AJMAS
https://alqalam.utripoli.edu.ly/science/ eISSN 2707-7179

*Original article*

# Epidemiological and Clinico-Mycological Aspects of Pityriasis Versicolor in Tripoli-Central Hospital

**Talal Douzan[1], Hamida Al-Dwibe[2]*, Safa Sharfuldeen[3], Altaahir Almihabas[4]**

[1]*Tariq El-Matar Polyclinic, Ministry of Health, Tripoli, Libya*
[2]*Department of Dermatology, Faculty of Medicine, University of Tripoli, Tripoli, Libya*
[3]*Department of Histology and Genetic Science, Faculty of Medicine, University of Tripoli, Tripoli, Libya*
[4]*Department of Community Medicine, Faculty of Medicine, University of Tripoli, Libya, Libya*

**ARTICLE INFO**

***Corresponding Email:*** *aldwibeh@yahoo.co.uk*
***Received:*** *09-05-2022* ***Accepted:*** *23-05-2022* ***Published:*** *28-05-2022*
***Keywords:*** *Epidemiology, Superficial Mycosis, Pityriasis Versicolor, KOH, Cello-Tape, Libya.*


## ABSTRACT

***Background and aims****. Pityriasis versicolor (PV) is a common worldwide superficial fungal infection of the skin, caused by several species of a lipophilic dimorphic fungus, Malassezia. Usually presents with well-defined scaly hypopigmented or hyperpigmented macules and patches on seborrheic sites of body. The study was aimed to determine epidemiological, clinical and mycological profile of PV among patients attending out-patient dermatology clinic in Tripoli Central Hospital (TCH).* ***Methods****. A descriptive cross-sectional study was carried in a TCH for one year period in which 110 patients with skin lesions suspected to be PV were studied. Diagnosis of cases was done by using woods lamp and by direct microscopy using 10% KOH and cello-tape method.* ***Result****. Of 110 suspected cases of PV, 51.82% were females and 48.18% were males, with slight female preponderance (F:M = 1.08:1). The age of patients was ranged from 8 to 70 years, with a mean age 26.2 years. High frequency of infection (54.55%) was reported among age group 16–25 years and frequency of disease was inversely associated with older age (2.7%). The disease mostly reported among Libyans (95.6%), outdoor workers (54%), students (48.2%), 31.8% had positive family history of disease, 81.8% had negative past medical history, 80% hadn't associated skin disease, 80.9% hadn't drug history, and 52.7% had used treatment previously. Majority of cases (87%) were complained from cosmetic effect and 57.3% from itching. Most (54.6%) of them were presented with hyperpigmented lesions, that different in size and shape. The back, chest, back of the neck and arms were most common affected sites with a frequency of (60%, 50.9%, 51.8% & 42.7%, respectively), and symptoms were aggravated in summer time. KOH mount test has the higher diagnostic value (80%) followed by wood's lamp (77%), and cello-tap (71%).* ***Conclusion****. Study concluded that the clinic-mycological and epidemiological parameters on PV does not differ significantly from those observed by other studies. The KOH test was positive in most of the cases, which makes it suitable to be used than Cello-tape in diagnosis and confirmation of PV.*

***Cite this article:*** *Douzan T, Al-Dwibe H, Sharfuldeen S, Almihabas A. Epidemiological and Clinico-Mycological Aspects of Pityriasis Versicolor in Tripoli-Central Hospital. Alq J Med App Sci. 2022;5(1):282-288.*
*https://doi.org/10.5281/zenodo.6590129*

## INTRODUCTION

Pityriasis versicolor (PV) is a common, non-contagious superficial fungal infection of skin caused by a saprophytic, dimorphic and lipid-dependent yeasts belong to the genus Malassezia (formerly known as Pityrosporum). Malassezia (M) occurs as mycelia forms in the skin lesions and yeast form in culture media [1]. Malassezia is a member of normal flora of skin that transformed from nonpathogenic yeast cells to a pathogenic filamentous form under certain conditions such as exposure to hot, humid weather, sweating, impaired immune status, and genetic predisposition [2,3].

Pityriasis V was first clinically observed by Willan in 1801, the genus Malassezia was first described by Eichstedt and Baillon created the genus Malassezia 1889. In 1996, a new taxonomic classification based on the morphology, ultrastructure, and molecular biology was proposed and the new molecular techniques allowed investigators to identify genetic species of Malassezia [4-6]. Malassezia furfur was considered the main etiologic agent of PV, but the new researches revealed a predominance of M. globosa and M. sympodial is species [4]. Clinically PV manifested as well-defined scaly round or oval hypo or hyperpigmented irregular macules and patches on the upper trunk, neck, upper aspect of arms and face. Most often seen on lipid-rich areas of the body where the density and activity of sebaceous glands is high. Less common body areas

involved scalp, flexural areas and genitalia [1,4]. Often lesions appear hyperpigmented on lighter skin types and hypopigmented in darker or tanned skin [7]. Sometimes lesions slightly erythematous, but characterized essentially by fine branny scales [8]. Usually the disease is asymptomatic, but some patients occasionally report itching [5,6,8]. Often patient seeks medical advice for cosmetic purposes [1,9,10]. Disease has a worldwide distribution and more common in tropical region with incidence as high as 30–40% due to high temperature and humidity. It is also a common disorder in temperate climate [11-13]. The disease occurs at any age, usually not common in childhood but becomes more frequent in the age group between adolescence and middle age when the sebaceous glands are abundant and more active [4,8]. Seasonal variations of the disease were observed, with the highest incidence rates in summer months [14]. The diagnose of PV is confirmed by direct microscopy using KOH wet mount or transparent cello-tape method through detecting hyphae with clusters of spherical yeasts described as "spaghetti and meat ball" appearance in scaly skin scrapings [15,16]. Wood's lamp may also help in diagnosis, with lesions appearing pale yellow or golden fluorescence [8,15,16]. Topical antifungals are the first line in treating PV and are effective, however; systemic antifungals are recommended only for severe widespread disease or frequent recurrences or for recalcitrant cases in whom topical agents failed [4,9,17].
In Libya the PV is a common superficial fungal infection and because of lacking of any scientific study on this aspect. Thus, this study was carried out to establish the local epidemiological, clinical and mycological profile of PV among the patients attending out-patient dermatological clinic in Tripoli Central Hospital (TCH) in Libya.

## METHODS

### *Study design and setting*

This descriptive cross-sectional study carried out in out-patient dermatological clinic at the TCH over one year duration on patients suspected to have PV.

### *Data collection procedure*

A total of 110 patients were examined clinically for any evidence of PV. A data collection form was completed for each patient that included; age of patient, sex, occupation, history of recurrence, seasonal variations, family history, use of cosmetics, oils, shampoos, type of clothing, state of personal hygiene, history of an associated skin or systemic disease and drug intake. Then thorough clinical examination was done to evaluate the clinical feature, distribution, color, shape, size of the lesion, and presence of scales. The severity of disease was determined by using base line severity score. The lesions of patients clinically suspected of having PV were examined under wood's lamp for the presence of golden yellow fluorescence. Mycological confirmation was done by detecting the yeasts and hyphae as spaghetti and meatballs'' in scraped skin material under direct light microscopic using 10% KOH solution and cello-tape which used to pick up scales from the lesion, then the tape is mounted on a glass slide with methylene blue or Giemsa stain.

### *Statistical analysis*

The data was computerized using the Statistical Program for Social Sciences (SPSS version 21) that used for data entry and analysis. Descriptive statistics were used and all results are presented as frequencies, means ± standard deviation and percentages. Categorical data were compared using the Chi- square test and Fisher's exact test if appropriate. A P value of less than or equal to 0.05 was considered statistically significant.

## RESULTS

Of 110 suspected cases of PV patients, (51.82%) were females and (48.18) were males, with slight female preponderance (F:M = 1.08:1). The age of patients was ranged from 8 to 70 years, with a mean age 26.2 years. More than the half of the patients (54.5%) were aged between 16 – 25 years, followed by 26-35 years (19.09%), however; patients below 15 years were less frequently affected (9.09%). The disease frequency was inversely associated with older ages and the results wasn't statistically significant with p value 0.561 (Table 1).

***Table 1. Distribution of PV patients according to age group & sex***

| Age group / years | Male No. (%) | Female No. (%) |
|---|---|---|
| **(0-15)** | 3 (5.7%) | 7 (12.3%) |
| **(16-25)** | 29 (54.7%) | 31 (54.4%) |
| **(26-35)** | 10 (18.9%) | 11 (19.3%) |
| **(36-45)** | 6 (11.3%) | 5 (8.8%) |
| **(46-55)** | 2 (3.8%) | 3 (5.3%) |
| **(56-65)** | 2 (3.8%) | 0 (0%) |
| **(66-75)** | 1 (1.9%) | 0 (0%) |
| **Total** | 53 (100%) | 57 (100%) |

Most patients were Libyan with 95.60% and 80.37% were single. Majority of them were outdoors workers and students with frequencies of (54%) and (48.20%) respectively, followed by employees (14.5%), housewives (11%), patients with a privet business (6.3%), medical staff and teachers showed same frequencies (3.6%), and the lower frequency of disease was among police officers (1.8%). Only 31.8% of patients had positive family history of disease. About 80% of cases with PV have no history of any other skin lesions, and the highest frequency of associated skin disease was acne vulgaris (6%), followed by atopic eczema and tinea pedis in (3.6%, 2.7%, respectively). However, the other associated skin diseases (onychophagia, planter wart, psoriasis vulgaris, scabies and vitiligo vulgaris) had been reported less frequently with same percentage (0.9%) for each one.

The study showed that 81.8% of PV cases had no associated systemic disease and mainly reported with atopy (7.2%), then diabetes mellitus (2.7%). However; anemia, hypertension, fibroadenoma, urinary tract infections, arthritis and psychiatric patients had been reported with same frequency (0.9%), and 1.8% of cases had more than one disease associated with PV. About 80.9% of cases have no drug history, and 52.7% had used previously treatment (antifungal). Most of our patients were complaining from itching (57.8%), and was mild in most of them (41.8%), sever and disturbing only in 6 cases (5.5%), and only one patient had sweating symptom (1.9%) (Table 2). Most of the patients their symptoms were aggravated in summer time, 56.52% of them tanned in summer and (87%) had a cosmetic effect.

Study revealed many signs on examinations with variable degree of severity. Scaling was found in 71.8% of cases and was mild in 60.9% and 10.9% moderate, while 28.2% had no scales. Erythema was the least sign reported, almost 75.5% hadn't erythema, with mild degree in 19.1%, and moderate degree in 5.5%. Hypopigmentation was absence in 67.3%, 18.2% of cases had mild and 14.5% with moderate degree. In contrast almost more than half of patients (54.6%) had hyperpigmentation distributed to 38.2% mild and 16.4% moderate, the rest of cases were hadn't any hyperpigmentation with a percentage of 45.5% (Table 2).

***Table 2. Signs and symptoms distribution with degree of severity among studied patient (N=110)***

| Symptoms & Signs | Absence | Mild | Moderate | Severe |
|---|---|---|---|---|
| **Scaling** | 31(28.2%) | 67(60.9%) | 12(10.9%) | 0 (0%) |
| **Itching** | 47(42.7%) | 46(41.8%) | 11 (10%) | 6 (5.5%) |
| **Erythema** | 83(75.5%) | 21(19.1%) | 6 (5.5%) | 0 (0%) |
| **Hypopigmentation** | 74(67.3%) | 20(18.2%) | 16 (14.5%) | 0 (0%) |
| **Hyperpigmentation** | 50(45.5%) | 42(38.2%) | 18 (16.4%) | 0 (0%) |

Study showed that patients had many lesions at different sites and the common affected sites were back, arms, chest, and back of the neck, with a frequency of (60%, 51.8%, 50.9%, & 42.7%) respectively. The face (20%), lower abdomen (18.2%), lower extremity (4.5%), intertrigous area (3.6%), and the site with lowest frequency was genitalia (0.9%). Morphologically minority of cases (16.4%) had follicular lesions and coalesces lesion had been found in almost half of cases (51.82%). Majority (64%) had lesions with different sizes. Round shaped lesions were most frequent (76.4%), followed by oval (50.9%). About half of the cases (52.7%) had lesions with irregular margin. Study revealed six different colors. Brown (42.7%) and white (33.6%) were the common colors reported (Figure 1).


***Figure 1. a) Multiple brown (hyperpigmented)macules & patches over back; b). White (hypopigmented) macules & patches over forehead.***

In the study dark brown came with 20%, red color can only be found in ten cases (9.1%), fawn color and red brown have the same frequency with a percentage of 8.2% for each one. Summer was the major season of disease onset with a frequency of 47.27% and 56.52% of cases tanned in summer. Almost two-third of cases (60.4%) were had no previous treatment used before, while 39.6% were had used treatment. The most important used related drugs were only systemic steroid (3.6%) and contraceptive pills (1.8%). Others non-related drugs had been taken by most of the patients (94.6%).
Topical antifungal drugs were used by (36.9%), however olive oil, sulfur and topical steroid were used by only one patient with a frequency of 0.9% for each one and 60.4% of cases had no history of using previous topical antifungals. A total of 110 suspected PV cases, 80% of them were detected by KOH wet mount, 71.8% by cello-tape, while, Wood's lamp test gave a positive golden yellow fluorescence in 77.3% of cases (Figure 2). The sensitivity of cello-tape as compared to KOH wet mount is 92.9% and the specificity is 93.8%. and was statically significant (P = 0.0001), however the sensitivity of Wood's lamp as compared to KOH wet mount is 89.5% and the specificity is 64.7% and also was statically significant with (P = 0.0001).

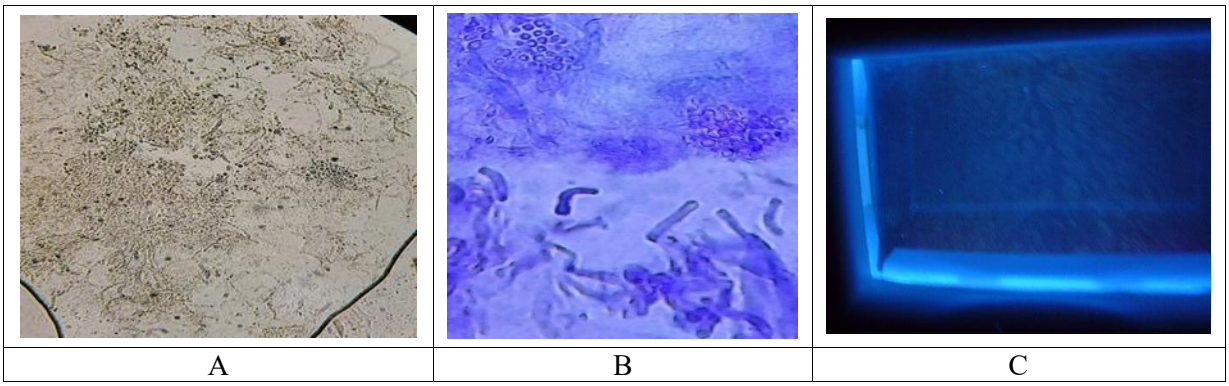


***Figure 2. a). KOH mount (×10): Hyphae with grouped & discrete spores giving the characteristic spaghetti and meatball appearance; b). Microscopic examination of Cello-tape with Giemsa stain (×40): Showing short hyphae of Malassezia & grouped spores; 3). Wood's lamp gave a positive golden yellow fluorescence***

## DISCUSSION

Pityriasis versicolor is a chronic superficial dermatomycosis characterized by hyperpigmented and hypopigmented macules and patches on the trunk and proximal extremities of young adults. It is distributed worldwide, found most frequently in tropical and temperate regions with high frequency of relapses [18]. It is caused by Malassezia species, a dimorphic fungus occurring as part of normal skin flora which implicated probably in the pathogenesis of other conditions such as atopic dermatitis, seborrheic dermatitis, confluent reticulate papillomatosis, pityriasis capitis and psoriasis as well as systemic infections [18,19]. The present study was done to assess the epidemiological and clinical features of PV. Out of the 110 cases examined, (51.82%) were female and (48.18%) were males, with female to male ratio 1.08: 1. The percentages of males and females affected by PV were almost the same (slightly higher in females). The study revealed no significant sex predilection and the female may more aware for the different color on her skin and sick medical advice for cosmetic purposes. Similar findings were reported by Santana et al [20]. The result was nearly in agreement with the result of Kaur

M et al study, which showed that both sexes are equally prone to develop PV [21]. However; other studies such as Ghosh SK et al and Tabaseera N et al revealed male preponderance over females [1,18].

The most common affected age group was 16-25 years followed by 26-35 years. The disease was found more frequent among adolescence and middle age. In a study by Akapata et al. was reported that majority of cases occurred during adolescence and was believed that because of hormonal changes which causing activation of the sebaceous glands with increase in sebum secretion and also Malassizia require oil for their growth [22]. The result of Ghosh SK et al and Tabaseera N et al studies showed younger age group, with most common age group affected was between 11 and 30 years [1,18]. In contrary the study of Salahi-Moghaddam A et al, reported older age group, with most common age group affected was between 28 and 36 years [23]. In contrast, El-Hefnawi et al. reported highest prevalence in the third and fourth decade of life [24].

Study showed that PV was more common among out door workers and students and this may be related to exposure to certain environmental factors like high temperature and humidity which are associated with outdoor activities or could be also related to increased sebaceous gland activity as most of our patients were adolescents and young adults [25]. In addition; may be because they are more conscious about the skin lesions and sick medical advice more often to dermatology OPD for cosmetic purposes. The result was in agreement with Ghosh SK et al, Tabaseera N et al, and Kaur M et al studies which reported high frequency of the disease among students [1,18,21].

As PV is not an infectious disease, and hereditable factors could contribute to its appearance indicating the role of a genetic factors in the transmission of the disease [3,26,27]. In the current study, family history was obtained in approximately 31.8% of cases. Similar findings had been reported by Hafez M et al study [26]. However; Ghosh SK et al study reported lower percentage (25%) and Rao GS et al study reported higher percentage (38.3%) [1,28]. The present study showed that the percentages of males and females affected by PV were almost the same (slightly higher in females). The result was in agreement with the result of Kaur M et al study, which showed that both sexes are equally prone to develop PV [21]. Other studies such as Ghosh SK et al and Tabaseera N et al revealed male preponderance over females [1,18]. In the current study family history was present in approximately 31.8%. Similar study was reported in Hafez M et al study [26]. However other studies showed different result such as Ghosh SK et al study which reported lower percentage (25%) and Rao GS et al study which reported higher percentage (38.3%) [1, 28]. Most of the patients in this study were students; this result was in agreement with the result of many studies such as Ghosh SK et al, Tabaseera N et al, and Kaur M et al studies [1,18,21].

The disease was observed during summer in 47.27% of our patients and probably high temperature and high humidity during summer months makes the person more susceptible for PV infection. Studies of Ghosh SK et al and Rao GS et al gave similar findings with increased number of cases in summer months [1,28]. Other studies also revealed that most of the cases had PV at the month August [1,8,12,13]. In the present study, a small number of patients had coexisting systemic diseases such as atopy, diabetes, anemia, hypertension, fibroadenoma, urinary tract infections, arthritis and psychiatric diseases. The most prominent systemic diseases associated with PV were atopy followed by diabetes and patients with these diseases usually had defective immunity which can lead to flare up and persistence of the disease [28]. The result was slightly similar to other studies such as Banerjee S, study which revealed that the most prominent diseases associated with PV were diabetes followed by hypertension [29]. The result of Ghosh SK et al study also showed similar result regarding associated systemic diseases with diabetes and lymphoproliferative malignancies as the most prominent diseases [1]. Different result was revealed in other study which showed that there is no association between PV and diabetes [14].

Regards the symptoms of PV in this study, most of the patients were symptomatic and itching was the main symptom. However, many previous studies reported that the majority of patients with PV had no symptoms and minorities of patients who had symptoms were complaining of itching as the most common symptoms. This difference could be contributed to the environmental factors or type of cloths used by patient [8,9,13]. In this study, we found a high frequency of patients with multiple sites and the most common sites affected with PV were the back, arms, chest, and back of the neck. Similar findings were also noted by Rao GS et al and Shoeib MA et al [28,30]. Studies which reported that PV lesions were seen mostly on the neck, back and chest possibly because these are the main sites where sebaceous glands were highly distributed and active [4,8]. In addition, more likely the humidity and high temperature encourage PV spread [28,29]. However; Tabaseera N et al reported that the most prominent site affected was the chest followed by the neck then the back [18]. Neck was the most common site affected in Salahi-Moghaddam et al and Ramadán S A et al studies while in Ghosh SK et al study showed that the face the neck was the commonest site affected by PV [1,23,31]. In contrast, Aljabre et al, showed that flexural lesions of PV were not uncommon [32].

The type of lesions seen in our patients were more of hyperpigmented variety than hypopigmented lesions. In contrary most of the studies reported that most of the lesions of PV were hypopigmented lesions [1,8,9,13]. This variation in the

morphological appearance of lesions may be due to differences in climatic conditions and different study population. Diagnosis of PV based mainly on the clinical examination, and microscopic examination of the skin scrapings and culture. KOH mount test was positive in 80% of cases in the present study as like other studies by Ghosh SK et al and Tabaseera N et al while Rao GS et al have reported relatively lower rates (46.60%) [1,18,28]. Cello-tape test and wood's lamp test were also performed in the current study in which they were positive in 71.8% and 77.3% of the cases respectively. Considering the statistically significant found between KOH mount, cello-tape, and woods lamp our study revealed the high sensitivity and specificity of KOH test in demonstration of fungal hyphae and grouped spores, thus the KOH mount test can be used as a better alternative to cello-tape and woods lamp for the diagnosis and confirmation of PV. This result indicates direct microscopic examination of skin scrapings using KOH mount is a rapid, inexpensive and sensitive test for diagnosis and confirmation of PV.

## CONCLUSION

The current study concluded that the clinico-epidemiological and mycological parameter did not differ significantly from those observed by other studies on PV. The itching and hyperpigmentation were the most common clinical presentations among out door workers and students of young age especially in summer months. KOH mount test was positive in most of cases, and can be easily used as a cost effective, office-based test than Cello-tape for rapid diagnosis and confirmation of PV. Early identification of the PV cases by clinical examination and simple laboratory techniques and use adequate treatment would help in prevent recurrences, and cosmological problems. Molecular studies are needed to determine Malassizia species causing PV among our population.

### *Disclaimer*

The article has not been previously presented or published.

### *Conflict of Interest*

There are no financial, personal, or professional conflicts of interest to declare.

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