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Original Article

Prevalence of metabolic syndrome among psoriatic patients attending a tertiary care hospital in Western India

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Abstract

Context Psoriasis is a multi-system inflammatory disease where the skin, nails and joints are commonly affected. Psoriasis is associated with an increased risk of cardiovascular atherosclerosis. Metabolic syndrome is a significant predictor of atherosclerotic disease with associated risk for cardiovascular events in such patients.

Aim To study the prevalence of metabolic syndrome among psoriatic patients attending tertiary care hospital in western India.

Material and Methods The present one year hospital based cross sectional study was done on a total of 100 psoriatic patients who attended our tertiary care hospital in western India from January 2017 to December 2017. A written consent form was obtained. All the patients were screened for metabolic syndrome according to NCEP-ATP III criteria. Venous samples were taken at the enrolment visit after the subjects had fasted overnight for measuring serum cholesterol, triglycerides and plasma glucose. An ethical committee clearance was obtained prior to the start of the study. Statistical analysis used: SPSS-17 software and epi-info software.

Results In our study, 32 out of 100 psoriatic patients (32%) had metabolic syndrome. 69% of the study population were males and 31% were females. PASI <9 was seen in 64% of the population. Hypertension, diabetes mellitus, duration of the disease, PASI were statistically significant in relation to occurrence of metabolic syndrome.

Conclusion Patients with psoriasis should be routinely screened for metabolic syndrome and treated accordingly to manage cardio-metabolic risk. However, the directionality of this association could not be established. Limitation; lack of controls in our study.

Key message Early detection of metabolic syndrome can prevent the occurrence of cardiovascular abnormalities.

Key words
Psoriasis, PASI, metabolic syndrome.

Introduction

Psoriasis is a common, chronic, inflammatory, papulosquamous, condition of the skin, in which both genetic and environmental influences have a critical role. The disease is variable in duration, periodicity of flares and extent.[1] The study was conducted to know the prevalence of metabolic syndrome among psoriatic patients attending tertiary care hospital in western India.

Several studies have recently concluded that

psoriasis is associated with systemic disorders such as cardiovascular disease, the metabolic syndrome (MS) cancer, chronic obstructive pulmonary disease, inflammatory bowel disease, depression and osteoporosis.[2,3] There are many reports that psoriatic patients tend to have concurrent illnesses that are termed as comorbidities, though there are remarkably few studies from India. Hence this study has been taken up to know the prevalence of metabolic syndrome in psoriasis.

Metabolic syndrome is defined as a cluster of risk factors including central obesity, atherogenic dyslipidemia, hypertension and diabetes mellitus. It is a strong predictor of cardiovascular disease, that confers a cardiovascular risk higher than the individual components.[4,5] The prevalence of metabolic syndrome has been estimated to be 15-24% in the general population and 30‑50% among psoriasis patients in the recent studies.[6]

Metabolic syndrome is diagnosed by the presence of three or more of the following five criteria of the National Cholesterol Education Programme's Adult Treatment Panel III (ATP III)[7]:

1. waist circumference > 102 cm(40 inches)in males or > 88 cm(35 inches) in females;
2. hypertriglyceridemia> 1.7 mmol/l (150mg/dl);
3. high density lipoprotein (HDL) cholesterol <1.0mmol/l (40mg/dl) in men or < 1.3mmol/dl (50mg/dl) in women;
4. blood pressure > 130/85 mmHg; fasting plasma glucose of > 6.1 mmol/l (100mg/dl).

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Material and Methods

This study was conducted within a duration of twelve months (January 2017 to December 2017) in the Department of Dermatology, Venereology and Leprosy, KLE'S Dr. Prabhakar Kore Hospital and Medical Research Centre, Belagavi. The study was a hospital-based cross sectional study involving 100 patients.

Inclusion criteria

Subjects of either sex of age group 15-60 years, with psoriasis, attending KLE'S Dr. Prabhakar Kore hospital & MRC, Belagavi.

Exclusion criteria

1) Subjects who are on drugs like anti-malarials, lithium, interferons, imiquimoid, NSAIDs, glibenclamide.
2) Subjects who are known cases of hypertension, DM, hyperlipidaemia before the onset of psoriasis.
3) Subjects who have renal or cardiac abnormalities.

An informed consent was taken from all patients and patient characteristics were recorded on a standard proforma. Statistical analysis of the data was done using statistical processing software (SPSS-17) and epi-info software. Descriptive statistics were reported using mean and standard deviation for the continuous variables and numbers and percentages for the categorical variables.

Independent *t*‑test was used to compare the mean values between cases. Chi‑square test was used to test the association between study variables and cases. $p \leq 0.05$ was considered to be statistically significant. The sample size was calculated using the formula $n=4pq/d^2$ where p is prevalence, q is 100-p and d is standard of error.

Table 1 Distribution by socio demographic and other factors

Factors	*Number of cases*	*Percentage*
Gender		
Male	69	69.00
Female	31	31.00
Age groups		
<=20yrs	7	7.00
21-30yrs	15	15.00
31-40yrs	31	31.00
41-50yrs	22	22.00
51-60yrs	25	25.00
Duration		
<1yr	14	14.00
1-5yrs	41	41.00
6-10yrs	21	21.00
>=11yrs	24	24.00
Hypertension		
No	93	93.00
Yes	7	7.00
Diabetic mellitus		
No	90	90.00
Yes	10	10.00
PASI		
<=9	64	64.00
>=9.1	36	36.00
Types		
CPP	75	75.00
CPP,PA	3	3.00
Erythroderma	5	5.00
Guttate	2	2.00
PPK	8	8.00
Pustular	2	2.00
Pustular, PA	2	2.00
Scalp	3	3.00
Total	100	100.00

PASI psoriasis severity index,CPP chronic plaque psoriasis, PA psoriatic arthritis, PPK palmoplantar keratoderma

The prevalence of psoriasis was 44. So $n=4*44*56/(10)^2 =$ 98.56 approximately 100.

Relevant data included age, gender, waist circumference, blood pressure, smoking habit, age of onset and duration of psoriasis, type and severity of psoriasis. To determine waist circumference, the upper hip bone was located and the measuring tape was placed at the level of the upper most part of the hip bone around the abdomen (ensuring the tape measure was horizontal). The tape measure was snug but did not cause compression on the skin. Blood pressure was recorded as the average of two measurements after subjects have been sitting for five minutes. Severity of psoriasis was assessed according to psoriasis area and severity index (PASI).[8]

Metabolic syndrome was diagnosed by the presence of three or more of the five criteria of the National Cholesterol Education Programme's Adult Panel III (ATP III).[7]

Venous samples were taken at the enrolment visit after the subjects had fasted overnight (at least 8 h). Serum cholesterol and triglycerides were measured with enzymatic procedures. Plasma glucose was measured using a glucose oxidase method.

The study was approved by the institutional ethical committee.

Results

The number of males in the study population were 69/100, 69% and females were 31/100, 31%, and 68% of study population belonged to age group between 21 to 50 years. Of the subjects enrolled 10% subjects were diabetic [10/100, 10%] and 7% hypertensive [7/100,7%]. PASI less than nine was seen in 64/100 (64%) compared to PASI more than nine in 36/100 (36%).

Regarding the type of psoriasis, CPP was the most commonest variety [75/100,75%] followed by PPK [8/100,8%], CPP, PA [5/100,5%] and other variety, as seen in **Table 1**.

There was no statistically significant relationship between gender [p>0.05], age categorization [p>0.05] in relation to occurrence of metabolic syndrome. Duration of disease, presence of

Table 2 Association between prevalence of metabolic syndrome with other characteristics

Factors	*Metabolic syndrome*				*Total*	*Chi-square*	*p-value*
	absent	*%*	*present*	*%*			
Gender							
Male	43	62.32	26	37.68	69	3.3010	0.0690
Female	25	80.65	6	19.35	31		
Age groups							
<=20yrs	6	85.71	1	14.29	7	7.4430	0.1140
21-30yrs	13	86.67	2	13.33	15		
31-40yrs	23	74.19	8	25.81	31		
41-50yrs	12	54.55	10	45.45	22		
51-60yrs	14	56.00	11	44.00	25		
Duration							
<1 yr	9	64.29	5	35.71	14	8.5390	0.0360*
1-5 yrs.	28	68.29	13	31.71	41		
6-10 yrs.	19	90.48	2	9.52	21		
>=11yrs	12	50.00	12	50.00	24		
Hypertension							
No	67	72.04	26	27.96	93	9.9800	0.0020*
Yes	1	14.29	6	85.71	7		
Diabetic mellitus							
No	64	71.11	26	28.89	90	4.0030	0.0450*
Yes	4	40.00	6	60.00	10		
PASI							
<=9	49	76.56	15	23.44	64	5.9900	0.0140*
>=9.1	19	52.78	17	47.22	36		
Types							
CPP	52	69.33	23	30.67	75		
CPP,PA	1	33.33	2	66.67	3		
Erythroderma	3	60.00	2	40.00	5		
Guttate	1	50.00	1	50.00	2		
PPK	7	87.50	1	12.50	8		
Pustular	0	0.00	2	100.00	2		
Pustular, PA	2	100.00	0	0.00	2		
Scalp	2	66.67	1	33.33	3		
Total	68	68.00	32	32.00	100		

*p<0.05 is statistically significant

hypertension and diabetes, PASI score were significant in relation to occurrence of metabolic syndrome [p<0.05] as seen in **Table 2**.

Longer duration of disease [p<0.05] and presence of diabetes mellitus [p<0.05] were the only factors that were significantly associated with the metabolic syndrome on doing multiple logistic regression in different factors as seen in **Table 3**.

Table 3 Multiple logistic regression analysis of metabolic syndrome

Factors	*OR*	*95%CI for OR*		*P-value*
		Lower	*Upper*	
Gender				
Male				
Female	0.61	0.19	1.91	0.3930
Age groups				
<=20yrs				
21-30yrs				
31-40yrs	0.36	0.04	3.76	0.3960
41-50yrs	0.26	0.05	1.35	0.1090
51-60yrs	0.60	0.20	1.84	0.3750
Duration				
<1yr				
1-5yrs	0.92	0.26	3.20	0.8950
6-10yrs	0.48	0.16	1.45	0.1940
>=11yrs	0.09	0.01	0.51	0.0070*
Hypertension				
No				
Yes	0.69	0.21	2.23	0.5330
Diabetic mellitus				
No				
Yes	10.99	0.99	124.34	0.0500*
PASI				
<=9				
>=9.1	1.36	0.25	7.44	0.7230

*p<0.05 is statistically significant

Discussion

The present study is a hospital- based cross sectional study conducted over a period of 12 months from January 2017 to December 2017 in the Department of Dermatology, Venereology and Leprosy, KLE'S Dr. Prabhakar Kore Hospital and Medical Research Centre, Belagavi. 100 psoriasis patients who met the inclusion criteria were selected for the study.

Since there is a bimodal age on onset, the first peak at 15-20 years of age and a second one at 55-60 years, patients between age of 15-60 years are included in this study.

In our study, 32 out of 100 psoriatic patients (32%) were positive for metabolic syndrome. Our study was similar to a study conducted by Lakshmi S *et al.*[6] involving 40 adult patients with psoriasis and 40 age- and sex-matched controls, where metabolic syndrome was present in 13 out of 40 (32.5%) patients with psoriasis, where as Gangaiah *et al.*[9] reported an incidence of 38% (19/50) in their study.

In the study, 140 patients with chronic plaque psoriasis and 140 controls carried out by Kothiwala SK *et al.*[10] the incidence of psoriasis in males was 102 (72%) and in females was 38 (27.1%). Another study by Hassan BS *et al.*[11] 64.7% were males and 35.3% were females. In the present study, majority of the study population were males [69/100, 69%] compared to females [31/100, 31%]. The findings of our study are nearly similar to the above mentioned studies with respect to gender-wise occurrence. Out of the 32 cases of metabolic syndrome 26/32 were males and 6/32 were females However, there was no statistically significant relationship between gender [p>0.05], in relation to occurrence of metabolic syndrome.

In a study by Gangaiah *et al.*[9] the maximum number of cases 26% (13/50) were noted in the age group of 31-40 years, which was nearly identical to the present study where majority of the patients were of the age group of 31-40 years [31/100, 31 %] and the least were of age less than 20 yrs. [7/100, 7%]. There was no association found between age and prevalence of metabolic syndrome in our study.

Madanagobalane S *et al.*[12] did not observe any difference between the presence of metabolic syndrome and the duration of the disease. Mallbris *et al.*[13] in their study, have shown that patients with new onset psoriasis had increased total cholesterol and HDL than controls, proving the presence of lipid abnormalities even in those with shorter duration of disease. On the contrary, an Indian study by Nisa *et al.*[8] has shown a positive association between longer duration of psoriasis and metabolic syndrome. In our study, majority of the population belonged in the group

of 1-5 years duration [41/100, 41%] and the 14% were less than one year duration [14/100,14%]. Duration of disease was significant in relation to occurrence of metabolic syndrome [p<0.05]. Our study has shown a positive association between longer duration of psoriasis and metabolic syndrome. However another Indian study by Gangiaiah *et al.*[9] did not find a relation between the presence of MS and the duration of psoriasis, probably due to smaller sample size in their study.

In the study by, Kothiwala *et al.*[10] mean systolic blood pressure (mm Hg) was 129.4(±14.42) in psoriasis cases and was 121.5(±11.90) in controls. Whereas, in our study, 32% of the patients were hypertensive. Amongst them, (44/69) 63.77% of the males and (13/31) 41.94% of the females had raised SBP. Raised DBP was seen in (23/69) 33.33% of the males and (4/31) 12.90% of the females. Presence of hypertension was significant in occurrence to metabolic syndrome (p<0.05).

In a study by Madanagobalane S *et al.*[12] 61% of the cases had FBS>100mg/dl. In our present study, 32% (10/32) of the metabolic syndrome patients were diabetics. Amongst them, 36.23% were males and 22.58% were females. Presence of diabetes mellitus was significant in occurrence to metabolic syndrome (p<0.05).

In a study by Kothiwala *et al.*[10] central obesity was observed in 26.4% of the psoriatic cases versus 11.4% of the controls. In the present study, we observed a higher abnormal waist circumference in females, 54.84% (17/31) compared to males, 34.78% (24/69). However, the difference was not significant.

Several studies have demonstrated higher lipid levels in psoriasis. Dreiher *et al.*[14] found a significant increase in lipid levels among psoriasis patients than in controls ($p < 0.001$). Shapiro *et al.*[15] found that psoriasis was associated hyperlipidemia, but was not associated with an increase in LDL level. Cohen *et al.*[16] have found that psoriasis is associated with dyslipidemia ($p < 0.015$). In contrast, LDL and total cholesterol were significantly higher among controls with MS than among psoriasis patients with MS ($p = 0.0170$ and 0.0164, respectively) in our study. In the present study, raised triglyceride levels were found in (17/69) 24.64% of males which was statistically significant. Lower HDL levels were found in (50/69) 72.46% of the males and (30/31) 96.77% of the females. There was statistically significant relationship between gender and HDL levels.

Zindancı *et al.*[17] and Mebazaa *et al.*[18] found that the prevalence of MS was independent of severity of psoriasis (PASI score). Kim *et al.*[19] however, found that metabolic syndrome was associated with severe forms of psoriasis ($p = 0.048$). Our study also documented a strong association (p =0.0140) between PASI score and metabolic syndrome.

Conclusion

Chronic plaque psoriasis is an immune-mediated inflammatory skin disease that is strongly associated with the clinical features of the metabolic syndrome, including abdominal obesity, hypertension, atherogenic dyslipidemia, type 2 diabetes, insulin resistance, and non-alcoholic fatty liver disease. Prevalence of metabolic syndrome in psoriasis was seen in 32% of the study population with statistically significant relationship between hypertension, diabetes mellitus, duration of the disease and PASI in relation to occurrence of metabolic syndrome. To conclude, Psoriasis should be regarded to occur as a result of complex interplay between inflammatory mediators and risk factors shared by both immune and metabolic diseases. Dermatologists should be

aware of comorbid illnesses and assess the patients for accompanying metabolic disturbances and refer the patient to appropriate specialists for further management.

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