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Original Research Article

Clinico-epidemiological profile of pityriasis versicolor among Sudanese patients attending Khartoum dermatology and STI teaching hospital

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ABSTRACT

Background: Pityriasis versicolor (PV) is a mild, chronic, superficial fungal infection of the stratum corneum caused by *Malassezia* species. The condition is common in tropical climates and frequently affects adolescents and young adults. This study aimed to assess the clinical and epidemiological characteristics of PV among Sudanese patients attending a tertiary dermatology hospital.
Methods: A descriptive cross-sectional hospital-based study was conducted at Khartoum Dermatology and STI Teaching Hospital over three months (May to July 2020), including 179 Sudanese patients clinically diagnosed with PV and confirmed by potassium hydroxide (KOH) microscopy. Data on demographics, disease characteristics, clinical features, and associated conditions were collected using a structured questionnaire and analyzed using SPSS version 11.5, with chi-square test for statistical significance at $p<0.05$.
Results: Young adults aged 20-24 years constituted the largest affected group (32%), with a marked male predominance (73.1%; male-to-female ratio 3:1). Hypopigmented lesions (50%) and patches (68.7%) were the most common clinical patterns, and the back (67.6%), neck (52%), and upper limbs (42%) were the most frequently involved sites. Acne vulgaris (13.5%) and scalp dandruff (3.4%) were the most common dermatological comorbidities. KOH positivity was 86%.
Conclusions: The clinico-epidemiological pattern of PV in Sudan aligns with global findings, with notable variations in age distribution and ethnic prevalence. This study provides updated epidemiological data on PV in the Sudanese population after several decades, contributing to a better understanding of the disease profile in this region.

Keywords: Pityriasis versicolor, *Malassezia* species, Epidemiology, Hypopigmented lesions, Sudanese patients, KOH microscopy

INTRODUCTION

Pityriasis versicolor (PV) is a mild, chronic, usually asymptomatic superficial fungal infection of the stratum corneum caused by lipophilic yeasts of the genus *Malassezia*, which are part of the normal human skin flora.[1,2] The condition is characterized by hypo- or hyperpigmented macules with fine scaling, commonly affecting seborrheic areas such as the trunk, neck, and upper arms.[1,2] PV is more prevalent in tropical and subtropical climates, with prevalence reaching up to 40-50% of individuals in tropical regions.[1,3] Sudan's hot and humid environment provides favorable conditions for the proliferation of *Malassezia* species. Several studies have clinically reported PV in Sudan decades ago, highlighting its longstanding presence in the region.[4] Few studies have characterized the clinical and epidemiological patterns of PV in different populations worldwide, demonstrating

variations in age distribution, sex predominance, and lesion morphology.[5-7] This study aims to update the clinico-epidemiological profile of PV in Sudanese patients after several decades without similar research, providing contemporary data on disease characteristics and associated factors.

Objectives

The study aimed to determine the clinical and epidemiological characteristics of PV among Sudanese patients, identify common age groups, sex distribution, and associated factors, describe clinical patterns of PV lesions, and determine systemic and dermatological comorbidities associated with the condition.

METHODS

A descriptive cross-sectional hospital-based study was conducted at Khartoum Dermatology and STI Teaching Hospital from May to July 2020. All consecutive Sudanese patients presenting with clinically diagnosed PV during the study period were included, totaling 179 participants. Patients with lesions not fitting PV diagnosis were excluded. Data were collected using a structured questionnaire that captured demographic information, disease duration, recurrence, seasonal variation, family history, comorbidities, and treatment history. Clinical examination assessed lesion type, color, distribution, and associated dermatological conditions. Laboratory confirmation was performed using KOH examination of skin scrapings, demonstrating the classic "spaghetti and meatballs" appearance.

Ethical approval for this study was obtained from the Khartoum Dermatology and STI Teaching Hospital Ethical Committee. Written informed consent was obtained from all participants or their guardians when applicable.

Data were analyzed using SPSS version 11.5, and chi-square test was used to determine statistical significance at $p<0.05$.

RESULTS

The study included 179 Sudanese patients. Males constituted 73.1% of the sample, with a sex ratio of 3:1. The most affected age group was 20-24 years, representing 32% of cases. Students formed the largest occupational group, and most participants were single. More than half of the patients were from northern Sudan, and ethnic variation was statistically significant. Disease duration ranged from one month to three years, with 48.6% reporting previous episodes and 26.7% experiencing one to three recurrences annually. Seasonal variation showed a summer peak. More than half of the patients had not received prior treatment, and among those treated, topical antifungals were most commonly used.

Hypopigmented lesions were the most common presentation, followed by mixed and hyperpigmented lesions. Patches were the predominant morphology, and the back, neck, and upper limbs were the most frequently involved sites. Dermatological comorbidities included acne vulgaris and scalp dandruff, while systemic associations included renal disease and diabetes mellitus. KOH positivity was 86%.

Table 1: Demographic characteristics of patients (n=179).

Variables	N	Percentage (%)
Gender		
Male	131	73.1
Female	48	26.9
Age 20-24 years	57	32.0
Students	106	59.2
Single	136	75.8
Northern Sudan	96	53.7
Western Sudan	66	36.7

Table 2: Disease characteristics.

Variables	N	Percentage (%)
Duration 1-3 months	68	38.2
Duration 1-3 years	43	24.2
Previous episodes	87	48.6
Recurrence 1-3/year	48	26.7
Summer peak	68	38.2
No prior treatment	97	54.2
Topical antifungals	69	84.1
Systemic therapy	6	7.3
Combined therapy	8	9.7

Table 3: Clinical features.

Variables	N	Percentage (%)
Patch lesions	123	68.7
Scaly lesions	120	67.0
Macular lesions	116	64.8
Papular lesions	8	4.5
Hypopigmented	90	50.0
Mixed	62	34.5
Hyperpigmented	27	15.5
Back	121	67.6
Neck	93	52.0
Upper limbs	75	42.0
Face	72	40.0

Table 4: Associated conditions.

Variables	N	Percentage (%)
Systemic diseases	21	11.8
Renal disease	5	2.9
Diabetes mellitus	4	2.3
Acne vulgaris	24	13.5
Scalp dandruff	6	3.4

DISCUSSION

The present study provides a comprehensive clinico-epidemiological profile of PV among 179 Sudanese patients, representing one of the few contemporary studies on PV in Sudan. The findings are interpreted and compared with previous studies below, parameter by parameter.

Age distribution

The predominant age group affected in the present study was 20-24 years (32%), consistent with the well-established peak incidence of PV in adolescents and young adults due to increased sebaceous gland activity during this period.[1,2] This finding is comparable to the study by Ghosh et al who reported that the majority of cases (37.27%) were in the 11-20-year age group.[3] Similarly, Santana et al found the most affected age group was 10-19 years, and Morais et al observed the highest prevalence in the 10-20-year age group (33.6%).[5,7] Nguyen et al also reported a high prevalence of PV among students in Vietnam, supporting the global pattern of PV predominantly affecting young individuals.[8] The slightly older age distribution in the present study may reflect differences in the study population, healthcare-seeking behavior, or environmental factors specific to Sudan.

Sex distribution

Males constituted 73.1% of the sample, with a male-to-female ratio of 3:1. This male predominance aligns with several previous studies. Singla et al reported a 69% male predominance in their study.[6] Archana et al found 73% male predominance, which closely matches the present study.[9] Ghosh et al reported a male-to-female ratio of 1.44:1, which is lower than the present study but still demonstrates a male preponderance. However, Morais et al reported a female predominance (68.6%), suggesting that sex distribution may vary by region and population studied.[3,7] The male predominance in the present study may be attributed to greater outdoor exposure and sweating among males in Sudan's hot climate, as *Malassezia* proliferation is favored by heat and humidity.[1,2]

Lesion type and morphology

Hypopigmented lesions were the most common presentation (50%), followed by mixed (34.5%) and hyperpigmented (15.5%) lesions. This is consistent with Singla et al who reported hypopigmented lesions in 85.8% of patients.[6] Vishwanath et al also found hypopigmented PV to be the most common variant (69.96%), followed by hyperpigmented (28.76%).[10] The predominance of patches (68.7%) as the predominant lesion morphology corresponds with classical descriptions of PV morphology.[1,2] The high proportion of hypopigmented lesions in the present study contrasts with older Sudanese reports that described more hyperpigmented lesions.[4] This shift may be attributed to increased sun exposure patterns, changes in skin-care product use, or earlier presentation to healthcare facilities. The predominance of scaly lesions (67%) further supports the classical clinical description of PV as a superficial scaling dermatosis.[1,2]

Site of involvement

The back (67.6%) was the most commonly involved site, followed by the neck (52%) and upper limbs (42%). This distribution is consistent with the classical predilection of PV for seborrheic areas, particularly the upper trunk, neck, and shoulders.[1,2] Singla et al similarly reported the chest (31.8%) and back (19.4%) as the most commonly affected sites.[6] The face was involved in 40% of cases in the present study, which is relatively high compared with typical adult presentations where facial involvement is less common.[2] This higher rate of facial involvement may be attributed to the tropical climate and increased sun exposure in Sudan, or to the ethnic skin characteristics of the study population.

Dermatological comorbidities

Acne vulgaris (13.5%) was the most common dermatological comorbidity, followed by scalp dandruff (3.4%). These findings support the recognized role of *Malassezia* in multiple seborrheic conditions.[11,12] Kim highlighted the close relationship between *Malassezia* species and seborrheic dermatitis, noting that these yeasts are found in seborrheic areas rich in sebaceous lipids.[11] Borda and Wikramanayake emphasized that *Malassezia*, particularly *M. globosa* and *M. restricta*, are implicated in dandruff and seborrheic dermatitis, with higher numbers of these organisms correlating with disease severity.[12] Rubenstein and Malerich noted the association between *Malassezia* (Pityrosporum) folliculitis and acne vulgaris, with reported incidence ranging from 12.2% to 27%.[13] The co-occurrence of acne vulgaris and PV in the present study underscores the shared pathogenic role of *Malassezia* in seborrheic skin conditions and suggests that patients with PV should be evaluated for associated seborrheic disorders.

Systemic associations

Systemic diseases were present in 11.8% of patients, with renal disease (2.9%) and diabetes mellitus (2.3%) being the most common. Ghosh et al reported that PV may be variably associated with systemic diseases such as diabetes mellitus, Cushing's disease, immunosuppressive conditions, and corticosteroid intake.[3] The association with diabetes mellitus highlights the influence of immune status on susceptibility to PV, as immunocompromised individuals are at increased risk of developing the condition.[2] Ashbee and Evans noted that the immune response to *Malassezia* species plays a role in disease susceptibility, and that altered host immunity may

contribute to the development of PV and other *Malassezia*-associated diseases.[14] However, the exact nature of these systemic associations requires further investigation, as the cross-sectional design of the present study limits causal inference.

KOH microscopy

The KOH positivity rate of 86% confirms the reliability of clinical diagnosis combined with direct microscopy. This finding is consistent with previous reports. Singla et al reported 92.9% KOH positivity among clinically suspected cases, while Vishwanath et al also demonstrated high KOH sensitivity in their cross-sectional study.[6,10] The characteristic "spaghetti and meatballs" appearance under KOH microscopy remains a cornerstone of PV diagnosis, although it should be noted that KOH examination does not provide 100% sensitivity.[1,2] The 86% positivity rate in the present study falls within the expected range and reinforces the value of KOH microscopy as a simple, rapid, and cost-effective diagnostic tool in resource-limited settings.

Seasonal variation

Seasonal variation with summer predominance (38.2%) was observed in the present study, reflecting the role of humidity and sweating in *Malassezia* proliferation. This finding aligns with global reports of higher PV incidence during summer months and in hot, humid climates.[1,2] Łabędź et al noted that PV shows a higher incidence during the summer seasons in temperate climates and year-round prevalence in tropical regions.[1] Leung et al similarly emphasized that PV is more common in hot, humid climates and tends to recur each summer.[2] The tropical climate of Sudan, characterized by high temperatures and humidity, likely contributes to the year-round prevalence of PV with summer exacerbation, as environmental factors directly influence the transformation of *Malassezia* from commensal yeast to pathogenic mycelial form.

Treatment patterns

More than half of the patients (54.2%) had not received prior treatment, and among those treated, topical antifungals were most commonly used (84.1%). This is consistent with current treatment guidelines recommending topical azole antifungals as first-line therapy for PV.[15] Gupta and Foley highlighted that topical ketoconazole, applied once or twice daily for 14 days, and once-weekly use of ketoconazole shampoo are effective treatments for PV.[15] The low rate of systemic therapy (7.3%) in the present study reflects the typically mild nature of PV and the effectiveness of topical agents. However, the high proportion of untreated patients (54.2%) suggests a need for improved patient education and access to dermatological care. The recurrence rate of 26.7% in the present study is consistent with the known tendency of PV to recur, particularly in tropical climates, underscoring the importance of maintenance therapy and preventive measures.[1,15]

Limitations

This study is limited by its single-center design, which may not fully represent the broader Sudanese population. The cross-sectional nature restricts assessment of long-term recurrence patterns. Molecular identification of *Malassezia* species was not performed, limiting deeper understanding of species-specific epidemiology. Future multicenter studies incorporating molecular techniques are recommended.

CONCLUSION

The present study demonstrates that pityriasis versicolor in Sudan predominantly affects young male adults aged 20-24 years, with hypopigmented patches on the back and neck being the most common clinical presentation. The clinico-epidemiological profile aligns with global patterns while revealing regional variations in age distribution, ethnic prevalence, and lesion morphology. The high prevalence of acne vulgaris and scalp dandruff as comorbidities underscores the role of *Malassezia* in multiple seborrheic conditions. The summer predominance and high KOH positivity rate further support the influence of environmental factors and the reliability of direct microscopy in diagnosis. This study advances the understanding of PV epidemiology in Sudan by providing updated, comprehensive data after several decades without similar research. These findings highlight the need for future multicenter studies incorporating molecular identification of *Malassezia* species to further elucidate species-specific epidemiological patterns and guide targeted prevention and treatment strategies in tropical regions.

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