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Research Article

**STUDY TO DETERMINE THE INCIDENCE OF  
ONYCHOMYCOSIS IN DIABETIC PATIENTS**Dr Ifrah Jabbar, Dr Shanza Naeem, Dr Fazal Abbas Haider  
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**Abstract:**

**Aim:** To determine the incidence of onychomycosis in diabetes and its relationship to age, gender, diabetes and control.

**Place and Duration:** In the dermatology department of Jinnah Hospital Lahore for one-year duration from March 2019 to February 2020.

**Patients and methods:** This descriptive study included 262 patients with type 2 diabetes. All patients were examined by a dermatologist, and patients with clinical suspicions were referred for laboratory examination, i.e. smear and culture. Confirmed cases of onychomycosis were treated with terbinafine 250 mg / day for four months. Patients were clinically observed monthly and data were recorded. Direct smear and nail culture were taken at the end of the treatment protocol.

**Results:** 262 diabetic patients (123 men and 139 women) were examined. The mean age and duration of diabetes was  $59.12 \pm 10.96$  years and  $7.24 \pm 12.8$  years, respectively. Nail fungus has been clinically diagnosed in 18 patients (6.9%), and a culture study was performed in only 10 patients (3.8%). 70% of cases of onychomycosis are men, and 60% were over 60 years old. There was no significant relationship between the incidence of onychomycosis and the duration of diabetes, but onychomycosis is more common in patients with poor diabetes control.

**Conclusion:** The incidence of onychomycosis in patients with type 2 diabetes is 3.8% and is significantly associated with poor diabetes control.

**Key words:** diabetes mellitus, onychomycosis.

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**INTRODUCTION:**

Given the large number of patients with diabetes and their growing trends worldwide, WHO has estimated that there will be 300 million in 2025. This group of patients should recognize a lot of problems, these patients and the treating physicians<sup>1-2</sup>. One of these problems is fungal skin and nail infections, which explains the higher incidence in patients with diabetes<sup>3</sup>. Fungal infections of the nails may increase the incidence of diabetic foot.

Onychomycosis covers about 33% of all fungal skin infections and 50% of all nail diseases<sup>4</sup>. If ignored, it can damage the skin and nails, which provides a favorable environment for the growth of microorganisms, increasing the risk of secondary infection, necrosis and diabetic feet<sup>5</sup>. Onychomycosis also causes deformation of nails and nails, and thus prevents a person from being in public places and in the community<sup>6</sup>. Therefore, determining its frequency, timely diagnosis and treatment can help prevent serious problems in these patients.

**PATIENTS AND METHODS:**

This descriptive study included 262 patients with type 2 diabetes. General information was recorded, such as age, gender, diabetes control, duration of

diabetes since diagnosis of diabetes and type of diabetes, and skin test results. Therefore, in patients with suspected onychomycosis, i.e. changes in nail color, nail deformity or subungual keratosis, etc. Mycological tests, direct smear and culture were performed. Patients with a positive smear and culture were considered positive onychomycosis, but fungal cultures were repeated for patients with a negative culture and suspected of having a serious clinical infection. Cases of confirmed onychomycosis were treated with terbinafine at a dose of 250 mg / day for 4 months. Samples were cultured again two weeks after surgery. Negative change cultures were then considered improved. Data were analyzed separately.

**RESULTS:**

In this study, 262 patients with type 2 diabetes, 123 (47%) men and 139 (53%) women from our diabetes clinic in Yazd were examined for onychomycosis. Eighteen patients (6.9%) were clinically suspected, but the diagnosis was tested by direct smear and culture only in 10 patients (3.8%).

The distribution of onychomycosis in our diabetics is shown in Table 1. The number of affected men was greater than that of women (3 vs 7), but statistical analysis was not significant. ( $p = 0.197$ ).

**Table 1** Onychomycosis distribution in diabetic patients according to sex

Sex	Without onychomycosis N (%)	With onychomycosis N (%)	Total N (%)
Female	136 (97.8)	3 (2.2)	139 (53)
Male	116 (94.3)	7 (5.7)	123 (47)
Total	252 (96.2)	10 (3.8)	262 (100)

Fisher's exact test,  $p = 0.197$

The mean age of patients was  $59.12 \pm 10.96$  years, and the distribution was 35–95 years. Of these, 147 (56.1%) were under 60 and 115 (43.9%) were over 60; There was no significant difference. Onychomycosis of the age in diabetes is shown in Table 2. There were 4 patients under 60 years of age and 6 patients over 60 years of age ( $p = 0.322$ ).

The average duration of diabetes in our population was  $12.81 \pm 7.24$  years, 45% were under the age of 10, and 55% had a history of diabetes over 10 years.

**Table 2** Onychomycosis distribution in diabetic patients according to age.

Age (years)	Without onychomycosis N (%)	With onychomycosis N (%)	Total N (%)
<60	143 (97.2)	4 (2.8)	147 (56.1)
>60	109 (94.8)	6 (5.2)	115 (43.9)
Total	252 (96.2)	10 (3.8)	262 (100)

Fisher's exact test,  $p = 0.342$

**Table 3** shows the distribution of onychomycosis by duration of diabetes. There were 5 patients lasting 10 years ( $p = 0.758$ )

**Table 3** Onychomycosis distribution in diabetic patients according to duration of diabetes.

Duration (years)	Without onychomycosis N (%)	With onychomycosis N (%)	Total N (%)
<10	113 (95.7)	5 (4.3)	118 (45)
>10	139 (96.5)	5 (3.5)	144 (55)
Total	252 (96.2)	10 (3.8)	262 (100)

Fisher's exact test,  $p = 0.758$

Regarding diabetes control, 103 (39.3%) patients in this study had 7% HbA1C. Table 4 shows onychomycosis and diabetes control in patients with HbA1C. One in 10 patients with onychomycosis had 7% HbA1C in one patient, i.e. poor diabetes control in patients with onychomycosis. Statistical analysis, however, was insignificant. ( $p = 0.094$ , Fisher's exact test)

**Table 4** Onychomycosis distribution in diabetic patients according to HbA1C.

HbA1C	Without onychomycosis N (%)	With onychomycosis N (%)	Total N (%)
<7%	102 (99)	1 (1)	103 (39.3)
>7%	150 (94.3)	9 (5.7)	159 (60.7)
Total	252 (96.2)	10 (3.8)	262 (100)

Fisher's exact test,  $p = 0.094$

All patients responded well to terbinafine treatment, and two weeks after the treatment period, all patients were culture-negative.

## DISCUSSION:

In this study, the incidence of onychomycosis was 26% in 262 patients with type II diabetes. Comparing our results with previous studies, the incidence of onychomycosis in our study population was much lower than in other countries. The incidence of onychomycosis in diabetics depends on various factors, such as age, gender, underlying diseases, occupation, weather, environment, nail trauma, poor hygiene, moist environment and repeated contact<sup>7-8</sup>. nails with water; The relatively lower prevalence rate in our diabetics may be due to various reasons, such as heat and dry weather in Yazd, relatively better economic conditions and good hygiene, instructions for patients with diabetes. Re-examination by the Yazd diabetes center and dermatologist may be another reason why the incidence of onychomycosis is low in our diabetic patients. Another reason may be that we only consider positive cases of culture<sup>9</sup>.

The incidence of onychomycosis was compared in both sexes as men more often suffered foot injuries and sweating than women. Apparently, men had more onychomycosis than women; However, the difference was not significant. Male domination has been previously reported<sup>10</sup>. However, other studies have shown similar frequencies in both sexes.

The incidence of onychomycosis by age was also investigated in this study. The average age of patients with onychomycosis was similar to patients without disease (62.2 years and 59.80 years). Similar results were noted in previous literature. On the contrary, Suheyla et al<sup>11</sup>. They did not observe such a relationship. and Manjao et al<sup>12</sup>. The relationship between onychomycosis and diabetes control was also investigated. The mean HbA1C concentration in patients with onychomycosis was 8.2% compared to 7.61% in patients without onychomycosis. This indicates that the incidence of onychomycosis is higher in patients with diabetes and poorer disease control<sup>13</sup>. This is consistent with most other studies. But he did not observe such a connection with Sühey<sup>14</sup>.

Regarding the relationship between the onset of onychomycosis and the duration of diabetes, there

was no significant difference in the average duration of the disease between patients with onychomycosis who were 12.8 years old in both groups and those without onychomycosis. He reported similar results with suhey and found no link between onychomycosis and the period of diabetes<sup>15</sup>. However, this discovery differed from other studies; In all these cases, a relationship was observed between the onset of onychomycosis and the period of diabetes.

## CONCLUSION:

Based on available data, FDA approved drugs for onychomycosis are terbinafine and itraconazole. By comparing these two antifungals, terbinafine was better than itraconazole. A multicentre clinical study involving 508 patients compared the efficacy of continuous terbinafine (25 mg / day) and itraconazole (400 mg / day for 7 days a month) and pulse therapy. In the terbinafine group, 54% and 60% of patients showed improvement after 12 and 16 weeks, respectively; in the itraconazole group, 32% of patients showed improvement. Regarding absolute treatment (negative fungal test result and normal nail) with terbinafine and itraconazole, after 12 weeks of treatment the recovery was 46% and 23%, respectively, and it increased to 55% and 26%, respectively. For this reason, we treated all our patients with terbinafine at a dose of 250 mg / day and all responded well to the treatment.

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