

ORIGINAL ARTICLE

FREQUENCY OF METABOLIC SYNDROME IN PATIENTS WITH PSORIASIS

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Background: Psoriasis is a non-communicable, long-lasting disorder of the skin comprising various immunological inflammatory changes. Increasing evidence suggests that psoriasis is closely related to multiple organ systems, potentially arising due to underlying co-morbid conditions such as diabetes, hypertension, dyslipidaemia and obesity. Aim of this study was to know the frequency of metabolic syndrome in psoriasis patients. **Methods:** This cross-sectional study was conducted from May to November 2020 in a Tertiary-care hospital. Eighty patients diagnosed with psoriasis were selected using non-probability consecutive sampling. Informed written consent was obtained from each patient and a questionnaire was filled. Blood pressure, waist circumference, body surface area covered by psoriasis, Psoriasis Area Severity Index were recorded on initial visit. Fasting blood sugar, serum triglyceride and HDL cholesterol levels were advised. Patients were diagnosed to have metabolic syndrome if ≥ 3 out of 5 criteria for the modified version of National Cholesterol Education Program Adult Panel III were met. **Results:** There were 62 male and 18 female patients. A total of 39 patients (48.8%) met the criteria for metabolic syndrome. Amongst these, 26/62 (41.9%) males vs 13/18 (72.2%) females fulfilled the criteria. The mean BMI of males was 26.0 while those of females was 28.3, comparison of which demonstrated a noteworthy difference ($p=0.04$). A statistically significant ($p=0.038$) positive correlation (r) of 0.233 was observed between body surface area and BMI. **Conclusion:** Metabolic syndrome is seen frequently in patients of Psoriasis. Female patients have a significant frequency of metabolic syndrome and tend to have a higher BMI than males.

Keywords: Body mass Index; Metabolic Syndrome; Psoriasis

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INTRODUCTION

Psoriasis is a long standing, immuno-modulator driven skin disease that has multiple clinical manifestations. In the long run, it has effects on the patient's general physical as well as mental health. Psoriasis commonly involves nails and causes debilitating arthritis resulting in a severe compromise of the ability to perform regular day to day activities.¹ Psoriasis affects 125 million people world-wide thus representing a significant health-care burden.² A global review found that the occurrence of psoriasis ranged from 0.5 to 11.4% in adults and 0.1 to 1.4% in children.³

The pathogenesis of psoriasis involves an intricate interaction of several factors such as immunogenic modulators, genetic vulnerability, self-antigens that provoke immune reactions coupled with environmental influences.⁴ This disease is primarily driven by T cells such as Th1 cells and Th17 cells. Immuno-mediators such as TNF- α , IFN- γ , IL-17 and 22 play an important role in dysregulated keratinocyte expansion plaque development.⁵

Metabolic syndrome consists of a spectrum of inter-linked parameters such as obesity, insulin resistance, lipid abnormalities, and raised blood pressure. At the molecular level it produces an inflammation, mediated by the release of numerous

immunological cytokines.⁶ Obesity also represents a significant global burden. It has been found that metabolic syndrome and psoriasis involves similar pathogenic pathways that are driven by TNF- α , IL 17, IL- 22, IL-23 IFN- γ thereby suggesting a correlation between the two diseases.⁷ Adiponectin is a chemical mediator that increases insulin sensitivity and has anti-inflammatory anti-thrombotic properties. Its levels are significantly lower in patients of psoriasis thus solidifying the correlation between psoriasis and metabolic syndrome.⁸ This association between the two has coupled psoriasis with increased cardiovascular morbidity and mortality.⁹

According to a study published on women in 2008, the relative risk of developing psoriasis in an individual whose body mass index (BMI) was greater than 35.0 kg/m² measured up to 2.69 times more as compared to someone with a normal BMI.¹⁰ Not many studies have been conducted in Pakistan to study the aforementioned association. Hence, the purpose of our study is to determine the frequency of metabolic syndrome in patients of psoriasis. This will enlighten health care professionals of the existing linkage overall systemic effects of psoriasis; and in turn will lead to a more holistic approach towards management of

psoriatic patients eventually leading to better patient outcomes.

MATERIAL AND METHODS

This cross-sectional study was conducted in Pak-Emirates Military Hospital from May to November 2020. The study included 80 patients of psoriasis diagnosed clinically and if required, histologically. A non-probability consecutive sampling technique was used. Patients included in the study were at least 18 years old and who had been suffering from psoriasis for a minimum of 5 months. Children and pregnant women were excluded.

Written informed consent was taken from all patients. A simple questionnaire that included information regarding age, sex, duration of illness, occupation, subtype of psoriasis and family history was filled. Waist circumference, BMI, body surface area (BSA) covered with psoriasis and blood pressure were recorded at initial visit. Fasting lipid profile and fasting blood sugar were advised.

For evaluation of the severity of psoriasis, markers such as BSA along with Psoriasis Area Severity Index (PASI) were utilized. Patients’ waist circumference, height and weight were the main anthropometric measurements obtained for the purpose of this research; standardized weight (kg) and height (m) scales were used. BMI ranging from 25-30 kg/m² was classified as overweight whereas, obesity was categorized above 30 kg/m². Blood pressure was measured by sphygmomanometer. Metabolic syndrome was diagnosed using revised NCEP ATP III guidelines. The presence of any 3 out of 5 traits was taken as diagnostic: 1) Waist circumference ≥102 cm in males and ≥88 cm in females, 2) Serum triglycerides (TG) ≥1.7 mmol/L or receiving pharmacologic therapy, 3) Serum high-density lipoprotein (HDL) cholesterol <1 mmol/L in males and <1.3 mmol/L in females, 4) Blood pressure ≥130/85 mmHg or receiving pharmacologic therapy, and 5) Fasting blood sugar ≥5.6 mmol/L or receiving pharmacologic therapy.

SPSS software was used for analysing the data. Quantitative data was described as means with standard deviations whereas categorical data was illustrated in the form of frequencies and percentages.

RESULTS

Our study comprised of a total of 80 patients with 62 males (77.5%) and 18 females (22.5%). The mean age of male patients was 46.6 years whereas the mean age of female patients was 42.5 years. Metabolic syndrome was identified in 26 out of 62 (41.9%) men and 13 (72.2%) out of 18 women. Thus, it was observed that the number of female patients suffering from psoriasis had a significantly higher frequency of metabolic syndrome compared to males. Out of 18 female patients,

9 were classified as overweight and 6 were listed as obese. On the other hand, 23 male patients were overweight while 13 were obese. When the average BMI was correlated among gender groups using independent sample t-test, the occurrence of obesity was significantly more in females compared to males ($p=0.04$).

There were seventy patients of chronic plaque psoriasis, 5 of guttate, 2 of pustular, 1 of erythrodermic 2 of flexural psoriasis.

The mean BSA affected by psoriasis was 34.87%. After comparing it with the overall BMI, a statistically significant ($p=0.038$) positive correlation (r) of 0.233 was observed (Figure-1). After analysis of PASI scores its correlation with metabolic syndrome or its constituents, no significance could be derived ($p>0.05$). A comprehensive gender-based comparison analysis of individual variables such as serum TG, FBG, HDL, systolic diastolic blood pressure, failed to demonstrate a significant ($p>0.05$) difference upon application of Individual sample t –test. The frequency of above-mentioned parameters is shown in table-1.

Table-1: Distribution of various parameters among gender groups

Parameters	Men	Women
Sex	62 (77.5%)	18 (22.5%)
Fasting blood glucose (mmol/L)	5.47±0.91	5.38±0.75
S.B.P (mmHg)	128.9±13.8	124.8±9.9
D.B.P(mmHg)	83.5±8.2	85.3±7.3
Serum TG (mmol/L)	1.86±0.71	1.7±0.6
Serum HDL (mmol/L)	0.96±0.20	0.99±0.17
BMI	26.0±4.21	28.3±4.1
Waist Circumference(cm)	95.8±11.4	99.4±11.9
Family History of Psoriasis	7 (11.3%)	7 (38.9%)
Family History of Arthritis	12 (19.4%)	7 (38.9%)
Pre-existing Hypertension	15 (24.2%)	7 (38.9%)
Pre-existing Diabetes	6 (9.7%)	5 (27.8%)

SBP=Systolic Blood Pressure, DBP=Diastolic Blood Pressure, TG= Triglyceride, HDL= High Density Lipoprotein

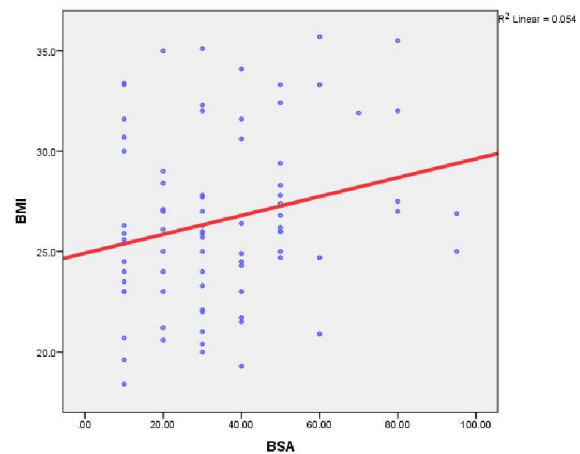


Figure-1: Correlation of BMI with body surface area covered with psoriasis

DISCUSSION

The patients who presented to us in the out-patient department did not belong to a particular group of population. However, majority of them came from a lower-middle socioeconomic class. We reviewed a total of 80 patients out of which most were suffering from chronic plaque psoriasis. The relative frequency of occurrence of metabolic syndrome and its various constituents was derived.

The abundance of people affected by metabolic syndrome has been evaluated by numerous studies worldwide. In Pakistan, the data is still lacking, and studies are yet to be published with regard to the frequency of metabolic syndrome. In contrast to this, our neighbouring country China has done a remarkable effort in identifying people who suffer from metabolic syndrome.¹¹ A total of 12570 subjects (45.2% men 54.8% women) with a mean age of 48.8 ± 15.3 (18–96) years participated in the trial in reference to the guidelines of China Diabetes Society. 9310 (40.7% men) individuals completed the investigation, with a response rate of 74.1%. The prevalence of metabolic syndrome in China was overall found to be 14.39%, the age-adjusted prevalence was 9.82%, 7.78% in men and 6.76% in women; 7.39% in rural residents and 6.98% in urban residents.

WHO has carried out age-standardized work in which the organization has been compiling a list of the average overweight population (adults) according to their respective countries; the data of which was last updated in 2017. Having recorded the data of various countries since 1975 up till the year 2016, WHO showed that in the recent past approximately 25.7% [19.4–32.7%] males in Pakistan had a BMI of 25 kg/m^2 or above whereas, the female population was observed to have almost 31.3% [25.4–37.7%] individuals, a substantially larger number, of whom the BMI was documented to be equal to or more than 25 kg/m^2 . After weighing up our results to WHO's, the study we performed revealed that the average BMI in males was 26 kg/m^2 with a S.D of 4.2 while females had a considerably higher mean BMI of 28.3 kg/m^2 with a standard deviation of 4.1, hence, validating the aforementioned results. When obese individuals were brought into the picture, the number of females whose BMI was over 25 increased compared to the number of males, to the point that the difference became significant as described earlier.

Data from multiple epidemiological studies suggest that patients of psoriasis tend to have a higher BMI (25 kg/m^2 or more) as compared to those who do not. Although the underlying mechanisms with regard to this association at present are yet to be concluded, researchers have largely hypothesized that

pro-inflammatory mediator arising from adipocytes may have a significant impact on psoriasis the way it manifests on the body^{12,13}.

Several existing trials have established a strong relationship between the developments of psoriasis in patients suffering from metabolic syndrome. We set our study side by side with internationally published papers in order to show the similarities differences between the results that were ultimately derived. A recent paper by Jensen P. gathered evidence suggesting that obesity is not only a risk factor for psoriasis but also exacerbates existing disease. Furthermore, there might be a strong link between weight reduction and improvement in the severity of psoriasis in overweight individuals.¹⁴ Excess body weight may also interfere with the medical treatment administered in psoriasis. Our study exhibited almost identical outcomes where we arrived at a firm conclusion that metabolic syndrome, especially BMI, had a significant effect on patients in whom psoriasis was prevalent with regard to their dermatological disease expression.

We also compared the results of our study with a study done in Italy by Gisondi *et al.*¹⁵ They studied 338 cases and 334 controls where the mean age of cases was 62.1 years while the mean BMI was around 27.7 kg/m^2 . Prevalence of metabolic syndrome was found to be 30.1% in cases versus 20.6% in controls. Increased number of patients with metabolic syndrome in our study population may have been due to a variety of factors. For example, the mean age of our study population was around 46.6 ± 14.9 years in males and 42.5 ± 14.0 years in females. In the trial that was conducted in Italy, Psoriatic patients had a higher prevalence of abdominal obesity whereas, hyperglycaemia, hypertension serum HDL were not seen to have any relative impact. Similarly, in our study, the mean BMI of our patients was $26.0 \pm 4.21 \text{ kg/m}^2$ and 28.3 ± 4.1 in males and females, respectively. These were the patients, due to the higher rates of obesity, who eventually ended up being vastly prone to various comorbidities that constitute metabolic syndrome thus signifying its role in the occurrence of psoriasis. No difference in the frequency of metabolic syndrome between males' vs females was shown in their study. However, in ours, the number of females suffering from metabolic syndrome that had psoriasis was remarkably higher than when compared to the male population. There was no correlation between severity of psoriasis and prevalence of metabolic syndrome in either study.

A similar study published in 2018, conducted by Aisha Ghias *et al.* in Lahore, involved 100 psoriatic patients out of which 41 were found to be suffering from Metabolic Syndrome.¹⁶ It was

found that in patients of psoriasis, metabolic syndrome was a frequent occurrence and that female patients were significantly overweight than male patients. Our study depicted the exact findings further highlighting the fact that as the patient's BMIs increased, there was a significant growth in the body surface area involved by psoriasis. A recent study showed metabolic syndrome had a male predominance, however our research as well as the above mentioned study¹⁶ came to almost identical conclusions, contrary to the study done in Bangladesh¹⁷.

Another paper written by Nadia Ali Azfar *et al.* included 58 psoriatic patients out of which 36.2% were found to be suffering from metabolic syndrome. They arrived at the conclusion that patients of psoriasis have a higher incidence of metabolic syndrome than controls. Our results were corresponding to the aforementioned, where we derived that there is a strong association between metabolic syndrome psoriasis. Moreover, their data did not find any correlation of the duration of psoriasis with metabolic syndrome. Likewise, after the analysis of our patient population, we could not prove the significance of the duration of disease to metabolic syndrome.¹⁸

The limitation of our study is a small sample size and a descriptive design.

CONCLUSION

Results reaffirm the notion that metabolic syndrome is a frequent finding in psoriatic patients. In addition, females had a significantly higher occurrence of metabolic syndrome evident by the fact that they had a higher BMI than males.

AUTHORS' CONTRIBUTION

MR: Conceptualization of idea, study design, sample collection, data entry. NI, AAM: Supervision, proof reading. FR: Sample collection. MABH, ST: Methodology, literature search, drafting of manuscript, statistical analysis and interpretation of data, derivation of results, critical Revision, grammar check.

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