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RESEARCH ARTICLE

TO STUDY NAIL CHANGES IN DERMATOLOGY.

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Abstract

Introduction: Nail cosmetology as it is evolving today is a fairly recent development. In some segments of society, the colour and the shape of the nail have become the measure of a woman`s personality and appeal; and an index of her vibrancy. The present study was undertaken to study the different types of nail changes seen in a regular dermatology OPD over a period of one year and prepare an epidemiological data on these findings. **Materials & Methods:** All patients attending the Dermatology OPD over a period of one year (01 Jan 2016 to 31 Dec 2016) were screened for various types of nail changes like Onychomycosis, Paronychia, Subungual hyperkeratosis, Pitting, Pterygium, Onycholysis, Onychoschizia, Melanonychia, Half and half nails, Trachonychia, Onychogryphosis, Subungual melanoma, etc. The patients were asked the details of the nail problem and individual nail photgraphs were taken with regards to the same. Data was further analysed to include the age, sex, whether nail changes were in isolation or in association with skin or hair changes, whether patients had history of any systemic illness and the percentage of various types of nail changes along with relevant investigations for confirmation of the same (30% KOH mount for onychomycosis and histopathology for clinical suspision of subungal melanoma). Statistical analysis was done using SPSS ver. 21. **Results:** Females are more affected than males. A total of 9 % of patients in skin OPD have nail changes which included oychomycosis (39.9%), paronychia (3.4%), onychomycosis and paronychia (13%) subungual hyperkeratosis (13.8%), pitting (15.1%), pterygium (0.6%), onycholysis (5%), onychoschizia (2.9%), melanonychia (4.6%), half and half nails (0.5%), trachyonychia (0.9%), onychogryphosis (0.1%) and subungual melanoma (0.1%). Melanonychia and half and half nails were significantly associated with systemic disease. **Conclusion:** The nail apparatus is an important structure and has certain indispensable functions. Hence abnormalities of the nail carry both physical and psychological implications and can give us a clue to underlying systemic disease.

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Introduction:-

The long and shapely nails depicted in early Chinese art speak of the relative importance people gave to nail care in ancient times [1]. However, nail cosmetology as it is evolving today is a fairly recent development. [2]. The chief function of the nail in man is that of protection. It protects the terminal phalanx and the fingertip and gives deftness and precision in picking up small objects. The nail also serves to augment the sensation of touch [3].

The nail apparatus develops and matures from the primitive epidermis between the ninth and twentieth weeks of intrauterine life [4]. As a structure the nail is first recognisable in a ten –week-old embryo [5] as primary nail field of proliferative ectoderm on the tip of the terminal segment of the digits. Continued proliferation of the nail fold in the proximal direction progressively defines their final dorsal position. Due to a relatively slow rate of growth, the field become somewhat depressed and the epidermis overlaps their side and proximal end to form of nail fold. The proximal part of each nail fold proliferates to form the root of the nail, and this soon becomes formative zone or germinative portion of the nail. And from this germinative zone, the actual substance of the nail in formed continuously. Keratin synthesis can be identified in the nail unit from of the earliest stage of embryonic differentiation [6]. Fetal growth of the nails is gradual, their edges merely reaching the tips of the digits at birth and the finger nails appearing rather longer than the toe nails [7].

The present study was undertaken to study the different types of nail changes seen in a regular dermatology OPD over a period of one year and prepare an epidemiological data on these findings.

Materials & Methods:-

A hospital based observational study was conducted at Dermatology Out-Patient Department, SS Medical College and hospital, Rewa, MP, over a period of one year. All patients attending the Dermatology OPD over a period of one year (1 Jan 2016 to 31 Dec 2016) were screened for various types of nail changes like Onychomycosis, Paronychia, Subungual hyperkeratosis, Pitting, Pterygium, Onycholysis, Onychoschizia, Melanonychia, Half and half nails, Trachonychia, Onychogryphosis, Subungual melanoma, etc. In case of more than 1 nail change seen in a patient, the dominant nail change would be taken into consideration.

All patients were duly informed about the nature of the study and after obtaining the relevant informed consent, the patients were asked the details of the nail problem and individual nail photgraphs were taken with regards to the same.

Data collected was then subjected to statistical analysis via SPSS software ver. 21. Further analysis was done to include the age, sex and whether nail changes were present in isolation or in association with skin or hair changes, whether patients had history of any systemic illness. The percentage of various types of nail changes along with relevant investigations for confirmation of the same (30% KOH mount for onychomycosis and histopathology for clinical suspision of subungal melanoma) was done.

Results:-

The prevalence of the nail changes found in skin OPD patients over a period of 1 year was 9.76% (table 1). Mean age of study subjects was 38.76 years with slight female predominance (58.9%). Only nail involvement was seen in 75.1%, while nail with skin/ hair and nail with systemic involvement was seen in 13.2% and 11.7% subjects respectively (table 2). Most common nail change observed was onychomycosis (38.2%) followed by paronychia, subungal hypertrophy and pitting. Other major changes observed were onycholysis, Melanonychia, pterygium, Onychoschizia (table 3). Association of nail changes with gender and age was shown in table 4 and 5. Skin and hair changes were observed to be associated with pitting while systemic changes were observed to be associated with melanonychia ($p<0.05$) (table 6).

Table 1:- Prevalence of Nail Changes in the skin OPD over study duration.

Variable	
Total no. of Patients	24,688
Patients with nail changes	2409
Prevalence of Nail changes	9.76%

Table 2:- Baseline variables in Study subjects

Baseline variable (n-2409)	mean (n)	SD (%)
Age	38.76	7.46
Female	1420	58.9%
Male	989	41.1%
Only Nail involvement	1810	75.1%
Nail with skin and/ or hair	318	13.2%
Nail with systemic disease	281	11.7%

Table 3:- Distribution of subjects based on the Nail Changes

Nail Changes (n-2409)	n	%
Onychomycosis	921	38.2%
Onychomycosis and paronychia	312	13.0%
Paronychia	85	3.5%
Subungual hypertrophy	347	14.4%
Pitting	378	15.7%
Pterygium	14	0.6%
Onycholysis	126	5.2%
Onychoschizia	73	3.0%
Melanonychia	115	4.8%
Half and half nails	12	0.5%
Trachyonychia	22	0.9%
Onychogryphosis	2	0.1%
Subungual melanoma	2	0.1%
Total	2409	100.0%

Table 4:- Gender-wise distribution of Nail Changes

Variables	Female (n-1420)	%	Male (n-989)	%	p- value
Onychomycosis	584	41.1%	337	34.1%	< **0.05**
Onychomycosis with Paronychia	228	16.1%	84	8.5%	< **0.05**
Paronychia	73	5.1%	12	1.2%	< **0.05**
Subungal Hyperkeratosis	221	15.6%	126	12.7%	**0.20**
Pitting	152	10.7%	226	22.9%	< **0.05**
Onycholysis	75	5.3%	51	5.2%	**0.80**
Onychoschizia	48	3.4%	25	2.5%	**0.36**
Melanonychia	45	3.2%	70	7.1%	< **0.05**

Table 5:- Age-wise distribution of Nail Changes

Age (mean +/- SD)	Present	Absent	p- value
Onychomycosis	44.12 (4.5)	38.65 (5.2)	<0.05
Onychomycosis with Paronychia	47.66 (7.1)	38.97 (5.4)	<0.05
Paronychia	37.67 (3.9)	44.78 (6.7)	<0.05
Subungal Hyperkeratosis	45.53 (5.6)	41.33 (5.8)	<0.05
Pitting	35.66 (4.4)	44.33 (5.6)	<0.05
Onycholysis	47.55 (4.6)	43.56 (5.4)	<0.05
Onychoschizia	39.76 (5.4)	43.22 (4.5)	<0.05
Melanonychia	33.56 (7.6)	44.45 (5.6)	<0.05

Table 6:- Association of Nail Changes with degree of Involvement

Nail Changes	Nail Only (n-1810)	Nail + hair/ skin (n-318)	Nail + Systemic Disease (n-281)	p-value
Onychomycosis	800	23	98	**<0.05**
	44.2%	7.2%	34.9%	
Onychomycosis with	273	3	36	**<0.05**

Paronychia	15.1%	0.9%	12.8%	
Paronychia	74	2	9	**<0.05**
	4.1%	0.6%	3.2%	
Subungal Hyperkeratosis	309	6	32	**<0.05**
	17.1%	1.9%	11.4%	
Pitting	91	270	17	**<0.05**
	5.0%	84.9%	6.0%	
Pterygium	0	14	0	**<0.05**
	0.0%	4.4%	0.0%	
Onycholysis	99	17	10	**0.348**
	5.5%	5.3%	3.6%	
Onychoschizia	65	1	7	**<0.05**
	3.6%	0.3%	2.5%	
Melanonychia	45	1	69	**<0.05**
	2.5%	0.3%	24.6%	
Half and Half Nail	0	0	12	**<0.05**
	0.0%	0.0%	4.3%	
Trachyonychia	21	1	0	**0.159**
	1.2%	0.3%	0.0%	
Onychogryphosis	2	0	0	**0.71**
	0.1%	0.0%	0.0%	
Subungal Melanoma	1	0	1	**0.517**
	0.1%	0.0%	0.4%	

Discussion:-

According to the Guidelines/ Outcomes Committee, American academy of Dermatology [8], the incidence of nail changes in skin patients is 10% which is in accordance with our study (9.76%); the incidence of nail changes increases as the age progresses which is also the case in our study with maximum incidence of nail changes seen in patients beyond the age of 40 years. While there is no sex predilection according to the above paper, in our study the incidence of nail changes is more in females (58.9%) than males (41.1%).

The number of patients with only nail changes (75.1%) is significantly higher than the number of patients of nail changes associated with skin or hair disorder (13.2%) or with any systemic disease (11.7%)

Onychomycosis (with or without paronychia):-

A total of 51.2% of our patients had onychomycosis (38.2% - only onychomycosis; 13.0% - onychomycosis with paronychia) which is similar to that reported by Van Der Straten et al. [9] and Summerbell et al. [10] both of whom reported the incidence of onychomycosis to be around 50% of all nail changes.

In our study the incidence of onychomycosis increases as the age progresses and the association is significant which is similar to that seen by Ramesh et al. [11] as the faster rate of nail plate growth prevents onychomycosis in children. The incidence of onychomycosis is higher in females than in males and the only nail involvement is seen more frequently than in association with skin, hair or systemic disease. Only 37% of patients of onychomycosis were proven on 30% KOH mount as chances as high false negative results are known with this method as mentioned by Fletcher et al. [12].

Paronychia:-

Our study shows that incidence of paronychia is higher in females than males which is mostly due to wet and cold hands due to prolonged contact with water as shown by Esteves et al. [13] and Hellier et al. [14]. The maximum incidence of paronychia is seen between 30 to 39 years of age in our study which is similar to that observed by Esteves et al. [13] who reported increased incidence of paronychia between ages 30 to 60. According to Stone et al. [15], paronychia may be seen in children due to thumb sucking but in our study, no children presented with paronychia.

Paronychia mainly presents with nail changes as in our study but may also be present in patients with systemic diseases (3.0% of our patients) like pemphigus as mentioned by Engineer et al. [16] and in squamous cell carcinoma as mentioned by Beti et al. [17].

Subungal Hyperkeratosis:-
The incidence of subungual hyperkeratosis is our study was marginally higher in females (14.5%) than males (12.7%) but the association is not significant. The incidence of subungual hyperkeratosis increases significantly with age with the maximum incidence being above 40 years of age. Our study also shows that subungual hyperkeratosis presenting with only nail changes is significantly higher than in association with akin, hair or systemic disease.

Pitting:-
Our study shows that pitting is more common in males than females and the association is significant. Our study shows that pitting is more common in less than 30 years of age and is highly associated with skin and hair changes which are similar to Nanda et al. [18] and Kumar et al. [19] who have described higher incidence of pitting in children suffering from psoriasis.

Pterygium:-
In our study, males are more affected than females but the association is not significant. All patients of pterygium are associated with skin and/or hair changes which is similar to reports of pterygium in association with lichen planus by Samman et al. [20], with graft versus host disease by Little et al. [21] and with type II lepra reaction by Patki et al. [22].

Onycholysis:-
The incidence of onycholysis is equal in males and females in our study. There is a bimodal peak of onycholysis in our study which can be explained on the basis of multiple causes of onycholysis which includes trauma, fungal infection, eczema, drug reactions, maceration, photo-onycholysis [23], hypothyroidism [24], hyperthyroidism [25], trauma [26], drugs like 5-FU [27], doxycycline [28-30], retinoids [31] and chemotherapy [32]. Our study also did not show any significant difference between the association of onycholysis with only nail changes or in association with skin/hair or systemic disease which can also be explained on basis of the multiple causes of onycholysis.

Onychoschizia:-
Our study shows no significant difference in the incidence of onychoschizia in males and females which is in contrast to study by Waillis et al. [33] which says that onychoschizia can be found in 27% - 35% of normal adult females. The incidence of onychoschizia is maximum between 30-39 years of age in our study which can be explained on basis of females who repeatedly soak their hands in water for domestic work and develop onychoschizia as explained by Waillis et al. [33]. Onychoschizia is associated more significantly with only nail changes than with skin/hair or systemic disease.

Melanonychia:-
Our study shows presence of melanonychia to be significantly higher in males (7.1%) than females (3.0%) and probably be attributed to multiple drugs or systemic diseases that these patients had. The incidence of melanonychia is significantly more in less than 30 years of age which is probably due to racial pigmentation in contrast to study by Monash et al. [34] which says that 77% of Afro-Carribeans over 20 years of age have longitudinal melanonychia and the prevalence of which increases to almost 100% by 50 years. The incidence of melanonychia is significantly more in association with systemic disease than with only nails or in association with skin and/or hair. This is possibly due to the multiple drugs which can cause pigmentation of the nails as demonstrated by Gallais et al. [35].

Half and Half nail:-
Our study shows significantly greater incidence of half and half nails in males (0.9%) than females (0.2%) with all patients having associated systemic disease as shown in study by Daniel et al. [36].

Trachyonychia:-
Our study shows equal incidence of trachyonychia in both males and females with maximum incidence of trachyonychia between 30 – 39 years of age which is probably due to its association with dermatological conditions like alopecia areata [37], lichen planus and psoriasis which usually present in this age group.

Onychogryphosis:-
In our study, 2 males of more than 50 years presented with onychogryphosis with only nail changes. This finding is similar to that observed by Cohen et al. [38], Dawber et al. [39] and Gilchrist et al. [40] that onychogryphosis is a nail disorder of the elderly.

Subungual melanoma:-
In our study, 2 males of more than 50 years presented with nail changes suggestive of subungual melanoma. These patients had a positive Hutchinson's sign which is a strong clinical marker of subungual melanoma as shown by Kopf et al. [41]. Both these patients were advised biopsy but were lost to follow up.

Conclusion:-
The nail apparatus is an important structure and has certain indispensable functions. Hence abnormalities of the nail carry both physical and psychological implications and can give us a clue to underlying systemic disease.

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