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Original Research Article

Comorbid diseases and severity in psoriasis patients at Khartoum Dermatology and Venereology hospital, August-December 2019

Zainab M. R. Mohamed[1]*, Maisoon Mohammed Omar[2]

[1]Department of Dermatology, Medical Services, Doha, Qatar
[2]Khartoum Dermatology and Venerology Hospital, Khartoum, Sudan

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***Correspondence:**
Dr. Zainab M. R. Mohamed,
E-mail: zainab.mhd.rahma@gmail.com

ABSTRACT

Background: Psoriasis is recognized as a multisystemic disease characterized by systemic inflammation. This study explores the association between psoriasis severity and co-morbid conditions, including hypertension, diabetes, psoriatic arthritis, nail psoriasis, and symptoms such as cough and dyspnea, along with psychological factors like social isolation and sleep disturbances. Objectives were to identify co-morbid diseases associated with different severity levels of psoriasis as measured by the psoriasis area and severity index (PASI) scores at Khartoum dermatology and venereology teaching hospital (KDVTH) from August to December 2019.
Methods: This prospective, observational, descriptive, cross-sectional study enrolled 150 psoriasis patients using a quantitative approach. The PASI score was used to assess disease severity.
Results: Among the 150 participants (58.6% male, 41.4% female), the distribution of psoriasis severity was 18.7% severe, 30.6% moderate, and 50.6% mild. Significant co-morbidities were observed in severe cases: hypertension (46.4%), diabetes (28.6%), psoriatic arthritis (39.2%), and nail psoriasis (32.2%). Notably, 25% of patients were on lipid-lowering medications. Social isolation and sleep disturbances were prevalent in 30% of moderate and 57% of severe cases.
Conclusions: Severe psoriasis is significantly associated with multiple co-morbidities, which can adversely affect patients' prognosis and quality of life. Addressing these associations may enhance management strategies for psoriasis patients.

Keywords: Psoriasis, PASI, Co-morbidities, Hypertension, Diabetes, Psoriatic arthritis, Nail psoriasis, Lipid disorders, Social isolation, Sleep disturbances, Pro-inflammatory mediators, Quality of life

INTRODUCTION

Psoriasis is a common chronic inflammatory skin disease that may exhibit a variety of clinical manifestations mediated by type 1 and 17 helper T cells, which affects 2% to 3% of the general population. Although conventionally considered a disease limited to the skin and joints, increasing evidence suggests that psoriasis has far-reaching systemic effects.[1]

Research characterizing the risk of co-morbidity in patients with psoriasis may advance our understanding of the natural history of psoriasis and improve clinical practice. In particular, the presence of co-morbid diseases may affect psoriasis treatment choice and monitoring, as well as inform the provision of comprehensive care with proper health screening, evaluation, and management. Associations with co-morbid diseases, such as metabolic syndrome, chronic obstructive pulmonary disease, asthma, peptic ulcer

disease, liver disease, renal failure, and rheumatoid arthritis, have also emerged.[2]

There is no universally accepted definition for the term co-morbidity. Traditionally, co-morbidity has been defined as a medical condition coexisting with the primary disease either as a current or past condition. Co-morbidities should be distinguished from diseases with a common immunologic pathogenesis (eg, mixed connective tissue diseases and related skin conditions) or dermatoses strongly associated with specific (internal) diseases (e. g., erythema nodosum and sarcoidosis or inflammatory bowel disease.[2,3]

Psoriasis causes great physical, emotional and social burden QoL, in general, is often significantly impaired, Disfiguration, disability and marked loss of productivity are common challenges for people with psoriasis.[3] The presence of co-morbidities in dermatology is of interest for various reasons. From a preventative perspective, a skin disease can be an early marker of systemic disease, and therefore, identify patients who are at risk of having other, more life-threatening diseases.[4] An association between a skin disease and comorbidities may influence clinical management (eg, multidisciplinary approach and treatment options.[4]

Ideally, treatments are selected that improve both conditions simultaneously. However, co-morbidities may also be a contra-indication for therapies indicated for the skin disease or drugs used in the treatment of the co-morbidity may interact with the dermatologic therapy.[4] Co-morbidities impact health-related quality of life in patients with a dermatologic condition, knowledge about the association between a dermatosis and another disease may increase the understanding of the shared pathogenesis of both diseases.[5]

Co-morbidities classically associated with psoriasis are psoriatic arthritis (PsA), Crohn's disease, psychological/psychiatric disorders and uveitis.in recent years, metabolic syndrome as a whole and its individual components have been associated with psoriasis.[2] Recent studies also showed an increased prevalence of celiac disease, non-alcoholic fatty liver disease (NAFLD), and erectile dysfunction in patients suffering from psoriasis.[6] Preliminary epidemiological data suggest that adequate treatment of psoriasis could reduce the incidence of these co morbidities.[7] Social exclusion, discrimination and stigma are psychologically devastating for individuals suffering from psoriasis and their families.

Treatment of psoriasis is still based on controlling the symptoms, topical and systemic therapies as well as phototherapy are available, in practice, a combination of these methods is often used It is also very important to identify and manage common comorbidity that already exists or may develop, including cardiovascular and metabolic diseases as well as psychological conditions.[8]

The objective of this study is to identify associated co morbid diseases in psoriasis patients of mild, moderate, sever PASI score. And to determine which degree of severity has more correlation with co morbid diseases among psoriasis patients.

METHODS

Study design

This was a prospective, observational, descriptive, analytical and cross-sectional hospital-based study.

Study area

Study was conducted at KDVTH in Khartoum State. Hospital has specialized psoriasis clinic that follows appr. 80-120 psoriatic patients each week. This clinic serves patients from different geographical areas in Sudan**.**

Study duration

Study was conducted from August to December 2019**.**

Study populations

The study population consisted of adult psoriasis patients who attended the dermatology and venereal diseases clinic at KDVTH during the study period.

Inclusion and exclusion criteria

The study included Sudanese patients diagnosed with psoriasis aged 18 to 70. It ensured gender equity by selecting male and female participants proportionally based on clinic attendance. Patients provided informed consent before participation, while those who refused, were non-Sudanese, or were over 70 were excluded.

Data collection

The data was collected using a self-administered close-ended questionnaire. It consists of demographic data and medical and drug history.

Data handling and processing

Statistical analysis conducted using the statistical package for social sciences (SPSS version 20), a computer program. Results were presented in tables and figures.

Ethical considerations

The credibility of this research was ensured by obtaining ethical approval from the Sudanese medical specialization board, securing permission from the Psoriasis clinic and the venereal disease head department, obtaining written consent from all patients, and maintaining strict confidentiality throughout the study.

RESULTS

The study was conducted among 150 Sudanese patients diagnosed with psoriasis and have been interviewed at Khartoum dermatology hospital in psoriasis clinic. The socio demographic characteristics in this study found that 88 of patients are male represented (58.6%) and 62 patients are females represented (41.4%) (Figure 1). The age group category of 18-30 years revealed 19 patients represented (12.7%), followed by 44 patients are in the age group of 31-40 years represented (29.3%), 63 patients represented (42%) are in age group 41-50, and 24 of the patients are more than fifty years (16%) (Figure 2). Based on their educational level, 13 patients are non-educated were representing (8.6%), 32 patients are educated until basic schools and were representing (21.3%), for secondary education level there are 79 patients representing (52.6 %), and 26 patients had university degree and those represented (17.3%).

Concerning the clinical types of psoriasis, 80 patients had been diagnosed with plaque psoriasis type and it represented (53.3%), 23 patients had psoriatic arthritis and this represented (15.3%), 15 patients represented (10%) had nail psoriasis, 11 patients had erythrodermic psoriasis represented (7.3%), 9 patients had guttate psoriasis represented (6%) and 7 patients had scalp psoriasis representing (4.6%), 3 patients had inverse psoriasis represented (2%) and 2 patients had pustular psoriasis and this represents (1.3%) (Figure 3).

Regarding duration of psoriasis per years its revealed that 25 patients had a duration of 1-5 years which represented (16.6%) out of the total of 150 Patients, in duration of 6-10 years 45 patients were found and represented (30%), for 11-16 years there are 57 Patients and those represented (38%), and >16 years are 23 patient representing (15.3%) (Figure 4).

Severity of psoriasis according to PASI score, 76 patients are mild equal to (50.3%), moderate are 46 patients represent (30.6%) and sever are 28 patients represent (18.7%).as detailed in (Figure 5).

According to the associated co-morbid diseases with mild form of PASI score, there were76 patients, 6 of them had hypertension represented (7.8 %), 4 patients had psoriatic arthritis represented (5.2%), 3 patients had nail psoriasis represented (3.9%), 2 patients had diabetes represented (2.6 %), 1 patient suffered from dyspnea represented (1.3%), 2 patients had complained of cough represented (3.6%), 1 patient was receiving lipid lowering agent for atherosclerosis representing (1.3%). 17 patients were suffering from social isolation and sleeping disturbances representing (22.3%) (Figure 6).

Psoriasis patients according to moderate PASI score are 46 patients, 9 patients of them had hypertension those represented (19.5%), 5 patients are diabetic represented (10.9%), 8 patients had psoriatic arthritis represent (17.3%), 6 patients had nail psoriasis represent (13%) 1 patient suffered from dyspnea represented (2.2%) and 2 patients from cough represented (4.5%), there were 3 patients receiving lipid lowering agents for atherosclerosis represented (6.5%), 14 patients are suffering from social isolation and sleeping disturbances representing (30%), as shown in (Figure 7).

Psoriasis patient with sever PASI score are 28 patients, 13 of them had hypertension represented (46.4%), 8 patients had diabetes represented (28.6%), 11 had psoriatic arthritis which represented (39.2%) 6 patients are diagnosed with psoriatic nails represented, (21.4%), 5 patients complained of dyspnea represented (17.9%) and 8 patients suffered from cough representing (28.6%). 7 patients are taking took lipid lowering agents 3 of them for fatty liver and 4 patients for atherosclerosis both represented (25%). 16 patients suffered from social isolation and sleeping disturbance representing (57.1%) (Figure 8).

P value for the three categories as per Chi square statistical test revealed the following, hypertension had a ($p>0.0114$) of mild PASI score, ($p<0.0301$), moderate ($p<0.0491$) and for sever form. Diabetes showed a ($p<0.0008$) for mild, ($p<0.0339$) for moderate and a ($p<0.0469$) for sever PASI score, PsA had a ($p<0.0014$) for mild ($p<0.0338$) for moderate and ($p<0.0473$) for sever PASI score, nail psoriasis had a ($p<0.0013$) mild score, a ($p<0.0327$) for moderate and for sever PASI score had a ($p<0.0484$). Regarding cough it showed a ($p<0.0040$) for mild score and for the moderate it showed a ($p<0.0052$) and a ($p<0.0467$) for sever. Dyspnea showed in the mild score a ($p<0.0040$) and ($p<0.0049$) for moderate and ($p<0.0461$) for the sever score. Patients took lipid lowering agents revealed ($p>0.0020$) for mild, ($p<0.0210$) for moderate and in the sever score ($p<0.0476$). Patients suffered from social isolation and sleeping disturbances showed a ($p>0.0401$) for mild score, ($p<0.0484$) for moderate and ($p<0.0502$) for sever PASI score as shown in Table 1.

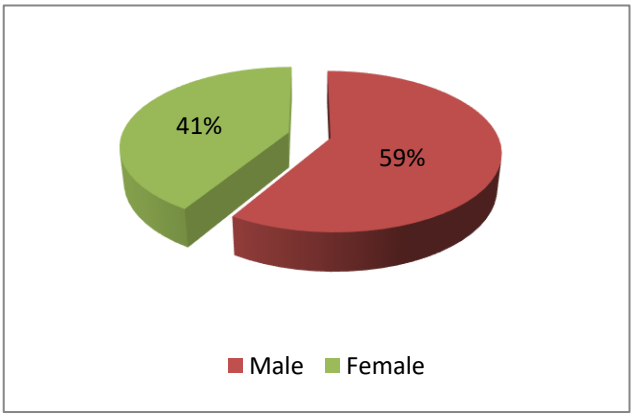

Figure 1: Gender distribution of psoriasis patients in the study of co morbid diseases and severity in psoriasis patients at KDH, August-December 2019, (n=150).

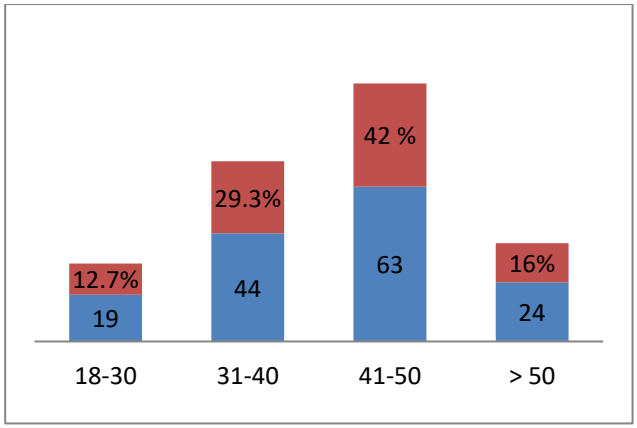

Figure 2: Age of psoriasis patients in the study of co morbid diseases and severity in psoriasis patients at KDH, August-December 2019, (n=150).

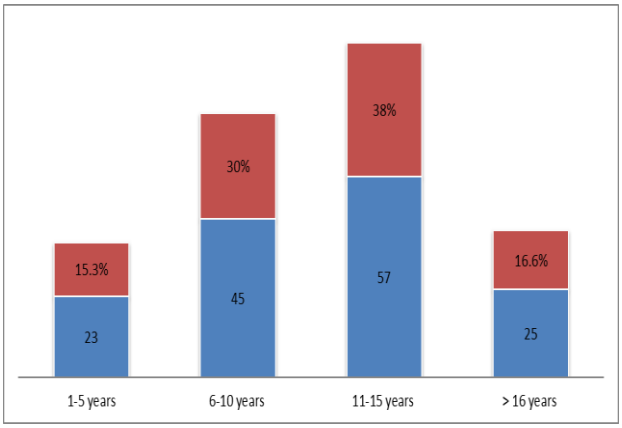

Figure 5: Duration of psoriasis in the study of co-morbid diseases and severity in psoriasis patients per years at KDVTH, August-December 2019, (n=150).

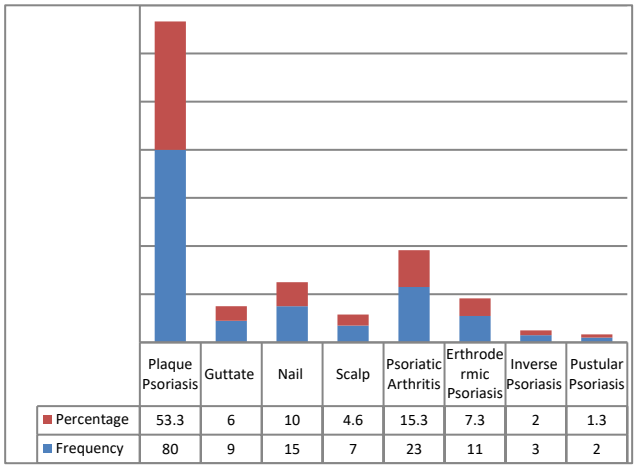

Figure 3: Clinical types of psoriasis in the study of co-morbid diseases and severity in psoriasis patients at KDVTH August-December 2019, (n=150).

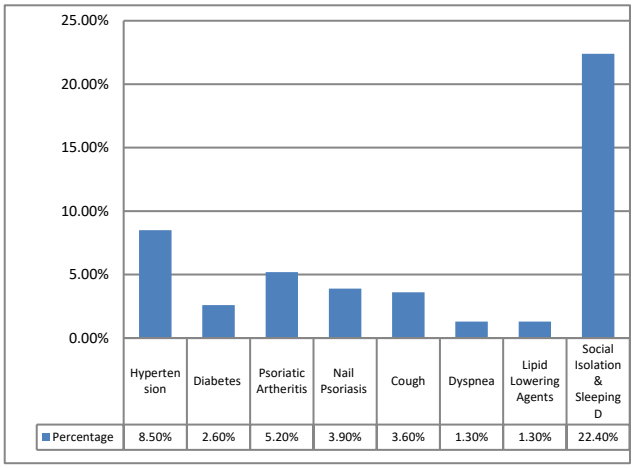

Figure 6: Associated co-morbid diseases in 76 patients of mild PASI score in the study of co-morbid diseases and severity in psoriasis patients at KDVTH, August-December 2019, (n=150).

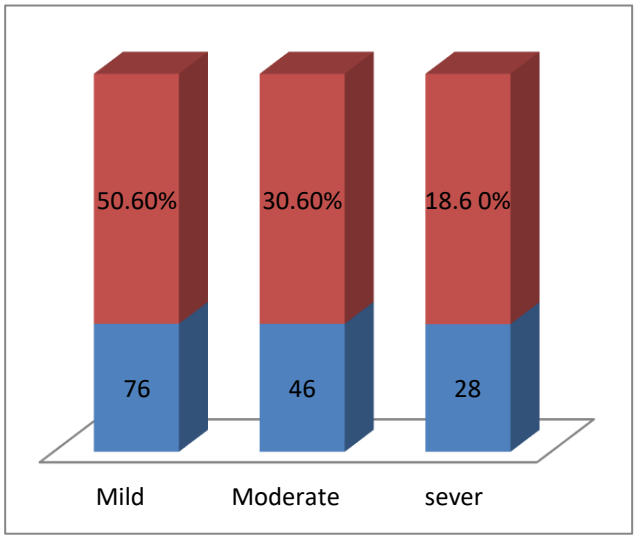

Figure 4: PASI scores in the study of co-morbid diseases and severity in psoriasis patients at KDVTH, August-December 2019, (n=150).

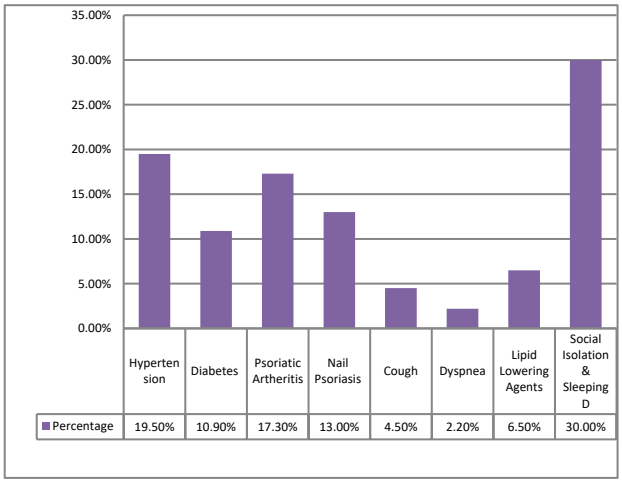

Figure 7: Associated co-morbid diseases in 46 patients of moderate PASI score in the study of co-morbid disease and severity in psoriasis patients at KDVTH, August-December 2019, (n=150).

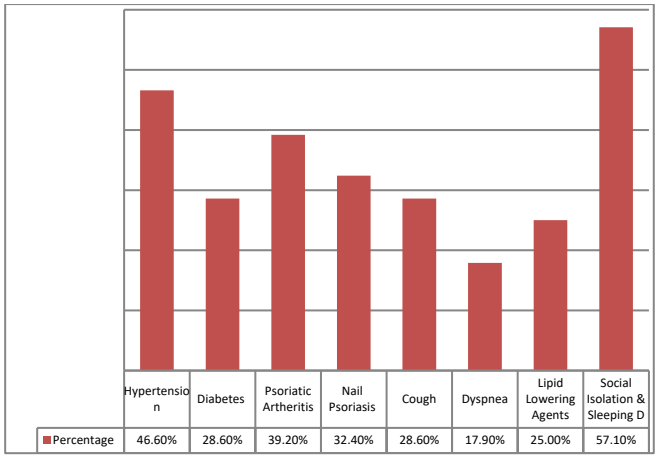

Figure 8: Associated co-morbid diseases in 28 patients of sever PASI score of in the study co-morbid diseases and severity in psoriasis patients at KDVTH, August-December 2019, (n=150).

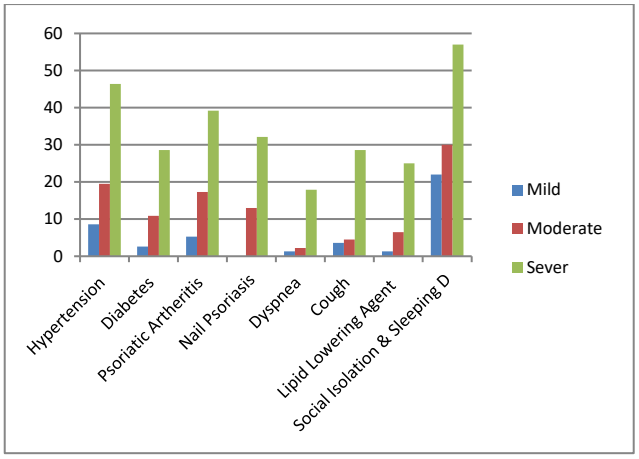

Figure 9: A comparison of associated comorbid diseases in different PASI scores in the study of co morbid diseases and severity in psoriasis patients at KDVTH, August-December 2019, (n=150).

Table 1: P value of different PASI scores and associated co-morbid diseases in the study of co-morbid diseases and severity in psoriasis patients at KDVTH, August-December 2019, (n=150).

Disease severity and number of patients	HTN		Diabetes		PsA		Nail psoriasis		Cough		Dyspnoea		Lipid lowering agents		Social isolation and sleeping disturbances	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Mild (76)	6	7.89	2	2.6	4	5.2	3	3.9	2	3.6	1	1.3	1	1.3	17	22
P value*	0.0114		0.0008		0.0014		0.0013		0.0014		0.0014		0.0020		0.0401	
Moderate (46)	9	19.5	5	10.9	8	17.3	6	14	2	4.5	1	2.2	3	3.6	14	30
P value*	0.0301		0.0339		0.0338		0.0327		0.0052		0.409		0.0210		0.0484	
Severe (28)	13	46.6	8	28.6	11	39.2	6	21.4	8	28.6	5	17.9	7	25	16	57
P value*	0.0491		0.0469		0.0473		0.0484		0.0467		0.0461		0.0476		0.0502	

*****P value in corresponding to chi square statistical test for the association between two variables, p<0.046 is significant.

DISCUSSION

This study covered 150 psoriasis patients at Khartoum dermatology teaching hospital, aimed to identify association between psoriasis severity and certain co morbid diseases or symptoms which may indicate presence of other diseases, and to determine which degree of psoriasis severity (based on PASI score) has more correlation. The co morbidities in this study included hypertension, diabetes, psoriatic arthritis, nail psoriasis although to figure out symptoms like-cough and dyspnea-that may indicate other associated underlying cardiopulmonary diseases, also patients whom diagnosed with fatty liver and atherosclerosis evidenced by taking their lower lipid agents as a marker for dyslipidaemia. This study touched minor psychological aspect in form of figuring social isolation and sleep disturbances which may reflect struggle with the community and self-esteem.

The study revealed that 88 of patients are males represented (58.6%) and 62 are females represented (41.4%). This showing that men are more prone to develops psoriasis slightly higher than women; a Cohort study done in Sweden covered 5438 people by Schemitt-Egenlof from Umea university 2013 discovered that there is a serious gender gap and men are affected more.[9] Another cohort study done by Hagg and Erikson, covered 2294 psoriasis patients and revealed that males affected are (62.1%) and (37.9%) are women.[10] This variation may be due to those men are more exposed to life stressful conditions or may be due to their social habits like smoking.

Luckily 79 of patients are educated till secondary school and 26 had a university degree both represented (69.9%) of the total number of patients thus may enhance understanding the disease and applying treatment properly, although these patients would be more liable to understand associated co morbidities.

Regarding age of the patients the study revealed that 63 patients are of age below forty years which represented (42%) and 87 patients are above forty years equivalent to (58%). This can be explained by that a lot of diseases may appear after 4th decade of life.

Patients had been categorized based on PASI score and associated co morbidity into three groups, mild, moderate and sever, 76 ,46, and 28 patients respectively (Figure 4).

Regrading clinical types according to the result of the study plaque psoriasis was the commonest among the 150 patients, 80 patients of them diagnosed with plaque psoriasis representing a (53.3%) as shown in Figure 3. California dermatology research institute released a study done by Smith in United State revealed that plaque psoriasis is the commonest type.[11]

Hypertension or high blood pressure had been determined by a significant positive association with sever psoriasis as 13 out of 23 patients represented (46.6%) had hypertension with a ($p<0.0491$), Figure 8, Table 1. A study done by Takeshita published a Population-based cross-sectional study drawn from the health improvement network in UK done among 1200 patients with psoriasis determined association of hypertension among those with severe psoriasis.[12] The association between psoriasis and hypertension may also be attributed to the production of endothelin-1, which is produced by keratinocytes as an autocrine growth factor, endothelin-1 is a potent vasoconstrictor.[13]

Diabetes in this study revealed a significant relation with sever PASI score, 8 patients out of 28 patients categorized in sever PASI score which represents (28.5%) had a significant association ($p>0.0462$) as shown in Figure 8 and Table 1. A population-based study, "psoriasis and the risk of diabetes with moderate and sever PASI score" by Brauchli et al first published on 19 November 2018, the results within the study population of 449 patients identified 161 has diabetes in sever Psoriasis more than of mild ones, a ratio of 1.36.[14] The inflammation caused by psoriasis raises the level of an insulin-like growth factor and insulin resistance that's linked to diabetes.[15]

Psoriatic arthritis, is the most well recognized co morbidity of psoriasis and it's a characterized by joint inflammation and extra articular manifestation.[15] This study identified 23 patients of PsA representing (15.3%) of the total number of patients, high association between psoriasis severity and psoriatic arthritis has been confirmed in this study as 11 of them had been categorized in sever PASI score category representing (39.2%) and ($p>0.0473$) as shown in Figure 8 and Table 1. A cross sectional study done by Haroon and Kirby in UK, conclusions 29% of 200 patients with severe Psoriasis PASI was associated with PsA.[16] Explained by, the synovial T-cells in PsA are functionally active, which may migrate also into the psoriatic skin as well as joints, T-cells, cytokines, chemokines, and matrix metalloproteinases (MMPs) are supposed to play important roles in the inflammatory process leading to the destruction of joint tissues T-cell-derived cytokines such as IL-1β, IL-2, IL-10, interferon-γ (IFN-γ), and TNF-α are dominantly detected in the synovium, these are same for skin lesions.[17]

Nail psoriasis causes aesthetic and functional impairment, and is indicative of more severe forms of psoriasis as shown in this study, a ($p<0.0484$) is significant. Regina and Schons had done a cross-sectional based study among 203 patients identified that Nail involvement in psoriasis is a marker for more severe coetaneous manifestations and joint involvement.[18] Saulite et al found an increased expression of IL-10 in the affected nail bed suggesting unique pathways of psoriatic nail disease and the nail as an immune-privileged site.[19]

In this study cough and dyspnea are asked as symptoms might be an indication for cardio-pulmonary disease it had been confirmed that sever psoriasis has more association, 8 patients complained of cough representing (28.6%) and 5 are patients suffered from dyspnea represented (17.9%) in the category of sever PASI score with a ($p>0.0466$) and ($p>0.0461$) respectively as showed in Figure 6 and Table 1. Cardio-pulmonary disease is more prevalent in those with moderato severe psoriasis than mild; a large retrospective cohort study of the UK general practice research database, including more than 130,000 psoriasis patients ages 20 to 90 revealed a greater-than-normal incidence of myocardial infarction in patients with severe psoriasis (12%), reinforcing a connection between psoriasis and heart disease that had also been confirmed.[20] The chronic systemic inflammation, that is part of severe psoriasis, leads to insulin resistance, resulting in endothelial dysfunction and atherosclerosis, cytokines, such as tumor necrosis factor α (TNFa) and IL-1β, foam cells and other antigen-presenting cells can present internalized auto antigens such as oxidized low-density lipoprotein and heat shock proteins, on human leukocyte antigen (HLA) molecules to the innate immune system, resulting in a chronic low-grade inflammatory response which affect small blood vessels in many organs in the body.[21]

Lipid disorders, the study identified 11 patients taking lipid lowering agent for fatty liver and atherosclerosis 7 patients out of them had been categorized with sever PASI score representing (25%), 3 patients took it for fatty liver and 4 patients for Atherosclerosis. A significant association with ($p<0.0476$) as shown in Table 1. A study done by Ma et al reviewing 'the association between psoriasis and dyslipidaemia', on cohort study done among 2662 patients 810 of them had sever psoriasis, showing greater psoriasis severity appeared to be associated with higher prevalence of dyslipidaemia (OR 1.55 and 2.09).[22-24] Another Italian study included 130 psoriatic patients versus matched controls, done by Kouris et al released by Indian journal of dermatology, determined NAFLD was significantly greater in psoriasis (47%) versus controls (28%).[24] In the adipose tissue, insulin allows free fatty esterification and triglyceride fat storage. When insulin resistance develops, free fatty acids are inappropriately shifted to non-adipose tissues, as the

liver. Moreover, the hepatic lipogenesis and the activation of pro-fibrotic cytokines are mediated by hyperinsulinemia, insulin resistance and hyperinsulinemia increase the excretion of triglycerides by the liver, resulting in elevated serum levels of triglyceride, those cytokines are produced by Psoriatic skin lesions mainly TNF-α, IL-6.[24]

Social isolation and sleeping disturbances, in line with hypotheses that cytokines and proinflammatory mediators like TNF alpha which are released in psoriasis changes the levels of chemicals in brain, chemicals like serotonin, melatonin and dopamine can be affected in a way that could lead to anxiety sleeping disturbances and depression, depression and psoriasis are thought to share similar inflammatory cytokines.[24] Psoriasis in itself causes stress, which further aggravates the condition. However, most of the patients who reported exacerbated episodes precipitated by stress described disease-related stress resulting from cosmetic disfigurement and the social stigma of psoriasis.[24] In this study, a significant association had been identified in moderate and sever PASI categories ($p<0.0.0484$), ($p>0.0502$) respectively as shown in Table 1. A 14 patient of moderate psoriasis representing (30%) of moderate category and 17 patients representing (57%) of the sever category. Kouris et al conducted a cross-sectional study quality of life and psychosocial aspects in Greek patients with psoriasis published among 84 patients with severe psoriasis, (61%) of them had showed significant association of anxiety, sleep disruption ($p>0.083$).[24]

Limitations

The hospital-based sample limits generalizability to the broader population, potentially skewing results toward more severe cases. The cross-sectional design prevents establishing causality between psoriasis and comorbidities. Self-reported medical history may introduce recall bias, and lifestyle factors like smoking or diet were not considered, possibly affecting observed associations.

CONCLUSION

This study explored the association between psoriasis severity, as measured by PASI scores, and various comorbidities in patients attending Khartoum dermatology and venereology hospital. It found that patients with severe psoriasis were significantly more likely to experience comorbid conditions such as hypertension, diabetes, psoriatic arthritis, and nail psoriasis. The prevalence of psychosocial impacts, including social isolation and sleep disturbances, was also higher in patients with severe disease. These findings emphasize the importance of managing comorbidities alongside psoriasis to improve patient outcomes and quality of life. Future studies should consider a population-based approach to investigate these associations further longitudinally.

Future studies should use population-based samples, incorporate longitudinal designs by tracking patients over time to assess the development and progression of comorbidities and include objective medical history and lifestyle factors like smoking and diet to improve generalizability, establish causality, and reduce bias.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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