

## An Analysis of the Clinical-Epidemiological Alterations in Nails in Various Dermatoses

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### Abstract:

**Background:** Approximately 10% of all dermatological problems are nail abnormalities. The nail unit may independently reflect dermatological illnesses and exhibit particular changes that serve as indicators for a variety of systemic disorders. Therefore, a physical examination is incomplete without a nail examination. A sizable fraction of dermatological problems are nail abnormalities. The nail serves as a window that offers crucial hints for any underlying, systemic, dermatological, and disorders. Despite the fact that evaluating the nails is a must for any cutaneous evaluation, it is a relatively underutilized appendage. Nail alterations may be a sign of underlying systemic disorders or infections in addition to being an aesthetic concern. Without prompt treatment, nail conditions may deteriorate, considerably interfere with everyday activities, and lower quality of life. The purpose of the study is to document the clinical range of nail problems, including those caused by congenital, developmental, infectious, neoplastic, degenerative, dermatologic, and systemic diseases. to research the full range of clinical nail problems, including those that are systemic, congenital, developmental, infectious, neoplastic, degenerative, dermatological, and infectious in nature.

**Aim:** This study was carried out to document the clinical pattern, determine the etiology, and identify risk factors for various nail changes.

**Material and Method:** This cross-sectional observational study was carried out in the dermatology department. A dermatological outpatient department (OPD) at a tertiary care hospital recruited 150 patients (of any age or gender) who presented with any type of nail irregularity for this study. A case record form was created to collect basic demographic data (such as age, gender, address, and occupation) and detailed history (such as the present symptoms and other similar cutaneous/mucosal/hair/nail problems related to toenails). A history was gathered to check for any past trauma, drug use, and chemical exposure. A complete cutaneous and orogenital examination was performed during the clinical assessment.

**Results:** In the current study, 100 randomly selected dermatology patients with nail abnormalities included 60 men (40%) and 90 women (60%) who visited the dermatology outpatient department. The ratio of men to women was 0.8:1. The age range from which the nail modifications were noticed was 5 years to 35 years. Most of the patients were in the age range of 4 to 74. Nail complaints made up 46.5% of the patients' presenting symptoms in this study; however, in the remaining patients, nail alterations were discovered while they were being examined for other dermatological or systemic illnesses. The most common nail complaints were the physical or structural changes of nails in 50.5% of the patients, followed by pain and discoloration.

**Conclusion:** This study affirms the significance of the nail as a crucial element of the overall dermatological assessment. The early detection of cutaneous/systemic diseases that have gone undiagnosed until now is made possible by a thorough history and meticulous inspection of the nails, accompanied by straightforward investigations. Holistic management strategies can benefit from the identification of risk factors for common conditions like onychomycosis and paronychia. Therefore, further study should be done on the nail unit so that it can be used as a diagnostic tool and understood better.

**Keywords:** Nail Disorders, Onychomycosis, Paronychia, Psoriatic Nail Changes.

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### Introduction

The phrase "face is the mirror of the mind" is also true of nails, which can reveal both internal and external sickness. The benefits of nails include helping with fine object handling, protecting the distal finger, enhancing fine touch sensitivity,

and improving the aesthetics of hands. 10% of all dermatological problems are nail abnormalities.[1] The critical first step in diagnosing a nail problem is the precise recognition and reporting of nail findings. Nail

problems are becoming more commonplace worldwide and are still spreading. Nails evolved as an extension of the human body as man evolved and his manual skill grew. Like hair, nails have evolved into objects of interest and ornamentation as civilization and social relations have advanced. The main purpose of the nail in a man is protection, but it also serves other purposes like scratching, manual dexterity, and sensory awareness. Any abnormalities that affect any part of the nail unit are considered nail diseases. The plate, matrix, bed, proximal and lateral folds, and hyponychium are all parts of the nail unit. Some definitions also include the underlying distal phalanx.[2] Although they are uncommon in childhood, nail diseases become more prevalent as people age and impact a significant portion of the elderly population. Specific alterations that are indicators for a variety of systemic illnesses may be seen in the nail unit.

A transparent window into the vascular nail bed is provided by the nail. The nail folds, origin at the matrix, and attachment to the nail bed keep it in place.[3] About 10% of all dermatological problems are nail abnormalities. Additionally, nail alterations might occasionally be presenting symptoms before other systemic illness symptoms become clinically apparent. Consequently, a comprehensive nail examination is necessary for any dermatological evaluation. The nail is still a little understood, neglected, but easily accessible structure.[4]

The nail unit performs a number of crucial tasks. It serves as the distal digit's mechanical tool and protection. Additionally, it is essential for picking up little things and has aesthetic appeal. It also improves touch. This functional unit can become severely disabled if it is disturbed. Common nail disorders found in clinical practice include brittle nail syndrome, onychomycosis, paronychia, nail psoriasis (NP), longitudinal melanonychia (LM), Beau's lines, onychomadesis, and retronychia.[5] For a precise diagnosis, a thorough history and clinical examination are required. A diagnosis may also need dermoscopy, imaging, histopathology, and mycological testing. Any abnormalities that affect any part of the nail unit are considered nail diseases. A nail plate, nail matrix, bed, proximal, lateral, and distal nail folds, as well as a hyponychium, are all components of the nail unit.[6] These structures can be impacted by genetics, skin conditions, infections, systemic illness, aging, drugs taken internally and externally, physical and environmental factors, trauma, and benign and malignant tumors. The critical first step in diagnosing a nail problem is the precise recognition and reporting of nail

findings.[7] Nail problems are becoming more commonplace worldwide and are still spreading. Only a few clinical signs can be projected by the nail as a whole.[8] It is to blame for the numerous distinct nail disorders' more or less comparable clinical presentations. Despite the fact that numerous earlier studies concentrated on specific nail conditions including nail psoriasis, onychomycosis, and nail tumors, there are very few published studies that address nails as a whole system.[9] Therefore, the goal of this study was to record numerous clinical patterns of nail changes and correlate them with various systemic and dermatological disorders.[10] Congenital, infectious, neoplastic, degenerative, dermatologic, and systemic diseases that impact the nail unit were among the clinical range of nail disorders that the study attempted to document.

### Material and Methods

This is a cross-sectional observational study conducted in the Department of Dermatology. This study was conducted at a tertiary care hospital that included 150 patients (irrespective of age and gender) presenting with any kind of nail abnormality to a dermatology outpatient department (OPD). A case record form was designed to obtain basic information on demographics (i.e., age, gender, address, and occupation) and detailed history (i.e., Presenting complaints and other associated cutaneous/nail/hair/mucosal complaints related to toenails, and associated cutaneous/mucosal/hair). History was taken for any trauma, drug intake, and contact with chemicals. Clinical examination constituted a thorough cutaneous and orogenital examination. A nail examination was carried out in detail, including the number of nails involved and the type of abnormality (i.e., nail shape, attachment, surface, and color).

Detailed history was taken and a thorough clinical examination was done. A written informed consent was obtained from all the participants.

### Investigations

The patients were subjected to the following investigations as per requirement: Routine investigations, such as a Hemogram test, biochemical evaluation, blood glucose, and human immunodeficiency virus (HIV) serostatus, were conducted in all patients. A skin biopsy was performed when it was required to confirm the clinical diagnosis. Special investigations, such as potassium hydroxide (KOH) (10%) mount and culture on Sabouraud's dextrose agar media, dermatophyte test medium in suspected cases of onychomycosis, serum vitamin B12 level in all cases of melanonychia, and serum ferritin level in all cases of koilonychia and platynychia, were conducted. A nail unit biopsy (nail bed and matrix) was performed

only on those cases presenting with isolated nail disease.

**Inclusion criteria**

- Patients of all age groups including children and both sexes with nail changes were taken up for the study

**Exclusion Criteria**

- Mentally challenged individuals and those unwilling or unable to give informed consent were excluded.

Nail diseases are far more than cosmetic concerns and can greatly impact the ability to perform daily activities. Clinical presentations of these nail conditions vary greatly and the ability to form a differential diagnosis can streamline diagnosis and initiation of treatment. A total of 150 cases with nail changes were subjected to the study. The age group of cases varied from 4 to 74 years. Duration of nail disorders ranged from 5 to 35 years. A variety of nail manifestations was noted in this study. All types of onychomycoses including proximal subungual type and superficial white onychomycosis were noted in the study. Nail changes in HIV, PPKD,

Pachyonychia congenital, systemic amyloidosis, and those with bleomycin were made note of. No malignant nail tumors could be documented in the study because of its short duration.

**Statistical Analysis**

The clinical and laboratory findings were recorded, and the data were analyzed using SPSS software (version 20.0). Qualitative data variables were expressed as frequency and percentage. The chi-square test/Fisher’s exact test was used to determine the association between the diagnoses with various qualitative data variables. Descriptive statistics and percentages were used to analyze the data.

**Result: -**

In the present study, the nature of nail alterations was seen in one hundred random dermatological patients with 60 males (40%) and 90 females (60%) with nail changes, attending the Dermatology Outpatient Department. Male to female ratio was 0.8:1. The minimum age at which the nail changes were observed was 5 years and the maximum was 35 years. The majority of patients were between 4-74 years.

**Table 1: Observed Nail Diseases (n = 150)**

Nail Diseases	No. (%)
Onychomycosis	37(24.6)
Psoriasis	30 (20.0)
Lichen planus	10 (6.6)
Paronychia	9 (6.0)
Vesiculobullous disease	6 (4.0)
Connective tissue disorder	7 (4.6)
Melanonychia (isolated)	6 (4.0)
Eczema	6 (4.0)
Leukonychia	3 (2.0)
Epidermolysis bullosa	2 (1.3)
Ichthyosis	2 (1.3)
Ingrown nail	2 (1.3)
Alopecia areata	3 (2.0)
Habit tic deformity	3 (2.0)
Koilonychia	3 (2.0)
Subungual Wart	3 (2.0)
Blue nail	2 (1.3)
Darier’s disease	2 (1.3)
Platynychia	2 (1.3)
Pityriasis rubra pilaris	2 (1.3)
Subungual hematoma	2 (1.3)
Tuberous sclerosis	2 (1.3)
Drug reaction	1 (0.6)
Erythroderma	1 (0.6)
Pyogenic granuloma	1 (0.6)
Pincer nail	1 (0.6)
Secondary syphilis	1 (0.6)
Vitiligo	1 (0.6)
Total	150 (100.0)

In this study, 46.5% of the patients had nail complaints as the presenting feature; however, in the remaining, nail changes were noted while evaluating for some dermatological or systemic disorders. The most common nail complaints were the physical or structural changes of nails in 50.5% of the patients, followed by pain and discoloration. Nail involvement secondary to

dermatological disease was the most common overall cause of nail involvement (45%), followed by nail infections (38%); nevertheless, systemic-, traumatic-, genetic-, and drug-related causes contributed to the remaining 17% of nail diseases. Overall, onychomycosis (24.6%) was the most common cause, followed by nail psoriasis (20%).

**Table 2. Correlation of Color Changes with Etiology of Nail Diseases (n = 80)**

	Onychomycosis	Psoriasis	Paronychia	LP (Lichen Planus)	Other	Total	Percentage (%)
Yellow	15	6	3	0	2	26	32.5
White	13	2	1	0	5	21	26.25
Black	5	2	0	3	11	21	26.25
Green	4	0	2	1	0	7	8.75
Blue	0	0	0	0	2	2	2.5
Red	0	0	0	0	3	3	3.75
Total	37	10	6	4	23	80	100.0

Nail discoloration was observed in 80 patients. The most common color change was yellow (n = 26; 32.5%) followed by black (n = 21; 26.25%), white (n = 21; 26.25%), green (n = 7; 8.75%), red (n = 3; 3.75%), and blue (n = 2; 2.5%). Nail discoloration was more common in onychomycosis as compared to all other causes of nail color changes. In the analysis of individual diseases, the most common nail change in psoriasis was pitting followed by subungual hyperkeratosis and onycholysis. The most common nail change in lichen planus was trachyonychia.

### Discussion

The nail plays a significant role in a number of dermatological conditions. The clinical nail variations are frequently seen in everyday practice. Even the smallest modification in a nail could raise suspicions in the age of the aesthetic consideration trend. Males were found to have a noticeably higher prevalence of nail disorders in the current investigation than females. A German study conducted in 2010[11] on 3531 patients with nail psoriasis showed that nail involvement was more prevalent in male individuals. The aforementioned findings agree with those of the current investigation. Males may have a higher frequency than females due to their higher level of outdoor activity and propensity to report to the healthcare system.

Additionally, men are probably more likely than women to have the majority of dermatological and/or systemic disorders that affect the nails. On the other hand, it was found in this study that the group with onychomycosis had more females than males. Similarly, the study of onychomycosis in 100 patients by **Bokhari et al. 1999**[12] reported a female predilection (female: 72% and male: 28%).

Due to their higher involvement in home chores and increased moisture exposure, Indian women may be more susceptible to developing a fungal infection than other women. This gender bias in onychomycosis may be a result of this.

This study evaluated the occupational risk of several nail infections and found a strong link between onychomycosis and occupation. The aforementioned results are in line with the results of a study conducted on 130 onychomycosis patients by **Gupta et al. in 2007**[13] indicating a higher prevalence of nail diseases among farmers. The present study found a high prevalence among manual workers and housewives, which might be attributed to increased sweat, a higher risk of trauma from one's job, exposure to soil saprophytes, and water exposure. Similar to the findings of the current study, another Indian study performed by **Kaur et al.2008**[14] reported that onychomycosis constituted 20 - 30% of all onychopathies.

A study on 1728 patients with nail psoriasis conducted by **De Jong et al.1996**[15]demonstrated pitting to be the most common nail manifestation; however, it was not possible to find any study reporting the proportion of nail pitting among individuals presenting with various nail changes.

**Kaur et al. 2008**[14] in their study conducted on 167 psoriasis patients and **Ghosal et al.2004**[16] observed pitting to be the predominant nail change, followed by onycholysis and subungual hyperkeratosis. These observations were similar to those reported by the present study. The study carried out by **Tosti et al.2001**[17] showed longitudinal ridging (10/15) as the most common nail finding, followed by trachyonychia (2/15) in lichen planus. **Kanwar and De 2010**[18] observed longitudinal ridging as the most common finding in

17% of patients, followed by pitting in 15% and thinning of the nail plate in 9% of patients.

Physical and psychological impairments brought on by nail psoriasis have a substantial detrimental impact on quality of life. The cosmetic impairment caused by nail psoriasis can occasionally be so severe that patients seek to hide their hands and/or feet or avoid social and professional situations. Pitting, onycholysis, subungual hyperkeratosis, and splinter hemorrhages are signs of nail alterations in psoriasis.[19] According to our analysis, the most typical sign of nail psoriasis is pitting. Pits are more prevalent in fingernails than toenails.[20] These superficial nail plate depressions are signs of anomalies in the proximal nail matrix. When psoriasis affects the proximal nail matrix, parakeratotic cells that normally keratinize the stratum corneum are disrupted.[21] As the nail develops, these cells become visible and are sloughed off to create coarse and widespread pits. A subacute, chronic dermatosis known as lichen planus (LP) is characterized by small, flat-topped, glossy, polygonal violaceous papules that may group together to form plaques.[22] 10% of people with generalized LP have specific nail abnormalities.[23] The proximal nail fold's bluish-red staining is a sign of an early alteration. Onychorrhexis, distal splitting (onychoschizia), pterygium development, focal or diffuse thinning, koilonychia, increased longitudinal ridging, and proximal onycholysis are symptoms of severe instances.

Nail modifications go beyond simple aesthetic issues. Damage to the nails can significantly affect daily functioning and lower quality of life. The examination of the nails can shed light on a variety of systemic infections and diseases. Understanding the clinical signs and symptoms of common nail problems can speed up diagnosis and treatment while preventing further nail damage. In order to prevent additional nail damage, treatment should include patient education as well as a focused strategy depending on the etiology.

#### Conclusion:

This study affirms the significance of the nail as a crucial element of the overall dermatological assessment. The early detection of cutaneous/systemic diseases that have gone undiagnosed until now is made possible by a thorough history and meticulous inspection of the nails, accompanied by straightforward investigations. Holistic management strategies can benefit from the identification of risk factors for common conditions like onychomycosis and paronychia. Therefore, further study should be done on the nail unit so that it can be used as a diagnostic tool and understood better. Nails continue to be a little understood yet easily accessible structure that

invites investigation and assessment. Infections were found to be the most prevalent ailment in our study. To preserve cleanliness and avoid infections, it is crucial to keep the nails clean, dry, and clipped. The nail has emerged as an aesthetic concern in today's well-established cosmetology sector and requires additional research for preventive treatments.

#### References: -

1. IADVL Textbook of Dermatology, third edition.
2. Kaur R, Kashyap B, Bhalla P. A five-year survey of onychomycosis in New Delhi, India: Epidemiological and laboratory aspects. *Indian J Dermatol* 2007;52:39-42.
3. Baran R, de Berker DA, Holzberg MT. Baran & Dawber's diseases of the nails and their management. Chichester, West Sussex, UK: John Wiley & Sons; 2012;4.
4. Raja Babu KK. Nail and its disorders. In: Valia RG, Valia AR, editors. IADVL Textbook and atlas of dermatology. 2nd ed. Mumbai: Bhalani Publishing House; 2001.
5. Nageshwaramma S, Kumari GS, Vani T, Ragini P, Glory GR. A clinical-epidemiological study of nail changes in various dermatoses. *IOSR J Dent Med Sci* 2016;15(3):1-6.
6. Veer P, Patwardhan N S, Damle A S. Study of onychomycosis: prevailing fungi and pattern of infection. *Indian J Med Microbiol* 2007;25(1):53-56.
7. Scher RK, Daniel CR. eds. Nail: Therapy, Diagnosis, Surgery. Philadelphia: Saunders, 1997;2:3.
8. Alejandra Iglesias. Lourdes Tamayo, Cristina Sosade-Martínez, Carola Durán-McKinster, Luz Orozco Covarrubias, Ramón Ruiz-Maldonado. Prevalence and Nature of Nail Alterations in Pediatric Patients. Article first published online: 2001.
9. Van de Kerkhof PC, Pasch MC, Scher RK, et al. Brittle nail syndrome: a pathogenesis-based approach with a proposed grading system. *J Am Acad Dermatol*. 2005;53(4):644-651.
10. Iorizzo M, Pazzaglia M, Piraccini BM, et al. Brittle nails. *J Cosmet Dermatol*. 2004;3(3):138-144.
11. Schons KR, Knob CF, Murussi N, Beber AA, Neumaier W, Monticelio OA. Nail psoriasis: a review of the literature. *A Bras Dermatol*. 2014;89(2):312-7.
12. Bokhari MA, Hussain I, Jahangir M, Haroon TS, Aman S, Khurshid K. Onychomycosis in Lahore, Pakistan. *Int J Dermatol*. 1999;38(8):591-5.
13. Gupta M, Sharma NL, Kanga AK, Mahajan VK, Tegta GR. Onychomycosis: Clinico-mycologic study of 130 patients from Himachal

- Pradesh, India. *Indian J Dermatol Venereol Leprol.* 2007;73(6):389–92.
14. Kaur R, Kashyap B, Bhalla P. Onychomycosis—epidemiology, diagnosis and management. *Indian J Med Microbiol.* 2008;26(2):108–16.
  15. De Jong EM, Seegers BA, Gulink MK, Boezeman JB, van de Kerkhof PC. Psoriasis of the nails associated with disability in a large number of patients: results of a recent interview with 1,728 patients. *Dermatology.* 1996;193(4):300–3.
  16. Ghosal A, Gangopadhyay DN, Chanda M, Das NK. Study of nail changes in psoriasis. *Indian J Dermatol.* 2004;49(1):18.
  17. Tosti A, Piraccini BM, Cambiaghi S, Jorizzo M. Nail lichen planus in children: clinical features, response to treatment, and long-term follow-up. *Arch Dermatol.* 2001;137(8):1027–32.
  18. Kanwar AJ, De D. Lichen planus in children. *Indian J Dermatol Venereol Leprol.* 2010;76(4):366–72.
  19. Dogra A, Arora AK. Nail psoriasis: The journey so far. *Indian J Dermatol* 2014;59:319-33.
  20. De Berker DA, Baran R. Disorders of Nails. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. *Rook's Textbook of Dermatology*, Oxford: Willey Blackwell; 2010;8:23-6.
  21. Zaias N. Psoriasis of the nail unit. *Dermatol Clin* 1984;2:493-505.
  22. Lever WE, Schaumberg-Lever G. *Histopathology of the Skin*. Philadelphia: JB Lippincott Company 1990; 7:168-175
  23. Samman PS. The nails in lichen planus. *Br J Dermatol.* 1961;73:288-92