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Psoriasis and Metabolic Syndrome: A Gender Case-Study Clinical Correlation

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Metabolic syndrome (MS) and Psoriasis are chronic inflammatory conditions resulting from multifactorial pathogenesis comprising hereditary and environmental factors. The main common factor to link these conditions is Intestinal Hyper permeability (IHP), also known as the Leaky Gut Syndrome (LGS. The gender predisposing for Non Alcoholic Fatty Liver Disease (NAFLD) in psoriasis is main objective of the study.
Methods: Metabolic syndrome was diagnosed by ultrasonic evidence of non-alcoholic fatty liver (NAFLD) in psoriatic patients and asymptomatic control. All the collected information put into predesigned Performa. The data was entered and analysed using SPSS v23.0. Mean± Standard Deviation (SD) of age, duration of disease Psoriasis Area and Severity Index (PASI) Score, Body Surface Area, frequency and the percentage of non-alcoholic fatty liver and gender. Two groups, cases and controls, were compared to assess association between psoriasis and non-alcoholic fatty liver and Chi square test was applied. P value ≤ 0.05 was considered as a significant. Odds ratio was calculated at 95% of confidence level.
Results: In gender wise distribution of cases and control 65 (65%) male and 61 (35%) female were included in cases and 75 (65%) male and 36 (35%) female were included in control group.

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Compared to control the odd of non-alcoholic fatty liver was found to be more prevalent in males as compared to the females (OR=3.42, CI 1.624 to 7.201, p-value <0.00).
Conclusions: The rate of NAFLD is significantly increased in concerning control cases and it was 2 times more likely in male cases as compare to female.

Keywords: Psoriasis; metabolic syndrome; non alcoholic fatty liver disease; intestinal hyper permeability.

1. INTRODUCTION

Metabolic syndrome (MS) and Psoriasis are chronic inflammatory conditions resulting from multifactorial pathogenesis comprising hereditary and environmental factors. The main common factor to link these conditions is Intestinal Hyper permeability (IHP), also known as the Leaky Gut Syndrome (LGS) [1, 2]. Psoriasis is nowadays considered one of the endotypes of Atopic Dermatitis (AD), a specific presentation of the food hypersensitivities conditions [3]. Psoriasis and AD may be produced by diverse hypersensitivity mechanisms, either IgE-mediated or Non–IgE-mediated [4, 5]. The cytokine profile developed by the absorption of bacterial endotoxins, due to IHP such as the tumour necrosis factor-alpha (TNF-α), IL-6, and IL1-β play a common role in the development of MS and psoriasis [6, 7]. Metabolic syndrome characteristics (obesity, hypertension, hyperlipidaemia and insulin resistance) are commonly associated with psoriasis [8]. The relationship between psoriasis and non-alcoholic fatty liver disease (NAFLD) is suggested by non-invasive imaging, which is considered as the hepatic manifestation of metabolic syndrome [9,10].

In broader terms, NAFLD is a collection of macro vesicular fat in more than 5% of hepatocytes in those who do not consume alcohol in harmful amounts (<20 gm/day) [11]. NAFLD can be identified with good imaging ultrasonography with a sensitivity of about 85% [12]. It has been well documented by studies of the natural history of fatty liver that patients having isolated fatty liver are likely to experience fewer liver-related mortalities. Despite there has been numerous literature available connecting psoriasis with NAFLD, however, in this study, we will discuss the gender predisposition between NAFLD and psoriasis. It is well evident that NAFLD is more common in psoriasis as it is documented by a study done in the Netherlands (46%) [13]. The prevalence of NAFLD in psoriasis has also been reported from various studies done in Italy (47%) [14] and in India (45%) [15]. There is the pertinent finding of the severity of psoriasis since the NAFLD itself leads to more severe psoriatic attacks as is documented by some studies [16].

Owing to a high prevalence of NAFLD in psoriasis and vice versa. We wanted to know if gender has any impact on NAFLD and psoriasis. The instinct to carry out this study was;

1. There are no local studies available to the best of our knowledge to establish the impact of gender on the development of NAFLD in psoriatic patients.
2. The literature review precludes that strong relationships exist between psoriasis and NAFLD.

2. METHODS

The study was approved from College of Physician and Surgeons of Pakistan (CSPS) and IRB was sought from Jinnah Post-graduate medical Centre (JPMC).

A case control study was conducted from February 2018 to August 2018 at Department of Dermatology, Jinnah Postgraduate Medical Institute, Karachi (JPMC). Non-Probability Consecutive sampling technique was used to select cases and controls. Sample size was calculated with expected rate of 47% [7] prevalence of NAFLD in Case (P1) and 28% [17] prevalence of NAFLD in control (P2) group, power of test was set at 80% and confidence interval at 95%. Total sample size calculated was 202, with 101 participants in each group. We defined cases as Diagnosed case of psoriasis as per operational definition with moderate to severe intensity within age bracket of 18 to 75 years having any gender. Whereas the control were matched for age and sex and who have any other skin but psoriasis. The exclusion criteria used was Pregnant & lactating mother, History of alcohol, History of drugs (Cyclosporin, Retinoids, Methotrexate), History of Smoking, Hepatitis B & C diagnosed by Elisa Method and Obesity (BMI > 30) as these were also independent causes of fatty liver.

Psoriasis cases and controls (not having psoriasis) attending dermatology department all were referred to the radiology for the assessment of non-alcoholic fatty liver with one of the following findings showing hyper echoic liver parenchyma, impaired visualization of intra hepatic vessels (portal vein and hepatic vein) and increased liver size, was considered as a fatty liver. This information as age, gender, duration and severity of disease was entered in pro forma.

The data was entered and analysed using SPSS v23.0. Mean± Standard Deviation (SD) of age, duration of disease Psoriasis Area and Severity Index (PASI) Score, Body Surface Area, frequency and the percentage of non-alcoholic fatty liver and gender. Two groups, cases and controls, were compared to assess association between psoriasis and non-alcoholic fatty liver and Chi square test was applied. P value ≤ 0.05 was considered as a significant. Odds ratio was calculated at 95% of confidence level. Effect modifiers like age and gender were controlled through stratification Post stratification Chi square test was applied. In gender wise distribution of cases and control 65 (65%) male and 61 (35%) female were included in cases and 75 (65%) male and 36 (35%) female were included in control group as shown in Table 3.

Table 1. Descriptive statistics of respondent

Variables	N	Minimum	Maximum	Mean	±Sd	95% C. I
Age (Years)	202	18	75	46.395	7.837	45.30-----47.48
*Duration of Psoriasis (Months)	101 (Only in cases)	2	300	130.94	18.28	127.33-----134.54
*PASI Score (Years)	101 (Only in cases)	29	50	41.24	6.24	40.00-----42.47
Body surface Area	101 (Only in cases)	0.28	0.64	0.472	0.052	0.461-----0.482

**Psoriasis Area and Severity Index*

Table 2. Frequency of ages of respondent

Age [Years]		Minimum	Maximum	Mean	±Sd	95% C. I
Group	Cases (n=101)	18	75	48.56	6.69	47.23----49.88
	Control (n=101)	18	75	44.23	7.08	42.83----45.62

Table 3. Frequency of gender of participants

	Male	Female
Cases	65	36
	65%	35%
Control	75	26
	74%	26%

Table 4. Occurrence of NAFLD in Psoriatic cases

Group	Nonalcoholic fatty liver		P-value	Odd ratio	95% confidence interval
	Yes	No			
Cases	53(52.5%)	48(47.5%)			
Controls	29(28.7%)	72(71.3%)	0.001*	2.741*	1.532 to 4.904

Table 5. Gender wise occurrence of NAFLD in Psoriatic cases

Gender			Nonalcoholic fatty liver		P -value	Odd ratio	95% confidence interval
			Yes	No			
Male	Group	Cases	37(56.9%)	28(43.1%)			
		Control	17(27.9%)	44(72.1%)	0.001	3.42	1.624----7.201
Female	Group	Cases	16(44.4%)	20(55.6%)			
		Control	8(30.0%)	28(70.0%)	0.192	1.867	0.727-----4.794

3. RESULTS

Out of total 201 study participants 140 (69%) male and 62 (31%) female. Out of total 201 study participants 140 (69%) male and 62 (31%) female. In cases males were 65 (65%) and females were 36 (35%) whereas in control males were 75 (74%) and 26 (26%) female were included in control group. Compared to control the odd of being non-alcoholic fatty liver was > 2 in Psoriasis patients with [OR 2.741, C.I (1.532 to 4.904)] and p value was found to be highly significant (p value =0.001). In age group of 18 to 45 the odd of being non-alcoholic fatty liver was 3 times more likely in cases as compare to control with [OR 3.712, C.I (1.723----7.998)] and P value was found to be highly significant i.e. (p value=0.001); similarly in age group of > 45 the odd of being non-alcoholic fatty liver was 1.8 times more likely in cases as compare to control with [OR 1.888, C.I (0.756 to 4.717)] and P value was found to be non-significant (p value =0.171). In stratification of male the odd of being non-alcoholic fatty liver was 3 times more likely in cases as compare to control with [OR 3.42, C.I (1.624 to 7.201)] and P value was found to be highly significant (P=0.001); similarly in stratification of female the odd of being non-alcoholic fatty liver was 1.86 times more likely in cases as compare to control with [OR 1.867, C.I (0.727 to 4.794)] and p value was found to be non-significant (p value=0.192).

4. DISCUSSION

Psoriasis is one among chronic inflammatory diseases of Skin, associated with NAFLD. Moreover the prevalence of NAFLD is much higher in patients who have psoriasis. There are many explanation of this increase prevalence of NAFLD among psoriatic disease including insulin resistance and metabolic derangement leading to fatty steatosis [4]. The treatment of psoriasis is also associated with factors which tend to increase the hepatotoxicity as hepatotoxic agent such as methotrexate are mainstay of treatment of psoriasis, and psoriatic therapy itself increase the susceptibility of liver damage [10,18]. Upon evaluating patients from United States urban-based tertiary dermatology clinic centre, it was found that a robust system need to be implemented to check sensitivity of treatment of psoriasis on NAFLD. We found in our study that prevalence of NAFLD in psoriatic patient was higher than in general population (52.5% vs. 28.7%). Our finding are also contradict with an Indian hospital-based study which documented high prevalence of NAFLD in general population and psoriatic patients (17.4% and 7.9 % in psoriasis patients and age, sex and BMI-matched controls, respectively) [12]. These lower prevalence could be attributed to use of alternative definition of NAFLD (i.e., evidence of steatosis on liver ultrasound and elevation of liver enzymes and triglycerides and ethnic differences in risk factors). However according to our findings the odd of being non-alcoholic fatty liver was > 2 in Psoriasis patients with [OR 2.741, C.I (1.532-----4.904)] and P value was found to be highly significant i.e. (P=0.001). Whereas our study finding are consistent with other study done in Italy and Netherlands which also showed high prevalence of NAFLD in psoriatic patient [7,10,11].

We found that male sex is more prone to develop NAFLD in psoriasis. This is unique finding as the data was also undergone with stratification at the analysis to control for confounders and effect modifiers. In literature review it was found that the gender predisposition has never been studied before, however prevalence of NAFLD is substantially higher in Psoriasis patient at all. However further research is needed to justify this finding by addressing confounders and effect modifier or genetic as well as hormonal factors.

The strength of our study was that we selected consecutive sampling method, as our inclusion and exclusion criteria were strict. The bias were addressed by using objective definitions for predictor and outcome variable in our study. Our main limitation are that ultrasonography and exclusion of secondary causes of chronic liver disease were used to make a clinical diagnosis of NAFLD instead of liver biopsy. So far as Liver biopsy is regarded as gold standard for staging of liver disease [7]. However, using liver biopsy for determination of fatty liver was beyond our study design as liver biopsy is itself is associated with morbidity and mortality [13]. We also want to document the referral bias as we conducted the study at single tertiary care centre, however this peculiar bias is less likely to be interrupting our results as many of the study participants were self-referred and encompassed a diverse geographic distribution. The confounder like diseases associated with NAFLD were addressed by selection of cases. Any case having diabetes, Chronic Hepatitis and other chronic diseases were excluded from analysis.

5. CONCLUSIONS

It is to be concluded that rate of non-alcoholic fatty liver was 2 times more likely in male cases

as compared to females. Future prospective, there is a need to conduct more observational and comparative studies using large sample size with multiple study centres in Pakistan are needed to confirm the findings of the present study.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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