

## PROFILE OF PSORIASIS AMONG IN PATIENTS OF DERMATOLOGY DEPARTMENT OF A GOVERNMENT TERTIARY CARE TEACHING HOSPITAL IN MYSORE: A MEDICAL RECORD BASED STUDY

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### ABSTRACT

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#### BACKGROUND

Psoriasis is a common chronic inflammatory disease with varied prevalence and morphology. There is no complete cure for psoriasis. Estimation of burden and the clinical profile of psoriasis patients will generate evidence which can be utilized for efficient management of specialist services, better care and improving the quality of life of the psoriatic patients.

#### OBJECTIVE

To estimate the burden and study the clinical profile of psoriasis among in-patients of the Dermatology Department at K. R. Hospital, Mysore.

#### METHODOLOGY

Medical records based descriptive study of psoriasis patients admitted to the Dermatology department of a government tertiary care teaching hospital during 2009-2013. From the disease index card patients and their inpatient case sheets were identified. Using a predesigned and pre tested proforma the details were obtained from the case sheet.

#### RESULTS

The overall burden of psoriasis among inpatients of dermatology department for 5-year period was 59 per 1000 patients admitted. A declining trend was observed in the burden of psoriasis from 2009 to 2013. Majority of the patients were in the age group 35-64 years (68%) and nearly 80 percent of them were men. The most common type of psoriasis was Psoriasis vulgaris. More than half of the patients had severe type of psoriasis according to PASI scoring. Average length of stay was 18 days. Nearly 58 percent of cases were repeat cases. Most common category of drugs administered were antihistaminics, corticosteroids, antibiotics, emollients and antimetabolites in that order. Hypertension was found among 16 percent of patients. Serum albumin and total protein was found to be low in 52% and 27% of the patients respectively.

#### CONCLUSION

The burden of psoriasis was high among the in-patients of dermatology department. It was more common among male in-patients.

#### KEYWORDS

Psoriasis, Burden, Clinical Profile, Tertiary Care Hospital, Mysore.

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#### INTRODUCTION

Psoriasis is a chronic inflammatory skin disease with varying degrees of severity and disability.<sup>[1]</sup> Prevalence of psoriasis varies in different parts of the world. According to published reports, prevalence in different populations varies from 0% to 11.8%.<sup>[2-5]</sup> In developed nations like Europe, USA and Canada it ranges from 1.4 – 4.7%.<sup>[6]</sup> Asia has reported low prevalence of psoriasis than western countries.

In India the incidence of psoriasis among total skin patients ranged between 0.44-2.2% with overall incidence of 1.02%.<sup>[7]</sup> Psoriasis is twice common in males compared to females.<sup>[7]</sup> Psoriasis can present at any age and has been reported at birth and in older people of advanced age.<sup>[8]</sup> A bimodal age of onset has been recognized in several large studies.<sup>[8]</sup> Psoriasis can be highly variable in morphology, distribution, and severity. By far the most common type is chronic plaque psoriasis, affecting nearly 90% of psoriasis patients.<sup>[7]</sup> Further, psoriasis may have a variable course and generally does not affect survival, but has negative impact on the quality of life.<sup>[9]</sup>

Comorbidities associated with psoriasis include psoriatic arthritis, depression, hypertension, diabetes and cardiovascular diseases.<sup>[10]</sup> Regular tobacco smoking not only increases the risk of developing psoriasis but also its severity. The other risk factors include alcoholism, obesity, mental stress, recurring infections and genetic predisposition.<sup>[11]</sup>

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Psoriatic Area and Severity Index (PASI) has been used to assess the severity of psoriasis. PASI score is related to the length of stay in hospital. Higher the PASI score longer will be stay in the hospital with its added economic consequences to the patients and their families.<sup>[12]</sup> There is no complete cure for psoriasis and treatment is aimed at providing symptomatic relief and improving quality of life for sufferers.<sup>[13]</sup> The physical, psychological and economic impact of disease has stimulated a growing international interest and concern about psoriasis.<sup>[13]</sup> The estimation of burden and the clinical profile of psoriasis patients will generate evidence which can be utilized for efficient management of specialist services, better care and improving the quality of life of the psoriatic patients. Hence the present study has been planned with following objectives.

### OBJECTIVES

- To estimate the burden of psoriasis among in-patients of the Dermatology Department at K. R. Hospital, Mysore.
- To study the socio demographic and clinical profile of psoriasis among in-patients of the Dermatology Department at K. R. Hospital, Mysore.

### METHODOLOGY

This was a medical records based descriptive study of psoriasis patients admitted to the Dermatology department of K. R. Hospital, Mysore. The study was done during July 2014 to December 2014. The project proposal was submitted to the Institution Ethics Review Board (IERB) and approval was obtained for the study. The objectives of the study were explained to Medical Superintendent and Medical Records officer of K. R. hospital, Mysore and written permission was obtained from them. From the annual statistical report total number of patients admitted to Dermatology Department was obtained for 5-year period (2009-2013) from the Medical record section. This formed the denominator for the calculation of burden of the psoriasis.

The number of psoriasis patients admitted during the same time period formed the numerator, which was obtained from the disease index card with the ICD Classification L-40 (ICD coding for Psoriasis). The cards contain the details of psoriasis patients like, inpatient number, name, age, sex etc. Using the details in the Disease Index cards the inpatient case sheets were obtained from medical record filing section with the assistance of the staff of Medical records department. A pre-designed and pre-tested proforma was used to collect the data from the case sheet. Details of the patient like socio demographic profile, type of psoriasis, Psoriatic Area Severity Index (PASI), ICD classification, length of stay in the hospital, month and year of admission, laboratory investigations if any, treatment given and any other relevant information were included in the proforma.

### Statistical Analysis

The data collected was entered into Microsoft excel worksheet and analysed using SPSS version 13.0 software. Appropriate descriptive statistical measures like proportions were calculated for the categorical data. Even the numerical data were transformed into categorical data and the proportions in each category was calculated.

### RESULTS

Over the five-year time period (2009-2013) 97 patients with diagnosis of Psoriasis were admitted in the Dermatology

department of K. R. Hospital, Mysore. The overall burden of psoriasis among inpatients of dermatology department for 5-year period was 59 per 1000 patients admitted. Nearly one case of psoriasis was found for every 17 patients admitted. A declining trend was observed in the burden of psoriasis from 2009 to 2013 (Table 1). Nearly 85 percent of the cases were from Mysore district and 11 percent were from adjacent district, Mandya (Figure 1). More than 10 cases were admitted in the months of February, June and December. This trend indicated that more cases were admitted during the beginning, middle and the end of the year (Graph 1).

Majority of the patients were in the age group 35-64 years (68%) and nearly 80 percent of them were men. The ratio was nearly 4 males to one female. Over 75% belonged to above Poverty Line of socio economic class. Nearly 44 percent were smoking tobacco and 32 percent were consuming alcohol (Table 2).

The most common type of psoriasis was Psoriasis vulgaris and the least common type was palmoplantar psoriasis. More than half of the patients had severe type of psoriasis according to PASI scoring. Nearly 40 percent of the patients stayed in the hospital for 10 days or less. One in 3 patients stayed for 21 days or more. Nearly 58 percent of cases were repeated and among them 3 in 5 cases were repeated twice or more (Table 3).

By far the most common category of drugs administered were antihistaminics, topical corticosteroids, antibiotics, emollients and antimetabolites in that order. As per the JNC VII criteria hypertension was found among 16 percent of patients. Some of the laboratory investigations done and their inference were as given in the Table 3. Abnormalities in the values were found among less than 20% of the patients for most of the investigations except for serum albumin and total protein, which showed abnormalities in 52% and 27% of the patients respectively (Table 3).

### DISCUSSION

In the present study, the burden of psoriasis was found to be 5.9% for the 5-year time period. It showed a declining trend from 11.9% in the year 2009 to 3.2% in the year 2013. This is nearly similar to other published reports across the world and India.<sup>[1,3,6,7,14]</sup> It has been found that more cases were admitted during the early summer, monsoon and during the winter season of the year. Similar trend was found in a study done in North India.<sup>[14]</sup> references are not according to standards. they are not similar to the one referred before. Style is changed from reference no 14.

Nearly 68% of the cases were found in the age group of 35-64 years and among them 39% belonged to 45-54 years' group. Many hospital based studies done around the globe and in India have showed similar results.<sup>[3,4,6,7,14-18]</sup> Based on few studies done in India, the peak age of onset of disease was reported to be in third and fourth decade.<sup>[7]</sup> Even though bimodal onset had been described in various studies with second peak between 55-60 years, current study, which is descriptive and based on records, could not account for such a trend.

Males were found to be twice as commonly affected by psoriasis as females by many studies.<sup>[3,4,7,19]</sup> in the current study this ratio has been found to be 4:1, which is higher compared to other studies.

Nearly 21% of the patients belonged to below poverty line category. As psoriasis can have significant economic consequences as well as affect the quality of life of these people, this finding can have important policy implication for providing health care services to the lower socio economic strata of the society.

In this study 44% were smoking tobacco and 32% were consuming alcohol. As both tobacco smoking and alcohol increase the risk of developing as well as severity of psoriasis, these high proportions found in this study gives an indication for implementation of appropriate measures for de addiction programmes.<sup>[20-22]</sup>

Psoriasis vulgaris was the most common type and palmo plantar was the least common type of psoriasis found affecting nearly 52% and 5% of psoriatic patients respectively. Data from hospital based study in Chile showed similar results.<sup>[23]</sup> Different studies from India and abroad have found chronic plaque psoriasis as the commonest variety of psoriasis.<sup>[7,13,16,17]</sup> Majority (50%) of patients had severe grade of psoriasis as per PASI scoring (>20) and only 8% had mild grade of psoriasis. In a study done by Gopal MG et.al, in Bangalore 42% had severe grade of psoriasis and 3% had mild grade of psoriasis as per PASI scoring.<sup>[24]</sup> In a tertiary care center most of the times people with high grade disease get admitted for the in-patient care.<sup>[25]</sup>

Over 60% of the patients stayed in the hospital for more than 10 days and among them nearly 22% stayed for more than a month. The average length of stay was nearly 18 days. This indicates the huge burden on hospital resources as well as direct and indirect costs incurred by the patients and their attendants in managing psoriasis. In turn this can also be an area of future research for finding better treatment and other services to reduce the duration of hospital stay and cut down on the costs. Majority of the patients were repeat cases and among them around 59 percent were treated as inpatients for two or more times.

The three most common category of drugs administered to the in patients of psoriasis were antihistaminics, topical corticosteroids, antibiotics. Emollients and antimetabolites were administered respectively to nearly 58% and 52% of them. In a study by Vijayan M et.al in Kerala topical emollients, topical steroids and antihistaminics were the 3 common types of drugs administered to psoriatic patients.<sup>[13]</sup> In the present study nearly 16% of the psoriatic patients were found to be diagnosed with hypertension. Psoriasis was found to be associated with hypertension in a study by Ghiasi M et al.<sup>[26]</sup> Few other studies also showed similar association.<sup>[27-29]</sup> In the current study low serum albumin and total protein levels were found in nearly 52% and 27% of the psoriatic patients respectively. This is comparable to the results from other studies.<sup>[30,31]</sup> Reduced albumin in psoriasis patients has been suggested to be due to lowered rates of albumin synthesis or increased rates of turnover.<sup>[32]</sup> Later, it was also suggested that the hypoalbuminemia in psoriasis patients may be the result of an increased endogenous catabolism of albumin without significant loss through urine, stools or skin.<sup>[33]</sup>

Abnormalities in other laboratory investigation results were found 10-20% of psoriatic in-patients except for abnormality blood urea which was found in 5% of them. These abnormalities could not be attributed to either the drug therapy or psoriasis per se as a direct cause and effect

relationship could not be established in this kind of medical records based descriptive study. Moreover, different studies done under different situations reported varied results on these and other laboratory parameters.<sup>[1,5-7,13,16,18,20,22,30,31,34-37]</sup>

**CONCLUSIONS**

The burden of psoriasis was high among the in-patients of dermatology department. It was more common among male in-patients. Psoriasis vulgaris was the most common and palmo plantar was the least common type of psoriasis found. Over half of patients had severe grade of psoriasis as per PASI scoring (>20). Majority were repeat cases. Average length of stay was 18 days. The most common category of drugs administered to the in patients of psoriasis were antihistaminics, corticosteroids, antibiotics. Low serum albumin levels were found in more than half of the patients.

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Year of Admission	Total No. of Inpatients in Dermatology Dept.	No. of Psoriasis Patients	Burden/1000 Patients
2009	210	25	119.04
2010	247	22	85.02
2011	290	17	58.62
2012	484	20	41.32
2013	413	13	31.47
<b>Total</b>	<b>1644</b>	<b>97</b>	<b>59</b>

*Table 1: Burden of Psoriasis among in Patients of Dermatology Department at KR Hospital, Mysore*

Age Group	Male		Female		Total	
	No	%	No	%	No	%
<25	5	5.2	2	2.1	7	7.3
25-34	7	7.2	8	8.2	15	15.4
35-44	19	19.6	2	2.1	21	21.7
45-55	22	22.7	3	3.1	25	25.8
54-64	16	16.5	4	4.1	20	20.6
≥65	8	8.2	1	1.0	9	9.2
Total	77	79.4	20	20.6	97	100

Socioeconomic Status						
	Frequency	%				
APL	77	78.4				
BPL	20	20.6				

Smoking Tobacco						
	No	%				
Yes	43	44.3				
No	54	55.7				

Consumption of Alcohol						
	No	%				
Yes	31	32				
No	66	68				

*Table 2: Socio Demographic Characteristics of Psoriasis Patients Admitted to K. R. Hospital, Mysore*

Type of Psoriasis	Frequency	%	ICD Classification
Psoriasis vulgaris	50	51.5	L 40.0
Pustular psoriasis	24	24.7	L 40.1
Erythrodermatous	13	13.4	
Psoriasis unspecified	5	5.2	L 40.9
Palmoplantar	5	5.1	L 40.3
<b>Total</b>	<b>97</b>	<b>100</b>	
Grading based on PASI score			
Mild (<10)	8	8.2	
Moderate (10-20)	37	38.1	
Severe ≥20	52	53.6	
Length of stay in days			
≤10	38	39.2	
11-20	28	28.5	
21-30	18	18.6	
≥31	13	13.7	
Average length of stay	17.92±15.31 days		
Repeated cases			
Yes	56	57.7	
No	41	42.3	
Frequency of repetition			
1	23	41.1	
2	17	30.4	
≥3	16	28.5	
Type of drug administered*			
Antihistamines	88	90.7	
Topical Corticosteroids	68	70.1	
Antibiotics	67	69.1	
Emollient	56	57.7	
Antimetabolites	50	51.5	
NSAIDS	15	15.5	
Calcium	15	15.5	
Acitretin	11	11.3	
Folic acid	8	8.2	
Antifungal	8	8.2	
Protein powder	7	7.2	
Antileprosy	6	6.2	
Ferrous sulphate	3	3.1	
Coal tar	2	2.1	
Hypertension#			
Yes	15	15.5	
No	82	84.5	
High Blood urea (>40 mg/dl)			
Yes (High)	4	4.5	
No (Normal)	84	95.5	
High Serum creatinine (>1.36 mg/dl)			
Yes	11	12.1	
No	80	87.9	
Low Serum Albumin (<3.5 g/dl)			
Yes	46	52.3	
No	42	47.7	

Low Total Protein (<6 g/dl)	n=85		
Yes	23	27.1	
No	62	72.9	
High AST (>45 U/l)	n=87		
Yes	16	18.4	
No	71	81.6	
High ALT (>50 U/l)	n=86		
Yes	11	12.8	
No	75	87.2	
High ALP (>125 U/l)	n=82		
Yes	9	11	
No	73	89	
High Total Bilirubin (>1 mg/dl)	n=89		
Yes	12	13.5	
No	77	86.5	
High Direct Bilirubin (>0.4 mg/dl)	n=86		
Yes	12	14	
No	74	86	

Table 3: Clinical Profile of Psoriasis Patients

\*Multiple response.

# Blood pressure ≥ 140/90.

Values Davidson- 20<sup>th</sup> edition.

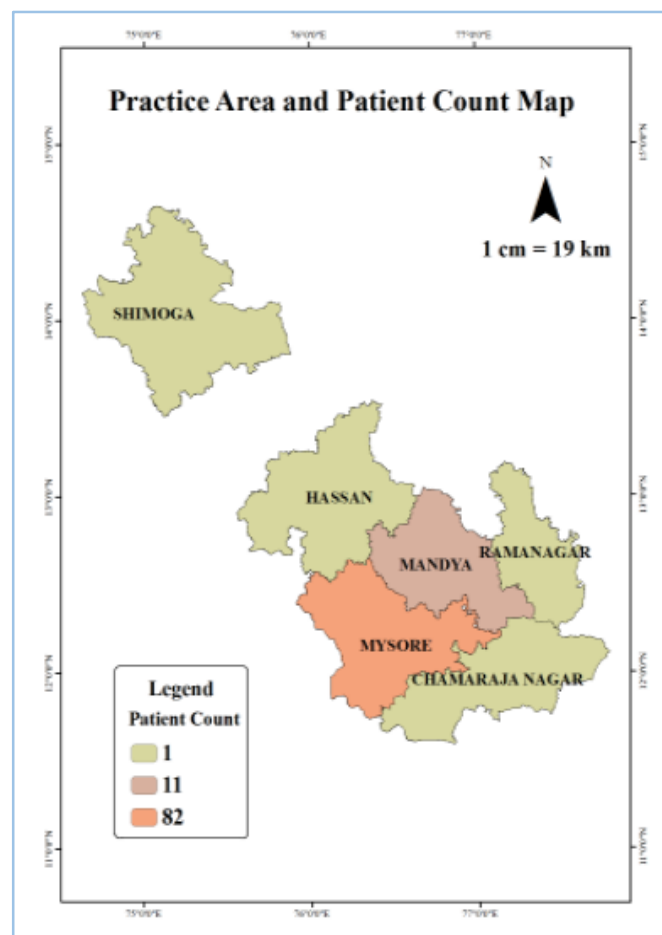
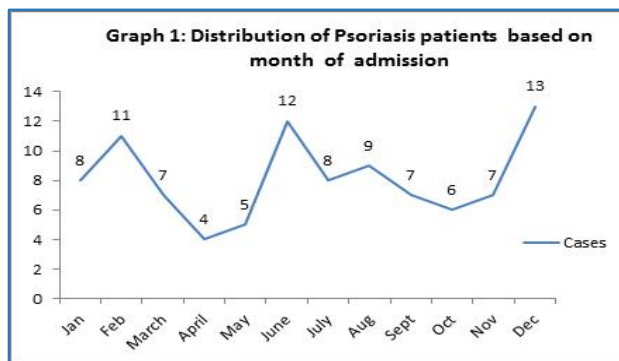


Fig. 1



## REFERENCES

- Khalid JM, Globe G, Fox KM, et al. Treatment and referral patterns for psoriasis in united kingdom primary care: a retrospective cohort study. *BMC Dermatol* 2013;13(1):1-9.
- Schon M, Boehncke W. Psoriasis. *N Engl J Med* 2005;352(18):1899-912.
- Bedi TR. Psoriasis in north India. Geographical variations. *Dermatologica* 1977;155:310-4.
- Kaur I, Kumar B, Sharma V, et al. Epidemiology of psoriasis in a clinic from north India. *Indian J Dermatol Venereol Leprol* 1986;52:208-12.
- Swanbeck G, Inerot A, Martinsson T, et al. A population genetic study of psoriasis. *Br J Dermatol* 1994;131:32-9.
- Christophers E. Psoriasis-epidemiology and clinical spectrum. *Clin Exp Dermatol* 2001;26(4):314-20.
- Dogra S, Yadav S. Psoriasis in India: prevalence and pattern. *Indian J Dermatol Venereol Leprol* 2010;76(6):595-601.
- Langley RGB, Krueger GG, Griffiths CEM. Psoriasis: epidemiology, clinical features, and quality of life. *Ann Rheum Dis* 2005;64(Suppl II):ii18-23.
- Krueger GG, Feldman SR, Camisa C, et al. Two considerations for patients with psoriasis and their clinicians: what defines mild, moderate, and severe psoriasis? What constitutes a clinically significant improvement when treating psoriasis? *J Am Acad Dermatol* 2000;43(2 Pt 1):281-5.
- Armstrong A, Pearson K. Psoriasis and cardiovascular disease: epidemiology, mechanisms, and clinical implications. *Psoriasis Targets Ther* 2012;2:1-11.
- Nordqvist C. All about psoriasis [Internet]. Medical news today. Cited 2015 Sep 9. Available from: <http://www.medicalnewstoday.com/info/psoriasis/risks-of-psoriasis.php>
- National clinical guideline centre. Psoriasis-assessment and management of psoriasis. Clinical guideline: methods, evidence and recommendations. National Clinical Guideline Centre. 2012.
- Vijayan M, James E, Vidyapeetham AV. Prevalence, clinical profile and prescribing pattern of psoriasis in a tertiary care referral hospital. *Intl J Pharm Tech* 2010;2(4):1241-52.
- Bedi TR. Clinical profile of psoriasis in north India. *Indian J Dermatol Venereol Leprol* 1995;61(4):202-5.
- Choon SE, Lai NM, Mohammad NA, et al. Clinical profile, morbidity, and outcome of adult-onset generalized pustular psoriasis: analysis of 102 cases seen in a tertiary hospital in Johor, Malaysia. *Int J Dermatol* 2014;53(6):676-84.
- Ejaz A, Suhail M, Iftikhar A. Psoriasis in Pakistani population: associations, comorbidities, and hematological profile. *J Pakistan Assoc Dermatologists* 2013;23(1):42-6.
- Loo CH, Uk M, Chan YC, et al. Clinical profile, morbidity and outcome of adult patients with psoriasis at a district hospital in northern Malaysia. *Med J Malaysia* 2015;70(3):177-81.
- Sinniah B, Devi SS, Prashant BS. Epidemiology of psoriasis in Malaysia: a hospital based study. *Med J Malaysia* 2010;65(2):112-4.
- Okhandiar R, Banerjee B. Psoriasis in the tropics: an epidemiological survey. *J Indian Med Assoc* 1963;41:550-6.
- Madden J, Barthell J. Liver function in psoriasis. *J Invest Dermatol* 1947;9(3):125-30.
- Behnam SM, Behnam SE, Koo JY. Smoking and psoriasis. *Skinmed* 2005;4(3):174-6.
- Cassano N, Vestita M, Apruzzi D, et al. Alcohol, psoriasis, liver disease, and anti-psoriasis drugs. *Int J Dermatol* 2011;50(11):1323-31.
- Valenzuela F, Silva P, Valdés MP, et al. Epidemiology and quality of life of patients with psoriasis in Chile. *Actas Dermosifiliogr* 2011;102(10):810-6.
- Gopal MG, Ankur T, Sharath Kumar BC, et al. A clinical and epidemiological study of psoriasis and its association with various biochemical parameters in newly diagnosed cases. *J Clin Diagnostic Res* 2013;7(12):2901-3.
- Woods AL, Rutter KJ, Gardner LS, et al. Inpatient management of psoriasis: a multicentre service review to establish national admission standards. *Br J Dermatol* 2008;158(2):266-72.
- Ghiasi M, Nouri M, Abbasi A, et al. Psoriasis and increased prevalence of hypertension and diabetes mellitus. *Indian J Dermatol* 2011;56(5):533-6.
- Neimann AL, Shin DB, Wang X, et al. Prevalence of cardiovascular risk factors in patients with psoriasis. *J Am Acad Dermatol* 2006;55(5):829-35.
- Mallbris L, Ritchlin CT, Stahle M. Metabolic disorders in patients with psoriasis and psoriatic arthritis. *Curr Rheumatol Rep* 2006;8(5):355-63.
- Sommer DM, Jenisch S, Suchan M, et al. Increased prevalence of the metabolic syndrome in patients with moderate to severe psoriasis. *Arch Dermatol Res* 2006;298(7):321-8.
- Bhatnagar M, Bapna A, Khare AK. Serum proteins, trace metals and phosphatases in psoriasis. *Indian Journal of dermatology, venereology, and leprology. Medknow Publications* 1994;18-21.
- Gousia S, Qazi M, Sabiya M, et al. Comparison of levels of serum copper, zinc, albumin, globulin and alkaline phosphatase in psoriatic patients and controls: a hospital based casecontrol study. *Indian Dermatol Online J* 2015;6(2):81-3.
- Worm AM, Rossing N. Transcapillary escape rate of albumin and plasma volume in patients with varying degrees of psoriasis. *Br J Dermatol* 1977;97(4):423-7.
- Worm AM, Taaning E, Rossing N, et al. Distribution and degradation of albumin in extensive skin disease. *Br J Dermatol* 1981;104(4):389-96.
- Karoli R, Fatima J, Shukla V, et al. A study of cardio-metabolic risk profile in patients with psoriasis. *J Assoc Physicians India* 2013;61(11):798-803.
- Lea WAJ, Cornish HH, Block WD. Studies on serum lipids, proteins, and lipoproteins in psoriasis. *J Invest Dermatol* 1958;30(4):181-5. Nisa N, Qazi MA. Prevalence of metabolic syndrome in patients with psoriasis. *Indian J Dermatology, Venereol Leprol* 2010;76(6):662-5.
- Puri N, Mahajan BB. Original article a study of clinical and biochemical correlation in patients of psoriasis in acute exacerbation. *J Pakistan Assoc Dermatologists* 2014;24(3):236-40