

Onychomycosis among Patients with Schizophrenia and Comorbid Substance Use Disorders

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Abstract: *Onychomycosis is the most common nail disease in the world and represents half of all onychopathy cases. An object of the study are nail materials from modified nails of patients with schizophrenia with/without comorbid substance use disorder (SUD). The examination for mycotic pathogens has been conducted using a native substrate containing 30% KOH, a test on Sabouraud Agar, test on DERMASEL SELECTIVE AGAR. Among patients in the group with schizophrenia and comorbid SUD, there are 13 cases of onychomycosis (25,5%), and in the control group with schizophrenia without SUD – 3 (9,1%) ($p < 0,05$). In the group of patients with schizophrenia and comorbidity that have total onychomycosis of the lower and upper limbs, *Trichophyton mentagrophytes* and *Trichophyton rubrum* were isolated in 5 of the patients, while only *Trichophyton rubrum* was isolated in the other 3. In the comorbidity group with distal onychomycosis of the lower limbs, *Trichophyton mentagrophytes* was isolated in the only woman and two men, *Candida albicans* was isolated in 1 man and *Trichophyton rubrum* was also determined as a cause of the disease in 1 man. In the 3 cases of distal onychomycosis in the control group, only *Trichophyton rubrum* was isolated.*

Keywords: onychomycosis, dermatophytes, schizophrenia, comorbid substance use disorders

1. Introduction

Onychomycosis is a chronic, slowly developing fungal infection of the nail plate, caused by dermatophytes, yeasts and molds [1-3]. Onychomycosis is the most common nail disease in the world and represents half of all onychopathy cases [1-3]. Recent studies regarding the spread of onychomycosis among the total population of the USA and Canada show a frequency of respectively 6.5% [2] and 14% [2]. In comparison, the Achilles project – the largest study of onychomycosis across 20 European countries – discovered a frequency of 29.6 % [4].

The aim of the current study is to determine the frequency of onychomycosis among patients with schizophrenia and comorbid substance use disorder (SUD) hospitalised in Psychiatric clinic for 5-years period.

2. Materials and Methods

An object of the study are $n = 202$ patients of the Psychiatric clinics of UMHAT “Dr Georgi Stranski” in the city of Pleven, Bulgaria, for the period between January 2012 – January 2017, admitted with a diagnosis of Schizophrenia, according to the criteria of ICD-10 (F20) and DSM-IV (295). We are examined 101 hospitalised patients with schizophrenia and comorbid abuse of psychoactive substances and 101 hospitalised patients with schizophrenia without abuse of psychoactive drugs, in a comparative correlation with the studied comorbid group in terms of sex, age, place of residence and education

Criteria for including patients in the comorbid group:

Patients, hospitalised in the psychiatric clinics of UMHAT “Dr Georgi Stranski”, Pleven in the period between January 2012 – January 2017

- 1) Age: 18 – 64 years.

- 2) All patients must simultaneously cover the criteria for the schizophrenia diagnosis (F20) according to ICD-10 and (295) according to DSM-IV and substances use disorders (SUD) (alcohol, opioids, cannabinoids, psychostimulants, hallucinogens, sedatives or a combination) (F1x.0 and F1x.2 in ICD-10 and DSM-IV).
- 3) Men with ≥ 8 points and women with ≥ 6 points per Alcohol Use Disorders Identification Test (AUDIT).
- 4) Men with ≥ 6 points per Drug Use Disorders Identification Test DUIT and women with ≥ 2 points per DUIT.
- 5) Confirmation of the diagnosis through a Diagnostic Interview for psychosis (DIP)
- 6) Patients have personally and voluntarily signed an Informed Consent Agreement for participation in the scientific study.

Criteria for including patients in the control group with schizophrenia without SUD:

- 1) Patients, hospitalised in the psychiatric clinics of UMHAT “Dr Georgi Stranski”, Pleven in the period between January 2012 – January 2017
- 2) Age: 18 – 64 years.
- 3) The control cohort should be in a comparable correlation of the criteria: sex, age, place of residence and education with the researched comorbidity group.
- 4) All patients must cover the criteria for a schizophrenia diagnosis (F20) according to ICD-10 and (295) in DSM-IV and not cover the one for abuse or addiction to psychoactive substances (alcohol, opioids, cannabinoids, psychostimulants, hallucinogens, sedatives or a combination) (in ICD-10 and DSM-IV).
- 5) Patients have personally and voluntarily signed an Informed Consent Agreement for participation in the scientific study.

Criteria for excluding patients from the two research groups:

- 1) Patients under partial or full judicial disability

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- 2) Refusal to sign or a discard of the Informed Agreement
- 3) Patients with an organic brain pathology, epilepsy and mental disability

The current study is using sociological methods of data collection – interview, observation and desk research, where the objects of the study cannot be identified directly or indirectly, or the identification would not cause any harm to the persona.

Nail material from modified nails of patients with a clinical picture of onychodystrophy has been collected and examined in the period between 2012 – 2017 r.

The examination for mycotic pathogens has been conducted using a native substrate containing 30% KOH, a test on Sabouraud Agar, test on DERMASEL SELECTIVE AGAR. None of the research procedures pose any risk for the life and health of the patients.

Each participant has received a detailed written and oral explanation before personally and voluntarily signing and dating an Informed Consent Agreement for participation in the scientific study.

For the needs of the current study, 695 inpatients in departments of the Psychiatric clinics of UMHAT “Dr Georgi Stranski” in the period January 2012 – January 2017 with Schizophrenia as an admission diagnosis (ICD-10 F20) have been investigated.

The included patients are between 18 and 64 years of age, have not been under partial or full judicial disability and do not have an organic brain pathology, epilepsy, or mental disability.

After analysis of the screening data, it was established that comorbid SUD is registered in 101 (14,5%) from all 695 patients hospitalised with schizophrenia in the Psychiatric clinics.

All 101 inpatients with schizophrenia and comorbid SUD signed informed consent to participate in the study.

Of the remaining patients with schizophrenia without SUD was formed a control group (random selection) of 101 patients in a comparable ratio criteria: gender, age, residence and education with those of the study group of comorbid with SUD.

The results are illustrated by frequency averages, correlations and others.

The following parametric tests for hypothesis testing at normal and near normal distribution of cases have been applied in analysing the results: t - test, ANOVA with *Post hoc tests* LSD, Tukey, Scheffe, Bonferroni, Newman-Keuls, Duncan as well as nonparametric tests in other than the normal distribution of cases: Pearson' χ^2 - test, Mann-Whitney W-test, Kruscal-Wallis H-test.

Regression models were used for modelling and forecasting correlative dependencies. The Kaplan-Maier test was

administered for modelling and comparison of time-event data type.

The significance of the results, findings and conclusions was determined at $p < 0.05$.

3. Results

For the period between January 2012 to January 2017 a total of 695 inpatients admission diagnosis F20 Schizophrenia. Of them 594 (85.5%) do not have a SUD and 101 (14.5%) have a comorbid SUD.

The group of patients with comorbidity were compared to a control group formed (on a random selection basis) by the other patients with schizophrenia without SUD – 101 patients in a comparable ratio criteria (gender, age, residence and education) to those of the study group with SUD.

From the 101 inpatients with a comorbid SUD, 24 (23.8%) are women and 77 (76.2%) – men.

The results showed the highest proportion of hospitalized patients with schizophrenia and comorbid SUD for both gender are in the age group 25 – 34 years. In this age group, women are 41.7% and men are 29.9% ($p > 0.05$). The next age group among males with comorbidity is 35 – 44 years old – 28.6%, and for women it is the age group of 45 – 54 years old – 20.8%. The smallest proportion of hospitalized men are in the age group of 15 – 24 years old – 5.2%, and for women – 55 – 64 years old – 8.3%.

We found a significantly higher proportion of women (54.2%) than men (35.1%) in the age group older then 35 years ($p < 0.001$), and also significantly higher proportion of the examined patients at a young age – yonger then 45 years, compared to those over 45 years of age ($p < 0.001$). In the first age group there are 66 patients (65.4%) from the group with schizophrenia and comorbid SUD, and in the second (over 45 y.) – 35 of them (34.6%).

Patients with comorbidity more often ($p < 0.01$) have accompanying somatic diseases ($n = 51$), compared with the control group ($n = 33$).

A great difference in the presence of accompanying somatic diseases was noted between the two genders ($p < 0.05$) in the comorbid group – 66.7% women and 44.2% men, as well as in the control group ($p < 0.05$) – 16.7% women and 37.7% men.

Among patients with accompanying somatic diseases in the group with schizophrenia and comorbid SUD, there are 13 cases of onychomycosis (25.5 %), and in the control group – 3 (9.1 %) ($p < 0.05$). Among men in the study group with comorbid schizophrenia and SUD the frequency of onychomycosis is 35.3%, and in the control group – 10.3%. ($p < 0.05$).

In the group with schizophrenia and comorbid SUD there is one woman with onychomycosis (6.3 %), while in the control group there aren't any. The study data analysis determined a notable difference in terms of onychomycosis

and skin diseases by gender in the group with comorbidity ($p < 0.001$).

Onychomycosis in the group of patients with comorbid schizophrenia and SUD is distributed as follows: 8 (61.5%) men with total onychomycosis of the upper and lower limbs and 5 (38.5%) cases (1 woman and 4 men) with a distal onychomycosis of the lower limbs. All three onychomycosis cases in the control group have distal onychomycosis of the lower limbs.

In the group with schizophrenia and comorbid SUD of patients with total onychomycosis of the lower and upper limbs, *Trichophyton mentagrophytes* and *Trichophyton rubrum* were isolated in 5 of the patients, while only *Trichophyton rubrum* was isolated in the other 3.

In the comorbidity group with distal onychomycosis of the lower limbs, *Trichophyton mentagrophytes* was isolated in the only woman and two men, *Candida albicans* was isolated in 1 man and *Trichophyton rubrum* was also determined as a cause of the disease in 1 man.

In the 3 cases of distal onychomycosis in the control group with schizophrenia without SUD, only *Trichophyton rubrum* was isolated.

4. Discussion

Onychomycosis is found more frequently at an elderly age, and is more common among men than women.

A well-known fact is that age is a risk factor for developing onychomycosis. Age is even considered the main disease factor, as proven by a number of international studies [5]. Onychomycosis affects almost 20% of patients aged over 60 years. In 90% of the cases in North America the disease was caused by dermatophytes (*Trichophyton* spp.). Moreover, elderly patients are predisposed to onychomycosis due to factors such as frequent nail dystrophy, slow nail growth, a higher risk of diseases of the peripheral vessels and diabetes [6].

However, our data did not support this statement. In both research groups patients from the younger age group (below 45 years) had a larger share than those above 45 years of age. Age did not prove to be a risk factor for development on onychomycosis among the investigated research groups. A number of international studies have shown that schizophrenia and depression are risk factors for the development of onychomycosis. Here comes the question why the frequency of onychomycosis determined in the current study is way higher among patients with schizophrenia and SUD (25,5%) in comparison to the control group with schizophrenia without SUD (9,1%).

Nowhere in available literature did we find any information explaining these results, therefore the answer to this question deserves to be a ground for further investigation efforts.

5. Conflict of interest

The authors have no conflicts of interest to declare.

References

- [1] Kardjeva V, Summerbell R, Kantardjiev T, Devliotou-Panagiotidou D, Sotiriou E, Gräser Y. Forty-eight-hour diagnosis of onychomycosis with subtyping of *Trichophyton rubrum* strains. *Journal of Clinical Microbiology* 2006;44(4):1419-1427.
- [2] Ghannoum MA, Hajjeh RA, Scher R, N Konnikov, Gupta AK, Summerbell R. A large scale North American study of fungal isolated from nails; the frequency of onychomycosis, fungal distribution, and antifungal susceptibility patterns. *J Am Acad Dermatol* 2000;43:641-648.
- [3] Hamnerius N, Berglund J, Faergemann J. Pedal dermatophyte infection in psoriasis. *Br J Dermatol* 2004;150:1125-1128.
- [4] Burzykowski T, Molenberghs G, Abeck D, Haneke E, Hay R, Katsambas A. High prevalence of foot disease in Europe; results of the Ahilese project. *Mycoses* 2003;46:496-505.
- [5] Bouguerra R., Essaïis O., Sebäi N. Prevalence and clinical aspects of superficial mycosis in hospitalized diabetic patients in Tunisia, *Med Mal Infect.* 2004;34(5):201-205
- [6] Loo D., Onychomycosis in the elderly: drug treatment options, *Drugs Aging.* 2007;24(4):293-302