

Occupational associations of lichen planus clinical variants: a cross-sectional study from River Nile state, Sudan

Abstract

Background: Lichen planus is an idiopathic, inflammatory, and immune-mediated disease that affects the skin, nails, hair, and mucous membranes. It predominantly occurs in middle-aged individuals and typically follows a chronic course characterized by relapses and periods of remission.

Objective: To investigate the common clinical variants of lichen planus and their occupational associations in River Nile State, Sudan.

Methods: A descriptive, cross-sectional, retrospective, hospital-based study was conducted in Atbara Hospital, Aldamer Hospital, and Barbar Hospital between December 2021 and May 2022. Data were collected using a structured questionnaire from 65 patients who met the inclusion criteria, after obtaining informed consent. **Results:** Of the 65 patients, 38 (58.5%) were females and 27 (41.5%) were males. Regarding age distribution, 32 (49.2%) patients were between 19 and 40 years, 17 (26.2%) between 40 and 60 years, 14 (21.5%) were below 19 years, and 2 (3.1%) were above 60 years. The clinical variants of lichen planus observed in this study included hypertrophic 10 (15.4%), actinic 9 (13.8%), classical 9 (13.8%), pigmented 8 (12.3%), guttate 7 (10.8%), generalized 5 (7.7%), linear 4 (6.2%), annular 4 (6.2%), ulcerated 3 (4.6%), atrophic 2 (3.1%), twenty-nail dystrophy 2 (3.1%), follicular 1 (1.5%), and erythematous 1 (1.5%). Occupational associations revealed that indoor occupations were represented by housewives 22 (33.8%), students 13 (20%), office workers 6 (9.2%), and laboratory workers 2 (3.1%). Outdoor occupations included farmers 8 (12.3%), gold miners 8 (12.3%), cement workers 4 (6.2%), and freelance workers 2 (3.1%).

Conclusion: Lichen planus was found to be more common among middle-aged females. The most frequent clinical variant was the hypertrophic type. Furthermore, the disease was associated with both indoor occupations—mainly housewives and students—and outdoor occupations such as farming and gold mining.

Keywords: lichen planus, clinical variants, occupational association, River Nile state, Sudan

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Introduction

Lichen planus (LP) is a chronic, idiopathic, mucocutaneous inflammatory disease that commonly presents in dermatological and dental clinics.¹ It was first described by Erasmus Wilson in 1869 and is characterized by the appearance of violaceous, polygonal, pruritic, flat-topped papules and plaques of unknown etiology, affecting the skin, mucous membranes, hair, and nails.² The term *lichen* is derived from the Greek verb “to lick” and the Latin *lichen* (tree moss with a flat surface).³ Although the exact etiology of LP remains unknown, it is widely considered to be an immune-mediated disorder in which cell-mediated immunity plays a central role. Drugs, metals, and infections may act as triggering factors by altering immune responses.⁴ Both genetic predisposition and environmental exposures are believed to interact in disease development.⁵ Epidemiologically, LP affects approximately 1% of the global population, most commonly adults over 40 years of age.⁶ Oral lichen planus (OLP) occurs in about half of affected individuals and is more prevalent in women than men, while nail involvement is observed in around 10% of cases.⁷

The onset of disease is usually insidious. Clinically, cutaneous lesions present as itchy, flat-topped, shiny, violaceous papules with fine whitish streaks known as Wickham’s striae.⁸ LP exhibits several

clinical variants, including hypertrophic, follicular, linear, actinic, annular, pigmented, atrophic, pemphigoid-like, guttate, generalized, mixed forms, and twenty-nail dystrophy.⁹ The diagnosis is primarily clinical, supported by dermoscopic and histopathological findings.¹⁰ LP can affect any part of the body, but it is most frequently observed on the flexor aspects of the wrists, dorsal hands, lumbar region, shins, ankles, scalp, oral mucosa, and genital mucosa.¹¹ The condition is often self-limiting, with cutaneous lesions typically resolving within 6–12 months, although mucosal and nail involvement may persist longer.¹²

The classic clinical description of LP is summarized by the “six Ps”: planar (flat-topped), purple, polygonal, pruritic, papules, and plaques.¹³ Post-inflammatory hyperpigmentation frequently follows regression of lesions.¹⁴ Complications of LP include persistent pruritus, oral ulceration, nail dystrophy, cicatricial alopecia, gingival involvement, genital lesions, and, in rare cases, malignant transformation, particularly in oral lichen planus.¹⁵ Given the variation in clinical presentation and potential association with occupational exposure, this study was conducted to investigate the common clinical variants of lichen planus and their occupational associations among patients in River Nile State, Sudan, between December 2021 and May 2022.

Methodology

Study design

A descriptive, cross-sectional, hospital-based study was conducted.

Study area

The study was conducted in Atbara Hospital, Aldamer Hospital, and Barbar Hospital, which are located in River Nile State in northern Sudan. These hospitals are considered the main referral centers with dermatology and venereology specialists in the state.

Study duration

The study was conducted over six months, from December 2021 to May 2022.

Study population

The study population included all adult patients diagnosed with lichen planus who attended the selected hospitals during the study period and were willing to participate.

Inclusion criteria

All patients diagnosed with lichen planus in the selected hospitals during the study period who agreed to participate in the study.

Exclusion criteria

Patients who refused to participate in the study.

Sample size and sampling technique

A total coverage sampling technique was used, including all patients who fulfilled the inclusion criteria during the six-month data collection period. A total of 65 patients were enrolled in the study.

Data collection tools and techniques

Data were collected through direct interviews with patients by the researcher using a structured questionnaire, following clinical examination and confirmation of diagnosis.

Data management and analysis

The collected data were entered and analyzed using the Statistical Package for Social Sciences (SPSS), with statistical calculations performed by a qualified statistician.

Ethical consideration

Ethical approval was obtained from the Sudan Medical Specialization Board, the Ministry of Health, the Ministry of Interior, and the Ethics and Development Committee (EDC), as well as from the administrations of the participating hospitals. Written informed consent was obtained from all participants after explaining the study's purpose and procedures. Participation was voluntary, and patients were assured of their right to withdraw at any time without any impact on their medical care. Confidentiality was maintained by coding questionnaires and ensuring anonymity.

Results

This study included a total of 65 patients with confirmed lichen planus (LP) who attended the dermatology clinics in the selected hospitals during the study period. The demographic characteristics of the study participants are presented in Table 1. The majority of patients (76.9%, n=50) were from the Northern State, followed by the Western

State (13.8%, n=9), Eastern State (6.2%, n=4), and Central State (3.1%, n=2). Table 2 outlines the occupational distribution of the patients. Indoor occupations were predominant, with housewives constituting the largest group (33.8%, n=22), followed by students (20.0%, n=13). Among outdoor occupations, farmers and gold miners were equally represented (12.3% each, n=8). The educational background of the participants is detailed in Table 3. Most patients had a secondary level of education (41.5%, n=27), followed by primary education (38.5%, n=25). A smaller proportion were illiterate (15.4%, n=10) or had a university education (4.6%, n=3). The potential precipitating factors for LP are summarized in Table 4. The majority of cases (64.6%, n=42) were idiopathic. Sunlight exposure was reported as a factor in 18.5% (n=12) of cases, while infections and mercury exposure each accounted for 13.8% (n=9) of cases. Other factors, including drugs, trauma, and exposure to cement/soil, were less frequently reported (6.2% each, n=4). Table 5 displays the distribution of various risk factors among the patients.

Table 1 Distribution of patients by state of origin

State	No	Percent%
Northern State	50	76.9
Central State	2	3.1
Eastern State	4	6.2
Western State	9	13.8
Total	65	100

Table 2 Distribution of patients by occupation

Occupation	No	Percent%
Housewife	22	33.8
Student	13	20
Farmer	8	12.3
Gold miner	8	12.3
Office worker	6	9.2
Cement worker	4	6.2
Laboratory worker	2	3.1
Outdoor worker	2	3.1
Total	65	100

Table 3 Distribution of patients by educational level

Educational level	No	Percent%
Illiterate	10	15.4
Primary	25	38.5
Secondary	27	41.5
University	3	4.6
Total	65	100

Table 4 Distribution of patients by precipitating factors

Factors	Yes		No		Total	
	N	%	N	%	N	%
Idiopathic	42	64.6	23	35.4	65	100.0
Sunlight	12	18.5	53	81.5	65	100.0
Infection	9	13.8	56	86.2	65	100.0
Mercury	9	13.8	56	86.2	65	100.0
Drugs	4	6.2	61	93.8	65	100.0
Trauma	4	6.2	61	93.8	65	100.0
Cement products and soil	4	6.2	61	93.8	65	100.0

Table 5 Distribution of patients by risk factors

Risk factors	Yes		No		Total	
	N	%	N	%	N	%
Smoking	12	18.5	53	81.5	65	100
DM	7	10.8	58	89.2	65	100
HTN	7	10.8	58	89.2	65	100
Snuffer	4	6.2	61	93.8	65	100
Dokhan	3	4.6	62	95.4	65	100
Henna dye	1	1.5	64	98.5	65	100
Alcoholic	0	0	65	100	65	100

Smoking was the most common risk factor (18.5%, n=12), followed by Diabetes Mellitus (DM) and Hypertension (HTN), each present in 10.8% (n=7) of the patients. Other factors like snuff use (6.2%, n=4), 'Dokhan' use (4.6%, n=3), and henna dye application (1.5%, n=1) were less common. No patients reported alcohol consumption. The severity of pruritus (itching) among patients is shown in Table 6. Moderate itching was the most frequently reported symptom (47.7%, n=31), followed by mild and severe itching (21.5% each, n=14). A small number of patients reported no itching (9.2%, n=6). The anatomical distribution of LP lesions is detailed in Table 7. Sun-exposed areas and the lower limbs were the most commonly affected sites (33.8% each, n=22), followed by the upper limbs (32.3%, n=21) and generalized distribution (27.7%, n=18). Nail involvement was observed in 18.5% (n=12) of patients, while mucous membrane involvement was less common (7.7%, n=5). Finally, Table 8 presents the frequency of different clinical variants of LP. The hypertrophic variant was the most common (15.4%, n=10), closely followed by the actinic and classical variants (13.8% each, n=9). The pigmented (12.3%, n=8) and guttate (10.8%, n=7) variants were also frequently observed. Other variants such as linear, annular, ulcerated, atrophic, twenty-nail dystrophy, follicular, and erythematous were less common.

Table 6 Distribution of patients by severity of itching

Itching	No	Percent%
No	6	9.2
Mild	14	21.5
Moderate	31	47.7
Severe	14	21.5
Total	65	100

Table 7 Distribution of patients by affected site

Site	Yes		No		Total	
	N	%	N	%	N	%
Sun-exposed areas	22	33.8	43	66.2	65	100
Lower limb	22	33.8	43	66.2	65	100
Upper limb	21	32.3	44	67.7	65	100
Generalized	18	27.7	47	72.3	65	100
Nails	12	18.5	53	81.5	65	100
Wrist	10	15.4	55	84.6	65	100
Back	9	13.8	56	86.2	65	100
Abdomen	6	9.2	59	90.8	65	100
Scalp	6	9.2	59	90.8	65	100
Mucous membrane involvement	5	7.7	60	92.3	65	100
Palms and soles	4	6.2	61	93.8	65	100

Table 8 Distribution of patients by clinical variant of LP

Clinical type of lichen planus	No	Percent%
Hypertrophic	10	15.4
Actinic	9	13.8
Classical	9	13.8
Pigmented	8	12.3
Guttate	7	10.8
Generalized	5	7.7
Linear	4	6.2
Annular	4	6.2
Ulcerated	3	4.6
Atrophic	2	3.1
Twenty nail dystrophy	2	3.1
Follicular	1	1.5
Erythematous	1	1.5
Total	65	100

Discussion

Several studies have investigated the epidemiology and clinical characteristics of lichen planus (LP) in different populations. A retrospective analysis conducted in Mexico evaluated the clinical features of LP in children seen in the dermatology department. Over a period of 22 years and 7 months, 235 patients with clinically and histologically confirmed LP were identified. Of these, 24 patients (10.2%) were children aged 15 years or younger. The male-to-female ratio was 1:1.2. Classic lichen planus was the most frequent clinical pattern (43.5%), while mucous membrane and nail involvement were uncommon. No family history of LP or systemic disease was reported. According to international literature, the prevalence of LP in the pediatric population ranges from 2.1% to 11.2%. Most studies found no significant gender predominance, and the classic form of LP was the most commonly observed variant. Mucosal involvement was generally rare, except in reports from India and Kuwait, while nail involvement ranged from 0% to 16.6%. Evidence of systemic disease or familial clustering was limited.¹⁶ In a study of 65 patients with LP, females were more affected than males, with 38 (58.5%) females and 27 (41.5%) males. The most affected age groups were 19–40 years (32 patients, 29.2%) and 41–60 years (17 patients, 26.2%). This finding is consistent with the study by Parihar et al.,¹⁶ which described the clinicopathological profile of LP in an Indian population. Out of 145 cases, the majority (61%) presented with classical LP, predominantly affecting females in the 20–40 years age group.¹⁶ Basman et al.,¹⁷ assessed LP in 158 Iraqi patients, analyzing clinical subtypes and correlations with mucosal, nail, and scalp involvement, as well as age and gender distribution. Among the patients, 76 were males and 82 were females. The age range for males was 7–70 years (mean ± SD: 38.14 ± 16.96), while for females it was 17–65 years (mean ± SD: 45.06 ± 12.65).

Disease duration ranged from two weeks to five years. The classical type was the most common (74%), followed by the actinic type (10%), and the most frequently affected sites were the lower limbs, upper limbs, and face.¹⁷ Occupational associations with LP were also examined. Both indoor occupations (housewives 22, 33.8%; students 13, 20%; office workers 6, 9.2%; laboratory workers 2, 3.1%) and outdoor occupations (farmers 8, 12.3%; gold miners 8, 12.3%; cement workers 4, 6.2%; and free workers 2, 3.1%) were reported among patients. Lidén et al.,¹⁸ noted that LP-like eruptions can be induced by occupational exposure to color film developing agents containing p-phenylenediamine (PPDA) derivatives such as CD-2 and CD-3. In

a study of 119 LP patients, patch testing for CD-2, CD-3, PPDA, and IPPD was conducted in 49 patients. No occupational risk group or contact allergy was identified, and patch testing was recommended only if a history of chemical exposure existed.¹⁸

In the United States, Rasul TF, et al.,¹⁹ described LP as a chronic inflammatory disease affecting the skin and mucous membranes, predominantly in middle-aged individuals. The etiology remains unclear but is thought to involve dysregulated T-cell activation and altered immune responses, potentially associated with allergic contact dermatitis and hepatitis C. Exposure to heavy metals such as lead, tin, arsenic, and bismuth may trigger inflammatory and allergic reactions predisposing to LP development.¹⁹ A case of a 64-year-old female with longstanding oral lichenoid lesions and superimposed Wickham's striae was reported. She had allergic reactions to several medications and a history of gold-containing dental implants. Allergy testing confirmed a gold allergy, and the persistent mucosal irritation from her dental implants was linked to the development of oral LP. Management included topical triamcinolone 0.1% ointment and dental evaluation, with recommendations to replace gold-containing crowns to reduce ongoing irritation. This case represents the first documented instance of gold dental fillings contributing directly to the development of oral LP.¹⁷

Conclusion

This study concludes that the most common clinical variant of lichen planus in River Nile State was the hypertrophic type. Both indoor occupations (particularly housewives and students) and outdoor occupations (especially farmers and gold miners) were associated with LP. The condition was more prevalent among females and middle-aged patients, with rare occurrences of a family history or involvement of the mucous membranes. Sunlight was identified as the main precipitating factor, while smoking, diabetes mellitus, and hypertension were the most common risk factors. The lower limbs and other sun-exposed areas were the most frequently affected sites. Most patients exhibited a chronic disease course, moderate pruritus, and the Koebner phenomenon.

Recommendations

- I. While clinical examination may be sufficient for diagnosis in some cases, histopathological evaluation is often valuable for confirming the diagnosis of LP variants and is therefore recommended.
- II. Familiarity with the clinical characteristics of lichen planus and its variants is essential for timely recognition and effective management.
- III. Large-scale studies with long-term follow-up are necessary to assess the risk of malignant transformation, particularly in the ulcerative variant.
- IV. Further research with larger sample sizes is recommended in other regions of Sudan to better understand the epidemiology and clinical patterns of lichen planus.

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Conflict of interest

The authors declare there is no conflict of interest.

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