

## Rate of metabolic syndrome in psoriasis

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**Abstract** *Objective* To assess the rate of metabolic syndrome among the patients of psoriasis.

*Methods* It was a hospital based cross-sectional study. Fifty-eight patients, clinically and histopathologically diagnosed as psoriasis were selected by purposive sampling. Data including age, waist circumference and arterial blood pressure were recorded. Fasting blood glucose, triglyceride and HDL levels were measured. Metabolic syndrome was diagnosed by the presence of three or more of the five criteria of the modified version of National Cholesterol Education Programs Adult Panel III (ATPIII).

*Results* Out of 58 patients, 17 (29.3%) patients had metabolic syndrome. The prevalence of metabolic syndrome was higher in psoriatic patients in the 4th decade of life and predominant in male subjects. In psoriatic patients with metabolic syndrome, raised waist circumference >90 cm in men or >80 cm in women was found in 14 (82.3%), HDL cholesterol  $\leq$ 40 mg/dl in 13 (76.5%), blood pressure >130/85 mm Hg in 16 (94.1%), and fasting blood sugar >5.6 mmol/L was noticed in 12 (70.6%) patients.

*Conclusion* Metabolic syndrome was diagnosed in 29.3% of the psoriatic patients. Waist circumference, serum HDL cholesterol, blood pressure and fasting blood sugar were statistically significantly different ( $p < 0.05$ ) between patients with metabolic syndrome and without metabolic syndrome.

**Key words**

Psoriasis, metabolic syndrome.

### Introduction

Psoriasis is a chronic inflammatory disease affecting about 3% of the worldwide population.<sup>1</sup> It is characterized by macroscopic (clinical) and corresponding microscopic (histological) skin alteration and leads to considerable impairment of the quality of life of

the affected patients.<sup>2</sup> People with psoriasis typically have sharply demarcated erythematous plaques covered by silvery white scale, which most commonly appear on the elbows, knees, scalp, umbilicus, and lumbar area.<sup>3</sup>

Though psoriasis is universal in occurrence, its prevalence in different populations varies from 0.1% to 11.8%.<sup>4,5</sup> Several studies have indicated that genetic and behavioural factors may influence the prevalence of psoriasis. It affects men and women equally. The age of onset of psoriasis follows a bimodal distribution peaks

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between ages 20 to 30 years and again between the ages of 50 to 60 years.<sup>3</sup> This disease can manifest itself in the skin, as well as, affect the nails and joints. A survey by the National Psoriasis Foundation found that 75% of patients with psoriasis reported a moderate to severe negative impact of the disease on the quality of their lives, with an alteration of everyday activities.<sup>6</sup>

In addition, psoriatic patients have been found to have increased risk of developing other chronic disorders including diabetes mellitus, hypertension, coronary artery disease, metabolic syndrome, fatigue, and depression.<sup>7</sup> Previous studies have suggested a link between psoriasis and individual components of the metabolic syndrome, such as obesity, hypertension, diabetes, and dyslipidemia.<sup>8</sup> One study based on hospital patients of psoriasis in northern Italy, reported hypertension in 40.8%, diabetes mellitus in 19.2%, obesity in 57.1% and dyslipidemia in 37.8% patients.<sup>9</sup> Using the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) criteria, 30.1% increased risk of the metabolic syndrome developing among patients with psoriasis compared with patients with other skin diseases was reported.<sup>9</sup> The prevalence of the metabolic syndrome in normal population in USA is estimated to be up to 15% of the population.<sup>10</sup> Metabolic syndrome among psoriatic patients in India is around 25.0%.<sup>11</sup>

Psoriasis is one of the leading causes to develop metabolic syndrome which carries risk of cardiovascular disease including hypertension. It is assumed that in developed countries, morbidity and mortality of psoriasis is significantly associated with metabolic syndrome. Identification of risk factors for metabolic syndrome among psoriatic patients and to minimize them is an important aspect to manage psoriasis. But in Bangladesh even the

rate of metabolic syndrome among psoriatic patients is yet not studied. So our study was designed to assess the rate of metabolic syndrome among the patients of psoriasis.

## **Methods**

This cross-sectional study was carried out in the department of Dermatology and Venereology in collaboration with department of Biochemistry, Bangabandhu Sheikh Mujib Medical University (BSMMU) from April, 2012 to April, 2013. Fifty-eight patients were enrolled through purposive sampling. Psoriatic patients of either sex, >18 years of age, with disease duration > 6 months and those who consented to be included in the study were enrolled. Pregnant and lactating mothers, patients known to have uncontrolled hypertension, diabetes mellitus, hepatic, renal, cardiovascular, hematological and thyroid disease were excluded. At first, patients were clinically diagnosed as psoriasis by the presence of circumscribed, erythematous, dry, scaly plaques covered by silvery white scales with positive Auspitz sign. Later the diagnosis was confirmed by histopathological examination. A detailed history was taken and complete physical examination was done for each of the patients. The objective and procedure of the study were explained to the patient in easily understandable local language and written consent was taken from those who were interested to participate in this study. Patient's name, age, sex, marital status, education, occupation, duration of the disease, family history of psoriasis, personal history of smoking and alcohol-intake were taken. BP, waist circumference were measured. Fasting blood sugar (FBS), triglyceride and high-density lipoprotein (HDL) were estimated in the department of biochemistry, BSMMU.

Statistical analysis was carried out by using the Statistical Package for Social Sciences version

16.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. Chi-Square test was used to analyze the categorical variables. Unpaired t-test was used for continuous variables. *P* value <0.05 was considered as statistically significant.

## Results

Out of 58 psoriatic patients included in this study 43 were male and 15 female. Among them 17 (29.3%) patients had metabolic syndrome.

The mean age of patients with metabolic syndrome was 43.59±11.8 years (**Table 1**). Out of 17 patients with metabolic syndrome, 11 (64.7%) were males and 6 (35.3%) females. The prevalence of metabolic syndrome was higher in psoriatic patients in the 4th decades of life and predominant in male subjects (**Table 1**). In patients with metabolic syndrome, the mean duration of psoriasis was 10.71±5.24 years. 17.4% had family history of psoriasis, 52.9% were smokers and 29.4% alcoholics.

**Table 2** describes the frequency of different components of metabolic syndrome in 17 patients. Raised waist circumference >90 cm in men or >80 cm in women was found in 14 (82.3%), blood pressure >130/85 mm Hg in 16 (94.1%), fasting blood sugar >5.6 mmol/L in 12 (70.6%), serum triglyceride ≤160 mg/dl in 7 (41.2%), HDL cholesterol ≤40 mg/dl in 13 (76.5%).

**Table 3** compares various disease characteristics and features of metabolic syndrome in psoriatic patients who had metabolic syndrome (n=17) and those without metabolic syndrome (n=41). Patients with metabolic syndrome had significantly raised values of waist circumference, blood pressure, HDL cholesterol and fasting blood sugar (*p*<0.05).

**Table 1** Demographic and clinical characteristics of patients with metabolic syndrome (n=17).

|                                    | <i>N</i> (%) | <i>Mean±SD</i> |
|------------------------------------|--------------|----------------|
| <i>Age (years)</i>                 |              |                |
| ≤30                                | 2 (11.8)     | 43.59±11.88    |
| 31-40                              | 8 (47.1)     |                |
| >40                                | 7(41.7)      |                |
| <i>Sex</i>                         |              |                |
| Male                               | 11 (64.7)    |                |
| Female                             | 6 (35.3)     |                |
| <i>Duration of disease (years)</i> |              |                |
| ≤10                                | 12 (70.6)    | 10.71±5.24     |
| 11-20                              | 3 (17.6)     |                |
| >20                                | 2 (11.8)     |                |
| <i>Family history of psoriasis</i> |              |                |
| Yes                                | 3 (17.6)     |                |
| No                                 | 14 (82.4)    |                |
| <i>History of smoking</i>          |              |                |
| Yes                                | 9 (52.9)     |                |
| No                                 | 8 (47.1)     |                |
| <i>History of alcohol intake</i>   |              |                |
| Yes                                | 5 (29.4)     |                |
| No                                 | 12 (70.4)    |                |

**Table 2** Frequency of patients with different criteria for metabolic syndrome (n=17).

|   | <i>N</i> (%) | <i>Mean±SD</i> |
|---|--------------|----------------|
| <i>Waist circumference</i>                    |              |                |
| <i>Male</i>                                   |              |                |
| ≤90 cm  | 2 (11.8)     | 97.92±6.88     |
| >90 cm  | 9 (52.9)     |                |
| <i>Female</i>                                 |              |                |
| ≤80cm   | 1 (5.9)      | 87.75±6.29     |
| >80cm   | 5 (29.4)     |                |
| <i>Blood pressure (mm Hg)</i>                 |              |                |
| ≤130/85                                       | 1 (5.9)      | 6.01±0.93      |
| >130/85                                       | 16 (94.1)    |                |
| <i>Fasting blood sugar (mmol/L)</i>           |              |                |
| ≤5.6  | 5 (29.4)     | 174.35±50.68   |
| >5.6  | 12 (70.6)    |                |
| <i>Serum triglycerides (mg/dl)</i>            |              |                |
| ≤160mg/dl                                     | 7 (41.2)     | 34.53±7.06     |
| >160mg/dl                                     | 10 (58.8)    |                |
| <i>Serum high-density lipoprotein (mg/dl)</i> |              |                |
| ≤40mg/dl                                      | 13 (76.5)    |                |
| >40mg/dl                                      | 4 (23.5)     |                |

## Discussion

This cross-sectional study revealed that 17 of 58 (29.3%) patients with psoriasis had metabolic syndrome.

**Table 3** descriptive characteristics of psoriatic patients with and without metabolic syndrome (n=58)

|   | Patients with metabolic syndrome (n=17) | Patients without metabolic syndrome (n=41) | P Value             |
|---|---|--|---------------------|
| Sex M/F   | 11/6                                    | 32/9                                       | 0.230 <sup>ns</sup> |
| Age at enrolment (years), mean±SD                           | 43.59±11.88                             | 36.54±14.94                                | 0.087 <sup>ns</sup> |
| Duration of psoriasis (year)                                | 10.71±5.24                              | 7.27±8.24                                  | 0.117 <sup>ns</sup> |
| Smoker, n (%)   | 9 (52.9)                                | 20 (48.8)                                  | 0.772 <sup>ns</sup> |
| Waist circumference > 90 cm (men) or > 80 cm (women), n (%) | 14 (82.3)                               | 12 (29.3)                                  | 0.001 <sup>s</sup>  |
| Triglyceridemia >160mg/dl, n (%)                            | 10 (58.8)                               | 13 (31.7)                                  | 0.054 <sup>ns</sup> |
| HDL cholesterol ≤40 mg/dl, n (%)                            | 13 (76.5)                               | 19 (46.3)                                  | 0.035 <sup>s</sup>  |
| Blood pressure>130/85 mm Hg, n (%)                          | 16 (94.1)                               | 3 (7.3)                                    | 0.001 <sup>s</sup>  |
| Fasting blood sugar > 5.6 mmol/L, n (%)                     | 12 (70.6)                               | 5 (12.2)                                   | 0.001 <sup>s</sup>  |

Mean age of the patients was 43.59±11.88 years. Cohen *et al.*<sup>10</sup> showed the mean age of patients was 47.7±10.7 years. Almost similar age range was also reported by Zindanc *et al.*<sup>7</sup> and Cohen *et al.*<sup>8</sup> On the other hand, Gisoni *et al.*<sup>9</sup> observed a higher mean age (62.1±15.1years). Malhotra *et al.*<sup>11</sup> found mean age 31.41±13.41 years. The higher age range may be due to increased life expectancy, geographical and racial influences that may have significant impacts on metabolic syndrome.

In psoriatic patients with metabolic syndrome males are predominant. Malhotra *et al.*<sup>11</sup> found 73.3% males and 26.7% females. Zindanc *et al.*<sup>7</sup> found 44.3% males and 55.7% females. In our study 64.7% were males and 35.3% were females. But Cohen *et al.*<sup>8</sup> found almost equal percentage of males and females, 50.3% men and 49.7% women.

Different studies on patients of psoriasis with metabolic syndrome showed different duration of the disease. Zindanc *et al.*<sup>7</sup> found that mean duration of the disease was 11.4±9.2 years. In another study, Gisoni *et al.*<sup>9</sup> reported that mean duration of psoriasis was 18.1±16.1 years. In present study majority (70.6%) patients had psoriasis with the duration of ≤10 years, 17.6% patients had duration of 11-20 years and 11.8% patients had duration of >20 years. The mean duration of psoriasis was 10.71±5.24 years.

In the present study 17.6% patients had family history of psoriasis. More than half (52.9%) patients had history of smoking, 29.4% patients had history of alcohol-intake. Malhotra *et al.*<sup>11</sup> found 15.0% patients were smokers and 38.3% were alcoholics. The rate of metabolic syndrome reported by Malhotra *et al.*<sup>11</sup> was 25.0% and in our study it was 29.3%. The increased rate of metabolic syndrome in the present series was probably due to more smokers in the study population. Gisoni *et al.*<sup>9</sup> observed that 36.2% patients were smokers. Similar findings also reported by Nisa and Qazi,<sup>12</sup> Zindanc *et al.*<sup>7</sup> mentioned smoking rates were 35.7%.

Increased waist circumference (WC) is one of diagnostic criteria of metabolic syndrome. Gisoni *et al.*<sup>9</sup> showed waist circumference > 102 cm in male or > 88 cm in female in 57.1%. Malhotra *et al.*<sup>11</sup> found that 35.0% males had increased waist circumference (WC >90 cm). Zindanc *et al.*<sup>7</sup> found waist circumference ≥94 cm in men and ≥80 cm in women in 73%. Present study revealed that 52.9% male patients had waist circumference > 90 cm and 29.4% female had >80 cm.

In our study blood pressure ≤130/85 mm Hg was in 5.9% case and >130/85 mm Hg in 94.1% cases. Gisoni *et al.*<sup>9</sup> showed blood pressure >135/85 mmHg in 40.8%. This differs from that of the current study, this may be due to the fact

that the patients did not receive anti-hypertensive drug regularly.

Fasting blood sugar >5.6 mmol/L is also a diagnostic criterion of metabolic syndrome. Gisondi *et al.*<sup>9</sup> showed fasting plasma glucose > 6.1 mmol/L in 19.2% patients. Farshchian *et al.*<sup>13</sup> failed to demonstrate any difference between psoriatic patients and controls with regard to fasting blood glucose. They also failed to demonstrate any difference between patients with metabolic syndrome and patients without metabolic syndrome with regard to fasting blood glucose. In our study majority 70.6% patients had fasting blood sugar >5.6 mmol/L and 29.4% patients had  $\leq$ 5.6 mmol/L fasting blood sugar level.

In the present study serum triglyceride  $\leq$ 160 mg/dl was in 7 (41.2%) and >160 mg/dl was in 10 (58.8%) patients. Gisondi *et al.*<sup>9</sup> found serum triglyceride >160mg/dl in 37.8% patients. In another study, Malhotra *et al.*<sup>11</sup> found serum triglyceride >160mg/dl in 43.3% of patients. Mebazaa *et al.*<sup>14</sup> have demonstrated significantly higher level of serum cholesterol and triglycerides in psoriasis as compared to control population. Similar results were seen in a study by Nisa and Qazi.<sup>12</sup> They found 48.6% of psoriatic patients had hypertriglyceridemia.

In this study serum HDL-C  $\leq$ 40 mg/dl was found in 76.5% and 23.5% patients had serum HDL-C >40 mg/dl. Mean HDL-C was 34.53 $\pm$ 7.06 mg/dl. Gisondi *et al.*<sup>9</sup> found HDL cholesterol <1.0 mmol/L in male and <1.3 mmol/L in female in 18.0% of patients. Malhotra *et al.*<sup>11</sup> found decreased levels of HDL-C in 3.3% of patients. This deference may be due to medication, dietary habit, geographical and racial influences.

The present study revealed that waist circumference >90 cm (men) or >80 (women),

serum HDL cholesterol  $\leq$ 40 mg/dl, blood pressure >130/85 mm Hg and fasting blood sugar >5.6 mmol/L were statistically significant ( $p<0.05$ ) in psoriatic patients with metabolic syndrome and without metabolic syndrome .

## Conclusion

Metabolic syndrome is not uncommon in psoriatic patients. Patients developed metabolic syndrome mostly in the 4th decade of life and males were affected predominantly. Rate of metabolic syndrome was 29.3%. There was a statistically significant difference ( $p<0.05$ ) in waist circumference, serum HDL cholesterol, blood pressure and fasting blood sugar in patients with metabolic syndrome and without metabolic syndrome.

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