

To Determine the Association between Mycological Pathogens and Comorbid Disorders using a Cross-Sectional Design

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Abstract:

Background: Epidemiology of dermatophytosis can direct public health policies, assist researchers in comprehending the factors that contribute to the condition, and lead to the development of more effective therapies.

Objective: The purpose of this study is to use a cross-sectional design in order to assess the connection between mycological pathogens and comorbid illnesses.

Materials and Methods: 102 dermatophytosis samples from patients seen in the Dermatology Outpatient Department (OPD) were handled at the Microbiology Department after receiving consent from the Institutional Ethics Committee.

Results: Twenty-one patients were diagnosed with diabetes mellitus, nine were diagnosed with hypertension, seven were diagnosed with both illnesses, fifteen patients were diagnosed with bronchial asthma, three patients were diagnosed with psoriasis, and seven patients were diagnosed with polyarthritis. Forty patients did not have any co-morbid disorders. The results of the Chi-square test have p-values that were lower than 0.001, making them statistically significant.

Conclusion: We just identified the very tip of the iceberg; the growth of dermatophytosis might be better explained by many more cases. In India, the National Public Health Program is responsible for providing treatment for dermatophytes. To solve this problem, we need stricter drug regulations and increased awareness among the population. Abuse of prescription drugs and accidental overdoses committed at home may be the result of standards that are not strictly enforced.

Keywords: Dermatophytosis; Hair; Nails; Dermatology; Discomfort; Skin Infections.

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Introduction

Research is being conducted on this fungal infection of the skin, hair, and nails in order to gain a better understanding of what causes it, what symptoms it manifests, and how it may be treated [1]. Dermatophytosis, [2] a common skin illness, is capable of causing significant anguish for those who are infected with it. Dermatophytosis epidemiology has the potential to influence public health policies and actions, and researchers studying the disorder can increase their understanding of its underlying causes and provide more effective therapies as a result of their efforts [3, 4].

Arthroconidia can attach to keratinized tissue thanks to proteases secreted by dermatophytes. Dermatophytes can do this because they produce specialized proteases. These proteases are essential for assisting arthroconidia in passing through barriers such as keratinocyte-produced sphingosines and sebaceous gland-produced fatty

acids [3, 4]. The formation of hyphae follows the germination of arthroconidia. This expansion occurs radially and can occur in a variety of ways [5, 6]. Trichophyton mentagrophytes generates carbohydrate-specific adhesins on the surface of its microconidia, but Trichophyton rubrum does not. Trichophyton rubrum attaches to the epithelial cells as a result of this treatment. The rate of spore germination and penetration through the stratum corneum is substantially faster than the rate of desquamation.

The metalloendoproteases (fungalsins) and serine subtilisins (fungasins) released by dermatophytes considerably simplify this. Fungi produce hydrolases such as lipases, ceramidase, and mucolytic enzymes, which all contribute to the invasive process [7, 8]. Hydrolases can also be produced by fungi. To begin, keratinized tissues must undergo sulfitolysis to diminish the strength of disulfide bonds in those areas. Only then would

there be any possibility of penetration, and only then will the protease have access to the substrates.

In addition, because there were so few people included in the study, it is hard to determine with absolute confidence whether or not there was a substantial change. There was not a single correlational investigation in or near the region under consideration that compared any of these variables to one another [9, 10]. My research will look into the roles of variables in two subjects chosen at random [11, 12] in order to establish distinct therapy management strategies for this condition. In order to accomplish this, the purpose of my research is to investigate the functions of variables. To determine the association between mycological pathogens and comorbid disorders using a cross-sectional design.

Materials & Methods

The Institutional Ethics Committee gave its approval for the current inquiry, which was conducted at the dermatological outpatient clinic. A mycology study was done by the Dermatology Department with 102 dermatophytosis samples that met the study's guidelines for what to include and what to leave out.

This study was both analytical and observational. Patients of any age or gender who have a clinical suspicion of dermatophytosis and come to or are directed to the mycology of OPD were included. Patients who also had another systemic disease were also included. People who had extra germs, fungal diseases in their hair, nails, or skin folds, or who were leventers were not allowed to take part. Patients who refused to give full consent or who

were already taking oral or systemic antifungal drugs were not included either. As per standard practice, skin scrapings, nail clips, and hair that had been epilated were gathered. We took two samples from each subject to look at under a microscope. The amount of potassium hydroxide in these samples was between 10% and 40%.

The samples were grown on Sabouroud's dextrose agar with and without antibiotics, as well as Dermatophyte test medium (DTM). They were then set up for a straight KOH mount in a clean room. LPCB photos were used to study mold-like fungus colonies to learn more about their hyphae, conidia (microconidia and macroconidia), and how the conidia were arranged. We used Christensen's urea medium in a biochemical reaction test for urea breakdown to tell the difference between *T. mentagrophyte* species and *T. rubrum* species. That's what was done with Christensen's urea medium. The medium turns a bright rose color when *T. mentagrophytes* species break down urea. But *T. rubrum* doesn't change the color of the medium because it can't break down urea. The hair puncture test was used to tell the difference between *T. rubrum* and *T. mentagrophytes*.

Statistical analysis: When analysing qualitative data, we used the chi-square test; when analyzing quantitative data, we utilized the unpaired T test and the ANOVA test. It was determined that statistical significance had been reached when the p-value was 0.05 or below. The statistical program SPSS 28 was utilized throughout each and every one of the analyses.

Results

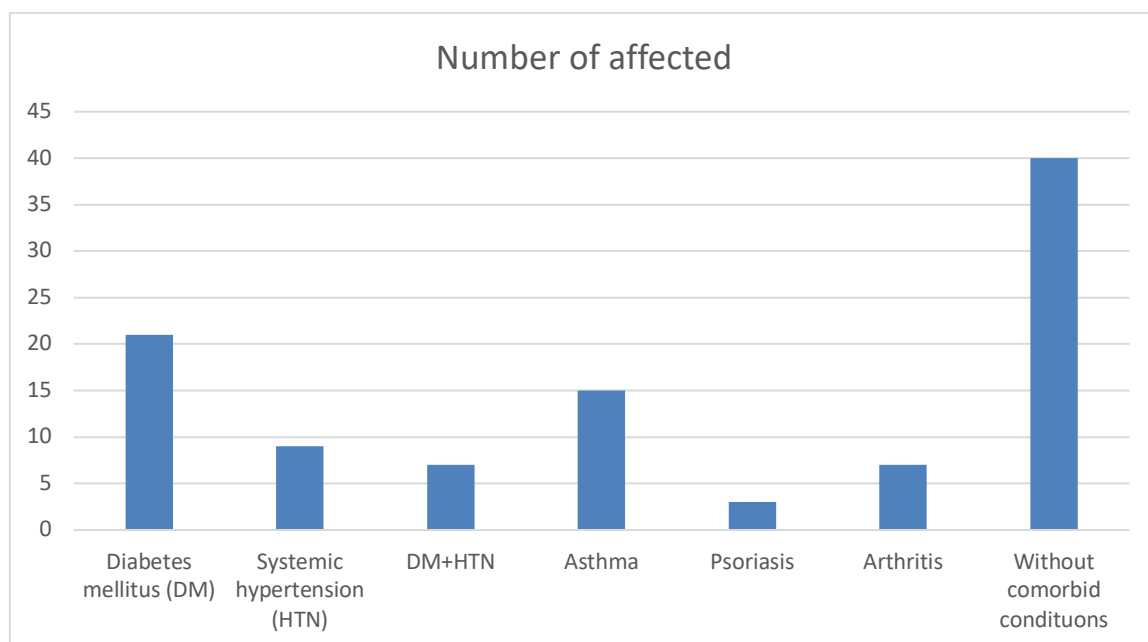


Figure 1: Prevalence of dermatophytosis in this study's population (n=102) in relation to other disorders

In total, there were 21 people in the study population who had been diagnosed with diabetes mellitus, 9 people who had been diagnosed with hypertension, 7 people who had been diagnosed with both hypertension and diabetes mellitus, 15 people who had been diagnosed with bronchial asthma, three people who had been diagnosed with psoriasis, and seven people who had been

diagnosed with polyarthritis. In addition, there were forty patients who did not have any co-morbid illnesses linked with their case.

The results of the Chi-square test revealed that the resultant p-value was lower than 0.001, suggesting that there was a significant statistical relationship between the two variables.

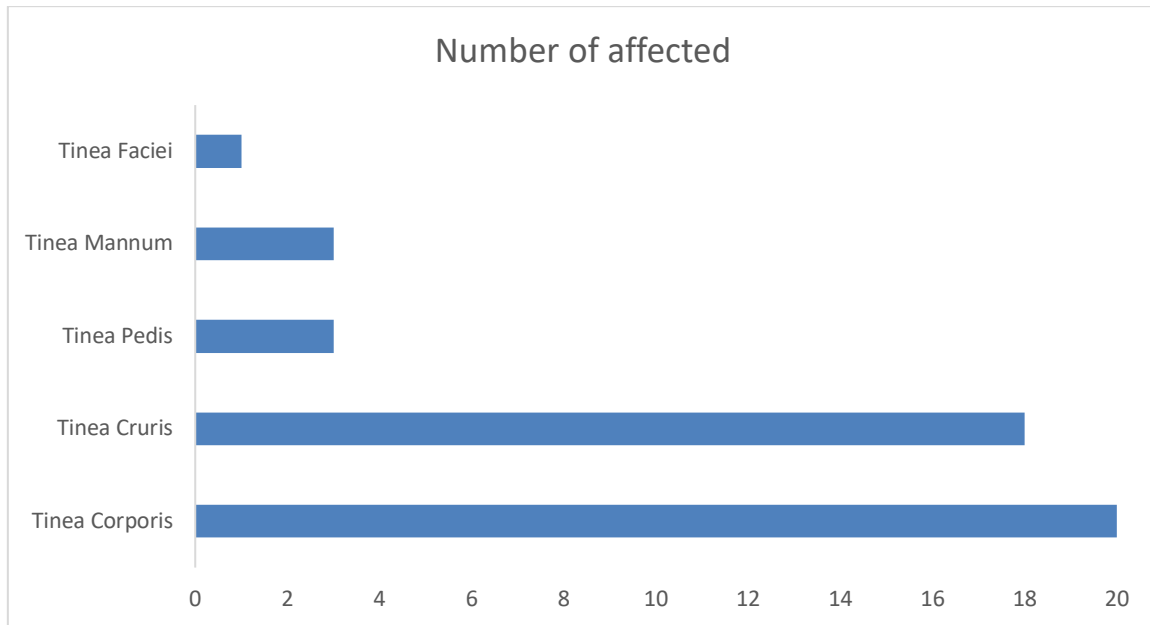


Figure 2: Skin scrapings (n=45) were taken from 102 participants, and the incidence of several dermatophyte pathogens was determined

Throughout the course of our investigation, we amassed a total of 102 samples to use in our analysis. 45 of them were samples of skin scrapings, 30 were samples of nail clippings, and 20 were samples of hair that had been epilated. The Chi-square test produced findings that were statistically significant, as shown by a p-value that was lower than 0.001, which ensures that it satisfies the criteria for significance established in advance.

During the course of this examination, 45 skin scraping specimens were analyzed, and the findings indicated that tinea corporis was the most common kind of dermatophytic lesion, accounting for 20 different occurrences. Tinea cruris, which accounted for 18 of the observed instances, was the condition that was shown to be the second most frequent. Tinea manuum and tinea pedis have been diagnosed in a total of three different patients. One of the cases was determined to have been caused by Tinea faciei.

Within the population that was being examined for this research, a total of 21 individuals were found to be suffering from diabetes mellitus, and 9 patients were diagnosed with hypertension. In addition to that, it was discovered that seven of the patients had both hypertension and diabetes mellitus. In addition, there were 7 patients who

were diagnosed with polyarthritis, 3 patients who were diagnosed with psoriasis, and 15 patients who were diagnosed with bronchial asthma. It is important to note that forty individuals did not show any signs or symptoms of linked co-morbid diseases. The results of the Chi-square test revealed that the resultant p-value was lower than 0.001, suggesting that there was a significant statistical relationship between the two variables.

Discussion

It is conceivable that these illnesses are aggravating the tinea infections, even though it is possible that the illnesses developing at the same time are coincidences. During the course of this investigation, it was found that diabetes mellitus was the most prevalent condition, observed in 21 subjects. Subsequently, a cohort of nine individuals diagnosed with systemic hypertension was included in the study. Psoriasis affected three individuals, while diabetes mellitus and systemic hypertension affected seven patients, and bronchial asthma affected fifteen patients. The present findings align with prior research [13], which demonstrated that diabetes accounts for 20% of hypertension cases, 16% of atopy cases, and 9% of diabetes incidences [14]. The study revealed that diabetes was observed in 22% of the patients, whereas high blood

pressure, dermatitis, and HIV were observed in 9%, 2%, and 2% of the subjects, respectively [15]. The presence of co-morbid conditions in the group being studied was determined to have a statistically significant association, as indicated by a p-value of 0.003. The primary focus of this work involved the analysis of skin scrapings, which constituted the majority of the samples (45). The remaining samples (24) were derived from nail clippings and hair removals. The results presented are consistent with the findings reported by previous investigations [19, 20]. These studies observed that skin scrapings constituted 54% of the investigated samples, hair samples constituted 39% of the analyzed specimens, and nail fragments constituted 7% of the examined materials. These findings are consistent with the results reported by previous studies [16, 17]. The statistical analysis revealed that the act of collecting samples from participants within the research group had a statistically significant result (p value = 0.002) in relation to the matter under investigation. Our inquiry resulted in the collection of a total of 102 specimens, including 45 skin scrapings, 30 nail clippings, and 20 samples of hair that had been epilated. Tinea corporis was found to be the most common type of dermatophytic lesion in this inquiry after it was determined from the examination of 45 skin scraping specimens that they contained. There were 20 occurrences of this condition. Tinea cruris came in at number two, accounting for 18% of all of the instances that were recorded. There were a total of three people who were found to be suffering from both tinea pedis and tinea manuum at the same time. Tinea faciei was identified in one of the instances. The prevalence of tinea cruris was found to exceed that of tinea corporis, indicating that individuals are more likely to seek medical attention due to the symptoms associated with tinea corporis, particularly the sensation of itching. The study revealed that a significant proportion of individuals afflicted with tinea experienced heightened perspiration due to engaging in strenuous labor or prolonged sun exposure, both of which exacerbated the condition.

Conclusion

Even if we had just found the very tip of the iceberg, there would still be many more cases in the population that would explain the recurrence and ongoing spread of dermatophytosis. Because of this, the National Public Health Program in India needs to tackle the dermatophyte issue. Tackling this problem will require strict drug control legislation and extensive public education and outreach initiatives. Problems like prescription drug abuse and accidental overdoses in the home might arise when drug regulations are not adequately enforced.

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