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Original Article

Histopathological study of scaly plaque over palm and sole in patients attending a tertiary care Hospital in Kathmandu

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ABSTRACT

Background: Dermatoses of palms and soles are frequently encountered as palms and soles have non-hairy skin. Scaling skin could be a symptom of many medical conditions including psoriasis, eczema, contact dermatitis, ichthyosis, actinic keratosis, lichen planus, tinea, etc.Psoriasis must be differentiated from its non-psoriatic lesions. Histopathological examination often serves as a confirmative part of the diagnosis.

Materials and methods: This was a hospital-based retrospective study carried out in the Department of Pathology and Department of Dermatology of Nepal Medical College Teaching Hospital. A total of 139 cases of scaly plaque skin lesions of the palm and sole from January 2020 to December 2022 were included in the study. The histopathological diagnosis was correlated with the clinical diagnosis.

Results: Among 139 persons presenting with scaly lesions, the median age was 36 yearswith an age range from 15 years to 80 years. A female preponderance (59%) was observed. The odds of Psoriasis were 2.5 times higher (OR CI: 1.21 to 5.17) among those aged 36 years and above (P value 0.011). There was a significant association between age categories and histological diagnosis of scaly lesions. The agreement was significant between the clinical and histological diagnosis for psoriatic (63.0%) and non-psoriatic lesions (76.3%) with a Cohen's kappa coefficient of 0.38 (SE: 0.084), P value < 0.0001.

Conclusions: Both psoriatic and non-psoriatic lesions can present as scaly plaque skin lesions, hence the knowledge of these clinical mimickers is important for the proper diagnosis. The histopathological examination will give the confirmatory diagnosis.

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INTRODUCTION

Skin is the largest and fastest-growing organ of the body.[1] Normal skin is constituted of epidermis, epidermal basement membrane, papillary and reticular dermis with related adnexa, and subcutaneous fat.[1,2] It is very important to remember that a considerable morphological variation exists in normal skin due to the topographic area and to physiological variation depending on hormonal balance, sex, and age.[2]Dermatoses of palms and soles are frequently encountered as palms and soles have non-hairy skin. These are among the most difficult of all dermatological therapeutic problems. This

group of diseases may be occupationally disabling.[3] The hands have been the affected site in 80% of occupational skin diseases.[4] Scaling skin could be a symptom of many medical conditions including psoriasis, eczema, contact dermatitis, ichthyosis, actinic keratosis, lichen planus, tinea, etc.[5]

Psoriasis is a chronic, relapsing, papulosquamous dermatitis.[6] It is characterized by an epidermis covered by erythematous, silvery white scaly, sharply demarcated, indurated plaques.[6,7] It can be evoked by scratching and the sharp demarcation usually stops at the palm-wrist junction and sides of fingers.[7] Psoriasis has different clinical variants that mimic diverse dermatological conditions.[8]Psoriatic lesions are classified into the guttate, plaque, pustular, and erythrodermic types according to clinical features, especially their size and distribution[9]. Histologically, psoriasis vulgaris must be differentiated from psoriasiform dermatitis.[8] The term psoriasiform implies that the lesion either clinically or histologically mimics psoriasis.Apart from psoriasis, seborrheic dermatitis, pityriasis rubra pilaris, allergic dermatitis, atopic dermatitis, nummular dermatitis, lichen simplex chronicus, pityriasis rosea, dermatophytosis, and mycosis fungoides comes under this group.[10]

Eczema is one of the most common skin disorders affecting the hands and also the commonest occupational skin disease (OSD).[8] The hands have been the affected site in 80% of the OSDs.[4] The increased prevalence in women as compared to men is seen in the younger age group.[11] Allergic contact dermatitis (ACD) is a known cause of hand eczema.[8] Eczema of the hand and foot can be caused by both exogenous and endogenous factors. The exogenous causes include irritant and allergic contact dermatitis whereas the endogenous causes include atopic dermatitis, discoid eczema, pompholyx, and hyperkeratotic eczema.[9]

Palmoplantar lichen planus (LP) presents as erythematous scaly plaques, punctate keratosis, diffuse hyperkeratosis, umbilicated plaques, and diffuse hyperpigmentation of palms and/or soles.[12-14] As it presents with various atypical clinical features, palmoplantar LP may create difficulty in diagnosis.[15,16] Similarly, there are many bacterial, fungal, and viral infections causing scaly lesions over palms and soles. Dermatophytic infections of palms and soles are called Tinea manuum and Tinea pedis respectively.[17] Tinea pedis or foot ringworm involves interdigital clefts of toes and nails.[18,19] Skin breakdown, humidity, and temperature play a role in this infection. The affected areas are erythematous and covered with fine silvery-white scales.[20]

In this study, the differential diagnosis of scaly plaques involving palms and soles was analyzed. The histopathological diagnosis was correlated with clinical diagnosis, mainly psoriatic and non- psoriatic lesions.

MATERIALS AND METHODS

A hospital-based retrospective studywas carried out in the Department of Pathology of a tertiary care center (NMCTH).All the cases of scaly plaque skin lesions of palm and sole from the Record Book and Computer of the Department of Pathology from January 2020 to December 2022.Ethical approval was taken from the Institutional Review Committee (IRC) of NMCTH. The collected data were entered in Microsoft Excel 2010 and analyzed using Epi-info version 7.3. Descriptive analysis was presented in numbers and percentages. Analytical statistics were done using the chi-square test.Agreement between clinical diagnosis and histopathologic diagnosis was assessed by Cohen's kappa.The level of significance was 5%,and a $P<0.05$ was considered as significant.

RESULTS

Among 139 persons presenting with scaly lesions, the median age was 36 years (IQR: 26 to 51 years). The study population age ranged from 15 years to 80 years. A female preponderance was observed as more than half (59%) of the study population comprised of women. Students (25.0%) with scaly lesions were followed by housewives (23.9%) and farmers (14.8%).

Persons with single scaly lesions were more common and they had various clinical diagnoses. (Table 1)

Table 1: Clinical features of the study population (n=139)

Clinical features	Frequency (n)	Percentage
Skin conditions		
Single	112	80.6%
Multiple	27	19.4%
Broad Clinical diagnosis		
Dermatitis	52	37.4%
Dermatitis, Fungal infection	6	4.3%
Dermatitis, Fungal infection, Psoriasis	8	5.8%
Dermatitis, Psoriasis	9	6.5%
Fungal infection	28	20.1%
Psoriasis	36	25.9%
TOTAL	**139**	**100.0%**

More than half (54.7%) of the study population were aged ≥ 36 years. Among persons with a clinical diagnosis of psoriasis, over two-thirds (68.6%) were aged ≥ 36 years. Odds of psoriasis were 2.5 times higher (OR CI: 1.21 to 5.17) among those aged 36 years and above in comparison to those aged less than 36 years (- value 0.011). (Table 2)

Table 2: Association between age categories and Psoriatic/ Non-psoriatic lesion (n=139)

Age categories	Clinical Diagnosis			OR	Chi-square P value
	Non-psoriatic lesion	Psoriatic lesion	Total		
< 36 years	47 (53.4%)	16 (31.4%)	63 (45.3%)	2.50 (1.21-5.17)	0.011**
≥ 36 years	41 (46.6%)	35 (68.6%)	76 (54.7%)		
Total	88	51	139		

As seen in Table 3, over one-half (54.5%) of persons with dermatitis were less than 36 years, while about two-thirds (63.0%) of persons with Psoriasis were ≥ 36 years and three-fourths of persons with fungal infection were ≥ 36 years. A significant association was observed between age categories and histological diagnosis of scaly lesions (Chi-square value 6.608, df 2, P = 0.036).

Table 3: Association between age categories and Histopathological diagnosis of scaly lesions (n = 139)

Age categories	Dermatitis	Psoriasis	Tinea	TOTAL	P value
< 36 years	42 (54.5%)	17 (37.0%)	4 25.0%	**63 (45.3%)**	**0.03***
≥ 36 years	35 (45.5%)	29 63.0%	12 (75.0%)	**76 (54.7%)**	
TOTAL	**77 100.00%**	**46 100.00%**	**16 100.00%**	**139 100.00%**	

A highly significant agreement was observed between the clinical and histological diagnosis for psoriatic (63.0%) and non-psoriatic lesions (76.3%), with a Cohen's kappa coefficient of 0.38 (SE: 0.084) P value < 0.0001. (Table- 4)

Table 4: Agreement between clinical and histological diagnosis among persons with scaly lesions (n = 139)

Clinical diagnosis	Histological diagnosis		Total	Kappa
	Non-psoriatic lesion	Psoriatic lesion		
Non-psoriatic lesion	71 (76.3%)	17 (37.0%)	88 (63.3%)	0.38
Psoriatic lesion	22 (23.66%)	29 (63.0%)	51 (36.7%)	
Total	93 (100.0%)	46 (100.0%)	139 (100.0%	

DISCUSSION

Skin is the largest organ of the body.[1] Scaly skin is a symptom of many medical conditions. Some of the conditions of scaly skin lesions include psoriasis, eczema, contact dermatitis, ichthyosis, actinic keratosis, lichen planus, and tinea.[5] Psoriasis affects approximately 2.0% to 3.0% of the world's population.[21]According to a study done in Kavre, Nepal, the overall prevalence of skin diseases was 9.9%.[22]In another study conducted in Lumbini, Nepal, it was found that psoriasis is a relatively common dermatological diseasethat has affected 2.9% of the people visiting the OPD of Dermatology and Venereology Department.[23] A study conducted in India showed the overall prevalence of psoriasis ranging from 0.4- 2.8%.[24]Higher prevalence rates were found in Western countries; the distribution ranges from 2.2% in the U.K. to as high as 4.5% in Norway. The prevalence of psoriasis among patients in the United States was 2.2% to 3.15%, while lower rates were observed in Latin Americans, Indians, and Africans (Egypt and Tanzania), and Asia, which is less than 0.5%. The wide variation in estimates of prevalence between regions may be attributed to the differences in ethnic or racial composition, genetics, environmental and climate conditions.[25]

In our study, the scaly lesions were more common in 20-49 years of age (67.6%) followed by age group ≥ 50 years (27.3%). Several other studies showed that scaly lesions were more common in young and late adulthood.[3,23,26] However, a study also showed that even younger age groups can be affected by these scaly lesions.[22]Our study showed that 59% of females were affected with scaly plaque over the palm and sole. Studies conducted by Hongal et al[3] in India and Mikrani et al[23]in Nepal also showed a female predominance in scaly plaque. However, another study done in the central part of Nepalshowed male predominance of psoriasis.[22]Kim et al also showed male predominance in the cases of psoriasis.[26]

Psoriasis is a common chronic T cell-mediated inflammatory disease that frequently presents as long-lasting, sharply defined, raised, dull red, scaly plaques, mostly on the extensor prominences and scalp.[27] Histopathological findings observed in active lesions are characterized by hyperkeratosis, parakeratosis, diminution or loss of the granular cell layer, acanthosis of the epidermal ridges, tortuous and dilated blood vessels, and perivascular leukocytic infiltrate in the dermal papillae.Typically, the epidermal ridges are evenly elongated and club-shaped at the tips. Two other changes that are diagnostic of psoriasis are the small accumulation of neutrophils within the parakeratotic stratum corneum called Munro microabscess and within the spongiotic epidermis called Kogoj abscess. Psoriasis may be divided into psoriasis vulgaris, generalized pustular psoriasis, and localized pustular psoriasis.[28]

Students (25%) and housewives (23.9%) were affected more in our study. A study conducted by Hongal et al[3] in India found a higher prevalence among housewives (30%). Another study conducted in Turkey by Oktem et al[29]found 48% of the disease in the cleaning staff.Kumar et al[30] conducted a study in India where they found that occupational exacerbation was seen in up to 40% of cases of psoriasis. These observations suggest that friction may play a role in localizing the lesions over certain areas in patients with pre-existing psoriasis.

Our study showed a greater number of single lesion (80.6%) than multiple lesions (19.4%). The most common clinical diagnosis was dermatitis (37.4%) followed by psoriasis (25.9%) and fungal infection (20.1%). Other cases had multiple clinical differential diagnoses.Among persons with a clinical diagnosis of Psoriasis, over two-thirds (68.6%) were aged ≥ 36 years. Odds of Psoriasis were 2.5 times higher among those aged ≥ 36 years in comparison to those aged <36 years (P value 0.011).Over one-half (54.5%) of persons with dermatitis were less than 36 years, while about two-thirds (63.0%) of persons with Psoriasis were ≥ 36 years, and three-fourths of persons with fungal infection were ≥ 36 years. A significant association was observed between age categories and histological diagnosis of scaly lesions. This finding correlates well with the findings in studies done by Mehta et al[8] and Venna et al[31] in India. Another study done in India by Banerjee et al[32]showed that psoriasis is more common in persons more than 36 years. a higher negative correlation in 63.3% of cases than positive correlation in 36.7% of cases towards diagnosis when histopathological diagnosis was compared with clinical diagnosis.In contrast to these studies, several studies conducted in Nepal as well as India by Jayalakshmi et al[33] (Nepal), Rao et al[34] (India), Mehta et al[8] (India), and Venna et al[31] (India), showed greater prevalence of psoriatic lesion than non-psoriatic lesion with 60.6%, 56.4%, 58%, and 56.7% respectively.

Psoriatic lesions were less common than non-psoriatic lesions in our study and included dermatitis and fungal infection(Fig 1, 2, and 3). Inone study done in India, 21.8% of cases were psoriatic lesions and 78.2% of cases were non-psoriatic lesions.The non-psoriatic lesions included non-specific dermatitis, spongiotic dermatitis, atopic dermatitis, etc.[32]In contrast to this, several studiesshowed a greater prevalence of psoriatic lesions than non-psoriatic lesion.[8,32,33,35]Clinical diagnosis of dermatitis was very common in our study. Dermatitis with differential diagnosis of fungal infection and psoriasis was also included. A study conducted by Barr et al[10] found the highest prevalence of

Figure 1: *Plantar psoriasis with scaly plaque lesion.*

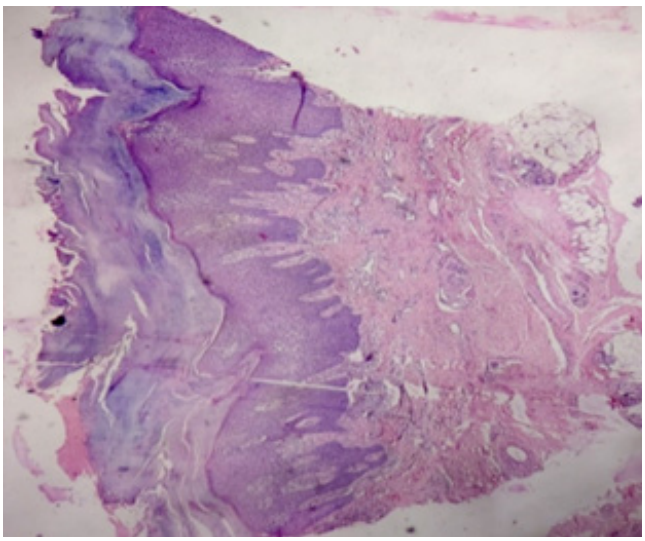

Figure 2: *Psoriasis showing focal parakeratosis, regular acanthosis, moderate focal spongiosis, focal suprapapillary thinning, clubbing of rete ridges, dilated dermal vasculature and moderately dense chronic inflammation in superficial dermis (H and E stain, 40X)*

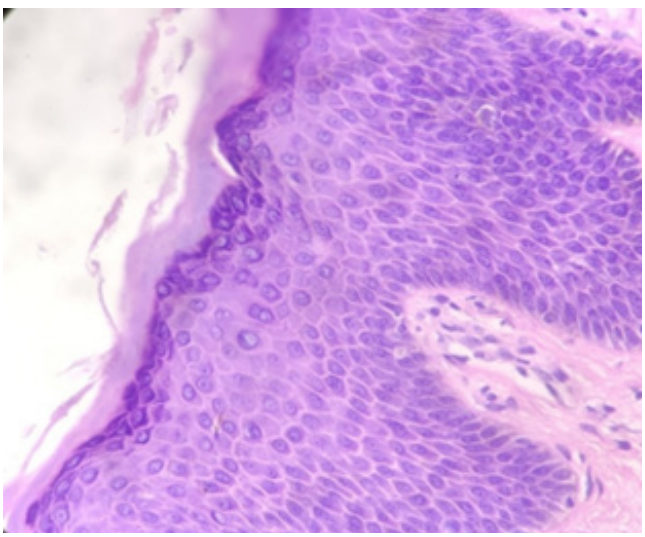

Figure 3: *Subacute spongiotic dermatitis showing marked spongiosis. (H and E stain, 400X)*

chronic dermatitis presenting as scaly plaque over the palm among cleaning staff. There were 11.5 % cases of tinea in our study. In a study conducted by Leyden et al[36], the overall prevalence of dermatophytic infection confirmed by histopathology among the patients attending the Dermatology Department was 28.2%. It was also found that patients with tinea pedis may contribute to refractory atopic disease. Approximately 10% to 25% of the world's population is infected by a dermatophyte among which tinea pedis and manuum are the most common clinical presentations with tinea pedis occurring in up to 70% of adults.[37] Tinea pedis, also known as athlete's foot or foot ringworm is an infection of the feet affecting soles, interdigital clefts of toes, and nails with a dermatophyte fungus. This is the most common form of dermatophyte infection.Tinea infection may be mistaken

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for atopic dermatitis or allergic eczema.[38]

A highly significant agreement was observed between the clinical and histological diagnosis for psoriatic (63.0%) and non-psoriatic lesions (76.3%), with a Cohen's kappa coefficient of 0.38 (SE: 0.084) P value < 0.0001. According to Faraz et al[39], the histopathology report confirmed the clinical diagnosis in 67.5 % and the second most common lesion was psoriasis (24%).Studies done by Mehta et al[8] and Venna et al[31] in India found that histopathological diagnosis was correlated with clinical diagnosis which revealed a positive correlation higher than that of negative correlation.

All the scaly lesions over palms and soles appear similar clinically and they can only be differentiated with the help of histopathological examination which is considered as the gold standard. This study will help to give the correct histomorphological diagnosis and aid in the management of different types of scaly plaque lesions over the palm and sole.

CONCLUSIONS

The diagnosis and management of scaly plaque solely depend on the histopathological diagnosis. Also, many features do overlap in these scaly plaque lesions. Hence, the histopathology of scaly plaque over palms and soles and its correlation with clinical diagnosis will help the dermatologist to arrive at the decision-making in the management of the cases. The result of this study will give us an idea about the common types of scaly plaque lesions of palms and soles coming to this part of Kathmandu Valley and will also contribute to the existing literature.

Conflict of Interest: None

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