Observational Study

Dermatoscopic evaluation of nail changes in psoriasis

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Dermatoscopy is a newer modality of investigation to evaluate nail changes. The present study was conducted to assess the patterns of nail changes in patients of psoriasis by dermatoscope and to differentiate psoriatic nail changes and other nail disorders. Prevalence of nail changes was found to be 10.22% among all cases of psoriasis. Male agricultural workers in their fifth decade were commonly affected. Chronic plaque psoriasis was the most common clinical type of psoriasis seen in 74.69% followed by scalp psoriasis in 6.79%. Hypertension and diabetes mellitus were observed in 37.65% and 20.37% of cases respectively. Nail bed changes were the most frequently encountered seen in 89.51% followed by nail matrix changes (74.69%). Out of all nail bed changes, onycholysis was the most common morphological defect visible to naked eye (69.92%) whereas splinter hemorrhage was the most common change visible by dermatoscope (75.86%). Pitting was the most common change observed both by naked eye and dermatoscope.

[*J Indian Med Assoc* 2018; **116:** 34-8]

Key words **: Psoriasis, nail changes, dermatoscopy.**

Psoriasis is a chronic, recurrent, immune mediated inflammatory skin disease which affects about 1.5-3% of the world's population with an apparently equal sex incidence[1,2]. Various genetic components and several environmental factors like infections are postulated to play important roles in the different types of presentation of the disease, most commonly as chronic, symmetrical, erythematous, scaly papules and plaques[3].

Lifetime incidence of nail involvement in psoriatic patients is estimated to be 80-90%, being common in the males and in the persons with higher bodyweight[4,5]. Concurrent nail psoriasis is seen inapproximately 10-78% of patients with cutaneous psoriasis, while 5-10% of patients having isolated nail involvement without any skin lesions[6-9].

The involvement of nails is frequent in psoriasis and the clinical spectrum is very heterogeneous depending on the involvement of the nail bed, matrix or folds[10]. Nail matrix involvement leads to coarse nail pitting (most common finding of nail psoriasis), dystrophy of nail and leukonychia. Nail bed alterations are onycholysis, subungual hyperkeratosis, splinter hemorrhages, oil drop/salmon patches, thickening of nail plate, whereas nail fold involvement results in paronychia. Combined nail matrix and nail bed psoriasis may develop psoriatic crumbly nail[11]. Psoriatic nails constitute a risk factor for secondary mycotic infections, which can occur in up to 27% of the cases[12].

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Nail psoriasis is thought to be associated with severe form of skin involvement and prolonged duration of skin lesions.

Nail dermatoscopy is a recent modality of investigation for the diagnosis of nail disorders being performed with hand held or video dermatoscope. Both clinical as well as dermatoscopic findings in nail psoriasis depend on the part of the nail unit affected. The nail matrix characteristics include pitting, longitudinal or transverse ridges and nail plate crumbling and characteristic nail bed changes are onycholysis, salmon patch and splinter hemorrhages[13].

Although nail psoriasis affects a substantial proportion of psoriasis patients and causes significant psychological distress, few epidemiologic data characterizing patients with nail involvement are available. Nevertheless, insufficient studies are available to validate use of a dermatoscope and a lack of evidence to recommend it as an alternative or substitute for nail biopsy.

Aims & Objectives :

The study objective was

- To assess the patterns of nail changes in patients of psoriasis both by naked eye and a dermatoscope
- To visualize subtle nail changes and to differentiate psoriatic nail changes and other nail disorders

Materials and Methods

It was a hospital based cross-sectional study conducted from October 2014 to October 2016 where all patients clinically diagnosed with psoriasis with nail changes attributable to psoriasis attending the OPD and indoor were included.

Patients who had received any systemic treatment for

psoriasis for at least one month before enrollment and those under any other treatment inducing or aggravating psoriasis were excluded from the study.

Detailed history regarding demographic details such as (age, sex, educational status, socioeconomic status), duration of skin and nail involvement, family history of psoriatic nail changes and presence of any other co morbidities other than psoriasis were recorded.

All cases enrolled into the study were subjected to clinical examination as general examination,Body mass index (BMI), Systemic examination, Dermatological examination- included assessment of type and severity of psoriasis according to psoriasis area and severity index (PASI).

Nails were examined both by naked eye and with a dermatoscope and Nail Psoriasis Severity Index was calculated.

Observation

In the present study, 1589 patients had psoriasis, out of 54607 patients who visited the OPD during the study period, making the prevalence of psoriasis up to 2.91%.

The prevalence of nail involvement among 1589 psoriasis patients was calculated to be 10.22% as 162 patients were found to have some degree of changes in nails attributable to psoriasis and were included in the study as cases.

In our study, majority of patients were male 94(58.03%) outnumbering females, with male: female ratio of 1.38: 1(94/68) (Table 1).

Table 1 — *Age Distribution of Cases*

Age (in years)	No of cases	Percentage
0 – 10	5	3.08
11 – 20	11	6.79
21 – 30	19	11.72
31 – 40	28	17.28
41 – 50	51	31.48
51 – 60	32	19.75
>60	16	9.87

Most of the patients were in the age group 41-60 years (51.23%). Mean and median ages were found to be 43.41±14.82 years and 46 years respectively.

Out of 162 patients, 99(61.11%) patients hailed from urban area and 63(38.89%) patients from rural areas (Table 2).

Table 2 — *Occupation, Educational & Socio Economic Status*

	No of Cases	Percentage
Occupation :		
Farmer	47	29.01
Office worker	31	19.14
Housewife	34	20.99
Businessman	29	17.9
Unemployed	21	12.96
Educational Status :		
Illiterate	13	8.02
Primary	37	22.84
Secondary	63	38.89
Higher	49	30.25
Socio-economic Status :		
Lower	19	11.73
Upper Lower	33	20.37
Lower middle	47	29.01
Upper middle	41	25.31
Upper	22	13.58

Among various occupations, farmers comprised of 47(29.01%) significant number of cases followed by housewives 34(20.99%) and office workers 31(19.14%). Majority of patients 63(38.89%) had studied up to secondary level while 49(30.25%) had completed graduation or above. Majority of patients 47(29.01%) belonged to lower middle socio-economic group. 41(25.31%) patients had upper middle and 33(20.37%) had upper lower status (Table 3).

Amidst different morphological patterns of psoriasis, patients of chronic plaque psoriasis 121(74.69%) constituted highest number followed by scalp psoriasis 11 (6.79%) and psoriatic erythroderma, isolated nail psoriasis 9(5.55%) each.

Table 3 — *Clinicaltypes of Psoriasis*

Sl no	No of cases	Percentage
Chronic plaque	121	74.69
Erythrodermic	9	5.55
Isolated Scalp psoriasis	11	6.79
Guttate	7	4.32
Inverse psoriasis	5	3.09
Isolated nail psoriasis	9	5.55

Mean duration of skin involvement and nail involvement were found to be 20.21±11.04 years and 13.97±10.59 years respectively. Similarly median durations were of 21years and 15 years respectively. Out of total 162 patients, 31(19.13%) patients had family history of psoriasis with nail involvement (Tables 4 & 5).

Table 4 — *PASI and Nail Changes*

PASI	No of Cases	Percentage
<10	31	20.26
10 – 20	90	58.82
>20	32	20.91

Out of all cases, 61(37.65%) were hypertensive, 37(22.84%) patients had deranged lipid profile while 33(20.37%) showed having DM. Other co-morbidities were found in the form of dermotophytic skin infections, chronic kidney disease, lichen planus and chronic obstructive pulmonary disease.

Table 5 — *Showing Co-morbidities*

Types of Diseases	No of Cases	Percentage
DM	33	20.37
HTN	61	37.65
Hyperlipidaemia	37	22.84
CKD	04	02.46
Lichen planus	03	1.85
Dermatophytic skin infection	13	8.02
COPD	07	4.32

Out of 162 people who were included in the study, diagnosis of psoriatic changes of nail was made of only with the help of a dermatoscope in 29(17.9%) cases while in rest the changes were visible by naked eye.

While only finger nails were involved in 32(19.75%) patients, exclusively toe nail involvement was seen in 19(11.72%) patients (Table 6).

In our study, majority of patients 61(37.65%) had up to 6 -10 number of nails involved followed by 47(29.01%) of cases who had involvement of more than 10 number of nails.

Table 6 — *Number of Nails Involved*

No of Nails Involved	No of Cases	Percentage
1	22	13.58
2-5	32	19.75
6- 10	61	37.65
>10	47	29.01

Out of 162 patients enrolled in the study, nail bed involvement was seen in maximum number of cases which is 145(89.51%) followed by nail matrix and nail fold changes which were 121(74.69%) and 31(19.13%) respectively (Table 7).

Table 7 — *Nail Changes*

Nailbed changes	visible to naked eye	visible in dermatoscope	Nailmatrix changes	visible in naked eye	visible to dermatoscope
Subungual hyperkeratosis	41	7	Pitting	83	19
Onycholysis	93	18	Leukonychia	28	14
Splinter hemorrhage	37	22	Red spots	25	11
Salmon patch	29	19	Crumbling	71	02

Onycholysis in 93(69.92%) was found to be the frequently visible nail bed changes to the naked eye. Subungal hyperkeratosis was seen in 41(30.82%) and salmon patch in 29(21.81%)

When nail bed changes were visualized through a dermatoscope splinter haemorrhages were the most common in 22(75.86%) cases amidst the other nail bed changes.

In the current study, pitting was seen in 83(62.41%) cases making it the commonest nail matrix change, visible to naked eye followed by crumbling of nail, which was observed in 71(53.38%) cases.

Pitting in form of micro pits was the distinct nail matrix change observed by a dermatoscope in 19(65.51%) cases followed by leukonychia in 14(48.27%) cases (Table 8).

Table 8 — *Showing NAPSI*

NAPSI	No of Cases	Percentage
<40	126	77.77
40 – 80	33	20.37
81 – 120	3	1.85
>120	0	0.00

NAPSI value, being the most common tool to assess severity of nail changes when used in our study up to 126(77.77%) cases had values in between 0 to 40 (Table 9).

Table 9 — *Presence of other Concurrent Nail Diseases*

Other Nail Diseases	No of Cases	Percentage
Onychomycosis	69	42.59
Traumatic onycholysis	39	24.07
Pterygium	11	06.79
Others	3	1.85

Onychomycosis in 69(42.59%) cases, traumatic onycholysis in 39(24.07%) cases were the commonest nail diseases which were simultaneously present with the psoriatic nails.

Symptoms of psoriatic arthritis were evident in 33(20.37%) patients, while in rest of the patients, any history of such symptoms could not be traced out.

Discussion

Psoriasis is a chronic, noncontagious inflammatory disease with variable morphology, distribution, severity, and course.Its prevalence was estimated to be approximately 2-3% as observed by Schon P *et al* in 2005 and Gudjonsson JE *et al* in 2006 which was comparable in our present study of prevalence being 2.91%[14,15]. However various Indian studies conducted by Bedi in 1977 and Kaur I et al in 1986 found the prevalence to be 0.8% and 1.4% respectively which assumably could be due to small sample size[16,17].

Various authors like Calvert HT *et al* in 1963, de Jong EM *et al* in 1996, Salomon J *et al* in 2003 had proposed the nail involvement in psoriasis cases could be 10 to 78%[6-8]. In our study the prevalence of nail involvement was found to be 10.19%. A German study by Augustin M *et al* in 2010 with a larger sample size of 3531 psoriasis patients found prevalence of nail involvement to be 40.9%[18].

Out of 162 cases of psoriasis patients with nail changes in our study, 94(58.03%) were males and 68(41.97%) were females. Therefore, a male preponderance was observed which is in accordance with the result of German study conducted by Augustin M *et al* (64.33% male), Malaysian study by Yap FB *et al* (Male 61.3%) in 2010[18,19]. However Schons KR *et al* in 2015 in his study observed a slight female preponderance[20]. Psoriasis is believed to be an immunologically mediated disorder with equal sex distribution and a higher incidence in males possibly reflects the trend in health seeking behavior in developing countries like India.

In our study, mean and median ages were calculated to be 43.41±14.82 years and 46 years respectively. The findings are quite proportionate to the results obtained by Klaassen KM *et al* in 2014 in Netherland (mean age 51.5±15.0 years) and Schons KR *et al* in 2015(mean age 51.8±15 years)[20,21]. Most of the cases belonged to 41-50 years age group (51 patients) in our study which could be attributed to increase economic independence and ability to spend on healthcare during that decade.

As far as the locality distribution of the cases concerned, 99(61.11%) patients hailed from urban area while 63(38.89%) patients from rural areas. This could be due to more stress, sedentary lifestyle with unhealthy addictions and also more treatment aspiring behaviour in urban people.

In a Brazilian study, Schons KR *et al* in 2015 in plaque psoriasis patients with nail changes observed farmers comprising 33.8% of cases followed by housekeepers 16.9% and sellers 10.7%[20]. Similarly in our study, farmers comprised of 29.01% cases followed by housewives 20.99%, office workers 19.14% and businessmen 17.9%. This could be due to ethnic, economic and geographic difference between two countries.

Out of 162 cases, 13(8.02%) were found to be illiterate, 37(22.84%) had completed primary level of education, 63(38.89%) had attained a secondary school while 49(30.25%) cases were graduates or post graduates.

In Netherland, Klassen KM *et al* in 2013 observed out of 963cases of nail psoriasis patients, 68.7% cases had plaque psoriasis[22]. Similarly, plaque psoriasis was seen in 74.69% of cases in our study. This mild variation probably could be due to smaller sample size in our study. Nail involvement without any skin changes was seen in 5.55% of cases similar to the observation by Jiaravuthisan MM *et al* in 2007 and de Berker D *et al* in 2009, where both the authors proposed incidence of isolated nail psoriasis to be 5%[3,9].

The Malaysian study conducted by Yap FB et al in 2010 showed 16.4% of psoriatic patients with nail involvement had positive family history[19]. Our study also obtained a resembling result ie, 19.13% patients had similar disease in family members.

Assessing psoriasis area severity index (PASI) in his German study in 2010, Augustin M et al witnessed 15.6% of women and 21.4% of men had PASI score more than 20[18]. Being quite analogous to the above results, 20.91% of people had PASI score above than 20 in our study. But in contrast, Schons KR *et al* in his study in 30 patients with nail changes attributable to psoriasis found 53.3% of them having PASI value less than 10, while it was 20.26% in our study, most possibly due to larger sample size in ours[20].

Taking various co-morbidities in account, in our study 61(37.56%) patients were hypertensive, 37(22.84%) patients had abnormal lipid profile, 33(20.37%) patients suffered from diabetes mellitus, 13 (8.02%) patients had dermatophytic skin infections, 7 (4.32%) patients were diagnosed as having COPD while 4 (2.46%) patients had chronic kidney disease and 3 (1.85%) patients had lichen planus. While these co-morbidities were seen in 60.49% of patients in our study, much the same results were obtained in study of Schons KR *et al* in 2015 where 63.3% patients having nail changes suffered from other co-morbid conditions[20].

Out of 162 patients in our study, diagnosis of nail changes attributable to psoriasis could be only made with a help of a dermatoscope in 29(17.9%) patients while in rest 133(82.09%) patients, the changes were gross and could be easily distinguished by naked eye.

While involvement of both finger and toe nails was observed in 111(68.52%) patients, isolated finger nails and toe nails involvement was visualized in 32(19.75%) and 19(11.72) patients respectively. Schons KR *et al* also obtained comparable results ie, both finger and toe nail involvement in 70% and isolated finger and toe nail involvement were seen in 20% and 10% of patients respectively[20]. Klassen KM *et al* in 2013 also mentioned 62% cases had both finger and toes involvement while only changes in finger nails and only toe nail changes were seen in 25.3% and 11.2% of cases respectively[21].

Single nail involvement was seen in 22(13.58%) patients while 20 nails changes were seen in 44(27.16%) patients in this study having resemblance to findings of an Indian study by Grover C *et al* in 2005, where the number of nails affected varied from all 20 nails (29%) to a single nail (19%)[22].

Among various components of nail, nail bed was involved in 145(89.51%) cases followed by nail matrix in 121(74.69%) of cases and nail fold in 31(19.13%) patients. Grover C *et al* in 2005 and Kaur I *et al* in 2001 in their studies had found out nail fold involvement in 21.42% and 33.3% of cases, much the same of our study[22,23].

Bedi in his study in 1977 noted nail changes in descending order of frequency, which were pitting, thickening of nail plate, partial onycholysis, subungual hyperkeratosis, yellow-brown discoloration, paronychia, and complete onycholysis[16]. Kaur I *et al* in her study in 2001 in 167 psoriasis patients over a 5years, mentioned pitting to be the most common nail change, followed by onycholysis, discoloration, subungual hyperkeratosis, longitudinal ridging and thickening of the nail plate[23]. Evident nail bed changes observed in study of Grover C *et al* in 2005 were distal onycholysis (76%), subungual hyperkeratosis (33%) and salmon patch (14%) while in study of Klassen KM et al in 2013 changes were onycholysis (57.7%), salmon patch (41.4%), Subungual hyperkeratosis (33.6%) and Splinter haemorrhages (13.5%)[20,21]. While examining nail bed changes in 162 patients in our study both by naked eye and dermatoscope, resembling to above studies onycholysis was seen in 111(68.51%), subungual hyperkeratosis in 48(29.63%), salmon patch in 36(29.63%) and splinter hemorrhage in 59(36.42%) patients.

Prominent clinical nail matrix findings in the observed nails in study of Grover C *et al* in 2005 were discoloration of the nail plate (67%), fine pitting (52%), ragged cuticle with nail fold erythema and scaling (48% each), while in study of Klassen KM *et al* in 2013 obtained results were pitting in 65.4%, leukonychia in 32.1%, red spots in 6.5% of patients[20,21]. Nail matrix changes evident in our study both by naked eye and dermatoscope were pitting 102(62.96%), leukonychia 42(25.92%), red spots in lunula 36(22.22%) and crumbling of nail plate in 73(45.06%) which were quite homologous to the above studies.

When NAPSI as proposed by Rich P *et al* was calculated, 126(77.77%) patients had value in the range of 0-40 followed by 33(20.37%) patients had values from 40 to 80 and 3(1.85%) patients had values within 80 to 120[24].

Natarajan V *et al* in 2010 mentioned about having 47.91% patients with psoriatic nails had onychomycosis[25]. Similarly in our study, 69(42.59%) patients had onychomycosis and 39(24.07%) patients had history of trauma to nails.

In the Malaysian study of Yap FB *et al* in 2010 evidence of psoriatic arthritis was revealed in 20.8% homogenous to our study where this was evident in 20.37%[19]. Augustin M *et al* in 2010 in his German study found 28.7% women and 24.4% men with nail changes had psoriatic arthritis[18]. However in study of Schons KR *et al* in 30 patients, the arthritis involvement had been seen in 43.3% patients[20].

Nail involvement in psoriasis is a marker for more severe cutaneous manifestations and joint involvement. Dermatologists should be familiar with the different clinical presentations of nail changes in psoriasis for an early diagnosis and a more precise determination of patient prognosis. The quantitative assessment of nail psoriasis also allows for a more objective evaluation of the evolution of the disease. Dermatoscope, being a handy, economical, feasible, easily adaptable instrument should hold it place high as a treasured possession in day to day or OPD practices to visualize every subtle nail changes discernible to naked eyes.

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