

Original Research Article

A Study on the Pattern of Nail Changes and Nail Disorders in Geriatric Patients in a Tertiary Care Hospital in a Rural Setting

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Abstract: Various physiological and disease associated changes and disorders are seen in the aging nail. Nails growth rate is slow among elders. Additionally, as age advances; nail plate appears pale, dull & opaque. Symptoms, signs and treatment options of these changes and disorders in the elderly will enable better assessment and management of disorders, in particular, various degenerative and onychologic concerns. 200 Patients aged 60 years or more, of both sexes, with nail changes are included, detailed clinical history regarding onset, duration and associated symptoms were analyzed. 200 patients aged 60 years & above were enrolled in study, majority of them 169 (84.5%) belonged to the age group of 61-70 years. Male: female was 3:2. The common occupation was agriculture workers 86 (43%), 138 (69%) were from rural background. Dull and opaque nails (188/200) were noted commonly. This study showed that the evaluation of nails is an important, as nail changes may reveal the clue and at times may lead to the diagnosis of the hidden internal systemic disorder. Thus nails are considered as the markers or windows for a wide range of systemic disorders.

Keywords: Nail changes, geriatric age group

INTRODUCTION:

Nail disease can be a both physical and social disability. Nail disorders comprise approximately 10% of all dermatological conditions. Nails are important appendages of the skin both functionally as well as cosmetically. Nails are indicators of health and markers of disease, nail cosmetology as it is evolving today are a fairly recent development [1]. Nail plate acts as protective covering for the fingertip [4]. Nail may be regarded as a window which often gives a clue to the diagnosis of many internal disorders [1]. Abnormal nails are of significant clinical importance, especially when they are the only presenting feature without any other apparent signs and symptoms of a systemic disease. Any portion of the nail unit may get affected by various dermatological conditions. The nail unit is a readily accessible appendage that lends itself for easy examination and evaluation. No physical examination is complete without the study of nails, because often the nail is a mirror of the underlying systemic disorders. Despite nails playing such an important role, they remain understudied and underutilized in clinical practice. Normally nails grow at an average rate of 0.1 mm per day. Rate of nail growth is inversely

proportional to the age. In the elderly, nails grow at a slower rate [1]. Senile nails are susceptible to abnormal biomechanics, trauma, infections, neoplasms, concurrent dermatological or systemic diseases and their treatments [5]. Impaired circulation, commonly due to arteriosclerosis also plays a significant role. Many of these are painful, affecting stability, ambulation and other functions like picking up of fine objects, tactile sensation, and protective function [5, 2]. The prevention and management of these conditions require periodic cutting of the nails and appropriate medical care [2, 3]. Not many studies are available from our country on nail changes and the prevalence of nail disorders in the elderly. We have, therefore, undertaken this study to assess the nail changes and/ or disorders in geriatric patients attending Medi Citi Institute of Medical Sciences, their importance and associations with various dermatologic and systemic disorders.

METHODOLOGY:

This study, a Cross sectional observational hospital based study was performed in Medi Citi Institute of Medical Sciences, Ghanpur for one & half year, from January 2014 to June 2015. All the patients

aged 60 years or more, of both sexes, with nail changes who attended the op or admitted in wards of MIMS were taken up for study. Institutional ethical clearance was obtained from the institutional review board before the start of the study. All elderly patients with nail changes were included in the study after taking informed consent. A detailed history was elicited to detect the onset, duration and progression of nail changes / disorders, their location, occupational and / or environmental exposures, precipitating and / or alleviating factors like cosmetics, medications, trauma, emotional and stress factors, other cutaneous or systemic disorders etc. Necessary investigations like KOH (potassium hydroxide) mount examination of the nail clippings, nail culture, nail biopsy, complete hemogram, urine analysis and any other investigations needed to evaluate for associated systemic diseases were carried out in selected cases. A thorough dermatological and systemic examination was conducted. Routine investigations like CBC, ESR, platelet count, complete urine examination, blood urea, and serum creatinine were done. Special investigations like nail clipping for bacteriological and fungal infection nail biopsy and skin biopsy were carried out.

RESULTS:

This study comprised of 200 patients of 60 years and above with nail changes who attended Medi Citi Institute of Medical Sciences.

Table 1: Age and sex distribution

Age (in years)	Male	%	Female	%	Total patients	Total %
61-70	102	51	67	33.5	169	84.5
71-80	14	7	10	5	24	12
81 and above	4	2	3	1.5	7	3.5
Total	120	60	80	40	200	100

In the present study out of 200 geriatric patients with nail changes, majority were males 120 (60%) & were in the age group of 61-70 years 102 (51%). 80 (40%) patients were females among whom 67 (33.5%) of females were in the age group of 61-70 years. There is no significant difference in sex distribution of nail disorders according to “The American Academy of Dermatology’s Guidelines / Outcomes Committee for care of nail disorders [5]. However in this study there was male preponderance with the male: female ratio of 3:2. This may be due to a reason that males tend to seek early medical attention compared to females.

Table 2: Distribution of patients according to occupation

Occupation	Number (200)	% (100)
Agricultural workers	86	43
Retired men/House-wife	52	26
Manual laborer	42	21
Sedentary worker (office)	8	4
Business	9	4.5
Others (Teacher) etc.	3	1.5

Out of total number of 200 cases in the study nail changes among geriatrics were found in 86 agriculture workers (43%). A number of nail changes in this study were related to the occupation as majority of patients gave history of repeated trauma and soaking in water for long duration (agricultural workers in fields).

Table 3: Distribution of patients according to residence

Residence	Number (200)	Percentage %
Rural	138	69
Urban	62	31
Total	200	100

Of 200 cases in the study 138 patients (69%) were from rural background. The rest of 62 (31%) of patients were from urban areas. This may be due to a population bias as most of the patients belong to rural community i.e., 138 (69%) and 62 (31%) belonged to urban areas, as a gender bias especially from rural area

Table 4: Spectrum of nail changes among patients

Nail changes	Number of patients
Dull / Opaque nails	188
Subungual hyperkeratosis	182
Altered contour	169
Longitudinal ridging	167
Brittle nails	126
Onychomycosis	121
Ragged cuticle	105
Thickening	102
Alunula	100
Onycholysis	97
Onychorrhexis	84
Clubbing	49
Chromonychia	44
Onychoschizia	37
Pitting	36
Beau’s lines	27
Thinning	21
Paronychia	19
Onychoptosis	19
Pterygium inversum unguis	11
Shiny nails	09
Onychomadesis	03
Anonychia	01
Brachyonychia	01

Out of total number of 200 cases in the present study, dull and opaque nails were present in maximum number of individuals (188/200). Other such senile nail changes and disorders seen in this study are subungual hyperkeratosis, altered contour, longitudinal ridging, brittle nails, onychomycosis, ragged cuticle, thickening, alunula, onycholysis, and onychorrhexis. Other least common nail changes were clubbing, chromonychia, onychoschizia, pitting, beau's lines, thinning, paronychia, onychoptosis, pterygium inversum unguis, shiny nails, onychomadesis, anonychia and brachyonychia.

Table 5: Types and distribution of altered contour

Altered contour	Number of patients (169)
Koilonychia	56
Platyonychia	42
Trachyonychia	34
Dystrophic nails	27
Pincer nails	10

Altered contour was present among 169 patients out of 200 patients in this study. Varied types of altered contour nails were koilonychia (56), platyonychia (42), trachyonychia (34), dystrophic nails (27) and pincer nails (10).

Table 6: Types and distribution of chromonychia

Chromonychia	Number of patients (44)
Neapolitan nails	21
Leukonychia	12
Melanonychia	06
Half and half nails	03
Terry's nails	02

Chromonychia was seen in 44 individuals among 200 patients. Various patterns of chromonychia seen were Neapolitan nails (21), leukonychia (12), melanonychia (6), half and half nails (3) and terry's nails (2).

Table 7: Types and distribution of nail thickening

Nail changes	Number of patients
Onychauxis	62
Pachyonychia	24
Hemionychogryphosis	09
Onychogryphosis	07
Total thickened nails	102

Out of 200 patients in this study thickened nails was seen in 102 patients among whom the different patterns are onychauxis (62), pachyonychia (24), hemionychogryphosis (9) and onychogryphosis (7).

Table 8: Nail changes associated with cutaneous/systemic diseases

Nail changes	Number of patients	Number of patients with associations	Associated disease	Number of patients with each associated disease
Subungual hyperkeratosis	182	88	Eczema Psoriasis Onychomycosis Subungual warts	38 21 17 12
Onycholysis	97	66	Anemia Psoriasis Fungal infection Occupational trauma Pellagra Leprosy Thyroid disease	22 17 08 06 05 04 04
Koilonychia	56	42	Anemia/Malnutrition Psoriasis Dermatophytosis Coronary disease Crohn's disease	33 04 03 01 01
Half and half nails	03	01	Renal disease	01
Anonychia	01	01	Lichen planus	01

Clubbing	49	37	Malnutrition Cirrhosis Respiratory disease Cardiac disease Crohn's disease	24 06 04 02 01
Pitting	36	28	Psoriasis Atopic eczema Alopecia	17 07 04
Trachyonychia	34	21	Lichen planus Alopecia Psoriasis	13 05 03
Dystrophic nails	27	18	Lichen planus Onychomycosis Trauma	09 05 04
Beau's lines	27	17	Trauma Eczema Respiratory disease Renal disease	10 04 02 01
Pincer nails	10	04	Psoriasis Onychomycosis	03 01
Melanonychia	06	04	Trauma Lichen planus Onychomycosis	02 01 01
Terry's nails	02	02	Cirrhosis	02

Of the 200 geriatric patients with nail changes, few patients had associated cutaneous / systemic diseases & few of these nail changes are specific to that particular disease. For example patients with psoriasis showed few specific nail changes like Onycholysis, pitting, koilonychia, subungual hyperkeratosis & trachyonychia. Patients with lichen planus showed Anonychia, dystrophic nails, trachyonychia & melanonychia. Patients with eczema had associated nails like subungual hyperkeratosis, pitting & beau's lines. Patients with systemic diseases like cirrhosis had terry's nails & clubbing, with renal disease had beau's lines & half and half nails etc.

DISCUSSION:

In this study conducted at Medi Citi institute of medical sciences a total number of two hundred patients aged 60 years and above were included in the study. According to WHO health statistics and information systems, for geriatric age group, UN agreed a cutoff of 60 years and above to refer to the older population and chronological age of 60 years is taken as a guide for the working definition of "old" or "geriatric" age [6]. Thus 60 years was taken as a cut off age for defining geriatric age. In this study among all the nail changes and disorders "dull and opaque nails" (188/200) were noted. Dull and opaque nails are one of the classic sign of senility of the nails. Arteriosclerosis leading to the impaired circulation may play a significant role. Sudhakar Rao *et al.*; [7] found at least one nail change due to ageing in 98 out of 100 patients. A pale, dull, and lustreless nail plate was seen in 73% of patients, opacity in 8%, and grey color in 6%. Düriye Deniz Demirseren

et al.; [8] found dull nails in 41.7 % of patients out of 249 patients aged 65 years and above. Moetaz El-Domyati *et al.*; [9] a total of 400 adult patients among which half of them are elderly of 60 years and above, the commonest age-related nail changes noticed were pale, dull, opaque, and lusterless nails (73%) [9]. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] out of 100 elderly patients dark or dull opaque nails were seen in 91 patients [10]. Subungual hyperkeratosis: Hyperkeratosis of the nail bed and hyponychium may occur in a wide range of conditions. 182 patients of 200 had subungual hyperkeratosis. Gurcharan Singh, Nayeem Sadath Haneef *et al.* noted subungual hyperkeratosis in 62 out of 100 elderly patients [10]. Altered contour: The different patterns of altered contour in this study were koilonychia (56), platyonychia (42), trachyonychia (34), dystrophic nails (27), and pincer nails (10). Koilonychia denotes a reverse curvature of both the transverse and longitudinal axes of nail plate i.e., "spooning" of the nails. Presence of anemia or malnutrition in a significant number of patients with koilonychia suggests that impaired hemoperfusion as a pathogenic mechanism for koilonychia. Platyonychia is "flattening" of the nails. Dystrophic nail refers to the poor nail formation, usually as the result of either exogenous or endogenous causes. Most common exogenous cause being trauma to the nail, fungal infections which account for approximately about 50% of nail dystrophies. Pincer nail describes a dystrophic nail where nail growth is pitched towards the middle of the nail, combined with increased transverse curvature. Trachyonychia are the rough nails, with rough surface affecting all of the nail

plate and up to 20 nails (20-nail dystrophy). Sudhakar Rao *et al.*; noted platyonychia 1, pincer nails in 2 cases out of 100 patients [7]. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; noted koilonychia in 36 and platyonychia in 65 individuals. Dystrophic nails in 5, 13 cases of pincer nail [10].

Longitudinal grooves/ ridges & onychorrhexis: Out of 200 patients, 167 patients had longitudinal ridging and 84 patients had onychorrhexis. Longitudinal grooves/ ridges may run all or part of the length of the nail in the longitudinal axis. Grooves may be full or partial thickness. Sudhakar Rao *et al.*; [7] found prominent longitudinal ridges were the commonest age-related changes in the nail surface in 85% of cases out of 100 patients. Onychorrhexis may occur where there are superficial grooves in the nail that lead to a distal split. Aging is the commonest cause of onychorrhexis. Moetaz El-Domyati *et al.*; [9] found onychorrhexis in 45.5% of cases out of 400 adult patients among which half of them are elderly of 60 years and above. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] reported onychorrhexis in 99 patients out of 100 cases. Brittle nails: 126 patients had brittle nails. Brittle nails are the nails where the flexibility of nail plate affects due to some process and which may be accompanied by splitting, layering, peeling and easy breakability. Sudhakar Rao *et al.*; [7] found brittle nails in 34 patients. Düriye Deniz Demirseren *et al.*; [8] found that the most frequent surface change was brittle nails, in 42.1% of 249 patients aged 65 years and older. Moetaz El-Domyati *et al.*; [9] noted brittle nails in 67.5% of 400 adult subjects among whom half of them were elderly of 60 years and above. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] reported brittle nails in 18 patients of 100 patients. Onychomycosis: 121 patients had onychomycosis. Onychomycosis accounts for up to 50% of all nail disorders. Most of the fungal nail infections are exclusively seen in adults. The most common type was distal and lateral subungual onychomycosis.

Sudhakar Rao *et al.*; [7] reported that the prevalence of onychomycosis increases with aging and reaches nearly 20% in patients over 60 years. Düriye Deniz Demirseren *et al.*; [8] found that the prevalence of onychomycosis being 33.3% out of 249 patients. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] noted 3/100 patients with Onychomycosis. T. Gunduz, K. Gunduz *et al.*; [13] reported that onychomycosis was suspected clinically in 102 cases, out of 214 elderly persons. Ji Young Yoo, Moo Kyu Suh *et al.*; [12] Found onychomycosis in 629 patients over 65 years of age during a 10-year period. Ragged cuticle: Ragged cuticle was seen in 105/200 patients in this study. Ragged cuticle is dry or cracked cuticle with ragged or irregular broken surrounding skin around the nail. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] noted ragged

cuticle in 88/100 patients. Nail thickening: Nail thickening was found in 102 out of 200 patients. The different patterns of nail thickening in this study are onychauxis (62), pachyonychia (24), hemionychogryphosis (9) and onychogryphosis (7). Onychauxis is the nail plate hypertrophy, over growth or thickening. Onychogryphosis is the increased curvature of the nails due to excessive thickening of the nail plate. They are also known as “Ram horn nails” as they resemble claws or Ram’s horn. Sudhakar Rao *et al.*; [7] onychauxis or thickening of the nail plate was noticed in 23% of the subjects out of 100. Düriye Deniz Demirseren *et al.*; [8] found onychauxis in 8.4% of subjects out of 249 patients aged 65 years and older. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] observed nail plate thickening in 69 patients out of 100 elderly patients. Various types of nail thickening noted are pachyonychia (26), onychauxis (48), onychogryphosis (8) and hemionychogryphosis (14) [10].

Alunula: Alunula was present in 100 out of 200 patients. Alunula is the absence of the lunula. Düriye Deniz Demirseren *et al.*; [8] noted lunula loss, in 77.9% of participants of 249 patients aged 65 years and older. Moetaz El-Domyati *et al.*; [9] observed the decreased lunula visibility was seen in (49%) of individuals of 400 adult subjects. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] found alunula in 40/100 study population. Onycholysis: Onycholysis was seen in 97/ 200 patients. Onycholysis is the distal and/or lateral separation of the nail plate from the underlying nail bed. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] noted onycholysis in 68 /100 elderly patients. Clubbing: Clubbing was noted in 49/200 patients enrolled in this study. Clubbing is the increased nail curvature in both transverse and longitudinal axis along with hypertrophy of the soft-tissue components of the digit pulp. Sudhakar Rao *et al.* found clubbing in 5 out of 100 patients [7]. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] noted clubbing in 17% of patients out of 100 study population.

Chromonychia: Chromonychia was seen in 44/200 patients enrolled in this study. Various patterns were: Neapolitan nails (21), Leukonychia (12), Melanonychia (6), half and half nails (3) & Terry’s nails (2). Chromonychia is the alteration in nail plate color. Neapolitan nails are old age white nails, which are characterized by 3 bands of colors i.e., the proximal half of the nail appears white with no discernible lunula, the distal free edge is opaque but the central portion retains the normal pink hue. Leukonychia is the whitish discoloration of the nail plate. Melanonychia is the black or brownish discoloration of the nail plate. Terry’s nails are the nails with light pink or white proximal end and give the appearance of ground glass and often obscure the lunula. Half-and-half nails are the

nails where there is a whitish or normal color at the proximal end and distal end being red, pink or brown in color with the sharp demarcation. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] found chromonychia in 58/100. The various types of chromonychia noted are diffuse chromonychia- 26, partial chromonychia- 13, Terry's nails- 13, longitudinal melanonychia- 8, transverse melanonychia- 2, punctate leukonychia- 2, longitudinal leukonychia- 1, half and half nails- 1 and Neapolitan nails- 1. Onychoschizia: Onychoschizia was present in 37/200 patients. Onychoschizia is the splitting of the nail plate superficially and the split usually beginning at the distal end of the nail plate. Sudhakar Rao *et al.*; [7] found onychoschizia in 15% of cases out of 100 in the study population. Düriye Deniz Demirseren *et al.* noted onychoschizia in 24.1% of cases [8]. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] observed onychoschizia 18/100 patients. Nail pitting: Pitting was noted in 36/200 in the study population. Pitting are the punctate erosions present on the surface of the nail plate. Sudhakar Rao *et al.*; [7] found that the prevalence of nail pitting in psoriasis is 67%. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; found pitting in 6/100 patients [10].

Joanna Salomon, Jacek C. Szepietowski *et al.*; [11] reported that subungual hyperkeratosis and pitting is the most typical nail changes associated with psoriasis. Beau's lines: Beau's lines were noted in 27/200 patients in this study. Beau's lines are the transverse grooves or depressions which occur on nail plate. Sudhakar Rao *et al.*; [7] found transverse ridges/furrows in 22% of individuals out of 100 cases. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] noted 23 patients with either single or multiple beaus' lines out of 100 patients. Nail thinning: Nail Thinning is thinning of nail plate, was found in 21/ 200 patients in this study population. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] observed nail plate thinning in 9 individuals out of total number of 100. Paronychia: Paronychia was found in 19/ 200 patients in this study population. Sudhakar Rao *et al.*; [7] reported chronic paronychia in 9/100 patients. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] found Paronychia in 6/100 patients. Onychoptosis: Onychoptosis was seen in 19/200 patients. Onychoptosis is "falling or loss of nail plate". Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] observed Onychoptosis in 5/100 patients. Pterygium inversum unguis: Pterygium inversum unguis was seen in 11/200 patients. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] observed Pterygium in 1 patient. Shiny nails: Shiny nails were seen in 9/200 patients. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] noted smooth and shiny nails in 7/100 elderly patients. Onychomadesis: Onychomadesis was noted in 3/200 patients enrolled in this study population. Onychomadesis is a proximal periodic idiopathic shedding or separation of the nail plate from the nail

bed or from the underlying subungual tissue. Anonychia: Anonychia was seen in 1/200 patients in this study. Anonychia is the absence of complete or part of nail plate or nail unit of one or several nails. Brachyonychia: Brachyonychia was noted in 1/200 patients in the study population. Micronychia or Brachyonychia is a condition where a nail is too small in size when compared with other nails on nearby digits. Thus brachyonychia are known as "short nails. Gurcharan Singh, Nayeem Sadath Haneef *et al.*; [10] found brachyonychia in 3/100 patients.

CONCLUSION:

A total of 200 patients aged 60 years and above were enrolled in this study, majority of the patients 169 (84.5%) belonged to the age group of 61-70 years. Male to female ratio was 3:2; 120 (60%) of patients being males and 80 (40%) females. The most common occupation among the study population was agriculture workers 86 (43%). Most of the patients 138 (69%) were from rural background and 62 patients (31%) were from urban background. Most of the nail changes were related to occupation where there was a history of frequent trauma/ soakage in water for long duration. Thus trauma is considered as one of the main etiological factors for senile nail changes. Dull and opaque nails (188patients / 200) were the commonest nail change observed, and are also the sign of senility of the nails. Impaired circulation, commonly due to arteriosclerosis may play a significant role. Some of these nail disorders had few associated cutaneous/systemic diseases. Awareness of the signs and symptoms of the aging nail is essential and has to be raised for better assessment and management of the onychologic disorders. Evaluation of nails is an important component of the physical examination, as nail changes may reveal the clue and at times may lead to the diagnosis of the hidden internal systemic disorder. Thus nails are considered as the markers or windows for a wide range of systemic disorders.

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