



PATTERN OF NAIL CHANGES IN PATIENTS WITH PAPULOSQUAMOUS DISORDERS: A CROSS-SECTIONAL STUDY

Dr. Venkatannagari Poojitha*	Junior Resident, MD, Department of Dermatology, Venereology and Leprosy (DVL), PES Institute of Medical Sciences and Research (PESIMSR), Kuppam, Andhra Pradesh, India.*Corresponding Author
Dr. Gangavaram Dinesh	Associate Professor, MD, Department of Dermatology, Venereology and Leprosy (DVL), PES Institute of Medical Sciences and Research (PESIMSR), Kuppam, Andhra Pradesh, India.
Dr. Kasipathi Sushmitha	Junior Resident, MD, Department of Dermatology, Venereology and Leprosy (DVL), PES Institute of Medical Sciences and Research (PESIMSR), Kuppam, Andhra Pradesh, India.

ABSTRACT **Background:** Papulosquamous disorders commonly involve the nails, and these changes may provide important diagnostic clues. This study evaluated the pattern of nail changes in patients with papulosquamous disorders. **Methods:** A cross-sectional study was conducted among 92 patients with papulosquamous disorders. Detailed clinical examination of all twenty nails was performed, and the pattern and frequency of nail changes were recorded. **Results:** The mean age of the participants was 35.25 ± 8.736 years, with 51.1% males and 48.9% females. Psoriasis was the most common disorder (55.4%), followed by lichen planus (21.7%). Nail involvement was observed in 66 (71.7%) patients and was highest in psoriasis and pityriasis rubra pilaris (100% each). Pitting was the most common nail abnormality (53%), followed by longitudinal striations (27.8%) and subungual hyperkeratosis (27.3%). Disease-specific nail changes included thinning of the nail plate in lichen planus, nail plate thickening in pityriasis rubra pilaris, leukonychia in lichen nitidus, longitudinal striation in lichen striatus, and Beau's lines in pityriasis rosea and pityriasis lichenoides chronica. **Conclusion:** Nail involvement is a common feature of papulosquamous disorders. Careful nail examination can aid in diagnosis, disease differentiation, and overall patient management.

KEYWORDS : Papulosquamous disorders; Nail changes; Psoriasis; Lichen planus; Pitting.

INTRODUCTION

The nail, often regarded as an index of health, serves as an important diagnostic window into both dermatological and systemic diseases.[1] As a specialized epidermal appendage, it represents the hardest epithelial structure in mammalian biology and performs several essential functions, including protection of the distal phalanx, enhancement of tactile sensation, facilitation of fine motor activities, and contribution to social communication and aesthetics.[2,3] Nail abnormalities may represent the earliest or even the sole manifestation of underlying disease, making nail examination an integral component of clinical evaluation.[4,5]

Papulosquamous disorders constitute a heterogeneous group of inflammatory dermatoses characterized by scaly papules and plaques and include conditions such as psoriasis, lichen planus, lichen nitidus, lichen striatus, pityriasis rosea, pityriasis rubra pilaris, parapsoriasis, and pityriasis lichenoides.[2] These disorders frequently involve the nail apparatus and produce characteristic nail changes that may aid in diagnosis and disease differentiation.[6] Nail involvement may precede, accompany, or follow cutaneous manifestations and can range from subtle findings such as pitting to severe abnormalities including onycholysis, subungual hyperkeratosis, and complete nail dystrophy.[7]

Nail changes are not merely cosmetic concerns but may result in pain, functional impairment, restriction of daily activities, and significant psychosocial distress, thereby adversely affecting quality of life.[7] In psoriasis, nail involvement is common and has been shown to correlate with disease severity and systemic comorbidities.[8-11] Despite their clinical importance, nail changes in papulosquamous disorders remain relatively under-reported and under-studied, particularly in disorders other than psoriasis. Furthermore, overlapping clinical features and the limited reaction patterns exhibited by the nail unit often make diagnosis challenging. Dermoscopy (onychoscopy) has emerged as a valuable non-invasive diagnostic tool that facilitates the recognition of subtle nail findings, improves diagnostic accuracy, and reduces the need for invasive procedures.[12]

Therefore, the present study was undertaken to evaluate nail changes in different papulosquamous disorders and to assess their association with individual papulosquamous disorders, thereby aiding early diagnosis and improving patient management.

METHODOLOGY

Study Design and Setting

The present observational descriptive cross-sectional study was conducted among 92 patients with papulosquamous disorders attending the Department of Dermatology, Venereology and Leprosy (DVL), PES Institute of Medical Sciences and Research (PESIMSR), Kuppam, Andhra Pradesh, India. The study was carried out over a period of 18 months from April 2024 to October 2025. The study was designed and reported in accordance with the STROBE guidelines and adhered to the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of PESIMSR, Kuppam, and written informed consent was obtained from all participants prior to enrollment.

Study Population and Eligibility Criteria

The study included patients diagnosed clinically with papulosquamous disorders who attended the DVL outpatient department during the study period. Patients of either sex and all eligible age groups with confirmed papulosquamous disorders were included. Pregnant and lactating women, patients with a history of acrylic nail use, patients with mehendi application at the time of nail examination, and patients with papulosquamous disorders associated with renal impairment, liver disease, or other significant systemic illnesses were excluded from the study to minimize confounding factors that could independently influence nail morphology.

Sample Size Estimation and Sampling Technique

The sample size was estimated using Cochran's formula for prevalence studies, based on a reported prevalence of nail disorders of 81% among patients with papulosquamous disorders by Wali and Prasad.[2] Using a 95% confidence level ($Z = 1.96$) and an absolute precision of 8%, the calculated minimum sample size was 92 participants. Accordingly, 92 eligible patients were enrolled using a purposive sampling technique during the study period.

Data Collection and Clinical Assessment

Following informed consent, demographic details including age and sex were recorded. A detailed clinical history was obtained with respect to age at onset of disease, duration of illness, type of papulosquamous disorder, distribution of skin lesions, and history of nail involvement. Relevant laboratory investigations, including complete blood count, liver function tests, and renal function tests, were performed whenever clinically indicated. Additional

investigations such as potassium hydroxide (KOH) mount examination and skin biopsy were carried out in selected cases to support the diagnosis.

All patients underwent a comprehensive nail examination in a well-lit clinical setting. Prior to examination, nails were cleaned to remove dirt, debris, nail polish, or other substances that could interfere with assessment. Both fingernails and toenails were systematically examined, and standardized numbering of nails was adopted to ensure uniform documentation and analysis. High-resolution digital photographs were obtained under standardized lighting conditions for documentation and comparison.

Measured Variables

The primary study variable was the presence and pattern of nail changes associated with papulosquamous disorders. Nail findings were assessed systematically by examining the nail plate, nail bed, nail matrix, and periungual structures.

Nail plate abnormalities: evaluated included pitting, characterized by multiple pinpoint depressions on the nail surface; longitudinal and transverse ridging indicating matrix involvement; and nail dystrophy, manifested by irregular thickening, thinning, deformity, or destruction of the nail plate.

Nail bed changes: assessed included onycholysis, defined as distal separation of the nail plate from the nail bed; subungual hyperkeratosis resulting from accumulation of keratinous material beneath the nail plate; oil-drop (salmon patch) discoloration appearing as translucent yellow-brown patches; and splinter hemorrhages presenting as longitudinal reddish-brown or black streaks due to capillary damage.

Nail matrix abnormalities: included leukonychia, characterized by white discoloration of the nail plate; Beau's lines, representing transverse depressions caused by temporary interruption of nail growth; and crumbly nails, indicating severe matrix damage with fragmentation of the nail plate.

Periungual and hyponychial changes: such as periungual erythema, scaling, cuticular abnormalities, and paronychia were also recorded. In selected cases, dermoscopy (onychoscopy) was performed to identify subtle nail features and vascular alterations not appreciable on routine clinical examination. Nail clippings or nail biopsies were obtained when histopathological confirmation was required.

Statistical Analysis

All collected data were entered into Microsoft Excel and subsequently analyzed using appropriate statistical software. Descriptive statistics were used to summarize demographic and clinical characteristics. Categorical variables were expressed as frequencies and percentages, and associations between nail changes and individual papulosquamous disorders were assessed using appropriate statistical tests. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 92 patients with papulosquamous disorders were included in the study. The mean age of the participants was 35.25 ± 8.736 years. Of the study population, 47 (51.1%) were males and 45 (48.9%) were females.

The distribution of papulosquamous disorders was presented in Figure 1. Psoriasis was the most common disorder and was observed in 51 (55.4%) patients, followed by lichen planus in 20 (21.7%) patients and pityriasis rosea in 9 (9.8%) patients. Less common disorders included lichen nitidus in 4 (4.3%) patients, pityriasis rubra pilaris in 3 (3.3%) patients, pityriasis lichenoides chronica in 2 (2.2%) patients, lichen striatus in 2 (2.2%) patients, and parapsoriasis in 1 (1.1%) patient.

The frequency of nail involvement among various papulosquamous disorders was presented in Figure 2. Nail changes were observed in all patients with psoriasis (100%) and pityriasis rubra pilaris (100%). Nail involvement was present in 50% of patients with lichen nitidus, lichen striatus, and pityriasis lichenoides chronica, whereas 35% of patients with lichen planus and 11.1% of patients with pityriasis rosea exhibited nail changes. No nail changes were observed in the patient with parapsoriasis. Overall, nail involvement was documented in 66 patients (71.7%).

The spectrum of nail changes observed in patients with

papulosquamous disorders was summarized in Table 1. Among the 66 patients with nail involvement, pitting was the most common nail abnormality and was observed in 35 (53.0%) patients, predominantly in psoriasis and pityriasis rubra pilaris. Subungual hyperkeratosis was noted in 18 (27.3%) patients, followed by longitudinal striations in 17 (27.8%), rough nails in 15 (22.7%), and onycholysis in 14 (21.2%) patients. Thick nails and Beau's lines were each observed in 13 (19.7%) patients. Other nail abnormalities included oil-drop sign in 12 (18.2%), onychomadesis in 11 (16.7%), longitudinal melanonychia in 9 (13.6%), and splinter hemorrhages in 6 (9.1%) patients. Less frequently observed changes included nail dystrophy and thin nails in 4 (6.1%) patients each, leukonychia and trachyonychia in 2 (3.0%) patients each, and pterygium in 1 (1.5%) patient.

Disease-specific analysis showed that pitting was the predominant nail finding in psoriasis (62.7%) and was present in all patients with pityriasis rubra pilaris (100%). In lichen planus, the most frequent nail findings were thin nails (57.1%), followed by longitudinal melanonychia (42.9%) and trachyonychia (28.6%). Leukonychia (100%) was observed in all patients with nail involvement due to lichen nitidus, whereas longitudinal striation (100%) was observed in lichen striatus. Beau's lines were observed in patients with pityriasis rosea and pityriasis lichenoides chronica.

The characteristics of nail involvement in different papulosquamous disorders were summarized in Table 2. The most commonly involved nails in psoriasis were the fourth and fifth fingernails and fifth toenail (F4, F5, T5), and the mean interval between the onset of skin lesions and nail involvement was 4.2 years. In lichen planus, the fourth fingernail (F4) was the most commonly affected nail, with a mean interval of 1.2 years. Nail changes developed within 2–6 months of the onset of skin lesions in the remaining disorders. The most common nail changes were pitting in psoriasis, thinning of the nail plate in lichen planus, Beau's lines in pityriasis rosea and pityriasis lichenoides chronica, nail plate thickening with pitting in pityriasis rubra pilaris, leukonychia in lichen nitidus, and longitudinal striation in lichen striatus. No nail involvement was observed in the patient with parapsoriasis.

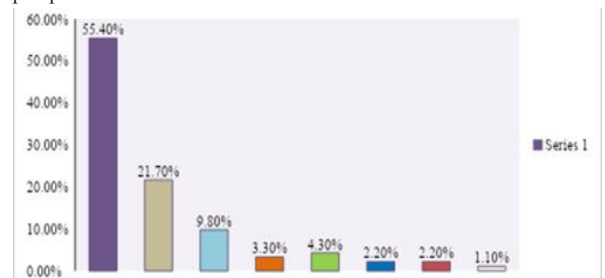


Figure 1: Distribution of Diseases Among Study Participants

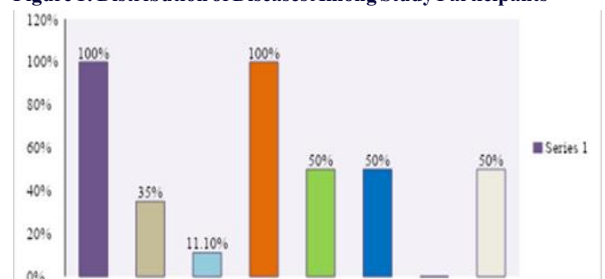


Figure 2: Frequency of Nail Changes Among Papulosquamous Disorders

Table 1: Nail Patterns Observed in Papulosquamous Disorders (N = 92; Nail Changes = 66)

Nail Changes	Ps n (%)	LP n (%)	Prp N (%)	LS n (%)	LN n (%)	PR n (%)	Pp n (%)	PLC n (%)	Total n (%)
Pitting	32 (62.7)	—	3 (100)	—	—	—	—	—	35 (53.0)
Subungual Hyperkeratosis	16 (31.4)	—	2 (67)	—	—	—	—	—	18 (27.3)
Thick Nail	10 (19.6)	—	3 (100)	—	—	—	—	—	13 (19.7)

Longitudinal Striations	14 (27.5)	2 (28.6)	—	1 (100)	—	—	—	17 (27.8)
Beau's Lines	9 (17.6)	1 (14.3)	1 (33)	—	—	1 (100)	—	13 (19.7)
Rough Nails	14 (27.5)	1 (14.3)	—	—	—	—	—	15 (22.7)
Onycholysis	14 (27.5)	—	—	—	—	—	—	14 (21.2)
Oil Drop Sign	12 (23.5)	—	—	—	—	—	—	12 (18.2)
Onychomadesis	11 (21.6)	—	—	—	—	—	—	11 (16.7)
Longitudinal Melanonychia	6 (11.8)	3 (42.9)	—	—	—	—	—	9 (13.6)
Splinter Hemorrhage	6 (11.8)	—	—	—	—	—	—	6 (9.1)
Nail Dystrophy	3 (5.9)	1 (14.3)	—	—	—	—	—	4 (6.1)
Thin Nails	—	4 (57.1)	—	—	—	—	—	4 (6.1)
Leukonychia	—	—	—	—	2 (100)	—	—	2 (3.0)
Trachyonychia	—	2 (28.6)	—	—	—	—	—	2 (3.0)
Pterygium	—	1 (14.3)	—	—	—	—	—	1 (1.5)

Ps – Psoriasis; LP – Lichen Planus; PRP – Pityriasis Rubra Pilaris; LS – Lichen Striatus; LN – Lichen Nitidus; PR – Pityriasis Rosea; Pp – Parapsoriasis; PLC – Pityriasis Lichenoides Chronica.

Table 2: Characteristics of Nail Changes in Papulosquamous Disorders

Papulosquamous Disorder	Common Nails Involved	Time Interval (Skin → Nail)	Most Common Nail Change
Psoriasis	F4, F5, T5	4.2 years	Pitting
Lichen Planus	F4	1.2 years	Thinning of nail plate
Pityriasis Rosea	F6	2 months	Beau's Line
Pityriasis Rubra Pilaris	T5, T6	6 months	Nail plate thickening; Pitting
Lichen Nitidus	F3, F4	3 months	Leukonychia
Lichen Striatus	F4	4 months	Longitudinal striation
Parapsoriasis	—	—	—
Pityriasis Lichenoides Chronica	T5, T6	3 months	Beau's Line

DISCUSSION

Papulosquamous disorders constitute a heterogeneous group of inflammatory dermatoses characterized by papules and scales, often presenting with overlapping clinical features that may pose diagnostic challenges. Nail involvement is a well-recognized manifestation of several papulosquamous disorders and may provide valuable clues for diagnosis, disease monitoring, and assessment of severity.[7] The present study evaluated the pattern and frequency of nail changes in patients with papulosquamous disorders and demonstrated that nail involvement varied considerably among different disorders.

The mean age of the study participants was 35.25 ± 8.736 years, indicating that papulosquamous disorders with nail involvement predominantly affected young and middle-aged adults. This finding was lower than that reported by David BG et al. (46.5 years) and Kaur et al. (41.5 $\pm$ 13.2 years), suggesting an earlier age of presentation in the present study population.[6,13] The variation may be attributable to differences in demographic characteristics, referral patterns, and disease distribution among study populations.

A slight male predominance was observed, with males constituting 51.1% of the study population and a male-to-female ratio of 1.04:1. Similar findings were reported by Hussain et al. and Kaur et al., who documented nearly equal gender distribution.[6,7] However, studies by Wali and Prasad, Singh and Varshney, and David et al. reported a

more marked male predominance.[2,3,13] The near-equal gender distribution observed in the present study suggests that nail involvement in papulosquamous disorders affects both sexes almost equally and may reflect improving healthcare accessibility and awareness among females.

Among the papulosquamous disorders studied, psoriasis was the most common disorder (55.4%), followed by lichen planus (21.7%) and pityriasis rosea (9.8%). Nail involvement was observed in 71.7% of all patients and was present in all cases of psoriasis and pityriasis rubra pilaris. These findings highlight the high frequency of nail involvement in papulosquamous disorders and emphasize the importance of routine nail examination during dermatological evaluation.

In psoriasis, nail involvement was observed in 100% of patients. This prevalence was higher than that reported in most previous studies, where nail changes were observed in approximately 80–90% of patients during the disease course. The higher frequency observed in the present study may be attributed to the inclusion of patients with longer disease duration and chronic plaque psoriasis. The most common nail abnormality was pitting (62.7%), followed by subungual hyperkeratosis (31.4%), rough nails (27.5%), longitudinal striations (27.5%), and onycholysis (27.5%). Similar observations were reported by Wali and Prasad, David et al., and Al-Mutairi et al., who also identified pitting as the predominant nail manifestation.[2,13,14] The predominance of pitting reflects involvement of the proximal nail matrix and remains a characteristic feature of psoriatic nail disease. The mean interval between skin lesions and nail involvement was 4.2 years, indicating that nail changes often develop after prolonged disease duration.

Lichen planus demonstrated nail involvement in 35% of patients. The most common nail abnormality was thinning of the nail plate (57.1%), followed by longitudinal melanonychia (42.9%), longitudinal striations (28.6%), and trachyonychia (28.6%). These findings were comparable with those reported by Antony and Sivaprakasam, Hussain et al., and Singh and Varshney, who also identified nail plate thinning as the predominant feature.[3,4,7] The mean interval between the onset of skin lesions and nail changes was 1.2 years, suggesting earlier nail involvement compared with psoriasis. The predominance of fingernail involvement observed in the present study was consistent with previous reports and may be related to greater susceptibility of fingernail matrices to inflammatory damage.

All patients with pityriasis rubra pilaris exhibited nail involvement. The most common abnormalities were nail plate thickening (100%), pitting (100%), and subungual hyperkeratosis (67%). Similar findings have been reported in previous studies, which described nail thickening and subungual hyperkeratosis as characteristic features of pityriasis rubra pilaris.[2,3,7,12,13,15–17] The predominance of toenail involvement and the average interval of six months between skin and nail lesions suggest early nail matrix and nail bed involvement in the disease process.

Nail involvement was observed in 50% of patients with lichen striatus, with longitudinal striation (100%) being the predominant finding. Similar observations have been reported by earlier investigators, who described longitudinal ridging and splitting as characteristic nail features.[2,3,7,12,13,15,18–20] The average interval of four months between cutaneous and nail manifestations suggests relatively early nail involvement. The nail changes observed in lichen striatus are believed to result from localized inflammation affecting the nail matrix along the lines of skin involvement.

In lichen nitidus, nail changes were observed in 50% of patients, with leukonychia (100%) being the only abnormality detected. Comparable findings have been reported in previous studies, where nail involvement was generally mild and limited to leukonychia or subtle nail plate alterations.[7,12,15,21,22] The short interval of approximately three months between skin and nail lesions indicates early but mild matrix involvement.

Nail changes were uncommon in pityriasis rosea, being observed in only 11.1% of patients. Beau's lines represented the sole nail abnormality. Similar findings have been reported in earlier studies and are likely attributable to temporary interruption of nail matrix activity during the acute inflammatory phase of the disease.[7,12,15] The

transient nature of these changes supports the benign and self-limiting course of pityriasis rosea.

Among patients with pityriasis lichenoides chronica, nail involvement was present in 50% of cases and manifested exclusively as Beau's lines. Previous studies have reported similar findings, suggesting that nail changes in this disorder are uncommon and usually result from transient matrix dysfunction rather than permanent structural damage.[1,12]

Overall, the present study demonstrated that the pattern of nail involvement differed significantly among various papulosquamous disorders. While psoriasis exhibited the highest prevalence and widest spectrum of nail abnormalities, other disorders showed more limited and disease-specific changes. Fingernails were more commonly involved than toenails in most disorders, except in pityriasis rubra pilaris and pityriasis lichenoides chronica, where toenail involvement predominated. These observations reinforce the importance of thorough nail examination in patients with papulosquamous disorders, as characteristic nail findings can provide valuable diagnostic clues and facilitate early recognition of disease-specific patterns. Furthermore, nail changes may reflect disease chronicity and inflammatory activity, emphasizing their role in comprehensive patient assessment and management.

The present study possessed several strengths. It systematically evaluated nail changes across a wide spectrum of papulosquamous disorders rather than focusing solely on psoriasis, thereby providing a comprehensive overview of nail involvement in these conditions. The correlation of cutaneous and nail manifestations enhanced diagnostic relevance and highlighted the practical importance of nail examination in routine dermatological practice. In addition, the study contributes valuable clinical and epidemiological data from a South Indian population, addressing a relative paucity of region-specific literature. However, certain limitations should be acknowledged. The study was conducted at a single tertiary care center, which may limit the generalizability of the findings. The relatively small sample size and cross-sectional design restricted detailed subgroup analysis and prevented assessment of the progression of nail changes and their response to treatment over time. Dermoscopic examination was not performed uniformly in all participants because of logistical constraints, and nail biopsy was not undertaken owing to patient reluctance, limiting histopathological confirmation in selected cases. Despite these limitations, the findings underscore the need for routine nail assessment in all patients with papulosquamous disorders. Future multicentric studies involving larger populations and prospective follow-up are recommended to better establish the relationship between nail involvement, disease activity, severity, and therapeutic response. Wider incorporation of dermoscopy into routine clinical practice and increased patient awareness regarding early nail changes may further improve diagnostic accuracy and facilitate timely intervention.

CONCLUSION

The present study demonstrated that nail involvement is a common and clinically significant feature of papulosquamous disorders, occurring in 71.7% of patients. Psoriasis showed the highest frequency of nail involvement, with pitting being the most common nail change. Distinct nail patterns were observed across different disorders and provided valuable diagnostic clues. These findings emphasize the importance of routine nail examination in patients with papulosquamous disorders, as nail changes may aid in diagnosis, reflect disease activity, and facilitate appropriate management. Incorporating systematic nail assessment, along with dermoscopy when available, can improve diagnostic accuracy and overall patient care.

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