

A STUDY OF NAIL CHANGES AND NAIL DISORDERS IN ELDERLY

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Received : XX/XX/2024
Received in revised form : XX/XX/2024
Accepted : XX/XX/2024

Keywords:

Nail Changes, Nail Disorder, Elderly.

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DOI: 10.47009/jamp.2024.6.5.164

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2024; 6 (5); 857-861



Abstract

Background: The aim of present work is to assess the nail changes and disorders in people above 50 years old compared with control age group (20 - 30 years old). **Materials and Methods:** The study included 100 subjects, of them 50 persons were above 50 years old (study group), the other 50 subjects were from 20 - 30 years old (control group). The study was performed in the outpatient of Department of Skin and VD, PMCH, Patna, Biha in the period from Septembr 2019 to August 2020. A detailed history from each subject was recorded, using questionnaire, to detect the onset, duration and progression of nail changes and/or disorders and their occupation. A magnifying lens of 4× power was used. The rate of growth of the left thumb nail per day was measured by observing the distal movement of a trans-verse scratch made on nail plate over a axed period of time(monthly for 6 months), using a rule and magnifying lens. **Result:** The study included 100 subjects. One hundred as study group (25 males, 25 females) were above 50years (mean± SD 65.1 ± 7.2). While 100 subjects were taken as control group (25 males, 25 females), their ages ranged 20 - 30 years (mean ± SD 23.1 ± 1.7). **Conclusion:** Some changes of the nail were signicantly correlated with advanced age like dull opaque nails, rough lusterlessness and longitudinal ridging. Therefore, these signs can be regarded as indicative of ageing in healthy Indian people.

INTRODUCTION

Though nail disorders can affect any age, some of the diseases have a predilection for the aged. Preexisting disorders may also be modified by progressive ageing. First and fifth digits are most commonly involved, with other digits being affected with varying frequency. Nail disorders comprise approximately 10% of all dermatologic conditions, the prevalence being higher in the elderly. The senile changes are presumably due to impaired peripheral circulation. Frequently arteriosclerosis is the cause, though it may not be marked. Trauma, faulty biomechanics, infections, concurrent dermatological or systemic diseases and their treatments are also contributory factors.^[1,2]

Changes which are observed in human nails as part of ageing process include: Alteration in chemical composition, the calcium content of the nails increases whereas iron decreases.

Alteration in histology, the nail plate keratinocytes enlarge. There is an increase in the number of “pertinax bodies”. The nail bed dermis shows thickening of the blood vessels and degeneration of the elastic tissue, especially beneath the pink part of the nail.

Alteration in nail growth, in the elderly, the rate of nail growth decreases progressively between 25 to 100 years of age, by approximately 0.5% per year.

Alteration in color, the senile nails may appear pale, dull, opaque, with the color ranging from yellow to brown or gray. Lunula may be decreased or absent altogether.^[3]

Alteration in contour, the senile nails usually have an increased transverse curvature and a decreased longitudinal curvature. Flattening of the nail plate (platyonychia), spooning (koilonychia), pincer nail deformity (involution) is found more frequently.^[4]

Alteration in surface texture, the senile nail may have increased longitudinal striations due to altered turnover rate of the matrix cells.^[5]

Alteration in thickness and consistency, in the elderly, the nail plate thickness may increase, decrease or may remain unchanged.

Nail Disorders among Elderlies: Common nail disorders that may affect elderly people more frequently than younger age individuals include Brittle nails which are common in persons older than 60 years and about 20% of randomly selected population is affected in one study. Females were affected more in a ratio of 2:1. They manifest as excessive longitudinal ridges, roughness of the nail plate (trachyonychia), horizontal lamellar splitting of distal nail plate (onychoschizia or onychoschisis),

and irregularity of the distal edge of the nail plate. Onychodystrophies such as nail plate hypertrophy (onychauxis), onychogryphosis, onycholysis, in growing toe nails (onychocryptosis), onychophosis, subungual hyperkeratosis, subungual corn (onychoclavus) and subungual hematoma, which these disorders usually result from Bony deformities of the digits or foot-to-shoe incompatibility (ill-fitting shoes), can cause faulty biomechanics leading to onychodystrophies. Other disorders like Onychomycosis, Paronychia, Subungual Exostosis, Myxoid Pseudocysts, Subungual Melanoma, also reported to occur more frequently in elderly people. Many previous studies have been done to assess the nail changes and disorders in elderly people who have various dermatological and systemic diseases, so, in this study we tried to more precisely specify those changes related to age from other changes that were due to associated conditions and treatments with advanced age.^[6]

The aim of present work is to assess the nail changes and disorders in people above 50 years old compared with control age group (20 - 30 years old).

MATERIALS AND METHODS

The study included 100 subjects, of them 50 persons were above 50 years old (study group), the other 50 subjects were from 20 - 30 years old (control group). The study was performed in the outpatient of Department of Skin and VD, PMCH, Patna, Bihar in the period from September 2019 to August 2020, those patients came from different sites inside and outside District. The design of study is case control, cross-sectional study of analytic purpose.

A detailed history from each subject was recorded, using questionnaire, to detect the onset, duration and progression of nail changes and/or disorders and their occupation. Environmental exposure of any precipitating factor like trauma, sport activities or even attaining abnormal posture, abnormal habits, tight shoes, use of cosmetics, any emotional upset or stressful conditions was also assessed.

A careful clinical examination of the nails was carried out including the type of nail change, site and symmetry.

A magnifying lens of 4× power was used. The rate of growth of the left thumb nail per day was measured by observing the distal movement of a transverse scratch made on nail plate over a fixed period of time (monthly for 6 months), using a rule and magnifying lens.

Inclusion Criteria

Subjects above 50 years old of age (study group) and subjects from 20 - 30 years old (control group), of both sexes were included in the study.

Exclusion Criteria

Systemic Diseases: chronic hepatic disease, chronic renal disease, etc. 2

Dermatological Diseases: psoriasis, lichen planus, alopecia areata, eczema, genodermatosis or other congenital nail diseases.

Drugs: Chemotherapy, B-blockers, PUVA, Retinoids, Others.

RESULTS

The study included 100 subjects. One hundred as study group (25 males, 25 females) were above 50 years (mean ± SD 65.1 ± 7.2). While 100 subjects were taken as control group (25 males, 25 females), their ages ranged 20 - 30 years (mean ± SD 23.1 ± 1.7), [Table 1].

The following nail changes were more frequent among study group than control group with significant statistical difference ($p = 0.043 - 0.000$) like dull opaque, rough lusterlessness, longitudinal ridging, altered thickness, ragged cuticle, altered contour, subungual hyperkeratosis and scaling nail folds. Longitudinal ridging (onychorrhexis), showed increased frequency (71% of the study group versus 0% of the control) with $p = 0.000$. The different types and distributions of altered contour in study group are including platyonychia, koilonychia, increased transverse curvature, pincer nail, dystrophy and downward bent distal nail plate.



Figure 1: Longitudinal ridging and dull opaque nails



Figure 2: Dark dull opaque nails

The different types and distributions of altered thickness of nail plate in the study group are thickening, thinning and onychogryphosis. Other changes although were statistically not significant,

some of them occurred more frequently among the study group like pitting, onycholysis, paronychia; on the contrary, in growing nails were reported more frequently in the control group. Chromonychia was not statistically significant (14% of study group versus 16% of the control) with $p = 0.692$. Longitudinal melanonychia was significantly higher in the study group (6% versus 0% of the control) with $p = 0.013$, while punctate leukonychia was significantly higher in the control group (16% versus 4% of study group) with $p = 0.005$.

In each subject the rate of growth of the left thumb nail per day was measured. The mean rate of nail growth of males and females in study group were 0.087 mm/day and 0.068 mm/day respectively, and for the control group were 0.096 mm/day and 0.093 mm/day respectively. So, the rate of nail growth was higher in control group than in study group for both sexes.



Figure 3: Onychotillomania showing ragged cuticle and bleeding



Figure 4: Pale white dull opaque nails



Figure 5: Median nail dystrophy



Figure 6: Punctate leukonychia



Figure 7: Pincer nails and periungual inflammation

Table 1: Age, sex, disease duration among the among the study group and control group.

Factors	Study Group			Total (No. of patients)	Control group		Total (No. of patients)
	Range	Median	±SD		Range	Median	
Age(years)	Range	50-91		50	20-30		50
	Median	65.1			23.1		
	±SD	7.2			1.7		
Duration of diseases	Range	1-1020			1-162		
	Median	440			80		
	±SD	66.3			29.1		

Table 2: Spectrum of nail changes in study group and control group (20-30 years).

Nail Changes	No. of subjects						Chi-square	P-value
	Study Group			Control group				
	No. of Male	No. of female	Total	No. of Male	No. of female	Total		
Dull opaque	21(42.0%)	21(14%)	42(84%)	0	0	0	144.8	0.000
Rough lusterless	22(44.0%)	20(40%)	42(84%)	0	0	0	110.2	0.000
Longitudinal ridging	21(42.0%)	14(28%)	35(70%)	0	0	0	104.3	0.000
Altered thickness	7(14%)	8(16%)	15(30%)	0	0	0	20.1	0.000
Ragged cuticle	9(18%)	6(12%)	15(30%)	1(2%)	0	1(2%)	25.1	0.000
Altered contour	4(8%)	10(20%)	14(28%)	0	1(2%)	1(2%)	20.6	0.000

Subungual hyperkeratosis	6(12%)	4(8%)	10(20%)	0	0	0	20.1	0.000
Scaling nail folds	2(4%)	4(8%)	6(12%)	0	0	0	13.2	0.000
Onychoschizia	2(4%)	2(4%)	4(8%)	0	0	0	9.1	0.004
Brittle nails	2(4%)	2(4%)	4(8%)	0	0	0	9.15.6	0.004
Onychomycosis	0	3(6%)	0	0	0	0	4.0	0.013
Shiny nails	2(4%)	0	2(4%)	0	0	0	90.7	0.000
Normal nails	1(2%)	0	1(2%)	2(4%)	12	14	2.6	0.052
Pitting	4(8%)	1(2%)	5	0	1(2%)	1(2%)	2.6	0.052
Onycholysis	2(4%)	2(4%)	4	0	1(2%)	1(2%)	0.687	0.407
Splinter hemorrhage	2(4%)	0	2(4%)	1(2%)	0	1(2%)	0	1.000
Beau's lines	1(2%)	1(2%)	2(4%)	0	2(4%)	2(4%)	0.157	0.692
Chromonychia	4(8%)	4(8%)	8(16%)	4(8%)	4(8%)	8(16%)	0.685	0.407
Subungual hematoma	2(0.04%)	0	2(4%)	2(4%)	0	2(4%)	1.02	0.155
Paronychia	0	2(0.04%)	2(4%)	0	0	0	1.02	0.155
Trachyonychia	0	2(0.04%)	2(4%)	0	0	0	1.02	0.155
Longitudinal splitting	1(0.02%)	0	1(2%)	0	0	0	1.02	0.155
Others Congenital malalignment big toenail	0	0	0	0	0	0	1.02	0.155
Glomus tumor	1(0.02%)	0	1(2%)	0	0	0	1.02	0.407
In growing nail	0	1	1	0	2(0.04%)	2(0.04%)	0.687	0.407

DISCUSSION

Two hundred subjects were included in the study, one hundred as study group; their ages were above 50 years, the other hundred as control group aged 20 - 30 years.

In the present study, the first and fifth digits were more frequently involved, and toenail involvement was commoner than the fingernails in many of the changes, which is consistent with the literature.

Age related color change of the nail plate like dull opaque nails, was the commonest nail change, being observed in (85% of the study group versus 0% of the control) with $p = 0.000$. This is consistent with the literature showing that senile nail may appear pale, dull and opaque, with its color varying from white or yellow to brown to gray.^[7]

It is found that white dull opaque nails were more frequent in fingernails, while dark dull opaque nails were more frequent in toenails, as reported by another study.

Rough, lusterless nails were reported to occur mostly in the toes. This study observed this senile nail change in 84% of the study group versus 0% of the control, with $p = 0.000$, exclusively involving toenails, sparing the great toenail in majority of cases.^[8]

The present study has demonstrated that longitudinal ridging (onychorrhexis) is strongly associated with aging. The study group showed increase in frequency (70% versus 0% of the control) with $p = 0.000$. Aging is the commonest cause of onychorrhexis or longitudinal ridging.

In this study it is found that both right and left thumbs were equally affected, but the left hand was generally more frequently and more significantly affected than the dominant hand especially the 4th and 5th fingers. This finding has not been reported by previous studies. The frequency was more in fingernails than in toenails.^[9]

Altered thickness of nail plate was a manifestation of aging as reported by other studies. Similarly, this study found a positive correlation between aging and

this nail change (30% of the study group versus 0% of the control) with $p = 0.000$. It was more common in toenails. Thickening was more prevalent in first and fifth toenails of each foot.^[10]

Altered contour of nail plate is also significantly correlated with increased age (28% of the study group versus 2% of the control) with $p = 0.000$. This is also reported as an important senile nail change in literature. Altered contour of nail plate in the form of platyonychia in 1 case, koilonychias in 3 cases, increased transverse curvature in 11 cases, pincer nail 2 cases, dystrophy 14 cases and downward bent distal nail plate 2 cases. Toe-nails were more frequently involved.^[11]

The prevalence of Onychomycosis is increases with age and reaches nearly 20% in patients above 60 years of age. In our study, we found the prevalence of onychomycosis to be (6% study group vs 0% control) $p=0.013$ which is significant. Onychomycosis has been reported to be more common in elderly men than elderly women. In our study we found that onychomycosis exclusively affected women. Although chromonychia is reported as a senile nail change in literature, however, this study did not show a significant correlation with age (16% of the study group versus 16% of the control) with $p = 0.407$, while longitudinal melanonychia was significantly higher in the study group (6% versus 0% of the control) with $p = 0.013$, and punctate leukonychia was significantly higher in control group (16% versus 4% of the study group) with $p = 0.005$. The higher prevalence of punctate leukonychia in fingernails among younger age group is also reported earlier being possibly due to microtrauma.^[12,13]

The rate of nail growth was higher in control group than in study group for both sexes, this is consistent with previous studies, which showed progressive slowing of nail growth rate with advanced age.^[14,15] Some Limitation of this study, may be, a larger number of subjects and a multicentre study may be required to more precisely assess the nail changes and disorders in older= people.

CONCLUSION

Some changes of the nail were significantly correlated with advanced age like dull opaque nails, rough lustrelessness and longitudinal ridging. Therefore, these signs can be regarded as indicative of ageing in healthy Indian people. Other disorders of the nail like pitting, onycholysis and paronychia were not age specific and, therefore, cannot be regarded as signs of ageing. Some other nail changes like ingrown nails and punctate leukonychia were more frequently reported in younger age individuals and hence, they were not ageing signs. Finger nail growth may be considered as a sign of aging of healthy Indian people.

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