

ASSOCIATION OF PSORIASIS WITH OSTEOPOROSIS AND OSTEOPENIA

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ABSTRACT

Background and Objective: psoriasis is frequently considered as a multisystem disease. Many studies have shown a potential relationship between psoriasis and bone comorbidity. This study was designed to evaluate the presence of osteoporosis and osteopenia in Syrian psoriatic patients. **Methods:** cross sectional study of 90 patients, including 51 psoriatic patients and 39 healthy adults. Collected data included age, gender, body mass index, disease area and severity index (PASI), duration of the disease (cases group), the presence of psoriatic arthritis (case group) and dual energy X ray absorptiometry (DXA) of the left femur and lumbar area. These statistic variables were compared with the variables of 39 healthy adults. **Results:** of 90 samples; 51 patients with psoriasis **31(60.8%)** were male and **20(39.2%)** were females, 39 healthy control **21(53.8%)** males and **18(46.2%)** females. **9(17.6%)** cases had left femur osteopenia in comparable with **4(10.3%)** controls (p value 0.3). Whereas **16(31.4%)** cases had osteopenia and **5(9.8%)** had osteoporosis of the lumbar area, **10(25.6%)** controls had osteopenia and **2(5.1%)** had osteoporosis of the lumbar area (p value 0.5). **Conclusion:** although Patients with psoriasis did not have statistically important relationship with osteoporosis and osteopenia there was a clinically important relationship. There was a negative influence of both psoriatic arthritis and the duration of the disease on the bone mineral density. There was no influence of disease severity on the bone comorbidity. There was a high incidence of osteoporosis and osteopenia within the control group, which could be attributed on the one hand to the small sample size, and on the other hand to the poor economic and nutritional conditions that Syria has been suffering from for more than a decade, which in turn will necessarily negatively affect bone density.

KEYWORDS: Psoriasis, osteoporosis, osteopenia, bone mineral density.

INTRODUCTION

Psoriasis is a chronic, inflammatory systemic disease that has been linked to many disorders such as obesity, metabolic syndrome, diabetes mellitus, hypertension, atherosclerosis and psoriatic arthritis.^[1,2,3,4] Psoriasis could also be associated with vitamin D deficiency.^[8]

Historically, psoriasis was defined as a hyperproliferative condition of epidermal keratinocyte, but nowadays it is classified as a complex immune disease mediated by T lymphocytes, dendritic cells and interleukins (IL23, IL17, TNFa).^[3]

Psoriasis severity is measured using the PASI score.^[2]

Osteoporosis is a generalized decrease in bone mass leading to a breakdown of the bone microarchitecture

and an increased risk of bone fractures. According to the WHO it is defined as a decrease in bone density at rate of two and a half standard deviations from the mean bone mineral density in healthy young adults of the same sex (T score).^[5] Osteopenia is characterized by a decrease in bone mass that is less severe than osteoporosis, pursuant to the WHO, osteopenia is defined by a T-score between -1 and -2.5.^[6]

On the other hand, T lymphocytes stimulate osteoclast differentiation and extend their lifespan via IL1, IL6 and TNFa. They also inhibit differentiation and function of osteoblasts and induce early programmed cell death via interleukins such as IL17.^[12,13]

Furthermore increased bone mineral density was observed in patients receiving TNFa inhibitors.^[8,9]

Many recent studies have indicated that psoriasis may be associated with osteoporosis or at least an increased risk of fractures.^[6,7,10] Whereas other studies reported no evident associations between psoriasis and decreased bone mineral density.

With regard to this background, a cross sectional study with a healthy control group was conducted to evaluate the condition of bone mineral density in Syrian psoriatic patients.

MATERIALS AND METHODS

Study population

After approval by local research ethics committee, a cross sectional study was conducted in department of Dermatology and Sexually Transmitted Diseases at Tishreen University Hospital in Latakia, Syria between February 2022 and February 2023.

Inclusion criteria

Patients with psoriasis in all its forms, over 20 years of age.

Exclusion criteria

Pregnancy and breastfeeding.

Parathyroid diseases, kidney failure, malabsorption and chronic inflammatory diseases.
Ovariectomy.

Systemic corticosteroid therapy (more than 5 mg a day for longer or equal to 3 months).

Patients receiving treatment for osteomalacia, osteoporosis or have been taking dietary supplements for more than or equal to 3 months.

Patients' organization and follow up

Patients were admitted to the study after obtaining informed consent. Data collection was acquired through interview with the patients using special developed forms. The forms included the following information:

Age, sex, BMI, type of psoriasis, duration of the disease, and severity of the disease measured by PASI score.

The value of PASI score ranged from 0-72. The severity of psoriasis was classified as mild when the score was less than 10, medium between 10-15, and severe over 15.

BMD was measured at the lumbar spine (L1-L4), and left femoral neck by DXA machine in Tishreen university Hospital.

Calcium, phosphorus, and alkaline phosphatase were measured to rule out osteomalacia where mineral bone density is low.

Patients with psoriatic arthritis were evaluated according to CASPAR criteria.^[12]

Statistical analysis

- Descriptive statistics to describe the sample and the studied variables.
- Quantitative variables with measures of central tendency and measures of dispersion.
- qualitative variables with frequencies and percentages.
- 2- Inferential Statistical based on statistical laws
- Chi-square test to study the relationship between qualitative variables.
- Independent T student test for the difference between the averages of two independent groups.
- The results are considered statistically significant with a p-value of <0.05.
- SPSS program was used to calculate statistical coefficients and analyze results.

RESULTS

The research sample included 51 psoriasis patients (14 patients had mild psoriasis, 20 had moderate psoriasis and 17 had severe psoriasis) attending the Dermatology and Sexually Transmitted Diseases Department at Tishreen University Hospital in Latakia between February 2022 and February 2023, who fulfilled the inclusion criteria of this research.

There were 44 (**86.3%**) patients with plaque psoriasis, 12(**23.52%**) with psoriatic arthritis, 7(**13.7%**) with nail psoriasis, 5(**9.8%**) with palmoplantar psoriasis, 3(**5.9%**) with erythrodermic psoriasis, 2(**3.9%**) with inverse psoriasis, 1(**2%**) with scalp psoriasis and 1 (**2%**) with guttate psoriasis.

A sample of 39 individuals was recruited as a control group in order to study the association of psoriasis with osteoporosis and osteopenia by measuring bone mineral density BMD.

The age of the patients in the research sample ranged from 20 to 72 years, and the average age was 44.20 ± 14.2 .

The duration of psoriasis ranged from 4 months to 30 years, and the mean duration of incidence was 8.73 ± 7.2 years.

Table (1): The difference in the demographic distribution among the study groups:

Demographic parameters	Patients	control	P-value
Sex male Female	31(60.8%) 20(39.2%)	21(53.8%) 18(46.2%)	0.5
Age(years) Mean ± SD	43.52±14.9	45.07±13.4	0.6
BMI Low weight normal over weight obese	0(0%) 24(47.1%) 19(37.3%) 8(15.7%)	1(2.6%) 22(56.4%) 9(23.1%) 7(17.9%)	0.3

Table (2): Psoriasis group distribution according to the duration of the disease

Psoriasis duration	Number	%
<5(years)	18	35.29%
≥5(years)	33	64.71%

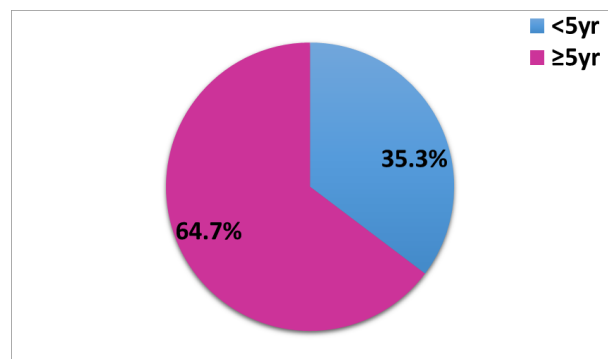


Figure (1): Psoriasis group distribution according to the duration of the disease.

Table (3): BMD of the left femoral neck in the study groups.

BMD	Control	patients	P-value
Normal	42(82.4%)	35(89.7%)	0.3
Osteopenia	9(17.6%)	4(10.3%)	

No osteoporosis was found in the two groups, there were no statistical significances between the two groups regarding BMD of the left femoral neck (P 0.3), but the rate of osteopenia was higher in psoriasis group.

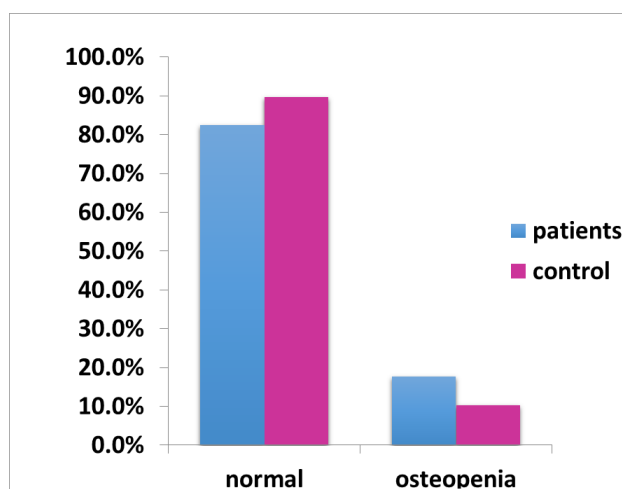


Figure (2): BMD of the left femoral neck in the study groups.

Table (4) mean BMD of the lumbar spine in the study groups.

Mean lumbar Spine BMD	patients	controls	P-value
normal	30(58.8%)	27(69.2%)	0.5
osteopenia	16(31.4%)	10(25.6%)	
osteoporosis	5(9.8%)	2(5.1%)	

There were no statistical significances between the two groups regarding mean BMD of the lumbar spine (p 0.5),

but the rate of osteoporosis and osteopenia was higher in psoriasis group.

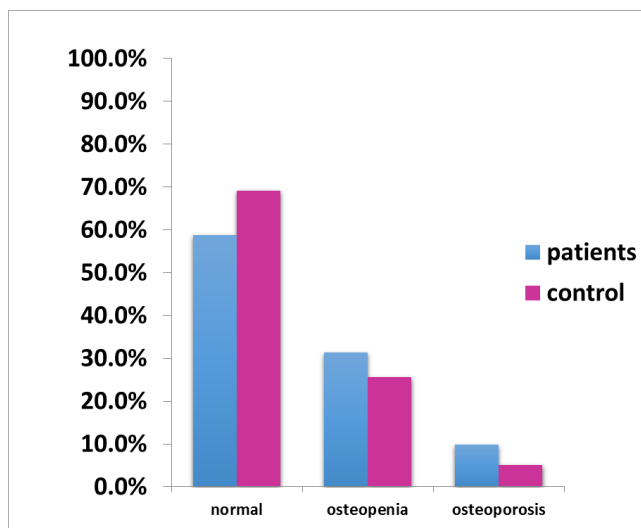


Figure (3): Mean BMD of the lumbar spine in the study groups.

The relationship between BMD and psoriasis severity in the patients group.

Psoriasis severity	BMD of the left femoral neck		Mean BMD of the lumbar spine		
	Normal	osteopenia	normal	osteopenia	osteoporosis
Mild	12(28.6%)	2(22.2%)	8(26.7%)	4(25%)	2(40%)
moderate	16(38.1%)	4(44.4%)	10(33.3%)	8(50%)	2(40%)
severe	14(33.3%)	3(33.3%)	12(40%)	4(25%)	1(20%)
P-value	0.9		0.7		

There were no statistical significances between BMD of both femoral neck and lumbar spine, and psoriasis severity (p0.9-p0.7)

The relationship between BMD and the duration of psoriasis in the patients group.

The duration of psoriasis	BMD of the left femoral neck		Mean BMD of the lumbar spine		
	normal	osteopenia	normal	osteopenia	Osteoporosis
<5	15(35.7%)	2(22.2%)	12(40%)	2(12.5%)	4(80%)
≥5	27(64.3%)	7(77.8%)	18(60%)	14(87.5%)	1(20%)
P-value	0.03		0.01		

Statistical significances were found between BMD of both femoral neck and lumbar spine, and the duration of psoriasis (p0.03-p0.01)

The relationship between BMD and the sex in the patients group.

sex	BMD of the left femoral neck		Mean BMD of the lumbar spine		
	normal	osteopenia	normal	osteopenia	Osteoporosis
Males	28(66.7%)	3(33.3%)	18(60%)	11(68.8%)	2(40%)
females	14(33.3%)	6(66.7%)	12(40%)	5(31.3%)	3(60%)
P-value	0.06		0.5		

There were no statistical significances between BMD of both femoral neck and lumbar spine, and sex in psoriasis group (p0.06-p0.5).

The relationship between BMD and the age in the patients group.

Age groups	BMD of the left femoral neck		Mean BMD of the lumbar spine		
	normal	osteopenia	normal	osteopenia	osteoporosis
20-30	13(31%)	0(0%)	10(33.3%)	3(18.8%)	0(0%)
30-40	7(16.7%)	1(11.1%)	5(16.7%)	3(18.8%)	0(0%)
40-50	3(7.1%)	1(11.1%)	3(10%)	0(0%)	1(20%)
50-60	14(33.3%)	6(66.7%)	9(30%)	8(50%)	3(60%)
60-70	3(7.1%)	1(11.1%)	1(3.3%)	2(12.5%)	1(20%)
70-80	2(4.8%)	0(0%)	2(6.7%)	0(0%)	0(0%)
P-value	0.3		0.3		

There were no statistical significances between BMD of both femoral neck and lumbar spine, and Age groups in

psoriasis group (p0.3-p0.3), but the rate of osteoporosis and osteopenia was higher between 6th-7th decades.

The relationship between BMD and BMI in the patients group.

BMI	BMD of the left femoral neck		Mean BMD of the lumbar spine		
	Normal	osteopenia	Normal	osteopenia	Osteoporosis
Normal	20(47.6%)	4(44.4%)	14(46.7%)	8(50%)	2(40%)
Overweight	15(35.7%)	4(44.4%)	11(36.7%)	6(37.5%)	2(40%)
obesity	7(16.7%)	1(11.1%)	5(16.7%)	2(12.5%)	1(20%)
P-value	0.8		0.9		

There were no statistical significances between BMD of both femoral neck and lumbar spine, and BMI in psoriasis group (p0.8-p0.9), but the rate of osteoporosis

and osteopenia was higher in patients with normal BMI and lower in patients with higher BMI.

The relationship between BMD and psoriatic arthritis in the patients group.

psoriatic arthritis	BMD of the left femoral neck		Mean BMD of the lumbar spine		
	Normal	osteopenia	Normal	osteopenia	Osteoporosis
+	3(7.1%)	9(100%)	2(6.7%)	6(37.5%)	4(80%)
-	39(92.9%)	0(0%)	28(93.3%)	10(62.5%)	1(20%)
P-value	0.001		0.0001		

Statistical significances were found between BMD of both femoral neck and lumbar spine, and the presence of psoriatic arthritis.(p0.001-p0.0001).

presence of articular complaints represented by psoriatic arthritis, on the other hand.

DISCUSSION

This study showed that there was no statistically significant relationship between psoriasis and osteoporosis/osteopenia. Although the percentage of osteoporosis/osteopenia was higher in the psoriasis group. This could be explained by the high percentage of osteoporosis/osteopenia in the control group, which may be attributed on the one hand to the smallness of the group and on the other hand, to the poor economic and nutritional conditions that Syria has been suffering from for more than a decade, which in turn will necessarily negatively affect bone density.

In addition to the presence of a statistically significant relationship between osteoporosis/osteopenia in patients with psoriasis and the duration of the disease.

Our study did not find a relationship between the severity of psoriasis and osteoporosis/osteopenia.

This study also showed the existence of a statistically significant relationship between osteoporosis/osteopenia in patients with psoriasis, on the one hand, and the

When comparing our study with international studies, we found Our study is consistent with the study of Kathuria et al.^[11] in America in 2016, which was conducted on 198,102,435 patients in terms of increasing the rate of osteoporosis/osteopenia in patients with psoriasis, but it was not consistent with it in terms of the existence of a statistically significant relationship. The Kathuria et al study also found an increased incidence of osteoporosis/osteopenia in women with psoriasis, which was not found in our study.

As well as, their study found an increased incidence of osteoporosis/osteopenia in patients with psoriatic arthritis.^[11] The Martinez-Lopez et al.^[8] study conducted in Spain in 2018, which included 185 patients, showed an increased incidence of osteoporosis/osteopenia in patients with psoriasis, with a statistically significant relationship, which was not found in our study, despite the increased incidence of osteoporosis/osteopenia in our study. Lopez et al's study also found an improvement in bone density with an increase in BMI, which was not found in our stud.

The Jinan Q. Mohammed.^[7] study conducted in Iraq in 2020, which included 154 patients, showed an increased incidence of osteoporosis/osteopenia in patients with psoriasis compared to patients with psoriatic arthritis, which we did not find in our study.

Through this study, we reached the following conclusions:

The incidence of both osteoporosis and osteopenia increases in patients with psoriasis, especially when the duration of the disease increases and the condition is associated with psoriatic arthritis.

Accordingly, we recommend

The need for bone density in patients with psoriasis when the duration of the disease exceeds five years, or if the condition is accompanied by articular disease.

Expanding the study of diseases associated with psoriasis as a chronic inflammatory condition involving many organs.

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