

# Comparison of mean serum prolactin levels between healthy and psoriatic patients

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## Abstract

**Objective** The goals of this study were to evaluate the mean blood prolactin levels between healthy and psoriatic patients and to ascertain the prevalence of psoriasis in patients presenting to a teaching hospital in Punjab.

**Methods** This study involved 153 patients of both genders aged between 18-70 years who presented at outpatient department of Dermatology, Mayo Hospital Lahore. 153 patients of both genders aged between 18-70 years were evaluated for psoriasis which was diagnosed clinically by the presence of red inflamed, sharply demarcated, indurated plaques, with silvery white scales over extensor surfaces and scalp for  $\geq 6$  months. 5ml of venous blood was sampled through venipuncture and was sent for serum prolactin level estimation. Mean serum prolactin level was compared between patients with and without psoriasis. A written informed consent was taken from each patient.

**Results** The patients were  $40.11 \pm 4.9$  years old on average. The majority of the patients ( $n=103$ , 67.3%) were in the 18–44 age range. Male to female ratio was 2:1, with 102 (66.7%) men and 51 (33.3%) women among the patients. These individuals serum prolactin levels ranged from 5.6ng/ml to 15.9ng/ml, with an average of  $8.9 \pm 2.3$ ng/ml. Six individuals (3.9%) had psoriasis, which was identified. The prevalence of psoriasis did not differ statistically significantly by gender ( $p$ -value=1.000) or by age ( $p$ -value=0.972). Patients with psoriasis had considerably higher mean serum prolactin levels than those without psoriasis ( $14.80 \pm 1.05$  vs.  $8.68 \pm 1.97$  ng/ml;  $p$ -value 0.001). Patients with and without psoriasis were divided into several subgroups based on patient's age, with similar substantial differences in mean serum prolactin level being identified.

**Conclusion** In the present study, 3.9% of patients presenting in dermatology outpatient department had psoriasis and these patients had significantly higher mean serum prolactin level compared to those without psoriasis which might be a potential therapeutic target and necessitates further studies in this regard to establish cause-effect relationship.

## Key words

Psoriasis, Keratinization, Serum Prolactin.

## Introduction

Psoriasis is a chronic inflammatory dermatoses with an estimated worldwide disease burden of 120-180 million people and prevalence of 0-

11.8%.<sup>1</sup> In a recent study, Aman *et al.* (2017) reported the frequency of psoriasis to be 3.80% among patients presenting at dermatologic outdoor of Mayo Hospital Lahore.<sup>2</sup> A relatively higher frequency of 5.9% has been reported by Fasih *et al.* (2017) in Azad Kashmir<sup>3</sup> while a relatively lower frequency of 1.1% has been reported by Alam *et al.* (2017) in Bangladesh.<sup>4</sup> Sharma *et al.* (2016) reported much higher frequency of 11.2% in India.<sup>5</sup>

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Epidermal keratinocyte's hyper-proliferation and defective differentiation, the over-activation of inflammatory cells such T cells, dendritic cells, neutrophils, and increased angiogenesis in the dermis are all characteristics of psoriasis. According to some data, psoriasis may develop or improve during pregnancy as well as during ages when hormonal changes like puberty and menopause are occurring.<sup>1</sup>

The anterior pituitary gland secretes the neuropeptide prolactin (PRL), which has a wide range of physiological effects. It has been suggested that it plays a significant role in immunomodulation and that it uses certain receptors to promote cell proliferation in cultured human keratinocytes.<sup>6</sup> According to certain research, psoriasis can worsen when a prolactinoma is present and serum PRL levels rise in those with the condition.<sup>6,7</sup>

Al-Sadat Mosbeh *et al.* (2017) reported that the mean serum prolactin level was significantly higher in Egyptian patients with psoriasis as compared to healthy controls (12.41±6.05 vs. 5.53±2.97 ng/ml; p-value<0.001).<sup>6</sup> Khatri *et al.* (2017) also reported similar significant difference in Indian patients with and without psoriasis (14.37±6.74 vs. 8.40±4.50 ng/ml; p-value<0.001).<sup>7</sup> Similar significant difference has also been reported by Elsherif *et al.* (16.9±7 vs. 11.2±6 ng/ml; p-value=0.003) among Libyan such patients.<sup>8</sup>

Thus, a higher serum prolactin level might be an attributable factor among psoriatic patients and might be a potential treatment target among such cases. However the current evidence is not conclusive and contains controversy. Robati *et al.* (2017) didn't observe any significant difference among Iranian psoriatic patients and controls (14.08±7.36 vs. 13.14±10.09 ng/ml; p-value=0.24).<sup>9</sup> Insignificant differences that are similar to our study has also been confirmed by

Ghiasi *et al.* in 2015 (320±179.38 vs. 318.18±191.78 mIU/L p-value=0.95) in Iran.<sup>10</sup> Due to this controversy in the existing literature and lack of enough localized published research, this current study will further reveal the results. The results of the present study will provide local baseline statistical data. If it reveals significantly higher mean serum prolactin level in psoriatic patients, it might prove as a potential therapeutic target in future practice.

## Methodology

This cross-sectional study was carried out at the Mayo Hospital Lahore's Department of Dermatology. After the summary was approved, the study lasted for six months, from 17 March 2018 to 16 September 2018. With a confidence level of 95% and a 5% error margin, a sample size of 153 cases was determined, with an expected frequency of psoriasis of 11.2%. By using Non-Probability, Consecutive Sampling, 5 patients were chosen. The study included adult, gender-neutral patients who presented to the dermatology OPD between the ages of 18 and 70 and gave written informed consent to participate. Pregnant women (as determined by a dating scan), lactating mothers (based on history), patients with diabetes mellitus (fasting blood sugar >110 mg/dl), chronic liver disease (serum bilirubin >1.2 mg/dl), chronic kidney disease (serum urea >40 mg/dl and creatinine >0.2 mg/dl), patients taking any of the following medications for the previous two weeks (dopaminergic receptor blockers. The 153 adult patients who matched the inclusion criteria and visited the dermatology clinic at Mayo Hospital in Lahore were enrolled in this study. Each patient provided a thorough medical history and signed an informed consent form. A clinical diagnosis of psoriasis was made. The level of serum prolactin was measured. The candidate herself noted and entered the patient's demographic information, the existence of

psoriasis, and the blood prolactin level into the supplied proforma. To remove bias, all serum prolactin level estimates were obtained from the same hospital lab. By excluding them, confounding variables have been managed.

**Results**

Patients' ages ranged from 18 to 70 years old, with a mean of 40.11±4.9 years. The majority of the patients (n=103, 67.3%) were between the ages of 18 and 44. The patient population was divided 2:1 between men and women, with 102 (66.7%) men and 51 (33.3%) women. As indicated in **Table 1**, the serum prolactin levels of these patients ranged from 5.6 ng/ml to 15.9 ng/ml with a mean of 8.9±2.3ng/ml.

According to **Table 2**, 6 (3.9%) patients had psoriasis. As indicated in **Table 3**, there was no statistically significant variation in the prevalence of psoriasis across various age groups (p-value=0.972) or gender groupings (p-value=1.000). According to **Table 4**, patients with psoriasis had substantially higher mean blood prolactin levels than those without the condition (14.80±1.05 vs. 8.68±1.97 ng/ml; p-value0.001).

As demonstrated in **Table 5**, similar statistically significant differences in mean blood prolactin levels were found between patients with and without psoriasis across a variety of patient age and gender-based subgroups.

**Table 1** Baseline characteristics of study sample.

Characteristics	Participants n=153
Age (years)	40.1±14.9
18-44 years	103 (67.3%)
45-70 years	50 (32.7%)
Gender	
Male	102 (66.7%)
Female	51 (33.3%)
Serum Prolactin (ng/ml)	8.9±2.3

**Table 2** Frequency of psoriasis in the study sample.

Psoriasis	Frequency (n)	Percentage (%)
Yes	6	3.9%
No	147	96.1%
Total	153	100.0%

**Table 3** Stratification of psoriasis across various subgroups (n=153).

Characteristics	N	Psoriasis n (%)	P-value
Age (years)			
18-44 years	103	4 (3.9%)	0.972
45-70 years	50	2 (4.0%)	
Gender			
Male	102	4 (3.9%)	1.000
Female	51	2 (3.9%)	

Chi-square test, observed difference was statistically insignificant.

**Table 4** Comparison of mean serum prolactin level between patients with and without psoriasis (n=153).

Psoriasis	n	Serum prolactin (ng/ml) mean±sd	P-value
Yes	6	14.80±1.05	<0.001*
No	147	8.68±1.97	

Independent sample t-test, \*observed difference was statistically significant.

**Table 5** Comparison of mean serum prolactin level between patients with and without psoriasis across various subgroups (n=153).

Effect Modifier	Sub-Groups	n	Serum Prolactin (ng/ml)		P-value
			Psoriasis (n=6)	No Psoriasis (n=147)	
Age	18-44 years	103	14.83±0.98	8.78±1.99	<0.001*
	45-70 years	50	14.75±1.63	8.47±1.94	<0.001*
Gender	Male	102	14.85±1.01	8.73±2.09	<0.001*
	Female	51	14.70±1.56	8.58±1.73	<0.001*

Independent sample t-test, \* observed difference was statistically significant.

## Discussion

People of all ages are susceptible to the chronic, non-infectious condition known as psoriasis. It has a lot of comorbidities and can affect the skin, nails, and joints.<sup>2</sup> Psoriasis is a disfiguring, incapacitating, and painful condition characterised by hyperproliferation and defective differentiation of epidermal keratinocytes, increased angiogenesis in the dermis, and hyperactivation of inflammatory cells like T cells, dendritic cells, and neutrophils.<sup>1</sup> Treatment still mostly focuses on addressing acute symptoms because the aetiology is still unknown.<sup>1,3,6</sup> Recent research, however, suggests that psoriatic patients have significantly higher mean serum prolactin levels and links this to endocrinology, explaining the pathological alterations in psoriasis.<sup>6,8</sup> The literature that is currently available, however, is divided when comparing the mean serum prolactin levels of healthy individuals and psoriatic patients.<sup>6-10</sup> However no similar locally published material was available, necessitating the present study.

The objectives of this study were to determine the prevalence of psoriasis in patients presenting to a teaching hospital in Punjab and to compare mean blood prolactin levels between healthy and psoriatic patients.

The patients in the current study had an average age of  $40 \pm 4.9$  years, with the majority (n=103, 67.3%) falling between the ages of 18 and 44. According to Haider *et al.* (2014), patients at Civil Hospital Karachi who presented with psoriasis had a similar mean age of  $40.01 \pm 2.6$  years.<sup>11</sup> According to Noor *et al.* (2017), similar patient characteristics at Lady Reading Hospital in Peshawar included a mean age of  $40.9 \pm 14.9$  years.<sup>12</sup> Ejaz *et al.* (2013) showed a comparable mean age of  $39.8 \pm 15.8$  years among psoriatic patients presenting at PAF Base Hospital,

Sargodha<sup>13</sup>, while Ghafoor *et al.* (2015) reported a  $42.7 \pm 6.1$  year mean age at PNS Shifa, Karachi.<sup>14</sup> According to Singh *et al.* (2017), these patients in India had a similar mean age of  $39.11 \pm 4.0$  years.<sup>15</sup> Mahmutovic *et al.* (2017) noted a substantially higher mean age of  $50.8 \pm 16.1$  years across Europe.<sup>16</sup>

Psoriasis was identified in 6 (3.9%) participants in the current investigation. According to Aman *et al.* (2017), 3.80% of patients visiting the dermatology outpatient clinic at Mayo Hospital, Lahore, had psoriasis. This finding is consistent with other reports of psoriasis prevalence in the local population.<sup>2</sup> Fasih *et al.* (2017) observed a substantially higher frequency of 5.9% in Azad Kashmir<sup>3</sup> while Alam *et al.* (2017) reported a relatively lower frequency of 1.1% in Bangladesh.<sup>4</sup> According to Sharma *et al.* (2016), India has a substantially higher frequency of 11.2%. According to Lindberg *et al.* (2014), Sweden saw a comparable frequency of 3.90%.<sup>17</sup> While Naldi *et al.* (2004) showed it to be 3.10% in Italy, Rachakonda *et al.* (2014) reported a comparable prevalence of 3.6% in the USA.<sup>18,19</sup>

We found that patients with psoriasis had significantly higher mean blood prolactin levels than those without psoriasis ( $14.80 \pm 1.05$  vs.  $8.68 \pm 1.97$  ng/ml; p-value 0.001). Khatri *et al.* (2017) showed similar significant difference in Indian individuals with and without psoriasis ( $14.37 \pm 6.74$  vs.  $8.40 \pm 4.50$  ng/ml; p-value 0.001). Our findings are comparable to theirs.<sup>7</sup> Both Al-Sadat Mosbeh *et al.* ( $12.41 \pm 6.05$  vs.  $5.53 \pm 2.97$  ng/ml; p-value 0.001) and Elsherif *et al.* ( $16.9 \pm 7$  vs.  $11.2 \pm 6$  ng/ml; p-value= 0.003) showed similar significant differences among Libyan such individuals.<sup>6</sup>

According to the current study, which is the first of its kind in the local population, 3.9% of patients who presented to the dermatology outpatient department had psoriasis. These

patients also had considerably higher mean serum prolactin levels than those who did not have psoriasis. However, it is yet unknown if this elevated prolactin level contributes to the development of psoriasis or if it is only a symptom of the condition. Additionally, we neglected to take into account the influence of disease management on serum prolactin levels or the control of serum prolactin levels on disease outcome, which might have clarified this relationship and established the importance of treating hyperprolactinemia in treating such patients' diseases or enhancing their response to treatment. The relationship between serum prolactin levels and disease severity may be useful for risk-stratifying upcoming patients. Future research is strongly encouraged to conduct such a study.

## Conclusion

In current study, 3.9% of patients presenting in dermatology outpatient department had psoriasis and these patients had significantly higher mean serum prolactin level compared to those without psoriasis which might be a potential therapeutic target and necessitates further studies in this regard to establish cause-effect relationship..

## References

1. Kanda N, Hau CS, Tada Y, Watanabe S. Prolactin may promote the development of psoriasis: reawakened issue. *J Clin Exp Dermatol Res*. 2013;4(5):1000198.
2. Aman S, Nadeem M, Mahmood K, Ghafoor MB. Pattern of skin diseases among patients attending a tertiary care hospital in Lahore, Pakistan. *J Taibah Uni Med Sci*. 2017;12(5):392-6.
3. Fasih S, Arif AB, Younas S. Pattern of skin diseases in Abbas Institute of Medical Sciences, Muzaffarabad. *Pak J Physiol*. 2017;13(4):26-9.
4. Alam MN, Husain A, Quarashi SA. The pattern of skin and venereal disorders among patients attending in the OPD of dermatology and venereology department of a tertiary care private hospital, Dhaka, Bangladesh. *J Pak Assoc Dermatol*. 2017;27(1):10-4.
5. Sharma S, Vyas K, Dhara PT, Ronak V. Demographic distribution of various skin diseases in patients visiting tertiary care hospital in Saurashtra region, Gujarat, India. *Int J Contemp Med Res*. 2016;3(6):1742-6.
6. Al-Sadat M, Almohamady AS, El-Shorbagy MS, Reda MA. Evaluation of serum prolactin level in psoriasis vulgaris. *Gulf J Dermatol Venereol*. 2017;24(1):16-25.
7. Khatri G, Mahajan VK, Mehta KS, Sharma KK, Bhushan S, Chauhan PS. Serum prolactin levels in patients with psoriasis: results of a pilot study. *Indian J Med Res*. 2017;145(2):250-2.
8. Elsherif NA, El-Sherif AI, El-Dibany SA. Serum prolactin levels in dermatological diseases: a case-control study. *J Dermatol Surg*. 2015;19(2):104-7.
9. Robati RM, Toossi P, Rahmati-Roodsari M, Khalilazar S, Abolhasani E, Namazi N, et al. Association of psoriasis severity with serum prolactin, thyroid hormones, and cortisol before and after treatment. *Sci World J*. 2013;2013:921819.
10. Ghiasi M, Hallaji Z, Narimani SA. Serum prolactin level in psoriasis: Is it really higher than in healthy individuals? *Iran J Dermatol*. 2015;18(1):6-9.
11. Haider S, Wahid Z, Najam-us-Saher, Riaz F. Efficacy of Methotrexate in patients with plaque type psoriasis. *Pak J Med Sci*. 2014;30(5):1050-3.
12. Noor SM, Ayub N, Paracha MM. Efficacy and safety of methotrexate versus acitretin in chronic plaque psoriasis. *J Postgrad Med Inst*. 2017;31(1):4-7.
13. Ejaz A, Suhail M, Iftikhar A. Psoriasis in Pakistani population: Associations, comorbidities, and hematological profile. *J Pak Assoc Dermatol*. 2016;23(1):42-6.
14. Ghafoor R, Rashid A, Anwar MI. Dyslipidemia and psoriasis: a case control study. *J Coll Physicians Surg Pak*. 2015;25(5):324-7.
15. Singh S, Dogra S, Shaiq N, Bhansali A, Malhotra S. Prevalence of metabolic syndrome in psoriasis and levels of Interleukin-6 and tumor necrosis factor- $\alpha$  in psoriasis patients with metabolic syndrome: Indian tertiary care hospital study. *Int J App Basic Med Res*. 2017;7:169-75.
16. Mahmutovic J, Zukic M, Pasalic A, Brankovic S, Jaganjac A, Katana B.

- Correlation between quality of life and depression among persons suffering from psoriasis. *Med Arch*. 2017;**71(5)**:341-6.
17. Lindberg M, Isacson D, Binge-fors K. Self-reported skin diseases, quality of life and medication use: a nationwide pharmaco-epidemiological survey in Sweden. *Acta Derm Venereol*. 2014;**94(4)**:188-91.
18. Rachakonda TD, Schupp CW, Armstrong AW. Psoriasis prevalence among adults in the United States. *J Am Acad Dermatol*. 2014;**70(5)**:512-6.
19. Naldi L, Colombo P, Placchesi EB, Piccitto R, Chatenoud L, La Vecchia C; PraKtis Study Centers. Study design and preliminary results from the pilot phase of the PraKtis study: self-reported diagnoses of selected skin diseases in a representative sample of the Italian population. *Dermatology*. 2004;**208(1)**:38-42.