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Original Research Article

Nail changes in construction site workers: an observational study

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ABSTRACT

Background: Nail changes are common in occupational labourers but no studies have been done pertaining to construction site workers. We studied nail changes in labourers working at various construction sites.
Methods: 50 labourers of age group 10-65 years and both sexes were enrolled for the study. Changes in nail apparatus were studied by dividing into nail plate, nail bed and nail fold changes.
Results: Males outnumbered females in our study. Most of the labourers were in age group of 10-25 years. Most common nail plate changes were Longitudinal ridging and discoloration of nail plate; nail bed were onycholysis, subungual hemorrhage, onycholysis and nail fold changes were absent cuticle and hang nail.
Conclusions: Adequate preventive measures are required at construction site workplace to prevent long standing nail sequalae.

Keywords: Nails, Occupational nail changes, Construction site labourers, Nail deformity

INTRODUCTION

Occupational nail disorders are abnormalities of one/more structure of the nail apparatus and are produced/aggravated by various occupational factors. The occupation should be a major factor in causation of nail changes as nail disorder would not have occurred if patient was not involved in that particular occupation.[1] For the patients to be diagnosed as occupational nail disorder there should be temporal relation between exposure and onset of nail symptoms and non-occupational exposure should be excluded as a probable cause.[2] Nail changes are quite common in occupational labourers whether they are working at construction site, hair salon or dye industry. Though multiple studies have been done in salon workers, no literature is available pertaining to nail changes in construction site workers.[3] We hereby report nail changes and deformities particular to construction site workers so that timely and adequate measures are taken to prevent longstanding nail sequelae.

METHODS

The study type was a cross-sectional observation study carried out at various construction sites in district Karnal (Haryana) from 01 March 2019 to 31 March 2019 (one month).

For the procedure of the study, we visited various construction sites in Karnal district of Haryana and gathered data of 50 labourers. Labourers of both sexes of age more than or equal to 10 years and less than or equal to 65 years were included in the study. Labourers with history of underlying skin disorder were excluded from the study. Informed written consent was obtained from all the study subjects. Demographic and occupational details were recorded, and finger and toe nails were examined for changes in nail plate, nail bed and nail folds. Significant changes in nail apparatus were taken down and photographic record was obtained and data analyzed.

RESULTS

Majority of construction site workers were males and the age ranged from 10-65 years. Two of our subjects were less than 14 years of age and one male was 65 years of age (Figure 1 and 2).

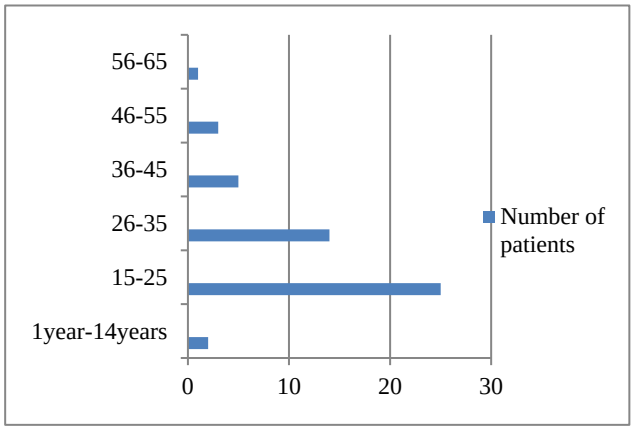

Figure 1: Age wise distribution of laborers.

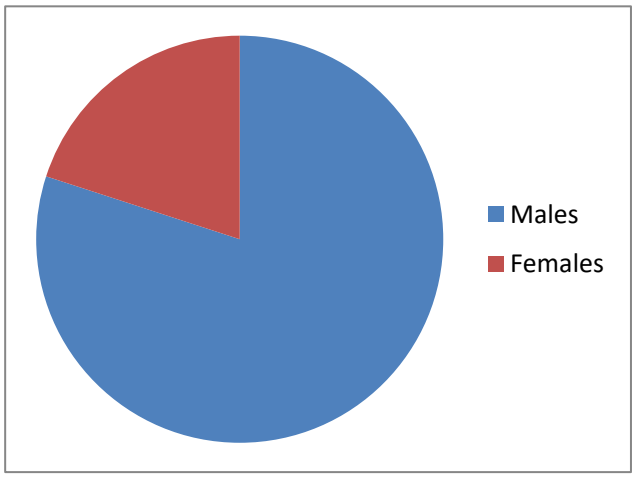

Figure 2: Sex wise distribution of subjects.

Majority of subjects were in construction site work for 5-15 years (Table 1).

Table 1: Duration of subjects were working in construction site.

Duration since occupation (year)	No. of subjects
<1	5
1-5	9
6-10	12
11-15	11
16-20	7
21-25	2
>25	4

Majority of the labourers in our study had nail plate changes, followed by nail fold and nail bed.

Amongst nail plate alteration most common change observed was longitudinal ridging of nail plate (Figure 3) seen in finger nails of 34 and toe nails of 40 labourers, second most common finding was nail plate discoloration (Figure 4) seen in finger nails of 25 and toe nails of 12 labourers. Less commonly observed were transverse ridging (Figure 5), transverse leukonychia (Figure 6), koilonychia and thinning of nail plate. Pterygium formation leading to prominent longitudinal ridging was seen in finger nail of 2 labourers (Figure 7). Pincer toe nail was observed in one labourer (Figure 8).

Changes seen in nail fold were chiefly absent/ragged cuticles (Figure 9) seen in finger nails of 33 and toe nails of 34 labourers. Other changes were paronychia seen in finger nail of 9 and toe nail of 4 labourers. Less commonly observed were hang nail (Figure 10) and dorsal pterygium.

Nail bed changes were least commonly observed. Changes observed in decreasing order of frequency were onycholysis, sub-ungual hyperkeratosis and hematoma/splinter hemorrhages.

Onychomycosis was commonly encountered fungal infection in our study and was seen in 7 labourers with concomitant involvement of both finger and toe nails in 2 subjects while in rest only toe nails were affected.

Figure 3: Longitudinal ridging.

Figure 4: Longitudinal melanonychia.

Figure 5: Transverse ridging.

Figure 6: Transverse leukonychia.

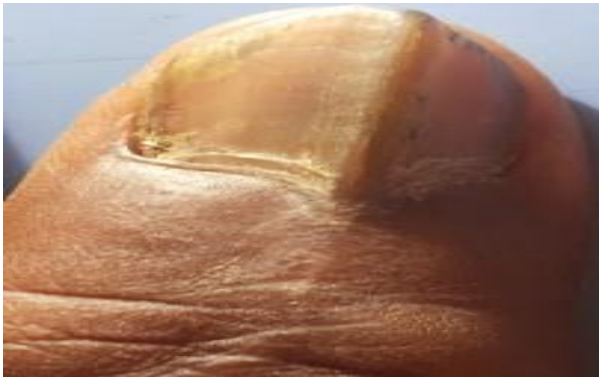

Figure 7: Pterygium with longitudinal ridging.

Figure 8: Pincer nail.

Figure 9: Ragged cuticle.

Figure 10: Hang nail.

DISCUSSION

Various workplace factors unique to construction site work might be the cause of occupational nail changes in our subjects. Awareness of these factors is critical to prevention and management of these occupational nail diseases. Important workplace factors which might be contributing to nail changes can be repeated trauma, various contact sensitizers, wet work, inadequate personal hygiene and infections.

In our observation majority of the subjects that is 50 percent were in 15-25 years of age which is in concordance with study conducted by Nijhawan et al wherein 200 subjects of various occupations were examined for nail changes and 57 percent of subjects were in age group of 10-25 years.[4]

Majority of the labourers that is 80 percent were males owing to sternous physical work required at construction sites. This finding too was in concordance with report by Nijhawan et al.

Longitudinal ridging/striations was the most common observed change in both finger and toe nails in our study and was most commonly seen in advanced age population. These should however be differentiated from other pathological nail changes like onychorrhexis. Major

trauma related to occupation can damage nail matrix leading to formation of pterygium and prominent longitudinal ridging as seen in finger nail of two labourers.[5]

Transverse ridging was mostly observed in toe nails and can be attributed to temporary cessation of nail matrix activity due to repeated mechanical injury. The chronic mechanic injury results in large transverse groove along the nail plate.[6]

Transverse leukonychia presents as 1-2 mm white lines on the nail plate which are often occurring at same site in each nail and was observed in finger nails of 10 labourers. It is almost always caused by repeated trauma to distal matrix.

Longitudinal melanonychia which appears as linear streaks/bands along the nail plate was seen in 15 nails and can be attributed to activation of quiescent melanocytes in matrix owing to repeated micro trauma or owing to racial pigmentation.[7] Other causes of nail plate discoloration in our study were onychomycosis seen in 7 subjects and exogenous pigmentation of nail plate due to dyes.

Koilonychia was also observed in few of the younger labourers and is attributed to anoxia or atrophy of the distal matrix. Repeated micro trauma and/or contact with chemicals that soften the nail plate causes koilonychias of finger nails while koilonychia of toenails can be caused by repetitive pressure and friction while working barefoot. Also, iron deficiency anemia is the most common cause of koilonychia in adolescents.[8]

Damaged/ragged cuticle was observed in finger nails of 33 and toe nails of 34 labourers and was the second most common alteration found in our study and can be caused by repeated contact allergy, irritant reactions to cement and other chemicals, prolonged hours of wet work, repetitive pressure and friction encountered in work and walking barefoot.

Paronychia was observed in finger nails of 9 labourers, mainly females. Primary defect for paronychia in these females can be damaged cuticle. Separation of the cuticle from the nail plate, leaves the region between the proximal nail fold and the nail plate vulnerable to infection, allergens, and irritants, triggering an inflammatory process.[9]

Hang nails were seen in few labourers and can be due to the hydration and dehydration caused by frequent wetting. However, usually hangnail has no obvious cause, though it may be self-induced.

Nail bed changes were least commonly observed. Changes observed in decreasing order of frequency were onycholysis, sub-ungual hyperkeratosis and hematoma/splinter hemorrhages and all these can be accredited to repetitive mechanical trauma, wet work, allergic and irritant contact dermatitis to cement and various organic solvents.[10]

Cement which is the most common culprit for contact sensitization in labourers is mainly composed of calcium oxide (lime) CaO, silicon dioxide (silica) SiO_2, aluminum oxide Al_2O_3, iron oxide FeO_3, magnesium oxide MgO, Sulphur dioxide SO_2, hexavalent chromium Cr(VI) and various to their alkaline oxides.

Nail involvement due to usage of cement, is due to a range of problems, including: the highly alkaline nature of cement, which can damage the skin directly; the presence of chromates which can produce sensitization and also due to the lack of training about preventive measures in construction workers.

Limitation of our study was: lesser number of subjects was enrolled for the study and correlation between various variables contributing to nail changes were not analyzed.

CONCLUSION

Thus, nail changes comprise a continuum of symptoms and severities, from very mild disease to severe illness demanding sick leave, change of occupation, or permanent disability, thus in turn affecting the quality of life. There-fore adequate and timely prevention and treatment is recommended to prevent longstanding nail sequelae.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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