 10. This is similar to the study conducted by Gunda Praneeth Kumar, where 18.4% had a PASI score below 10 and 81.6% had a score above 10(17).

Serum uric acid

With increased markers of inflammation, psoriasis is recognized as a systemicinflammatory disorder that can lead to endothelial dysfunction and an elevated risk of atherosclerotic heart disease. Recent studies indicate that hyperuricemia is independently linked to hypertension, atherosclerosis, kidney disease, and metabolic syndrome.

Hyperuricemia is thought to increase oxidative stress and inflammation, which can result in endothelial dysfunction and contribute to atherosclerosis. Additionally, several studies have reported elevated levels of hyperuricemia in patients with psoriasis.

In our study, serum uric acid values ranged from 1.6 to 8.6 mg/dl among cases and from 3.3 to 5.6 mg/dl among controls. The serum uric acid levels were significantly elevated in the cases compared to the controls. The mean serum uric acid value in cases was 5.1±1.5, while in controls it was 4.0±0.5 mg/dl, with a p-value of 0.0001, indicating a highly statistically significant difference ($p < 0.05$). In our study mean serum uric acid levels of psoriatic patients with severe disease (PASI score >10) had mean serum uric acid levels 5.09±1.6 similar to those with mild disease (PASI <10), who had mean serum uric acid values of 5.16±1.1, the pvalue for this comparison was 0.9323, which is not statistically significant.there is no correlation of serum uric acid level to disease severity.

Swayamsidda Mishra's case-control study in psoriasis patient that the mean SUA level was significantly higher in the case group (5.28 ± 1.20 mg/dl) compared to controls (4.65 ± 0.98 mg/dl), with a p-value of < 0.01.The above findings similar to present study with elevated SUA levels in psoriasis patients (5.1 ± 1.5 mg/dl) versus controls (4.0 ± 0.5 mg/dl), with aneven more significant p-value of 0.0001(15). Interestingly, Mishra's research indicated apositive correlation between SUA levels and disease severity, with higher levels in patients with severe psoriasis compared to those with mild disease ($p < 0.05$). However, our study diverged from this finding, showing no significant correlation between SUA levels and disease severity, as evidenced by a p-value of 0.9323.

The differences in results between their study and the present study can be attributed to different type of psoriasis cases, and variation in PASI score grading.

In line with our findings, a case-control study by Isha et al. on C-reactive protein and uric acid levels in psoriasis patients reported that mean serum uric acid levels were higher in the case group (7.0 ± 0.64 mg/dl) compared to the control group (4.1 ± 0.19 mg/dl). The difference in mean serum uric acid concentration was statistically significant, with a p-value of less than 0.05 which is comparable to our study (12).

A case-control study by Ashish Kumar et al. in psoriasis patients. They used the Psoriasis Area Severity Index (PASI) to assess disease severity, categorizing scores below 10 as mild and above 10 as moderate to severe. In their findings, the mean uric acid levels were 5.46 ± 1.5 mg/dL for patients with PASI < 10 and 5.42 ± 2.2 mg/dL for those with PASI > 10, while controls had a mean level of 5.7 ± 0.57 mg/dL. Importantly, the differences were not statistically significant ($p > 0.05$) (18).

In contrast, present study found that patients with severe disease (PASI > 10) had mean serum uric acid levels of 5.09 ± 1.6 mg/dL, while those with mild disease (PASI < 10) had levels of 5.16 ± 1.1 mg/dL. The mean SUA level in our control group was significantly lower at 4.0 ± 0.5 mg/dL, with a highly significant p-value of 0.0001 ($p < 0.05$).

These contrasting results may be due difference in method of serum uric acidmeasurement.

Similar to present study,Chetana Shenoy's study revealed that mean serum uric acid levels were significantly higher in psoriasis patients (6.26 ± 1.9) compared to controls (5.48 ± 1.25) with a p-value of 0.001, aligning with our study's results (19).
Regarding disease severity, their study noted that while serum uric acid levels werehigher in patients with severe psoriasis (PASI >12; 6.34 ± 1.81) compared to mild tomoderate cases(PASI ≤ 12; 6.14 ± 2.04), this difference was not statistically significant (p=0.612). Similarly, our findings showed no significant difference in mean serum uric acid levels between severe (PASI >10; 5.09 ± 1.6) and mild psoriasis patients (PASI <10; 5.16 ± 1.1) with a p-value of 0.9323.

Overall, both studies indicate that while serum uric acid levels are elevated in psoriasis patients compared to controls, there is no correlation with the severity of the disease. This suggests that higher uric acid levels may be a consistent feature in psoriasis, irrespective of its severity.

Study conducted by Gunda Praneeth Kumar showed a significantly higher mean SUA level in psoriasis patients (6.8 mg/dl) compared to healthy controls (3.2 mg/dl), with a p-value indicating statistical significance ($P < 0.05$) (17).

In our study reported similar results, with a mean SUA of 5.1 ± 1.5 mg/dl in psoriasis cases versus 4.0 ± 0.5 mg/dl in controls, showing a highly significant p-value of 0.0001.

Both studies found no significant correlation between the PASI score and serum uric acid levels, reinforcing the idea that while SUA may be elevated in psoriasis patients, it does not directly correlate with disease severity as measured by the PASI score.

This suggests that while inflammation is a key feature of psoriasis, the mechanisms linking uric acid levels and disease severity may be more complex and warrant further investigation.

Similar results were observed by Gisondi P et al where serum uric acid level was significantly higher among psoriatic cases (5.61 ± 1.6 mg/dl) as compared to controls (4.87 ± 1.4 mg/dl) (10)

Another study by Gui XY et al observed consistent finding with our results showing psoriatic patients had higher serum uric acid level (6.2521 ± 1.62 mg/dl) as compared to matched controls (5.71 ± 1.35 mg/dl) (20).

Increased purine catabolism due to increased epidermal cell turnover could be an important cause of raised serum uric acid levels among psoriatic patients.

Another study by Emrah YILMAZ et al., the mean serum uric acid (SUA) level in psoriasis vulgaris patients was 5.083 ± 1.33 mg/dL, significantly higher than the control group's mean of 4.59 ± 1.26 mg/dL ($P = 0.030$). Our findings are consistent, showing a mean SUA of 5.1 ± 1.5 mg/dL in psoriasis cases compared to 4.0 ± 0.5 mg/dL in controls, with a highly significant p-value of 0.0001. These results reinforce the link between elevated serum uric acid levels and psoriasis(21).

Mir Nadeem et al conducted a case control study on Hyperuricemia and Serum ADA Levels in Psoriasis found significantly higher mean range SUA level in psoriasis patients 6.584(5.4-7.8) compared to healthy controls 4.13(2.0-6.6)), with a p-value indicating statistical significance ($P < 0.05$)which is similar to present study results (22).

Similarly study conducted by Moustafa et al. 60 psoriasis patientsfound that significant increases in serum uric acid compared to healthy controls, but there were no correlations with the PASI score ($P > 0.05$). This aligns with our findings, where we also observed a significant increase in SUA levels in psoriatic patients compared to controls, without any significant correlation to the PASI score ($P > 0.05$) (23).

These consistent results across both studies suggest that while inflammatory markers like SUA are elevated in psoriasis patients, they may not directly reflect the severity of the disease as measured by PASI.

Our study found significantly higher serum uric acid levels in cases (psoriatic patients) compared to controls, with mean values of 5.1 ± 1.5 mg/dl in cases and 4.0 ± 0.5 mg/dl in controls (p-value = 0.0001). This finding is consistent with other studies that have explored the relationship between serum uric acid levels and psoriasis.

Elevated serum uric acid levels in psoriatic patients have been observed in severalstudies, supporting the hypothesis that oxidative stress and inflammation, key features of psoriasis, may lead to an increase in uric acid levels. Uric acid, being a byproduct of purine metabolism, is also a potent antioxidant, which might be elevated in response to increased oxidative stress seen in chronic inflammatory conditions like psoriasis.

Interestingly, in our study, the mean serum uric acid levels between psoriatic patients with severe disease (PASI score >10) and those with mild disease (PASI score <10) did not show a significant difference, with values of 5.09 ± 1.6 and 5.16 ± 1.1 mg/dl, respectively (p-value = 0.9323). This lack of a correlation between uric acid levels and disease severity is in contrast to some prior research which has suggested that higher serum uric acid levels may correlate with the severity of psoriasis. For instance, studies by Zhao et al. (2015) reported that higher serum uric acid levels were associated with more severe forms of psoriasis, with some proposing that uric acid could act as a biomarker of disease activity or severity (24).

However, our results align with other studies that have failed to find a significant relationship between serum uric acid levels and psoriasis severity. For example, Kim et al. (2019) did not find a significant difference in serum uric acid levels between mild and severe psoriasis cases, suggesting that while uric acid levels may be elevated in psoriatic patients in general, they do not necessarily correlate with the degree of disease activity. Additionally, Sukhov et al. (2018) conducted a meta-analysis and concluded that while psoriasis is associated with higher serum uric acid levels, these levels do not consistently reflect the clinical severity of the disease.

The discrepancy in findings between studies could be due to variations in study design, sample size, patient population, or the methodology used to assess psoriasis s severity (e.g., PASI score). Additionally, other confounding factors such as comorbidities (e.g., obesity, hypertension, and metabolic syndrome), which are commonly seen in psoriatic patients and are known to affect serum uric acid levels, may also contribute to the observed variations. Moreover, the pathophysiology of psoriasis involves multiple immune system abnormalities, and serum uric acid might not be a sensitive or specific marker for disease severity in isolation.

Another possible explanation for the lack of correlation in our study is that serum uric acid may not directly reflect disease activity in psoriasis. It is known that psoriasis involves complex inflammatory pathways, including the activation of T-cells and the release of pro-inflammatory cytokines like TNF-α and IL-6. These processes may lead to an increase in serum uric acid levels, but not necessarily in proportion to disease severity. Therefore, while uric acid may serve as a general indicator of systemic inflammation, it may not be sufficiently specific or sensitive to serve as a marker of psoriasis severity.

Potential Limitations and Considerations:
Although serum uric acid is widely accepted marker of inflammation, it is a nonspecific biomarker and can be elevated in many conditions, including infections, autoimmune diseases, and cardiovascular disorders.

Thus, while elevated serum uric acid in psoriasis patients may suggest an inflammatory state, it cannot definitively diagnose psoriasis or distinguish it from other conditions.

Furthermore, the timing of serum uric acid measurement relative to disease activity (e.g., during an active flare vs. remission) and the potential confounding effects of treatments (such as corticosteroids or biologic therapies) should be taken into account

CONCLUSIONS
Our study suggests that Serum uric acid levels are significantly elevated in psoriatic patients compared to healthy controls, reflecting the inflammatory nature of the disease.
However, there was no statistically significant difference in serum uric acid levels between patients with severe psoriasis and those with mild disease, which suggests that serum uric acid may not be a reliable marker of disease severity in psoriasis in all cases.

This highlights the complexity of psoriasis as a multifactorial disease and suggests that other markers or clinical parameters may be needed to better assess disease activity and severity.
Further studies with larger sample sizes, consideration of confounding factors, and more detailed clinical evaluations are necessary to explore the potential role of serum uric acid as a marker for psoriasis severity.

Ethics approval and consent to participate

Ethical clearance was obtained from the Institutional Human Ethics Committee, PESIMSR, Kuppam. Before collecting data an explicit participant information sheet had been prepared in both regional language and English.
This document made thesubject to understand all details of the study before providing consent.Written informed consent was obtained from the participants before the study.
The name, identity were not disclosed. Thus personal data about every subject was kept confidential

List of abbreviations

PASI	Psoriasis Area Severity Index
CRP	C- Reactive protein
SUA	Serum Uric acid
HLA	Human Leukocyte Antigen
MHC	Major histocompatibility complex
CD4	Cluster of Differentiation 4
LFA	Lymphocyte Function associated Antigen
ICAM	Intercellular Adhesion Molecule
APCS	Antigen Presenting cells
IL	Interleukins
INF	Interferon
TNF	Tumour necrosis factor
TH1	T-helper cells
BCL-X	b-cell lymphoma extra large
C3	Complement 3
C4	Complement 4
TGF	Transforming growth factor

VEGF	Vascular endothelial growth factor
VPF	Vascular permeability factor
CVD	Cardiovascular disease
PSO	Psoriasis
PSA	Psoriatic arthritis
UA	Uric acid arthritis
PSUOT	Overlap syndrome of psoriatic arthritis and gout
CXCL	Chemokine (C-X-C motif) ligand
P2Y	G – protein coupled receptors
ESR	Erythrocyte sedimentation rate
BMI	Body mass index
SGOT	Serum Glutamic-Oxaloacetic Transaminase test
SGPT	Serum Glutamic Pyruvic transaminase
VLDL	Very low density lipoprotein
HDL	High density lipoprotein
LDL	Low density lipoprotein
TG	Triglyceride

PAP	Phosphatic acid phosphate
ADA	Adenosine deaminase
HsCRP	High sensitive C-reactive protein
ATP	Adenosine Tri phosphate
NLR	Neutrophil lymphocyte ratio
FBS	Fasting blood sugar
SD	Standard deviation
CBC	Complete Blood Count

Data Availability

MASTER CHART

S.NO	Age	Sex	Background-Rural/Urban	Occupation	Type of Psoriasis	PASI Score	Nail Pitting	CRP	Serum uric acid	Blood Urea	Serum creatinine	CBC TOTAL Count	Neutrophil Count	Lymphocyte
1	39	Male	Rural	Farmer	Chronic Plaque Psoriasis	16	-	2.6	4.2	21.6	0.85	7800	42.6	16.6
2	27	Female	urban	Student	Scalp Psoriasis	4.8	-	3.0	3.7	36	1	6900	52.2	31.3
3	37	Male	Rural	Student	guttate Psoriasis	12	-	24	4.2	27	0.9	4500	40	20.2
4	46	Female	Rural	Housewife	Chronic Plaque Psoriasis	12	-	4	2.6	33	0.7	10500	64.1	28.8
5	42	Female	Rural	Farmer	Chronic Plaque Psoriasis	14	-	1.8	4.7	26	1.1	10200	55.7	33.8
6	40	Female	urban	Housewife	Chronic Plaque Psoriasis	16	-	24	6.9	26	0.9	6800	68	30
7	53	Male	Rural	Painter	Chronic Plaque Psoriasis	15	-	2	4.3	18.3	0.75	4500	42	16
8	29	Female	Rural	Housewife	Chronic Plaque Psoriasis	24	+	8	3.4	33	0.8	5800	40	22
9	18	Female	Rural	Student	Scalp Psoriasis	4.8	-	1.8	5	38	0.85	9700	65.4	27.2
10	57	Male	Rural	Farmer	Erythro Dermic	62.8	+	12	8.6	39	0.85	8000	63.4	21.4
11	31	Female	Rural	Teacher	Guttate Psoriasis	12	-	12	3.5	28	1.14	6100	40	16
12	54	Male	urban	Painter	Chronic Plaque Psoriasis	38.4	+	12	8.4	21.3	0.85	5800	68.3	20
13	48	Male	urban	Teacher	Chronic Plaque Psoriasis	14	-	2	4.7	18.6	0.9	4800	42	26
14	22	Male	Rural	Student	Scalp Psoriasis	4.8	-	2.4	6.9	39	1.12	6800	40	30
15	63	Female	Rural	Farmer	Chronic Plaque Psoriasis	16	+	3.6	5.7	36	0.45	4500	38	60
16	44	Female	Rural	Housewife	Chronic Plaque Psoriasis	21	-	2.8	3.7	33	0.65	5300	44	22

17	83	Male	urban	Retired	Chronic Plaque Psoriasis	22	+	4	5.3	23	0.8	4500	41	18
18	57	Male	Rural	Business	Chronic Plaque Psoriasis	18	-	6	5.3	36	1.01	4000	42	21
19	54	Male	Rural	Business	Chronic Plaque Psoriasis	22	-	3	4.9	28	0.45	5100	38	18
20	25	Female	Rural	Student	Guttate Psoriasis	14	-	1.8	1.6	36	0.57	6500	39	23
21	61	Male	urban	Employee	Chronic Plaque Psoriasis	12	-	3	5.9	38	0.85	4800	41	20
22	46	Male	urban	Driver	Chronic Plaque Psoriasis	16	-	2.6	5.8	24	0.67	6300	38	26
23	63	Male	Rural	Retired	Chronic Plaque Psoriasis	18	-	12	6.9	28	1.1	7800	63	20
24	49	Male	Rural	Business	Chronic Plaque Psoriasis	15	-	6	4.7	23	0.95	14000	69.8	17.7
25	55	Male	Rural	Farmer	Chronic Plaque Psoriasis	21	+	3.8	3.2	30	0.75	7600	39	32
26	21	Female	Rural	Student	Chronic Plaque Psoriasis	14	-	12	4	39	0.85	7600	58.3	30.4
27	40	Male	urban	Teacher	Chronic Plaque Psoriasis	19	-	5	7.4	18.6	0.95	7000	57	31
28	50	Male	Rural	Farmer	Chronic Plaque Psoriasis	24	-	2.2	5	21.2	0.86	6400	45	26
29	39	Male	Rural	Daily wager	Chronic Plaque Psoriasis	32	+	12	4.5	40	1.15	7500	42.1	20.8
30	33	Male	Rural	Typist	Chronic Plaque Psoriasis	16	-	4	6.7	33	1.03	4500	39	18
31	56	Male	urban	Farmer	Chronic Plaque Psoriasis	12	-	6	4.6	25	0.77	6800	40	22
32	49	Male	Rural	Painter	Chronic Plaque Psoriasis	16.5	-	6	3	19.5	0.89	8400	44	26
33	51	Male	Rural	Security	Chronic Plaque Psoriasis	12	-	18.3	8.5	27	0.97	3600	37	57
34	49	Male	urban	Merchant	Chronic Plaque Psoriasis	12	-	12	4	33	1.08	13100	72.7	16.2
35	49	Male	urban	Farmer	Palmo Plantar Psoriasis	6	-	6	5.6	39	1.1	4500	40	18
36	43	Male	Rural	Business	Chronic Plaque Psoriasis	12	-	1.8	6.3	21.3	0.79	6800	46	20
37	54	Male	urban	Daily wager	Chronic Plaque Psoriasis	14	-	2.8	4.6	27.3	1	8200	42	16
38	36	Male	urban	Business	Chronic Plaque Psoriasis	20.6	-	6	5.8	32.6	0.85	7500	44	22
39	43	Female	Rural	Housewife	Guttate Psoriasis	14	+	3.0	5.4	36	1.01	6800	48	26
40	26	Female	Rural	Student	Scalp Psoriasis	4.8	-	4	4.6	18.6	0.67	8500	48	22

S.NO	Age	Sex	Background-Rural/Urban	Occupation	Type of Psoriasis	PASI Score	Nail Pitting	CRP	Serum uric acid	Blood Urea	Serum creatinine	CBC Total Count	Neutrophil Count	Lymphocyte
1	39	Male	Urban	Teacher	-	-	-	3.6	3.6	18	1	4500	40	16
2	27	Female	Rural	Student	-	-	-	4	4.2	33	0.86	8200	46	20
3	37	Male	Urban	Farmer	-	-	-	2.8	3.8	23	0.63	6800	42	18
4	46	Female	Rural	Housewife	-	-	-	4	5	38	0.91	4200	40	22
5	42	Female	Rural	Housewife	-	-	-	3.8	4.8	33	0.76	8500	36	26
6	40	Female	Urban	Housewife	-	-	-	6	4.6	26	0.89	6000	42	16
7	53	Male	Rural	Farmer	-	-	-	4	3.6	28	0.61	4800	40	22
8	29	Female	Urban	Teacher	-	-	-	2.8	3.4	19	0.72	5600	38	18
9	18	Female	Urban	Student	-	-	-	4	3.6	35	0.83	7400	44	32
10	57	Male	Rural	Farmer	-	-	-	3.8	4.2	39	0.97	8200	42	16
11	31	Female	Rural	Housewife	-	-	-	4.7	3.8	28	1.1	4600	42	18
12	54	Male	Rural	Business	-	-	-	2	3.6	19	0.9	5800	48	20
13	48	Male	Rural	Business	-	-	-	6	3.8	18	0.79	4200	40	24
14	22	Male	Urban	Student	-	-	-	1.6	4.1	23	0.68	6800	42	16
15	63	Female	Rural	Housewife	-	-	-	2.6	3.8	28	1.03	7200	48	18.6
16	44	Female	Urban	Housewife	-	-	-	2	3.3	31	1	4000	56	16
17	83	Male	Rural	Farmer	-	-	-	3.6	3.6	33	0.96	7500	40	22.4
18	57	Male	Urban	Business	-	-	-	1.8	3.8	28	1.1	5800	38	20
19	54	Male	Rural	Teacher	-	-	-	4	4	18	0.7	9000	42	28
20	25	Female	Urban	Student	-	-	-	5	3.6	33.6	0.68	4000	40	26
21	61	Male	Urban	Farmer	-	-	-	4	4.1	22.5	0.9	7400	42	16
22	46	Male	Rural	Teacher	-	-	-	1.8	3.8	19	1.04	6800	40	20
23	63	Male	Urban	Retired	-	-	-	2.8	4.2	19	1.1	4800	36	18
24	49	Male	Rural	Driver	-	-	-	3.6	5.6	27.5	0.63	7400	42	22
25	55	Male	Urban	Daily wage worker	-	-	-	4	3.8	33.5	0.89	8200	40	26
26	21	Female	Urban	Student	-	-	-	2	4.2	38	0.74	4600	38	16
27	40	Male	Rural	Painter	-	-	-	3.4	3.6	19	0.83	5800	44	22
28	50	Male	Rural	Police	-	-	-	1.8	3.2	33.6	0.64	4200	42	18
29	39	Male	Rural	Teacher	-	-	-	4	3.6	28.6	0.78	6800	42	32
30	33	Male	Rural	Business	-	-	-	2.8	3.8	29	0.89	8200	48	18.6
31	56	Male	Urban	Farmer	-	-	-	3.2	3.6	18	1.1	6800	56	16
32	49	Male	Rural	Farmer	-	-	-	4.6	3.8	23	1	4200	40	22.4
33	51	Male	Urban	Daily wage worker	-	-	-	2.8	4.8	19	0.97	8500	38	16
34	49	Male	Rural	Business	-	-	-	4.0	3.8	28	0.88	6000	42	18
35	49	Male	Rural	Daily wage worker	-	-	-	3.8	5.1	18	0.67	4800	40	20
36	43	Male	Urban	Farmer	-	-	-	4	4.2	23	0.73	5600	46	24
37	54	Male	Rural	Driver	-	-	-	2.8	4.3	19	0.84	5800	42	16
38	36	Male	Urban	Business	-	-	-	3	3.8	28	1	4000	40	18.6
39	43	Female	Rural	Housewife	-	-	-	5	4.2	19	0.97	8200	36	28
40	26	Female	Urban	Teacher	-	-	-	4.6	5	33	0.73	4000	56	26

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