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Performance evaluation of rapid test potassium hydroxide for the diagnosis of onychomycosis.

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ABSTRACT… Objective: To determine the potassium hydroxide (KOH) sensitivity for the diagnosis of fungal nail infections. **Study Design:** Descriptive Case study. **Setting:** Department of Quaid-e-Azam Medical College Bahawalpur. **Period:** July 2017 to June 2020. **Material & Method:** The nail specimen immersed in 20% Potassium hydroxide in Petri dish and incubated aerobically at 37Ć for 1 hours. Upon microscopy, the presence of hyphae or spores that considered the test was positive. **Result:** Out of three hundred forty clinical screened cases, the sensitivity of KOH mount was 55.29% true positive. **Conclusion:** KOH mount microscopy is simple and cost-effective techniques to diagnose superficial fungal infections in the primary care and Outpatient settings.

Key words: Fungal Elements, KOH Mount and Outpatient Department (OPD), Potassium Hydroxide (KOH).

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INTRODUCTION

Potassium hydroxide is a routinely performed diagnostic test for the superficial fungal infections. Fungal culture is the gold standard for diagnosing dermatophytosis but it since last two decades' available molecular techniques have improved the diagnostic procedure.[1]

Onychomycosis is a chronic fungal infection of the nails that affects 5.5% of the world population and represents 20% to 40% of all nail infections. Approximately 30% of cutaneous mycotic infections are due to onychomycosis.[2]

Globally the burden of onychomycosis raised. Trichophyton species and yeast or molds are the dominant isolating fungal agents.[3] The mycological diagnosis performed by direct microscopy KOH is most cost effective techniques to identify the fungal elements but it does not allow the species identification.[4]

Fungal infection may be recognized initially yellow discoloration of the nail plate which is crumbly thickened rough debris. This dystrophic and thickened portion of nail causing pressure erosions of the nail bed.[5]

Onychomycosis is Greek word that derived from the "onyx" a nail and "mykes" a fungus[6] which can be classified as, i) distolateral subungal; ii) superficial white; iii) proximal subungal; iv) candida v) total dystrophic onychomycosis.[7] The trauma to nails are mostly occurring disease factor and peripheral vascular diseases, poor hygiene and chronic exposure of water is also significantly affects the nail beds.[8] The nail fungal infection is much more observed in diabetes mellitus and HIV patients which was determined up to 40% in general population. The dermatophyte reporting increasingly in zones of temperate while moulds such as aspergillus species are commonly detection in tropical and subtropical countries.[9,10,11]

KOH 20% mount microscopy is simple, rapid and inexpensive laboratory techniques. However, experience is required to interpret the mount.[12]

MATERIAL & METHODS

The clinically diagnosed (n=340) cases of Onychomycosis enrolled to dermatology outpatient department, Bahawal Victoria Hospital Bahawalpur, Jinnah Postgraduate Medical Center Karachi and various dermatologist clinics. The duration of study was 1st July 2017 to 30th June 2020. Typically, Onychomycosis begins as a yellowish discoloration under the nail. The nail may thicken, become rough and crumbly and separate from the nail bed, and debris may accumulate under the nail. Thickening and dystrophy of the nail result in pressure erosions of the nail bed and Hyponychim.[5] A detailed proforma filled after consent that containing the nail trauma, personal hygiene and other relevant history were noted. The specimen was selected the most affected nail.[13] Cases were selected irrespective of age and gender. The exclusion criteria were already receiving antifungal and other systemic diseases.[14]

The affected nail was immersed in 20% KOH and incubated at 37Ć for 1 hours. On microscopy of softened nail, the presence of fungal components like beaded spherical structure (spores), budding cells and thread like structure (hyphae) were observed and were considered for positive test.[15,16]

RESULTS

Out of (n=340) clinical diagnosed cases, the distribution of males was 220 while females were 120. The 50% positivity of onychomycosis observed in age group of 21 to 30-years. (Figure-1). KOH mount microscopy revealed true positive results in 55.29% cases while 44.71% cases were negative. (Table-I). This study showed KOH mount microscopy is a screening tool for fungal infection and is cost effective in population for establishing the disease in outpatient department and clinics.

Test	Positive n (%)	Negative n (%)
KOH	188 (55.29%)	152 (44.71%)

Table-I. Descriptive analysis of diagnostic methods. (N=340).

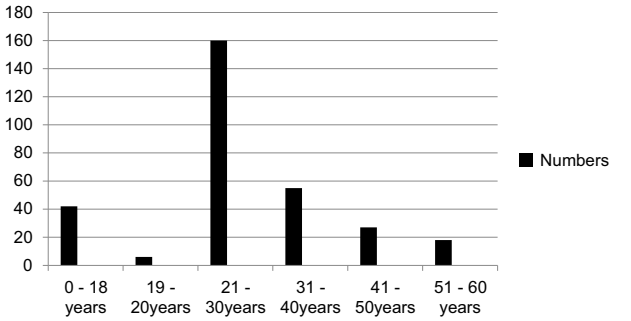

Figure-1. Distribution of age 1 group.

DISCUSSION

The 50% of nail diseases are caused by fungal infections. Several dermatophytes, non-dermatophytes, moulds, and yeasts may be involved for these disorders, collectively known as onychomycosis. We aimed KOH mount microscopy, for the screening and establishing onychomycosis at outpatient departmrnt.[17]

Sensitivity of KOH mount observed by Ahmad R et al[18] and Gianni C et al[19] was 59% and 59.3% respectively is comparable with our results that is 55.29%. Clinical cases of Onychomycosis by KOH microscopy by authors Wilsmann-Theis D et al[20] concluded 48% positive cases and Subathra, N[21] recovered 51% positive cases that are at par with our study. An observation by Jung MY et al[22] showed KOH sensitivity was 55.9% consistent with our study results. The present study observed KOH positivity was 55.29% which is closely matched with Dass S M et al[23] who recovered 56% positive tests. The positivity of KOH mount microscopy of our study results compared with Konda C et al[24] showed 4% lower ratio. Various other studies[25,26] observed range of 4 to 12% higher than with our results comparison.

Fungal culture and other diagnostic tools are expensive, time consuming. The special expertise personals required for these tools and even they did not available in every pathology laboratory and not included for diagnostic criteria.

CONCLUSION

KOH mount microscopy is efficient, simple and cost-effective techniques to diagnose superficial fungal infections in the primary care and

Outpatient settings.

RECOMMENDATION

KOH mount microscopy arrangements at OPD and primary care settings helpful for the detection of fungal elements and treat accordingly.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	M. Wajid Khurshid Sipra	Conceive of idea, Data collection, Writing of manuscript, Interpretation of Results, Final review of manuscript.	
2	Khawar Saeed Jillian	Interpretation of Results, Final Review of manuscript.	
3	Tayyaba Batool	Interpretation of Results, Final Review of manuscript.