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Original Research Article

A clinical study of prevalence of metabolic syndrome in psoriasis patients: a prospective cross-sectional observational study at a tertiary care centre in South India

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ABSTRACT

Background: Metabolic syndrome (MS) is a constellation of risk factors like central obesity, atherogenic dyslipidemia, hypertension and glucose intolerance. Psoriasis is associated with MS and this may be contributed by various inflammatory mediators like interleukin 6 and tumor necrosis factor α which are increased in psoriasis. Aim of the study is to assess the prevalence and risk factors associated with metabolic syndrome in psoriasis patients and to find association between metabolic syndrome and severity of psoriasis using PASI score.
Methods: A hospital based prospective observational cross sectional study was conducted in Vinayaka Missions Medical College and Hospital, Salem over a period of one year (June 2017 – June 2018) involving 100 psoriasis patients, included based on the inclusion and exclusion criteria. Patients were analyzed based on a standard proforma and metabolic syndrome was diagnosed with the South Asian Modified National Cholesterol Education Program Adult Panel III (SAM- NCEP ATP III).
Results: In the present study, prevalence of metabolic syndrome was 54%. The risk factors noted were female gender (p=0.015), nail involvement (p=0.249), joint involvement (p=0.007) and increasing PASI score (p=0.194).There was no significant association between type of psoriasis and metabolic syndrome. Among the different components of metabolic syndrome, majority of psoriasis patients were having raised fasting blood sugar.
Conclusions: The occurrence of metabolic syndrome is high in Indian population. Therefore apart from getting treated for psoriasis, patients should be screened for components of MS and should be followed up regularly for onset of components of MS.

Keywords: Psoriasis, Metabolic syndrome, PASI score, Fasting blood glucose

INTRODUCTION

Psoriasis is a T helper cell mediated chronic inflammatory multisystem disease, affecting 1-3% of population.[1] Metabolic syndrome is a constellation of risk factors like central obesity, atherogenic dyslipidemia, hypertension and glucose intolerance and is a strong predictor of cardiovascular disease, that confers a cardiovascular risk higher than the individual components.[1,2] The association between psoriasis and metabolic syndrome is due to the presence of systemic inflammation and elevated levels of cytokines such as tumor necrosis factor-α (TNF-α) and interleukin-6 (IL-6).[3] Also certain confounding factors like cigarette smoking, alcohol consumption, obesity, physical inactivity, homocysteinemia, psychological stress, and

depression also contribute to this association.[1,3] Various studies in India have shown a higher prevalence of metabolic syndrome in psoriasis patients (30-50%) when compared to general population (15-24%). Hence there is a need to treat psoriasis as a systemic disease rather than a mere skin disease. We undertook this study to assess the prevalence of MS in psoriasis and also to study association between MS and severity of psoriasis.

METHODS

The study was conducted among newly diagnosed psoriasis patients in outpatient Department (OPD) of Dermatology, Venereology and Leprology in Vinayaka Missions Medical College and Hospital, Salem over a period of one year (June 2017 – June 2018) after being approved by institutional Ethical Committee. A total of 100 psoriasis patients were included based on inclusion and exclusion criteria. All patients above 18 years of age willing to participate in the proposed study were included. Patients less than 18 years of age, those on cyclosporine, steroids or / and systemic retinoid therapy during preceding 1 month, and pregnant and lactating women were excluded from study.

After obtaining a written informed consent from all patients, data was collected based on a standard proforma, which included age, gender, age of onset, and duration of disease, joint pain, smoking and alcohol consumption, type and severity of psoriasis, height and weight, body mass index, etc. Severity of psoriasis was assessed according to Psoriasis Area and Severity Index (PASI). Waist circumference was measured by placing tape horizontally at the uppermost part of the hipbone around the abdomen. Blood pressure was recorded as the average of two measurements after asking the patients to rest for 5 min. Serum samples were taken after the subjects fasted overnight for at least 8 hours. Fasting serum lipid profile and fasting blood sugar were assessed.

Metabolic syndrome was diagnosed by the presence of three or more of the five criteria of the South Asian Modified National Cholesterol Education Program Adult Panel III (SAM- NCEP ATP III): waist circumference >90 cm in men or >80 cm in women; hypertriglyceridemia >1.7 mmol/l (150 mg/dl);HDL (high density lipoproteins) cholesterol <1.0 mmol/l (40 mg/dl) in men or <1.3 mmol/dl (50 mg/dl) in women; blood pressure >130/85 mmHg; fasting plasma glucose >6.1 mmol/l (100 mg/dl).[4]

Statistical analysis was done using Statistical package for social sciences (SPSS 18.0, SPSS Inc, Chicago, IL). Quantitative variables were compared with unpaired students t-test and for qualitative variables Chi-square test was used. P<0.05 was considered statistically significant.

RESULTS

Among 100 psoriasis patients, 61 were males and 39 were females with a male to female ratio of 1.56:1. Metabolic syndrome was more common in female psoriatic patients seen in 27 out of 39 patients (69%) and was found to be statistically significant (p=0.015) (Table 1). The age distribution varied from 18 to 75 years with a mean age of 45.25±15.17. In our study the prevalence of metabolic syndrome was found to be 54**%**. Among 54 psoriasis patients with metabolic syndrome, 47 (87%) were above 36 years of age and was found to be statistically significant (p=0.001). Majority of the patients in our study were having duration of psoriasis in range of 0-5 years (63%). We observed an increased risk of metabolic syndrome as duration of disease was increasing with 88% of patients with disease duration more than 10 years having metabolic syndrome and this association was found to be statistically significant (p=0.021) (Table 2).

Table 1: Comparison of characteristics in psoriasis patients with and without metabolic syndrome.

Parameters	Psoriasis patients with metabolic syndrome	Psoriasis patients without metabolic syndrome	P value
Sex			
Males	27	34	0.015
Females	27	12	
Age in years (mean±SD)	49±1.29	40.78±1.66	0.009
Age of onset (years) (mean±SD)	41.25±1.56	36.88±1.68	0.180
Duration of disease (mean±SD) (years)	7.74±8.8	3.97±3.58	0.005
PASI >10	14	7	
PASI (mean±SD)	9±8.2	4.9±3.8	0.001
Waist circumference (cm) (mean±SD)	96.7±1.58	86.37±9.4	0.586
Triglycerides(mg/dl) (mean±SD)	161.85±47.3	129.8±26.95	0.093
HDL(mg/dl) (mean±SD)	45.93±4.9	50.19±5.54	0.339
Systolic blood pressure (mm of Hg) (mean±SD)	131.48±8.7	120.22±8.02	0.867
Diastolic blood pressure(mm of Hg) (mean±SD)	87.22±5.6	77.39±6.8	0.06
FBS(mg/dl)	139.44±49.19	106.76±19.63	0.003

Table 2: Association between duration of disease and metabolic syndrome.

Duration of disease (years)	Total no. of patients (n)	No. of patients with metabolic syndrome N (%)	P value
0-5	63	31 (49)	0.021
6-10	20	8 (40)	
>10	17	15 (88)	
Total	100		

Table 3: Association between type of psoriasis and metabolic syndrome.

Type of psoriasis	Total no. of patients (n)	Patients with metabolic syndrome (N)	Percentage (%)	P value (Chi square test)
Plaque psoriasis	74	44	59.4	0.189
Pustular psoriasis	1	1	100	
Guttate psoriasis	6	3	50	
Erythrodermic psoriasis	1	1	100	
Palmoplantar psoriasis	15	5	33.3	
Scalp psoriasis	2	0	0	
Sebopsoriasis	1	0	0	

Table 4: Distribution of study population in total & those with metabolic syndrome based on PASI score.

PASI score	Total no. of patients (n)	Patients with metabolic syndrome (N)	Percentage	P value
0-10 (mild)	79	40	50.6	0.194
11-20 (moderate)	18	11	61	
>20 (severe)	3	3	100	
Total	100	54		

P value for gender & metabolic syndrome was calculated using Chi square test. P value for all other variables with mean & standard deviation was calculated with unpaired students t test.

Table 5: Comparison of prevalence of metabolic syndrome in Indian studies with the present study.

S. no.	Researcher	Study Population	Year	Sample size	Prevalence
1	Aruna et al[8]	Guntur, Andhra Pradesh	2009-2011	100	42%
2	Madanagobalane et al[10]	Chennai, Tamil Nadu	2008 -2010	118	44% (with SAM NCEP ATP III)
3	Nisa et al[11]	Srinagar, Jammu & Kashmir	2010	150	28%
4	Pereira et al[12]	Mumbai	2011	77	18.2%
5	Kothiwala et al[13]	New Delhi	2011-2012	140	39% 42.1% (with SAM NCEP ATP III)
6	Lakshmi et al[14]	Pondicherry	2012	40	32.5%
7	Khunger et al[15]	New Delhi	2013	50	30% (with SAM NCEP ATP III)
8	Girisha et al[16]	Mangalore, Karnataka	2013 -2014	156	28.8% (with SAM NCEP ATP III)
9	Gangaiah et al[17]	Tumakuru, Karnataka	2015 -2016	50	38% (with SAM NCEP ATP III)
10	Das et al[18]	West Bengal	2016	111	40.4%
11	Praveen Kumar et al[19]	Pondicherry	2016	30	60% (with SAM NCEP ATP III)
12	Lunawat et al[7]	Chennai	2017	207	49.8%
13	Present study	Salem	2017-2018	100	54% (with SAM NCEP ATP III)

NCEP ATP III: National Cholesterol Education Program Adult Treatment Panel III, SAM : South Asian Modification.

Table 6: Comparison of prevalence of metabolic syndrome in various International studies with the present study.

S. no.	Researcher	Study population	Year	Sample size	Prevalence
1	Sommer et al[20]	Germany	1996 – 2002	581	4.3% (WHO criteria)
2	Gisondi et al[1]	Italy	Not reported	338	30.1% (NCEP ATP III)
3	Chen et al[21]	Taiwan	2006 -2007	40	22.5 % (clinical assessment)
4	Kutlu et al[22]	Turkey	2007-2009	250	30.8% (IDF)
5	Augustin et al[23]	Germany	2005	33981	0.2% (ICD -10)
6	Love et al[24]	USA	2003-2006	71	39.9% (NCEP ATP III)
7	Present study	Salem	2017-2018	100	54% (with SAM NCEP ATP III)

IDF: International Diabetes Federation, NCEP ATP III: National Cholesterol Education Program Adult Treatment Panel III, SAM: South Asian Modification, ICD: International Classification of diseases.

Table 7: Comparison of mean age of our study population with other studies.

S. no.	Study	Mean age of study population (years)	Mean age of psoriasis patients with MS (years)	Mean age of psoriasis patients without MS (years)	P value
1	Girisha et al[16]	45.5±12.6	51.7±12.3	43±11.9	<0.001
2	Katrivel et al[25]	42.07	48.67±7.64	40.42±9.24	0.01
3	Singh et al[26]	39.1±14	47.6±12.5	33.4±11.9	0.001
4	Madanagobalane et al[10]	46.31±11.39	46.52±14.6	43.94±8.95	0.004
5	Lunawat et al[7]	46.46	50.23±10.56	42.73±15.09	Not mentioned
6	Kutlu et al[22]	41.39±14.7	35.06±13.53	27.24±15.5	0.000
7	Our study	45±15.17	49±12.9	40.78±16.6	0.009

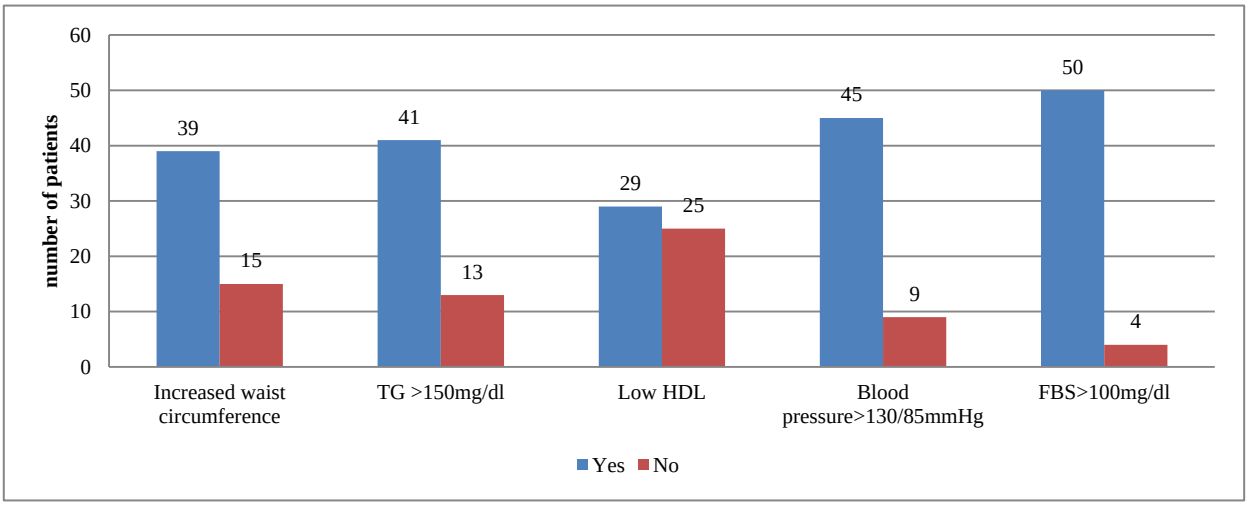

Figure 1: Distribution of various components of metabolic syndrome in psoriasis patients with metabolic syndrome.

Among patients with MS, housewives (21; 39%) constitute majority of patients followed by labourers (16), clerks (15) and students (2). A positive family history of psoriasis was found in 12 (22%) patients. Other risk factors noted in this study in decreasing order were history of stress (30), physical inactivity (27), smoking (26), alcohol (14), photosensitivity (12), history of upper respiratory infection (11) and history of intake of drugs precipitating psoriasis (9). Among patients with metabolic syndrome, 44 had chronic plaque type of psoriasis, five had palmoplantar psoriasis, three had guttate psoriasis and one each of pustular and erythrodermic psoriasis (Table 3). Prevalence of nail involvement was 79% and among them 45 patients (57%) had metabolic syndrome. Although the prevalence of metabolic syndrome was more in psoriasis patients with nail involvement, the association was not statistically significant. Among the 31 patients who had joint

involvement, 23 (74.2%) patients presented with metabolic syndrome and the p value was found to be 0.007 which was statistically significant.

Depending on PASI score, the disease can be mild (0-10), moderate (11-20) or severe (>20). Forty were having mild PASI score, 11 had moderate and three had severe PASI score (Table 4). From the Table 4, we can infer that the risk of metabolic syndrome was increasing with increasing PASI score although not statistically significant.

In our study 78% of psoriasis patients were having elevated fasting blood sugar (>100 mg/dl), 55% were having blood pressure more than 130/80 mm Hg, 47% were having hypertriglyceridemia (150 mg/dl), 43% with increased waist circumference (>80 cm for females and >90 cm for males) and 31% with low HDL(<40 mg/dl for males and <50 mg/dl for females). Among psoriasis patients with metabolic syndrome, 92.5% had raised FBS, 83.3% had raised blood pressure, 75% had hypertriglyceridemia, 72% had increased waist circumference and 53.7% had low HDL (Figure 1).

DISCUSSION

Psoriasis being a systemic inflammatory autoimmune disorder is connected with a range of comorbidities.[5] Although the exact mechanism for association of psoriasis with metabolic syndrome is not known, a common immunological mechanism shared by both plays an important role.

Prevalence of metabolic syndrome

In our study the prevalence of metabolic syndrome was 54% which is comparable to the recent study in South India by Kumar et al and Lunawat et al where the prevalence was 60% and 49.8% respectively and it is higher than the studies conducted in other parts of India and abroad.[6,7] (Table 5 and 6). Higher prevalence in our study compared to other studies conducted abroad may be due to the racial and genetic factors that play a role in development of metabolic syndrome. There was a higher prevalence of metabolic syndrome among general population of Asian Indians (30-40%) as compared to general population of Europeans (15-20%).[3] Among Indian studies the higher prevalence may be contributed by use of South Asian modification of NCEP ATP III criteria and the higher prevalence of metabolic syndrome was also seen in general population of Southern India when compared to Northern India (29.7% v/s 9.3%).[8]

Sex wise distribution of psoriasis patients

Although our study population shows a male preponderance (61%), metabolic syndrome was significantly more prevalent (69% v/s 44%) in psoriatic women in our study with a p value of 0.015. This was comparable to studies conducted by Lakshmi et al (66% v/s 23%) (p=0.021), Lunawat et al (62% v/s 34%) and Das et al respectively.[7,14,18] Higher prevalence of metabolic syndrome among female psoriatic patients can be explained by the lack of self-care and increased stress among female patients. In contrary, a study by Girisha et al showed a predominance of male psoriasis patients with metabolic syndrome although not statistically significant.[16]

Age wise distribution of psoriasis patients

The mean age of our study population was 45.25±15.17 years. Majority of patients were in the age group of 46-55 years (24%) in our study. In patients with metabolic syndrome, the mean age was found to be 49±12.9 years which is higher than the mean age of patients without metabolic syndrome (40.78±16.68 years) and was found to be statistically significant (p=0.009) (Table 1). This was comparable to various studies done previously as shown in Table 7. Among the various age groups metabolic syndrome was more prevalent in 46-55 years (70.8%) which was consistent with studies done by Sommer et al, Gisondi et al, and Lakshmi et al in contrary to study by Nisa and Qazi et al.[1,11,15,20] Therefore our study shows that the risk of metabolic syndrome increases with advancing age (more in patients above 35 years, p=0.001). This could be due to the fact that with increasing age the metabolic risk factors will be increasing and hence precipitates psoriasis or vice versa.

Duration of disease and metabolic syndrome

In our study, majority of patients were having duration of psoriasis of 0-5 years. The mean duration of disease in psoriatic patients with metabolic syndrome (7.74±6.8 years) was higher than those without metabolic syndrome (3.97±3.5) and was statistically significant (P value 0.005) (Table 1). This was substantiated by a study done by Nisa et al (13.67±11.87 v/s 6.46±5.80) and Gisondi et al (18.1±16.1 v/s 13.3±12).[1,11]

Type of psoriasis and metabolic syndrome

According to our study, metabolic syndrome was seen mainly in patients with psoriasis vulgaris 44 out of 74 (59.4%) which was supported with study conducted by Das et al.[18] However this observation was refuted by Lunawat et al where metabolic syndrome was more prevalent among palmoplantar psoriasis patients (63.27%) whereas in our study only 33.3% of palmoplantar psoriasis patients had metabolic syndrome.[7]

PASI *score and metabolic syndrome*

In our study majority (79%) of patients were having mild psoriasis (PASI of 0-10). Only 3 patients were having PASI more than 20 (severe psoriasis) and all were associated with metabolic syndrome. Although the risk for metabolic syndrome increases with increasing PASI score there was no statistically significant association

between severity of psoriasis and metabolic syndrome which was supported by studies by Madanagobalane et al, Kutlu et al and Gisondi et al.[1,10.22]

However mean PASI among psoriasis patients with metabolic syndrome was significantly higher than psoriasis patients without metabolic syndrome (P value 0.001) which is contrary to studies by Gisondi et al and Kutlu et al.[1,22]

Psoriasis and components of metabolic syndrome

In patients with metabolic syndrome, majority (92.5%) had raised fasting blood sugar values, followed by raised blood pressure (83.3%), raised triglycerides (75%), raised waist circumference (72%) and decreased HDL (53.7%). This is in contrary to study by Madanagobalane et al who showed that among psoriatic patients with metabolic syndrome majority (72.4%) were having a decreased HDL, followed by hypertriglyceridemia (59%), raised fasting blood sugar (25%) and hypertension (21.7%).[10]

Nail involvement and metabolic syndrome

Among patients with nail involvement, 57% had metabolic syndrome which is comparable to study by Singh et al (43%) and Ferdinand et al (57%) but there was no statistically significant association between nail involvement and metabolic syndrome as in the previous studies.[26,27]

Joint involvement and metabolic syndrome

In our study population 31% of patients had associated arthritis which was higher when compared to studies by Lunawat et al (10%), Singh et al (14%) and Ferdinand et al (5%).[7,26,27] Risk of metabolic syndrome was significantly high in patients with joint involvement (74%) (p=0.007) which was supported by studies of Ali et al and Raychaudhuri et al.[28,29]

Limitations

As our study was a cross-sectional study and we were not having a control group we could not find association between psoriasis and metabolic syndrome.

We were not able to find significant relation between increasing PASI score and metabolic syndrome due to our relatively small sample size.

CONCLUSION

As Asians are having a high risk of developing insulin resistance due to their genetic susceptibility, the occurrence of MS is high in Indian population. These findings emphasize that all psoriasis patients, apart from getting treated for psoriatic plaques should be screened for components of MS and should be followed up regularly for onset of components of MS.

They should also be educated regarding lifestyle modification like regular exercise, dietary changes and avoidance of substance abuse to prevent the development of MS.

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