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The Occurrence of Metabolic Syndrome in Patients with Psoriasis

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ABSTRACT

Objective: To determine occurrence of metabolic syndrome in patients of Psoriasis and to highlight any gender-based differences.

Study Design: Cross-sectional study design.

Place and Duration of Study: Pak-Emirates Military Hospital, Rawalpindi. Our research was conducted from Jul to Dec 2020 (6 months).

Methodology: A total of 80 patients diagnosed with psoriasis were selected using non-probability consecutive sampling. Informed written consent was obtained from each patient and a questionnaire was filled. Variables such as blood pressure, waist circumference, body surface area covered by psoriasis, and 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 or more of the 5 criteria for the modified version of the National Cholesterol Education Program Adult Panel III were met.

Results: There were 62 male & 18 female patients. A total of 39 patients (48.8%) met the criteria for metabolic syndrome. Amongst these, 26/62(41.9%) males & 13/18(72.2%) females fulfilled the criteria. The mean BMI of males was 26.0 and those of females was 28.3 & their comparison 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 & 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- 11.4% in adults and 0.1-1.4% in children.[3] The pathogenesis of psoriasis involves an intricate interaction of several factors such as immunogenic modulators, genetic vulnerability, and self-antigens that provoke immune reactions coupled with environmental influences.[4] This disease is primarily driven by T cells such as Th1 cells & Th17 cells. Immuno-mediators such as TNF-a, IFN-γ, IL-17 & 22 play an important role in dysregulated keratinocyte expansion and 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, mediatedby the release of numerous immunological cytokines.[6] Obesity represents a significant global burden. It has been found that metabolic syndrome & psoriasis involves similar pathogenic pathways that are driven by TNF-a, IL 17, IL- 22, IL-23 and IFN-γ thereby suggesting a correlation between the two diseases.[7] Adiponectin is a chemical mediator that increases insulin sensitivity and has anti-inflammatory and anti-thrombotic properties. Its levels are significantly lower in patients of psoriasis thus solidifying the co-relation 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 development of psoriasis in an individual whose body mass index (BMI) was more

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than 35.0 kg/m2 measured up to 2.69times more as compared to someone witha normal BMI.[10] There are not a lot of studies conducted in Pakistan to study the aforementioned association. Hence, the purpose of our study is to highlight this relationshipas well as to enlightenhealth care professionals of existing linkage and overall systemic effects of psoriasis. This will in turn lead to a more holistic approach towards management of psoriatic patients eventually leading to better patient outcome.

METHODOLOGY

This cross-sectional observational study was conducted in a Tertiary Healthcare setupfrom July to December 2020. Ethical Approval was obtained from the hospital administration (Reference number-A/28/EC/210/2020).The sample size for this research was calculated using WHO calculator (CI=95%, population proportion=27.4%, absolute precision=10%).[11] It included atotal of 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 had been suffering from psoriasis for a minimum of 5 months. Children and pregnant women were excluded from this study.

Written informed consent was taken from each patient along with a simple questionnaire, that included information regarding age, sex, durationof 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 lipids profile and fasting blood sugar were advised.

For evaluation of the severity of psoriasis, markers such as BSA along with Psoriasis Area and Severity Index (PASI) were utilized. Patient's 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 25-30kg/m2 was classified as overweight whereas obesity was categorized above 30kg/m2. Blood pressure was measured by sphygmomanometer. Metabolic syndrome was diagnosed using revised NCEP ATP III.[12] guidelines.The presence of any3 out of 5 traits is diagnostic:Waist circumference ≥102 cm in males and ≥88 cm in females, serum triglycerides (TG) ≥1.7 mmol/L or receiving pharmacologic therapy, serum high-density lipoprotein (HDL) cholesterol <1 mmol/L in males&<1.3 mmol/L in females, blood pressure ≥130/85 mmHg or receiving pharmacologic therapy, fasting blood sugar ≥5.6 mmol/Lor receiving pharmacologic therapy.

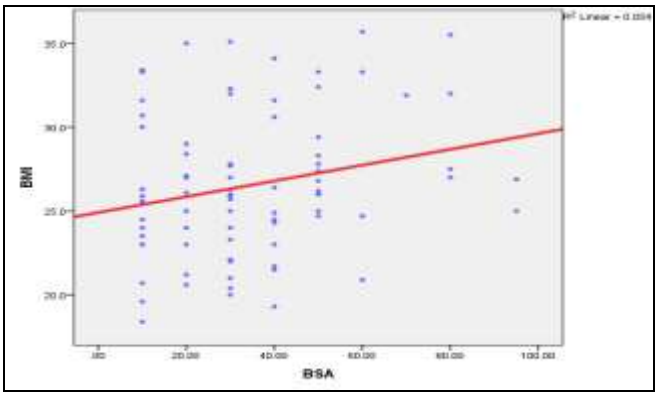

Figure-1: Co-Relation of Bmi With Body Surface Area Covered With Psoriasis.

SPSS software was used for analyzing the data. Quantitative data was depicted as means with standard deviations whereas qualitative data was illustrated in the form of frequencies and percentages. The data groups were compared using independent sample t-test.

RESULTS

Our study comprised of a total of 80 patients with 62 males (77.5%) and 18 females (22.5%). Metabolic syndrome was identified in 26 out of 62(41.9%) men& 13(72.2%) out of 18 women (Table-I). Thus, it was observed that the number of female patients suffering from psoriasis had a significantly higher frequency of metabolic syndrome than males. Out of 18 female patients, 9(50%) were classified as overweight & 6(33.3%) were listed as obese. On the other hand, 23(37%) male patients were overweight while 13(21%) were obese. When the average BMI was correlated among gender groups, the occurrence of obesity was significantly more in females compared to males (p=0.04).

Table-I: Distribution of Metabolic Syndrome.

Metabolic Syndrome	No. of patients
Criteria Met	39(48.8%)
Criteria Not Met	41(51.2%)

There were seventy patients (87.5%) of chronic plaque psoriasis, whereas the rest of them (12.5%) hadother rarer forms of psoriasis.

Table-II: Distribution of various parameters among gender groups.

Baseline Parameters	Men	Women	*p*-value
Fasting blood glucose (mmol/L)	5.47±0.91	5.38±0.75	0.66
Systolic Blood Pressure (mmHg)	128.9±13.8	124.8±9.9	0.17
Diastolic Blood Pressure (mmHg)	83.5±8.2	85.3±7.3	0.38
Serum Triglyceride (mmol/L)	1.86±0.71	1.7±0.6	0.62
Serum High Density Lipoprotein (mmol/L)	0.96±0.20	0.99±0.17	0.55
Body Mass Index	26.0±4.21	28.3±4.1	0.048
Waist Circumference(cm)	95.8±11.4	99.4±11.9	0.26

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 and 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 and 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-II.

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 neighboring country China has done a remarkable effort in identifying people who suffer from metabolic syndrome.[13] A total of 12570 subjects (45.2% malesand 54.8% females) ranging from 18 years of age all the way up to 96 years, with an average age of 48.8±15.3 years, participated in the trial in reference to the guidelines of China Diabetes Society.Individuals who completed the study numbered 9310 out of whom 40.7% were males, having anoverall response rate of 74.1%. Prevalence of metabolic syndrome in China was found to be 14.39%, along with the age-adjusted prevalence amounting to 9.82%, 7.78% in males and 6.76% in females; 7.39% in the people residing in rural areas compared to 6.98% in those located in urban localities.

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/m2 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/m2. After weighing up our results to WHO's, the study we performed revealed that the average BMI in males was 26 kg/m2 with a S.D of 4.2 while females had a considerably higher mean BMI of28.3kg/m2 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.

A recent paperby Jensen P. in 2016 gathered evidence suggesting obesity not only plays a major role in the development of psoriasis, but furtherexacerbatesexisting disease as well. Moreover, there might be a strong link between weight reduction and improvement of psoriasis severityin individuals who are overweight/obese.[14] A randomized trial included 60 obese patients with psoriasis. Those in the intervention group that were randomized to a low-calorie diet, lost 15 kg more than the controls, and experienced a greater mean reduction in their PASI than controls (mean PASI reduction -2.3).Similarly, body weight that is in excess also interferesin the managementof psoriasis. Our study exhibited almost identical outcomes where we arrived at a firm conclusion that metabolic syndrome, and especially BMI had a significant effect on patients in whom psoriasis was prevalent with regard to their dermatological disease expression.

We also compared our results with those derived by Gisondi et alin Italy.[15] They studied 338 cases along with 334 controls where the average age of subjects was 62.1 years and the mean BMI was around 27.7 kg/m2. 30.1% cases were seen to be suffering from metabolic syndromecompared to only 20.6% controls. Increased number of patients with metabolic syndrome in our research population may exist because of a variety of elements. For example, the average age of our participants 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, Patients suffering from psoriasiswere observed to havea higher prevalence of abdominal obesity whereas, high blood glucose, raised blood pressure and elevated serum HDL were not seen to have any relative impact. Similarly, in our research, the average BMI of our patients was 26.0±4.21 kg/m2 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 signifying its role in the occurrence of psoriasis. No difference in the frequency of metabolic syndrome between males and females was shown in their study. However, in ours, the number of females suffering from metabolic syndrome who had psoriasis was remarkably higher than when compared to the male population. Correlationexisting between the severity of psoriasis and prevalence of metabolic syndrome could not be derived 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'sBMIs 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 and the above mentioned study17came to almost identical conclusions, contrary to the study done in Bangladesh.[17]

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 affected by psoriasis have a higher incidence of metabolic syndrome compared to controls. Our results were corresponding to the aforementioned, where we derived a strong association between metabolic syndrome and 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]

CONCLUSION

In our research, we tried to highlight the association of metabolic syndrome and psoriasis. Our data showed that a total of 48.8% psoriatic patients met the criteria for metabolic syndrome. This in turn reaffirms the notion that metabolic syndromeis afrequentfinding 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.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MHR & NI: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

AAM & MABH: Data acquisition, data analysis, approval of the final version to be published.

ST: & FR: Critical review, concept, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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