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Comparative Analysis of Clinical Correlation of Leukonychia in Different Age Groups-A Original Study

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ABSTRACT

Introduction: Nails are an important aspect of not only external appearance but also internal constitution and nutritional status. The chemical profile of the normal nail contains keratin content, sulfur content, and mineral composition (which include magnesium, calcium, iron, zinc, sodium, and copper). White discoloration seen on nails is called leukonychia. As the normal nail plate consists of many nutrients, almost any nutritional deficiencies can show changes in the nail bed. Both increase and decrease in nutritional status can lead to rising or drop in the nail concentration. Many types of research have been done to prove the relation between leukonychia and diseases, nutritional deficiencies, etc. The main aim of the study is to determine whether there is any correlation between leukonychia and certain age groups.

Materials and methods: The current study was based on leukonychia which was conducted in Saveetha Dental College and Hospitals. A total of 30 participants had agreed to participate in the study and a picture of each hand was taken. Pictures of the participants' hands were taken using a smartphone without a flashlight. Later the pictures (results) were collected and analysed using SPSS software. Descriptive analysis was done to compare leukonychia with different age groups.

Results: Descriptive analysis was done to compare leukonychia with different age groups. In the present study, the significance shown was seen to be 0.000 which is less than 0.05, which confirms that this present study was significant. The participants of the study were found to be as 90% having no leukonychia (grade 0), 6.67% had punctate leukonychia (Grade 1) and the remaining 3.33% of the participants had longitudinal leukonychia (Grade 3).

Conclusion: The results show that leukonychia was most common in the age group of 41-50 years old participants, but many criteria such as gender, nutritional deficiencies were excluded in the study. This may be included in any future studies.

Key words: Leukonychia, Grading, Nutritional deficiencies, Innovative technique, Medical conditions

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INTRODUCTION

Nails are an important aspect of not only external appearance but also internal constitution and nutritional status [1]. The nail plate is the hard translucent, most visible, and functional part that sits and covers the nail bed. The nail is composed of keratin layers. The nail plate is surrounded proximally and laterally by nail folds, protecting its proximal and lateral edges [2]. The nail plate looks like a single solid object, but it consists of 100 layers of dead, flattened cells from the epithelium of the germinal matrix of the nail bed [3].

White discoloration seen on nails is called leukonychia. True leukonychia originates in the matrix and appears on the nail bed, apparent leukonychia is seen in the nail bed and pseudo leukonychia is due to external cause on the nail plate. There are three main types of leukonychia [4]. True leukonychia may be associated with hypocalcaemia, zinc deficiency, trauma, chemotherapy, and systemic diseases [5,6]. There are different types of true leukonychia, leukonychia totalis which is the whitening of the entire nail. They could be caused due to decrease in albumin, liver failure, and protein malabsorption. Leukonychia partialis are small white dots seen on the nails [7].

They are again further divided as punctate, transverse or striate, and longitudinal. Punctate is known as true leukonychia is small white spots that disappear after 8 months. They can travel with cell growth. Transverse/ striate is also known as Mee's line appearing as one or more horizontal lines. They are similar to apparent leukonychia but do not travel along with the growth of nails. They may occur due to acute infections, lymphoma, hepatic failure, renal failure, chemotherapy, etc. [7,8]. Longitudinal leukonychia is smaller than 1mm which appears as white bands and is seen parallel to the nail bed. And this may be associated with Darier's disease [9,10].

Terry's lines are seen to be a variant of apparent leukonychia. It can be caused by liver cirrhosis, congestive

heart failure, and diabetes mellitus [9,11]. Leukonychia was also found to be associated with various severe nutritional deficiencies like calcium, selenium, iron, kwashiorkor, marasmus, and immunodeficiency. The chemical profile of the normal nail contains keratin content, sulphur content and mineral composition (which includes magnesium, calcium, iron, zinc, sodium, and copper) [12]. As the normal nail plate consists of many nutrients, almost any nutritional deficiencies can show changes in the nail bed. Both increase and decrease in nutritional status can lead to rising or drop in the nail concentration [13]. A study was seen wherein a 7-year-old boy was diagnosed with asymptotic discoloration on the fingernails and toenails. It was reported that he had it since birth but no other problems were reported. Leukonychia totalis occurs rarely. No associated conditions were found on the diagnosis. It was most likely found to be inherited but the prognosis of leukonychia remains unknown [14].

Many types of research have been done to prove the relation between leukonychia and systemic diseases, nutritional deficiencies, etc. According to an article written by Ceyhan et al, it was seen that a 50-year-old woman who was suffering from autoimmune hypothyroidism had transverse leukonychia. After repeated KOH microscopic examination, it was found that both were related to each other [15,16]. This research needs to be done for understanding which age group was more commonly prone to leukonychia. Though the underlying mechanism is still unknown, this study can contribute information for future studies. The main aim of the study is to determine whether there is any correlation between leukonychia and certain age groups.

MATERIAL AND METHOD

The current study was based on leukonychia which was conducted in Saveetha Dental College and Hospitals. The study conducted was approved by the institutional review board. A total of 30 participants had agreed to participate in the study and a picture of each hand was taken. Pictures of the participants' hands were taken using a smartphone without a flashlight. Later the pictures were collected and analysed by different grades such as

Grade 0=No leukonychia

Grade 1=Punctate (small white spots)

Grade 2=Transverse (horizontal white lines)

Grade 3=Longitudinal (lines less than 1mm)

Gender, height, and weight factors were excluded. The results were collected and statistically analysed using SPSS software (IBM SPSS Statistics for Windows, version 23.0, Armonk, NY:IBM Corp. Released 2015). Descriptive analysis was done to compare leukonychia with different age groups.

RESULTS

Results are mentioned in Figures 1 to 3.

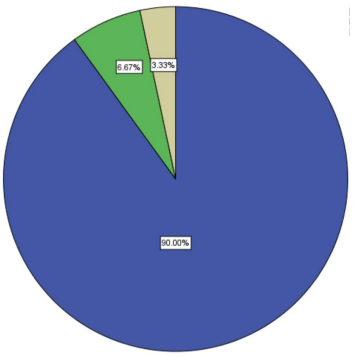

Figure 1: The pie chart depicts the grade of leukonychia. 90% (blue) was found to have no leukonychia, 6.67% (green) were of punctate leukonychia and the remaining 3.33% (yellow) had longitudinal leukonychia.

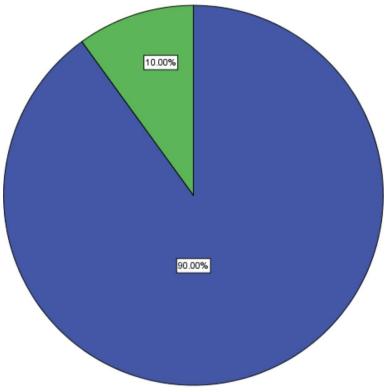

Figure 2: The pie chart depicts the age of the 30 participants who had participated in this study. 10% (green) of the total 30 participants were below 30 years and the remaining 90% (blue) were between the ages of 41- 50 years.

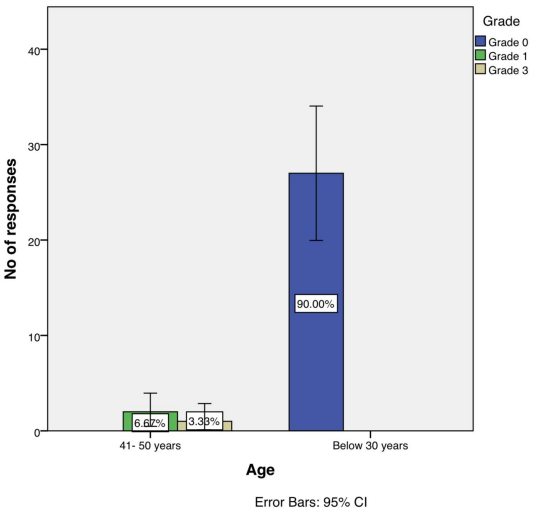

Figure 3: Bar chart represents the association of responses between age of the participants who had participated in the study and grade of leukonychia. X axis represents the age of the participants; Y axis represents the grade of leukonychia, grade 0 (blue), grade 1 (green) and grade 2 (yellow). 90% (blue) who were below the age of 30 years were found to

have grade 0 leukonychia, 6.67% (green) of the participants between the age of 41- 50 years were found have grade 1 leukonychia and the remaining 3.33% (yellow) of the participants between the age of 41-50 years had grade 2 leukonychia. The association was found to be statistically significant. Pearson's Chi square value= 0.005, p value=0.005 (<0.05).

DISCUSSION

The current study was based on the clinical correlation of leukonychia with different age groups. The results were collected and statistically analysed using SPSS software. Descriptive analysis was done to compare leukonychia with different age groups. In the present study, the significance shown was seen to be 0.000 which is less than 0.05, which confirms that this present study was significant. Figure 01 depicts the grade of leukonychia seen in the present study. 90% were found to have no leukonychia (grade 0), 6.67% were of punctate leukonychia (grade 1) and the remaining 3.33% had longitudinal leukonychia (grade 3). Figure 02 depicts the age of the 30 participants who had participated in this study. 10% of the total 30 participants were below 30 years and the remaining 90% were between the ages of 41- 50 years. Figure 03 depicts 90% (blue) of the participants who were below the age of 30 years were found to have grade 0 leukonychia, 6.67% (green) of the participants between the age of 41- 50 years were found have grade 1 leukonychia and the remaining 3.33% (yellow) of the participants between the age of 41- 50 years had grade 2 leukonychia. From Table 01, according to a previous research, Koo JY et al, stated that in their research there was no significant correlation between leukonychia and syndromes such as congenital hyperthyroidism, hypoparathyroidism, onychorrhexis, etc. [17]. In an article written by Foti C et al, it was seen that after a patient with transverse leukonychia, tetany and muscle cramps associated with hypocalcemia had undergone treatment with calcium lactogluconate, calcium carbonate, and calcitriol, nail alteration had occurred and transverse leukonychia had disappeared. The exact reason for causing transverse leukonychia is unknown [18].

In a study done by Adebajo et al, they stated that nail diseases were found to be seen and associated with functional impairment in patients with psoriatic arthritis. Nail diseases such as pitting, subungual hyperkeratosis, discoloration, dystrophy, and onycholysis were seen in these patients. Severe nail disorder is correlated with increased anxiety and depression scores in patients with proven psoriatic arthritis [19]. Habidullah Aktas had stated in his research that among Alopecia areata (AA-autoimmune, non-scarring, gait loss disease) patients, leukonychia was the most commonly found nail change. But there were criteria such as patients who have not recorded changes in their nail; changes in nail during diseased condition were to be excluded. Leukonychia was also found to be more common in AA patients of younger age [20]. Starace M et al stated in their article that in new-borns (at birth), traumatic punctate leukonychia was found and in toddlers (1-3 years), punctate leukonychia was found. The authors stated that the clinicians must take care and provide necessary treatment at early stages as the association of other diseases with leukonychia is still unknown. The importance of clinical examination and correct clinical history must be collected by the clinician to help them decide the correct management of the nail disease in younger patients [21]. P 'D'Souza et al stated that in a few patients, the presence of nutritional deficiencies was not seen in the patient's serum levels. They (clinicians) should consider distributing micronutrients in oral supplements in cases such as acquired leukonychia. As the underlying mechanism of micronutrients is still unknown, the association of leukonychia with what or what problem is still yet to be found [22].

Seval Erpolat et al had reported that leukonychia was found to be the most common nail disorder in pregnant women at both 14-28 weeks and 29-42 weeks of pregnancy. Although these changes in the nails of pregnant women are benign and do not require any particular treatment, these changes may cause cosmetic stress in these women [23]. In an article written by Zimeng You et al, it was seen that psoriasis patients had nail changes such as subungual hyperkeratosis, leukonychia, pitting, transverse groove, etc., and also developed discoloration of nails. A better state was seen after the treatment.

In the present study, conditions such as nutritional deficiencies, systemic diseases, or any other medical conditions were excluded and not considered as criteria in this study [23,24]. A. Salem et al had discussed in their study that among 100 chronic renal failure patients who were undergoing regular haemodialysis. In a healthy person, total leukonychia was observed more commonly among 76% of patients than in 30% who were in the control group. Frequent observation of nail changes must be done to trace the particular abnormality in the renal condition [25]. Transverse leukonychia was also found to be associated with hyper- parathyroidism even in absence of trauma in the history of the patients who had participated in the study [26].

Our team has extensive knowledge and research experience that has translate into high quality publications [27–46]. The limitations seen in the present study were that larger sample size could have been taken as well as the participants medical condition could have been considered in the present study. All age groups including infants to elderly people could have been considered. The future scope of the study is to consider all the limitations mentioned above and also to find the exact underlying mechanism of the nail and nail-related disorders.

CONCLUSION

The results show that leukonychia was most common in the age group of 41-50 years old participants, but many criteria such as gender, nutritional deficiencies were

excluded in the study. These criteria are to be included in any future studies.

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CONFLICT OF INTEREST

The author declares that there was no conflict of interest in the present study.

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