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Original Research Article

Clinico-epidemiological profile and onychoscopic pattern of nail disorders in geriatric population

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ABSTRACT

Background: Adequate knowledge about nail changes in the geriatric population can help in the early identification and timely treatment of underlying disease adding to the quality of life of the elderly population with nail concerns. The present study is aimed to study the clinico-epidemiological profile and onychoscopic pattern of nail disorders in geriatric populations.
Methods: This observational study included 100 subjects aged 60 years or more. Clinical examination and onychoscopic examination by Dermlite DL4 dermoscope with 10x magnification of the nail bed, nail plate, nail fold, and hyponychium in all the 20 nails were done. Even single positive findings in a single nail are considered in the study. If clinically suspected of onychomycosis, 20% potassium hydroxide mount was performed to identify fungal elements.
Results: Mean age of the subjects was 66.27±5.546 years. Male: female ratio was 2.1:1. Mean duration of complaints pertaining to nail changes was 4.7±3.864 years. The damaged cuticles were the universal finding in all the subjects (100%) in nail fold examination, nail dystrophy and longitudinal ridges were seen in all (100.0%) subjects of nail plate examination. The most frequently observed change in nail bed has been splinter haemorrhage (26% versus. 32%) and in hyponychium was subungual hyperkeratosis (36% versus 37.0%) clinically and dermoscopically respectively. Onychomycosis was diagnosed in 25% of total subjects.
Conclusions: Onychoscopy is an important, non-invasive modality to identify and diagnose the nail changes earlier which helps in managing the disease earlier.

Keywords: Nail disorders, Nail bed, Onychoscopy, Geriatric, Onychomycosis

INTRODUCTION

Like any other part of the body, ageing influences nails also and therefore nail disorders are frequently seen amongst the geriatric population.[1] Some of the changes are inherent due to increasing age, while others are acquired as a consequence of diseases or conditions which become more prevalent with increasing age.[2] Secondary factors contributing to pathological nail changes include impaired circulation in the distal extremities, infections, faulty biomechanics, and neoplasms.[3] With the advancing age, alteration in thickness, color, contour, fragility, surface features, cell size, growth rate and chemical composition of nail plate becomes more evident.[2] Onychomycosis is the most common nail-related disease seen in elderly individuals.[2]

Nail disorders vary according to the part of the nails involved. Typically, nail apparatus is comprised of epithelium as well as a connective tissue attachment. The matrix epithelium produces a nail plate and the nail bed epithelium helps in firm attachment. A specialized structure viz. hyponychium seals the subungual space and allows the physiological detachment of the nail plate from

the nail bed. The cuticle which is the free end of the proximal nail fold seals the nail pocket.[4]

Nail changes or disorders of nails can cause impairment of daily activities or may remain asymptomatic with substantial cosmetic derangement consequently resulting in a negative impact on psychology emphasizing the need for a detailed examination of nail changes.[3] Onychoscopy i.e., microscopic examination of the nail surface is a type of dermatoscopic examination providing a great deal in the diagnostic workup of nail disorders. Onychoscopy is a non-invasive, rapid tool that aids in enhancing visible nail features and in revealing cryptic features of diagnostic value. It provides a link between naked eye examination and histopathology of nails.[5,6]

The nail area has been a neglected area of geriatric health care.[7] It has been suggested that nail changes are a reflection of the disturbance of collagen.[8] It is important to focus on the nail changes in the geriatric population as adequate knowledge about nail changes can help in early identification and timely treatment of the underlying disease adding to the quality of life of the elderly population with psychological concerns. Thus, the present study was undertaken with the aim to study the clinico-epidemiological profile and onychoscopic pattern of nail disorders in geriatric population.

METHODS

Study design, study population, sample size, sampling technique

This observational study was conducted in the department of dermatology, venereology and leprosy, Sri Aurobindo Medical College and Post Graduate Institute, Indore, Madhya Pradesh, India after obtaining approval from the institutional ethics committee. The study included 100 elderly subjects aged 60 years or more who had visited the department over the period of 1.5 years (from September 2021 to February 2023). Enrolment of subjects in the study was done using a random sampling technique.

Inclusion criteria

Population aged more than 60 years with or without nail abnormality. Single positive findings even in the single nail unit are considered as a positive finding on the individual subject in the study.

Exclusion criteria

Subjects aged more than 60 years who are not willing to participate in the study.

Methodology

The information related to age, gender, and occupation was recorded. Record of comorbid conditions, duration of the complaint pertaining to nail changes, number of nails affected were recorded. Clinical examination of the nail bed, nail plate, nail fold, and hyponychium was performed in all the 20 nails. All parts of the nail were also examined using Dermlight DL4 dermoscope with 10x magnification. Single positive findings even in the single nail are considered as a positive finding on the individual subject in the study. On suspecting onychomycosis, a 20% potassium hydroxide (KOH) mount was performed to identify fungal infection if exists. The affected site was scrapped at a considerable depth, and keratin matrix is scooped out and mounted in 20% KOH solution. To detect fungal spores or fungal hyphae, direct microscopic examination was done in vision 2001 microscope with 10x and 40x magnification of objective lens.[9] The results were analysed using statistical package for the social sciences (SPSS) 21.0 software.

RESULTS

In this study, 100 subjects were included with a mean age of 66.27±5.546 years. The male: female ratio was 2.1:1 (62 versus 38). Most of the subjects were farmers [39 (39.0%)] followed by housewives [38 (38.0%)] (Table 1).

Table 1: Distribution of study subjects based on age, gender, and occupation.

Variables	Number (N=100)	Percentage
Age (in years)		
60-70	82	82.0
71-80	16	16.0
81-90	2	2.0
Gender		
Male	62	62.0
Female	38	38.0
Occupation		
Housewife	38	38.0
Farmer	39	39.0
Businessman/woman	3	3.0
Others	3	3.0
Retired	17	17.0

The prevalent comorbid condition was hypertension [17 (17.0%)] followed by diabetes mellitus [9 (9.0%)], tuberculosis [2 (2%)], hypothyroidism [2 (2%)], rheumatoid arthritis [2 (2%)], hepatitis [2 (2%)], basal cell carcinoma [1 (1%)], squamous cell carcinoma [1 (1%)], COPD [1 (1%)], coronary artery disease [1 (1%)], and atopy [1 (1%)] (Figure 1). Seventy-three (73.0%) subjects had no comorbid condition, and 17 (17.0%) and 10 (10.0%) subjects had single and multiple comorbid conditions respectively.

The mean duration of complaints pertaining to nail changes was 4.7±3.864 years (varying from 1 year to 13 years). All the patients showed involvement in multiple nail units. The number of nails involved was found to vary from 2 to 20.

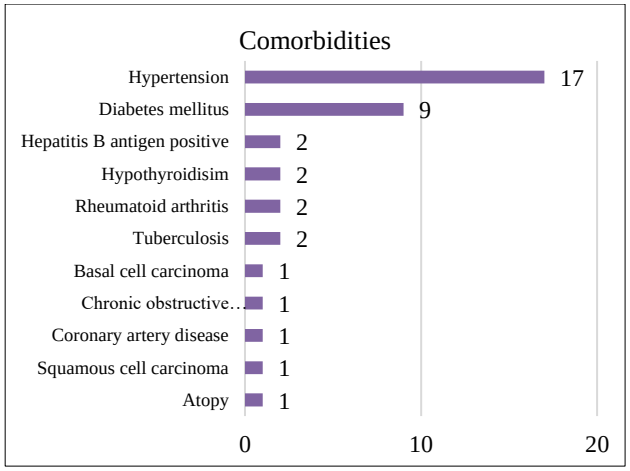

Figure 1: Frequency distribution of study subjects based on presence of comorbidities.

On clinical and onychoscopic examination of nail folds, damaged cuticle was the universal finding prevalent amongst all the subjects. Other findings included fissuring (68% versus 76%), scaling (56% versus 56%), erythema (30% versus 35%), black discoloration (24% versus 25%), and yellow discoloration (3% versus 6%) clinically and dermoscopically respectively. There was a statistically significant strong correlation between the clinical and onychoscopic findings for all the conditions except yellow discoloration for which correlation between clinical and onychoscopic findings was moderate (Table 2).

On examination of nail plate, dystrophy and longitudinal ridges were seen in all (100.0% versus 100%) subjects (Figure 2). Other findings included the presence of onychoschizia (43% versus 57%), onycholysis (74% versus 77%), melanonychia (41% versus 43%), leukonychia (38% versus 40%), horizontal groove (21% versus 27%), transverse groove (2% versus 2%), pitting (6% versus 8%), Beau's line (1% versus 1%), green discolouration (0% versus 1%) and median canaliform dystrophy (Figures 3-7). Figure 8 and Table 3 provides data on clinical and dermoscopic examination respectively.

The most frequently observed change in nail bed has been splinter haemorrhage (26% versus 32.0%) and hematoma (2% versus 2%) and the most commonly noticed change in hyponychium was Subungual hyperkeratosis (36% versus 37.0%) (Figures 9 and 10 and Tables 4-6). On the basis of clinical and dermoscopic examination, it is concluded that onychoscopy helped in identifying nail changes in more subjects compared to clinical examination.

Table 2: Distribution of study subjects based on clinical and onychoscopic examination of nail fold.

Features	Clinical examination (%)	Onychoscopic examination ($)	Correlation between clinical and onychoscopic findings	
			(Kappa correlation coefficient)	P value
Damaged cuticle	100 (100.0)	100 (100.0)	-	-
Fissuring	68 (68.0)	76 (76.0)	0.803	0.001*
Scaling	56 (56.0)	54 (54.0)	0.919	0.001*
Erythema	30 (30.0)	35 (35.0)	0.886	0.001*
Black discolouration	24 (24.0)	25 (25.0)	0.865	0.001*
Yellow discolouration	3 (3.0)	6 (6.0)	0.653	0.001*

*P value <0.05 was considered statistically significant

Table 3: Distribution of study subjects based on clinical and onychoscopic examination of nail plate.

Features	Clinical examination (%)	Onychoscopic examination ($)	Correlation between clinical and onychoscopic findings	
			(Kappa correlation coefficient)	P value
Dystrophy	100 (100.0)	100 (100.0)	-	-
Longitudinal ridges	100 (100.0)	100 (100.0)	-	-
Trachyonychia	98 (98.0)	99 (99.0)	1.000	0.000*
Onycholysis	74 (74.0)	77 (77.0)	0.919	0.001*
Longitudinal groove	53 (53.0)	66 (66.0)	0.735	0.001*
Onychoschizia	43 (43.0)	57 (57.0)	0.725	0.001*
Melanonychia	41 (41.0)	43 (43.0)	0.959	0.001*
Leukonychia	38 (38.0)	40 (40.0)	0.958	0.001*
Horizontal groove	21 (21.0)	27 (27.0)	0.836	0.001*
Median canaliform dystrophy	10 (10.0)	16 (16.0)	0.737	0.001*
Pitting	6 (6.0)	8 (8.0)	0.847	0.001*
Transverse groove	2 (2.0)	2 (2.0)	1.000	0.001*

Continued.

Features	Clinical examination (%)	Onychoscopic examination ($)	Correlation between clinical and onychoscopic findings	
			(Kappa correlation coefficient)	P value
Beus line	1 (1.0)	1 (1.0)	1.000	0.001*
Green discolouration	0 (0.0)	1 (1.0)	-	-

*P value <0.05 was considered statistically significant

Table 4: Distribution of study subjects based on clinical and onychoscopic examination of nail bed.

Features	Clinical examination (%)	Onychoscopic examination ($)	Correlation between clinical and onychoscopic findings	
			(Kappa correlation coefficient)	P value
Splinter haemorrhage	26 (26.0)	32 (32.0)	0.868	0.001*
Hematoma	2 (2.0)	2 (2.0)		
Within normal limit	71 (71.0)	65 (65.0)		
Total	100 (100.0)	100 (100.0)		

*P value <0.05 was considered statistically significant

Table 5: Distribution of study subjects based on clinical and onychoscopic examination of hyponychium.

Features	Clinical examination (%)	Onychoscopic examination ($)	Correlation between clinical and onychoscopic findings	
			(Kappa correlation coefficient)	P value
Subungual hyperkeratosis	36 (36.0)	37 (37.0)	0.978	0.001*
Within normal limits	64 (64.0)	63 (63.0)		
Total	100 (100.0)	100 (100.0)		

*P value <0.05 was considered statistically significant

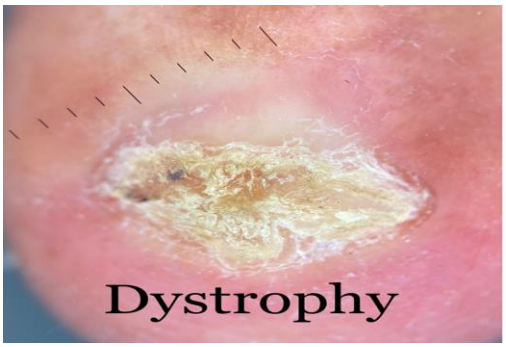

Figure 2: Dystrophy: abnormal changes in the shape, color, texture, and growth of the nail.

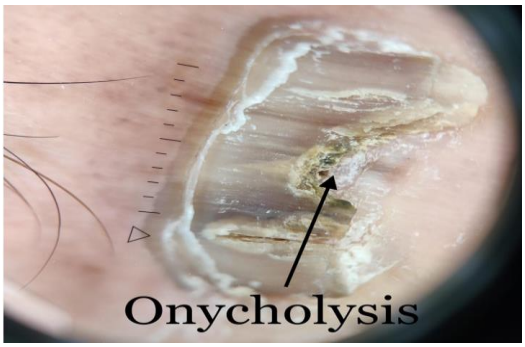

Figure 4: Onycholysis: separation of nail plate from nail bed.

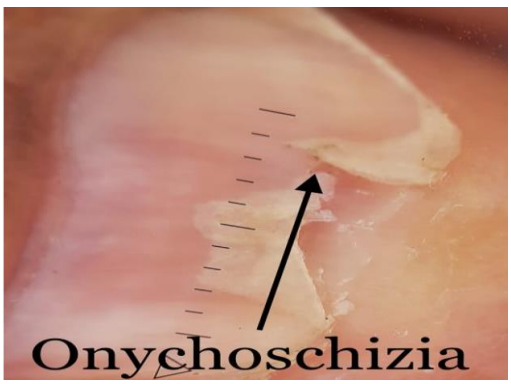

Figure 3: Onychoschizia includes splitting, brittle, soft or thin nail plate.

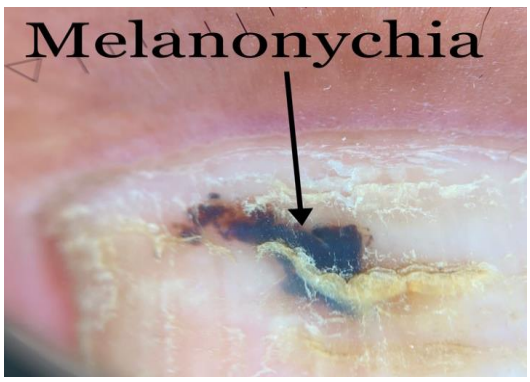

Figure 5: Melanonychia: characterized by brown-black discoloration of the nail plate.

On suspecting onychomycosis, 20% KOH mount was performed in 56 subjects of which 25 (44.7%) subjects had positive results for fungal hyphae and 31 (55.4%) subjects had negative results. 44 patients were not examined because it is not clinically suggestive of onychomycosis. So, onychomycosis was diagnosed in 25% of total subjects overall.

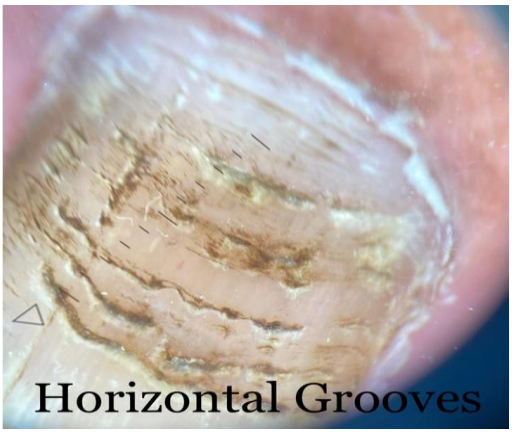

Figure 6: Horizontal grooves over the nail plate.

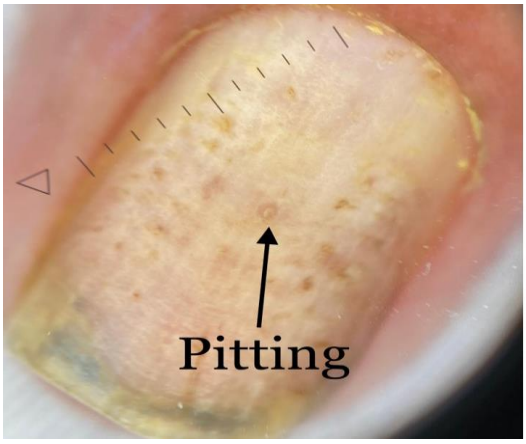

Figure 7: Small pits present over the nail plate.

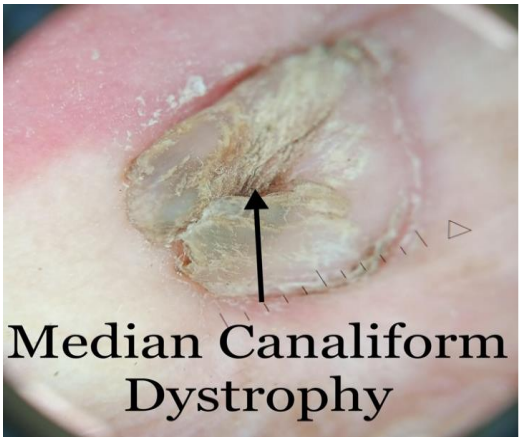

Figure 8: Median canaliform dystrophy: characterised by longitudinal splitting of nail plate.

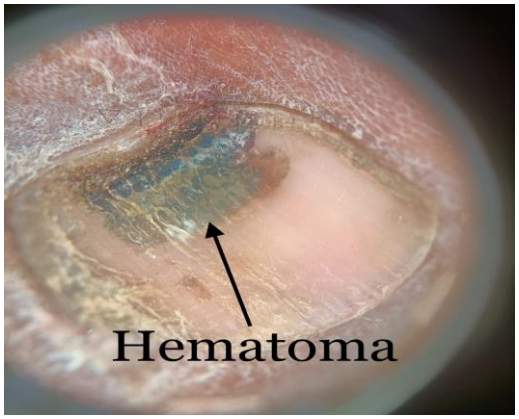

Figure 9: Hematoma (blood under nail).

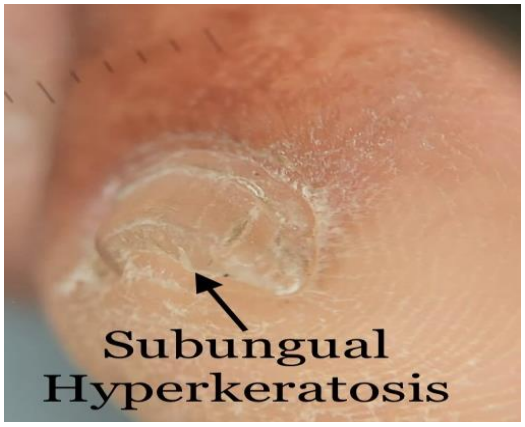

Figure 10: Subungual hyperkeratosis in hyponychium.

DISCUSSION

The ageing of nails is a natural process. Ageing brings about changes in the characteristics and physiology of nails making them susceptible to disorders.[10] Nail disorders contribute to nearly 10% of all dermatological conditions.[11] Nail disorders either primarily on their own or secondary to any other systemic disease have been known to have a negative impact on health-related quality of life and therefore need attention and a cure.[12]

National policy for older persons 1999 has defined elderly or senior citizens with the age of 60 years or more.[13] Therefore, this study included individuals aged 60 years or more. The mean age of the subjects was 66.27±5.546 years.

Comorbid conditions can contribute to brittle nails. In the present study, subjects showed the presence of systemic diseases such as hypertension [17 (17.0%)] as the most common comorbidity. Rao et al also reported the existence of hypertension in 19% of the subjects which is similar to our study.[16]

It is known that in individuals older than 60 years, brittle nails are a common finding. Clinically, brittle nails are

characterized by longitudinal ridging, horizontal layering (lamella separation) of the distal nail plate, roughness (trachyonychia) of the nail plate surface, and or irregularity of the distal edge of the nail plate and onychoschizia.[14,15] Our study revealed longitudinal ridges in all the subjects (100%) clinically. Rao et al also reported a high prevalence (85%) of longitudinal ridges in their study.[16] Bhat et al reported the commonest nail matrix change to be ridging in 85.7% of patients.[17] This is similar to our study as the commonest finding.

We found the presence of subungual hyperkeratosis in 37.0% of study subjects. Subungual hyperkeratosis is a type of onychodystrophy resulting due to faulty biomechanics.[14] Presence of disorders emphasized the need to inform the elderly population about the role of properly fitting shoes with no rigid platform.[14]

Bhat et al reported the commonest nail matrix change to be pitting in 85.71%, which is very different as our study reports pitting in 6% of subjects.[17] The commonest nail bed change reported by them was dilated and tortuous capillaries in the nail bed and hyponychium (90.48) followed by onycholysis (80.95%). Onycholysis is found to be in 74% of the subjects in our study. The difference in the findings of their study compared to our study can be contributed to the difference in the age group involved in both the studies. Their study involved subjects aged 1 year to 80 years whereas our study was directed towards the geriatric age group.[17] This showed differences in the prevalence of various nail changes in different age groups. Beau's line which was seen in 1 subject in our study is usually associated with pulmonary disease. Onycholysis is considered to be indicative of gastrointestinal disorder, pitting of nails is indicative of cardiovascular disease and anonychia is indicative of infectious diseases.[18]

20% KOH mount is performed to demonstrate the presence of fungal infection in the skin, hair, and nails. It is an easy procedure that can be performed on an outpatient basis and yields fast results within 1-2 hours.[9] Onychomycosis is a fungal infection frequently seen in elderly patients involving toenails and fingernails.[14] The prevalence of onychomycosis has been reported to be 0.5-5.0% in India.[6] However, in our study, onychomycosis was diagnosed in 25% of subjects. This indicated towards a higher prevalence of onychomycosis amongst the geriatric age group. Rao et al reported 15% prevalence of onychomycosis.[16] This result is different from our study.[14]

The results of the present study revealed that onychoscopy and clinical examination have a statistically significant strong correlation. Although it was found that onychoscopy is effective in detecting many changes which are missing on clinical examination and therefore the results of our study showed that onychoscopy is an important tool in studying nail changes.

The findings of our study showed that various nail changes were seen in the elderly population. These changes reflect the disorders or conditions involving the nails helping in early diagnosis, and better understanding leading to prompt treatment and prevention of disability.[1]

Limitations

Nails were examined only once at the time of enrolment and follow up of the patient is not done.

Only 20% KOH nail mount of scrapings and clipping is performed to diagnose onychomycosis, but nail culture and nail biopsy were not done.

Single positive finding in a single nail unit is considered for the study but changes in each and every nail are not quantified.

CONCLUSION

Onychoscopy is an important non-invasive, Easy to perform, cost effective modality to identify and diagnose the disease earliest and helps in managing the disease effectively.

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Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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