

# Depression in patients with fungal infection in tertiary care hospital

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## Abstract

**Objective** To document the incidence of depression in patients who have fungal infections in tertiary care hospitals of Karachi.

**Design** Cross sectional study.

**Settings** Tertiary general hospital.

**Methods** The study was initiated in the dermatology outpatient department of a tertiary general hospital after committee permission from November 2017 to April 2018. In this study the patients were recruited through convenience sampling and the inclusion criteria was patients diagnosed as having cutaneous and/or mucosal fungal infection by the consultant dermatologist after clinical evaluation and skin/mucosal biopsy with a confirmation of the same on histological report. Patients not willing to participate in the study were excluded. All the patients were informed about the nature of study and its applications and verbal informed consent was obtained from patients who were willing to participate in the study. Data collection was done in 350 patients having fungal infections out of which 219 have contagious fungal infections.

**Results** Total 62.57% patients had contagious fungal infections, 36.57% had depression, 40.28% patients had altered social behavior, 14.28% were associated with comorbidities, 20% were on medicine and 41.14% patients had previous fungal infections.

**Conclusion** This study showed that cutaneous and mucocutaneous fungal infections affects the quality of life of people, their social and professional life.

## Key words

Fungal skin infections, depression.

## Introduction

Brig et al. suggested that there is positive relation between skin and psychological problems.<sup>1</sup> Psychological stress could have a pessimistic collision on healthy skin, which may

exacerbate or precipitate dermatological disorders, indicative of the existence of relationship between psychiatry and dermatology.<sup>2</sup> Due to visibility and appearance of the dermatological disorders, not only they are related with cosmetic deformity but also results in a variety of psychopathological troubles which may cause distress to the patient, his/ her family, and society.<sup>3</sup> The relation between psychiatry and skin diseases is bidirectional i.e. psychiatric comorbidity

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manipulates the development and itinerary of dermatologic diseases by way of the effects of stress, depression, and anxiety,<sup>4</sup> on the other hand, cosmetically disfiguring dermatologic diseases may cause significant psychosocial miseries to the patients.<sup>5</sup>

Fungal infections are one of the major cause of skin diseases. Superficial and cutaneous fungal infections may be caused by dermatophytes, yeasts, and non-dermatophyte molds.<sup>6,7</sup> Dermatophytosis and other superficial and cutaneous fungal infections are still regarded as a chief health problems in many parts of the world.<sup>8,9</sup> The lipophilic yeast *Malassezia* is a normal microflora of the human skin that may be pathogenic under certain conditions. *Malassezia* species is the most frequent reason of dandruff, seborrheic dermatitis, folliculitis, papillomatosis, and tinea (pityriasis) versicolor.<sup>10-13</sup>

Patients in a psychiatric hospital may have difficulty in taking care of themselves properly, especially including performing daily foot care. For a variety of reasons, including lack of concern or lack of interest, a psychiatric patient with tinea pedis might not be able to uphold the appropriate cleanliness and foot care which is essential to treat the disease. Hence the condition of the foot could worsen.

However, skin fungal infections are caused mainly by dermatophytes such as *Trichophyton*, *microsporum*, and *epidermophyton* that can invade the stratum corneum and keratinized tissues.<sup>14-16</sup> The skin and the central nervous system are embryologically related as the epidermis and the neural plate both derive from embryonic ectoderm. Stress might act as a precipitating factor in commencement or exacerbation of skin disease through psychosomatic mechanisms.<sup>17</sup> Some studies reported that anxiety and depression are not

connected with age and sex,<sup>18,19</sup> but some studies reported that these disorders are more prevalent in women.<sup>20,21</sup>

Few studies are available internationally, regarding clinical and mycological features of tinea pedis and tinea unguium in psychiatric patients.<sup>14</sup> In Pakistan, populace have multifactorial etiology of depression. After in depth exploration of data scanty research was found on the topic. Therefore, this study was intended and conducted with the objective to assess the frequency of depression in patients who are infected with fungus in tertiary care hospitals of Karachi.

## **Methods**

The study was initiated in the dermatology outpatient department of a tertiary general hospital after institutional ethics committee permission from November 2017 to April 2018. In this cross sectional study the patients were recruited through convenience sampling and the inclusion criteria was patients diagnosed as having cutaneous and/ or mucosal fungal infection by the consultant dermatologist after clinical evaluation and skin/ mucosal biopsy with a confirmation of the same on histological report. Patients not willing to participate in the study were excluded. All the patients were informed about the nature of study and its applications and verbal informed consent was obtained from patients who were willing to participate in the study. Data collection was done in 350 patients having different types of fungal infections out of which 219 had contagious fungal infection. Patients were initially screened for their biographic data followed by detailed dermatological evaluation by a consultant dermatologist. Relevant investigations like scraping for fungus and biopsy were done when cutaneous fungal infections like tinea corporis, tinea cruris, tinea

pedis and tinea versicolor and mucocutaneous fungal infections like mycetoma and sporotrichosis were suspected.

Specimens were collected for mycological analysis from the sites of possible dermatophyte infections. Direct microscopy in potassium hydroxide (KOH) was done and causative species were identified by culturing the fungi in the Sabouraud’s Glucose agar.

A questionnaire was designed to enquire into the sociodemographic details like age, sex, residence, occupation, address, and comorbid; it also included details about triggering factors like stress, depression, stigma, addiction, previous fungal infections and medication history. The patients with fungal infections, were assessed and classified on the basis of their altered social behaviour and stage of depression i.e. no depression, moderate depression and severe depression. The data was analysed on SPSS version 17.

**Results**

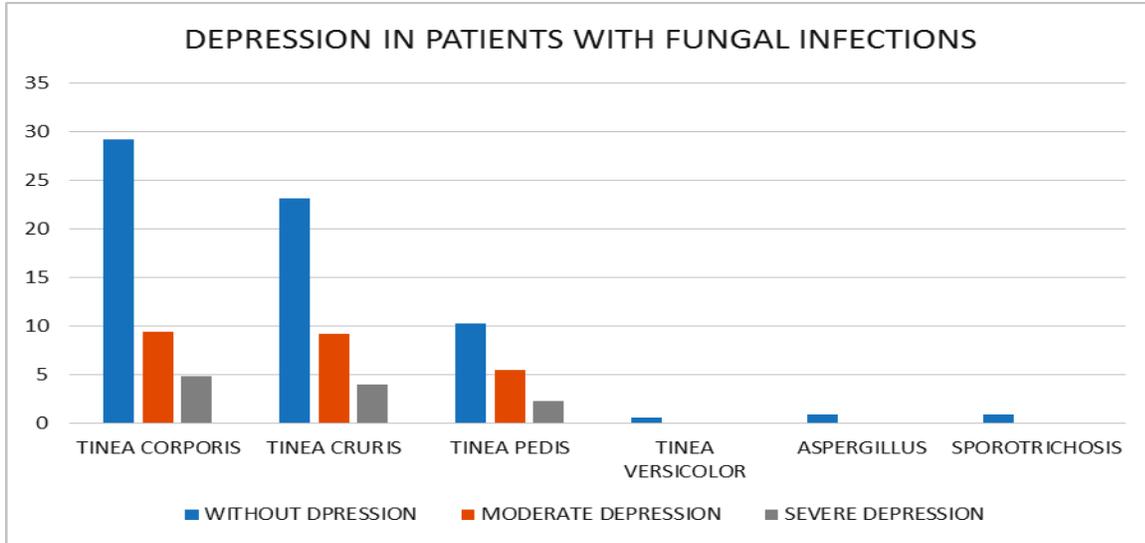
The main characteristics of the study groups are described in **Table 1**. Overall no significant difference could be found between clinical samples.

There were 350 patients afflicted with different types of fungal infections, out of which 219 (62.571%) patients had contagious fungal infections, 128 (36.571%) patients had depression, 141 (40.285%) patients had altered social behaviour, 50 (14.285%) patients were associated with co-morbids, 70 (20%) patients were on medicines and 144 (41.142%) patients had previous fungal infections (**Table 1**).

Depression was found in patients afflicted with tinea corporis, tinea cruris and tinea pedis while rest of the patients with other fungal infections were without depression. Out of 128 patients with depression, 84 (24%) patients were found with moderate depression and 44 (12.571%) patients were found with severe depression, while the rest of the patients were without depression.

**Table 1** showing depression level among different types of fungal infections

Type of fungal infection	Causative species	No of people afflicted	No of people with contagious infections	Depression High Moderate Without	People with altered social behaviour	Patients with associated co-morbids	Patient on medicine	Patient with any previous fungal infection
Systemic	-	-	-	-	-	-	-	-
Cutaneous	Tinea Corporis	152	129	Without-102 Moderate-33 Severe-17	31	50	50,patient were on antibiotic	71
	Tinea Cruris	127	63	Without-81 Moderate-32 Severe-19	43	-	20,patient were on antibiotics	34
	Tinea Pedis	63	25	Without-36 Moderate-19 Severe-8	67	-	-	37
	Tinea Versicolor	2	2	Without-2 Moderate Severe	-	-	-	-
Muco-cutaneous	Mycetoma	3	-	Without-3	-	-	-	2
	Sporotrichosis	3	-	Without-3	-	-	-	-



**Figure 1** Showing severity of depression in different types of infection

Altered social behaviour was found in patients afflicted with tinea corporis 31 (8.857%) patients, tinea cruris 43 (12.285%) patients and tinea pedis 67(19.142%) patients.

The study was also correlated with co-morbidities of other diseases associated with fungal infections, in which 50 (14.285%) patients of tinea corporis were associated with co-morbidities like hypertension and diabetes.

Among 350 patients, 70 (20%) patients were on antibiotics for the treatment of fungal infections, out of which 50 (14.285%) patients were of tinea corporis and 20 (5.714%) patients were of tinea cruris.

Previous fungal infections were found in 144 (41.142%) patients, in which 71 (20.285%) patients were of tinea corporis, 34 (9.714%) patients were of tinea cruris, 37 (10.571%) patients of tinea pedis and 2 (0.571%) patients suffered from mycetoma (**Figure 1**).

## Discussion

Psychodermatology is an appealing region of interface between psychiatry and dermatology because of bidirectional contact between skin

and brain, which probably is due to ectodermal origin of brain and most of the skin. Psychosocial stress can precede autoimmune or inflammatory skin disorders through neuroendocrine and neuroimmune deregulations. The body's reaction to stress is mediated by hypothalamus, pituitary, cerebral cortex, and the limbic system, in addition to the adrenal gland, as proposed by Selye.<sup>28</sup>

Patients with tinea versicolor generally show multiple lesions on the trunk, with intercalated regions of normal skin. Chronic dermatophytosis of the foot, nail, scalp and hands can behave like a reservoir of fungus for the growth of *Tineacorporis*.<sup>23</sup> Mycetoma is more frequently reported in males than females (3:1), probably attributable to men being more commonly involved in agricultural work.<sup>24,25</sup> *Sporothrix schenckii* gains entry into the skin by distressing implantation from polluted thorns, hay stalks, barbs, soil, splinters, and bizarre/ roadside injuries leading to cutaneous infection.<sup>26</sup> The clinical types of tinea pedis were classified as interdigital type, vesicular type, and hyperkeratotic type. The intermediate types were expressed as interdigital+vesicular type, interdigital+hyperkeratotic type, and

interdigital+vesicular+hyperkeratotic type. The hyperkeratotic type was defined as dry-type tinea pedis (moccasin foot or dry-type infection according to Textbook of Dermatology.<sup>27</sup>

Patients with cutaneous and mucocutaneous fungal infections do experience stressful events after the inception of the disease. Dermatophyte infections formed the majority of cutaneous disorders in the study groups. This may be accredited to the humid climate and hence increased sweating.<sup>28</sup> There was a higher incidence of dermatophyte infection in the study group as 98% of the patients had this disease in which tinea corporis was seen more frequently (43.4%). As a part of bidirectional interaction, dermatologic disorder may leave to psychiatric morbidities like depression, anxiety, social phobia, panic symptoms, and negative impact on quality of life.<sup>29-31</sup> This research showed that 64.8% of cutaneous and mucocutaneous fungal infections patients were mentally sane, whereas, 24% of patient had moderate and 12.57% of patients had severe mental disturbances. By this study we found 40.28% in our patients having distorted social behavior. The reason could be female preponderance in our study. Generally, females experience more depression because of the more stress experienced and have a greater reactivity to it with a higher rate of body displeasure and low confidence.<sup>32,33</sup> This was comprehensible due to infection on uncovered body parts leading to humiliation or self-consciousness Females may be more beauty consciousness than males and may evade going to school, office work, and so forth due to sensation of looking unappealing or being stared at by others.<sup>34</sup> Many experienced treatment difficulties because of frequent follow ups and long treatment periods which caused turbulence in their daily routine. In both the genders, depression and the various domains of quality of life were considerably associated. This indicates that depressed patients have considerably

impaired quality of life and vice versa. Researches have shown that the impact of a skin disorder on the quality of life is considered in many cases to be a stronger predictor of psychiatric morbidities like depression, anxiety, sleep disturbances, and adjustment disorder than physician's evaluation of clinical disease severity.<sup>35</sup>

In a nutshell skin disorders have a greater impact on quality of life, patients' usual daily activities and work, and it is a stronger interpreter of psychiatric morbidities like anxiety, stress and depression.

Cross sectional design and small sample size are the limitations of study. Hence it is recommended that more studies should be conducted with large sample size so that data should be representative of the whole population.

## **Conclusions**

This study showed that cutaneous and mucocutaneous fungal infections affects the quality of life of people, their social and professional life.

## *Recommendations*

In the light of this study it is recommended that community awareness programmes must be arranged by the health care professionals and dermatologists in order to awareness early diagnose and treatment of these fungal infections so that individuals can improve their quality of life.

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