



The Frequency of Demodex Spp in Depression Patients

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ORIGINAL
INVESTIGATION

ABSTRACT

Objective: *Demodex spp.*, usually located on the human skin, including the face and eyelashes, is a mandatory ectoparasite. The aim of this study was to evaluate the prevalence and factors affecting *Demodex spp.* in patients with depression.

Materials and Methods: In this study, 63 depressed patients and 63 healthy controls were evaluated. To collect samples for analysis, a drop of glue containing cyanoacrylate was put on a lamella and the lamella was pressed on the certain areas of the face (forehead, cheeks, nose, and chin) for about a minute. Then it was carefully removed and the density of *Demodex spp.* in a cm² was counted under a microscope. For the diagnosis, the presence of five or more *Demodex spp.* in a cm² was considered to be positive.

Results: In 23.8% of depressed patients (n=15) and in 9.5% of the control group (n=6), *Demodex spp.* was detected in the facial area. The presence of *Demodex spp.* in the facial area of depressed patients was significantly higher compared to the control group. When CGI severity scores of patients and the relationship between the severity of depression and the presence of *Demodex spp.* were compared, no significant difference was detected.

Conclusion: Depression may be a risk factor for the infection of Demodex parasites because of impaired immune system as well as reduction of self-care and hygiene of the person. For the itchy lesions on the face of depressed patients, *Demodex spp.* infestation should also be taken into consideration.

Keywords: Depression, *demodex spp.*, immunosuppression

INTRODUCTION

Demodex spp. is an ectoparasite that commonly exists in the human skin and is located generally in the face and eyelashes (1). There are several studies stating that it is associated with acne vulgaris, acne rosacea, and blepharitis (2). Two kinds of Demodex can settle in the human body. *D. folliculorum* is one of them and lives in the pilosebaceous channel. On the other hand, *D. brevis* is shorter and encountered in the sebaceous and meibomian glands. In the human body, *Demodex spp.* can be present mostly in the chin, cheek, nasolabial zone, and forehead and less frequently in the back, external auditory canal, nipple, and hips, etc. In the diagnosis of this parasite, methods, such as skin scarification, cellophane band method, punch biopsy, and standard superficial skin biopsy, are used (1, 3).

For people whose immune system is suppressed and who use immunosuppressive medication or for the elderly, while it is stated that Demodex infection might progress heavily, its pathogenicity is still controversial (3). In a study on diabetic patients, it was found that *D. folliculorum* intensity was significantly higher than in the control group (4).

Depression is a mood disorder in which the person's self-care generally decreases following despondency, weakness, and reluctance. There are a number of publications showing that immune system disorder and depression symptoms are correlated (5, 6). Also, in depression, it was demonstrated that corticotropin-releasing hormone (CRH), which manages the acute stress response and causes a good deal of proinflammatory cytokines to be released, was increased (5). It was reported that depression was associated with increases in cytokines, such as IL-6; acute phase reactants, such as CRP; and peripheral leukocyte count (5).

With the thought that the immune system can be partially suppressed and that self-care may decrease, it springs to mind that *Demodex spp.* can be more common in patients with depression. This study aimed to identify the prevalence of *Demodex spp.* in patients diagnosed with depression.

MATERIALS and METHODS

In this study, 63 patients who were admitted to the Psychiatry and Family Practice outpatient clinics in Mustafa Kemal University Medical Faculty Research Hospital and diagnosed with major depression in accordance with the

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DSM IV diagnosis system and 63 healthy individuals (similar in terms of age and gender) were included. Individuals who were 18 or older and who had not used topical acaricidal medication or oral or topical antibiotics in the last month were involved in the study. Those having any kind of dermatological disease (herpes infection, impetigo, perioral dermatitis, seborrheic dermatitis, lupus erythematosus, etc.), pregnant and nursing women, those having a systemic disease (diabetes mellitus, malignance, rheumatoid arthritis, etc.), and those receiving chemotherapy or radiotherapy treatment were excluded from the study.

Demographic features of the patients were recorded. For the study, approval was obtained from the ethics committee of Mustafa Kemal University Medical Faculty (2013-84). Before the study, all individuals were informed on the parasites researched and sample-taking method, and then the "Informed Patient Consent Form" was filled and signed by those who wanted to participate in the study. Samples were taken from the nasal root, forehead, chin, and cheek zones of individuals to look for *Demodex* spp.

Before samples were taken, it was guaranteed that there was no cream or lotion on the faces of the patients and that the region where the samples would be taken was dry. Also, the region was cleaned with alcohol. A 1 cm² circle was drawn on one side of a microscope slide with a glass pencil, and after a drop of adhesive containing cyanoacrylate was dropped within the area limited by the previously drawn circle, the adhesive-containing side of the microscope glass was pressed against the patient's skin and held there for a minute. After the duration was over, the microscope glass was removed slowly. *Demodex* spp. intensity on the 1 cm² was observed by analyzing the sample, which was turned into a prepartate by dropping a drop of glycerin on it and covering it with lamellae on the light microscope at x40 and x100 magnifications. Observation of 5 or more *Demodex* spp. per cm² was evaluated as positive in the diagnosis.

Statistical Analysis

The SPSS 18.0 (Statistical Package for Social Sciences Chicago, IL, USA) package program was used for the statistical analysis. Descriptive and analytic statistics were performed. Chi-square/Fischer's test was used to compare categorical variables. Whether continuous variables fit the normal distribution or not was evaluated with Kolmogorov-Smirnov test. Mann-Whitney U-test was used in the comparison between groups. A value of $p < 0.05$ was considered to be significant for all statistical data.

RESULTS

Demodex spp. was detected on the faces of 23.8% (n=15) of patients diagnosed with depression and 9.5% (n=6) of the control group. The existence of *Demodex* spp on the faces of patients diagnosed with depression was found to be significantly higher compared to the control group (odds ratio [OR] 2.9 (95% CI, 1.0-8.2); $p=0.031$) (Figure 1).

Demodex spp. positivity was evaluated in terms of age and gender in patients diagnosed with depression. No statistical correlation was found (Table 1).

Of the patients diagnosed with depression, for those who were positive for *Demodex* spp., the mean treatment duration was 3

Table 1. Correlation between the presence of *Demodex* spp. and some features that depressed patients have

		Demodex		p
		Positive	Negative	
Age (year)		27 (21-40)	29 (20-66)	0.507*
Gender n (%)	Male	4 (26.7%)	23 (47.9%)	0.232**
	Female	11 (73.3%)	25 (52.1%)	
Marital status	Married	8 (53.3%)	24 (50%)	0.822***
	Single	7 (46.7%)	24 (50%)	
Lifestyle	Family	17 (73.3%)	37 (77.1%)	0.740**
	Single	4 (26.7%)	11 (22.9%)	
Educational level	Uneducated	1 (6.7%)	4 (8.3%)	0.696***
	Primary	5 (33.3%)	17 (35.4%)	
	*Secondary School			
	High school	9 (60%)	20 (41.7%)	
A history of hospitalization	Yes	11 (73.3%)	28 (58.3%)	0.371**
	No	4 (26.7%)	20 (41.7%)	
A history of suicide	Yes	2 (13.3%)	5 (10.4%)	0.667**
	No	13 (86.7%)	43 (89.6%)	
Severity of depression	Mild and moderate	8 (53.3%)	27 (56.3%)	0.843***
	Severe	7 (46.7%)	21 (43.8%)	

* Mann-Whitney U-test, **Fisher's Exact Test, ***Chi-Square Test

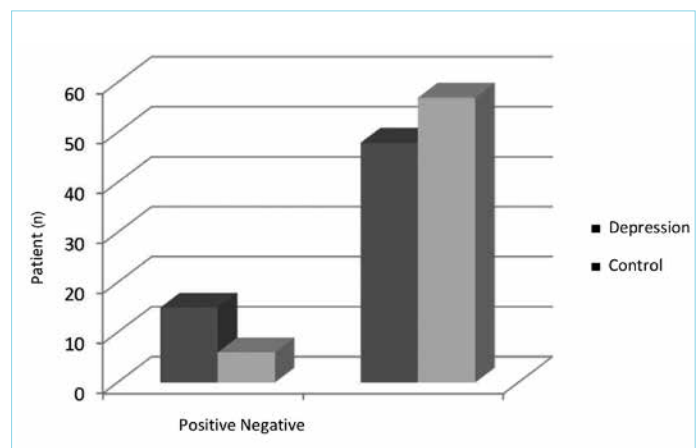


Figure 1. *Demodex* spp. positivity in patients with depression and healthy individuals

(1-13) years, and for those who were negative, it was 3 (1-20) years. No relationship was found between the existence of *Demodex* spp. and the duration of treatment ($p=0.824$).

Demodex spp. was found to be positive in 5 people whose Clinical Global Impression (CGI) severity score was 2, 8 people with a CGI severity score of 3, 1 person with a CGI severity score of 4, and 1 person with a CGI severity score of 5.

The relationship between CGI severity scores of patients and the existence of *Demodex spp* was evaluated, and no significant difference was detected ($p=0.307$).

DISCUSSION

In our study, the frequency of *Demodex spp.* was found to be 9.5% for healthy volunteers. Yazar et al. (7) examined samples taken using the cellophane band method from 171 healthy individuals and stated that *Demodex spp.* was found in 5 cases (2.9%). In another study, in which 100 healthy university students were analyzed, the *Demodex spp.* frequency was reported as 11% (8).

It has been stated that *Demodex spp.* infestation, which has no specific clinical symptoms, is widespread around the world, with no difference due to race and gender, and that it increases in direct proportion to age (9). Under normal circumstances, there are mechanisms controlling the increase of the acarus population in follicles. However, some factors may increase acarus proliferation (10, 11). Age is one of them. Ayca et al. (12) demonstrated that there was a significant difference between age above and below 20 years with regard to the positivity of *Demodex spp.* in patients with various dermatological complaints. In our study, on the other hand, no relationship was found between age and the prevalence of *Demodex spp.* This might have resulted from the fact that there was no patient below the age of 20 years and that the mean age was low (31 ± 31).

Another factor affecting the prevalence of *Demodex* is the immune condition of the individual. In the transition from clinically invisible colonization to dermatosis, primary and secondary immunosuppression might be a factor (9). It is stated that the illnesses that cause immune dysfunction, such as AIDS and malignancies, may increase the proliferation of opportunist acarus (11, 13).

It was stated that the infection might progress severely for individuals whose immune system was suppressed and who used immunosuppressive medication (4). Özçelik et al. (1) detected *Demodex folliculorum* on the faces of 25.5% of patients whose immune system was suppressed and who had chronic renal failure, and they stated that this percentage was higher compared to the control group. As is known, diabetes is a chronic disease in which the immune system is suppressed, and Akdeniz et al. (4) demonstrated that there was a positive correlation between *Demodex spp.* and HbA1c levels and that *Demodex folliculorum* intensity was higher than in the control group, especially in samples taken from the cheek (4).

Depression is an illness that progresses with deformity, weakness, and appetite and sleep disorders; affects life quality of the individual negatively; and deteriorates individual's social and occupational functionality (14). The individual's self-care decreases due to some symptoms, including weakness, reluctance, psychomotor retardation, and low energy, which are also among the diagnostic criteria. Moreover, it is known that parasitic infection is more common in populations with poor hygiene conditions (15). Concordantly, on the faces of patients diagnosed with depression, the prevalence of *Demodex spp.* may increase. Thus, in our study, the prevalence of *Demodex spp.* was found to be 9.5% in the control group, while it was 23.8% in patients with depression. However, no relationship was found between the prevalence of *Demodex* and the severity of depression.

In depression, while peripheral leukocyte (especially neutrophils and monocytes) count; cytokines, such as IL-6; and acute phase reactants, such as CRP generation, increase, lymphocyte count decreases (5). Moreover, there is a relationship between depression symptoms and functional immune system standards, such as low NK (natural killer) cell activity and a decrease in the proliferative response of lymphocytes against mitogenic stimulation (16, 17).

It is claimed that there is dysfunction in the hypothalamic-pituitary-adrenal (HPA) axis in depression. Plasma cortisol concentration and 24-hour urine free cortisol concentration are high in most major depression patients. Hence, there is cortisol hypersecretion in depression (18). Moreover, in studies carried out by using magnetic resonance imaging and computed tomography, a finding of enlargement in the hypophyseal and adrenal glands, which occurs during a depression attack and improves with treatment, was reported (19). CRH increases in typical depression and acts as the main regulatory hormone, causing many proinflammatory cytokines to be released in response to acute stress (5).

CONCLUSION

In conclusion, depression may be a risk factor for *Demodex* parasite infection caused by both weakening of the immune system and a decrease in an individual's self-care and hygiene. *Demodex spp.* infestation should also be taken into account in itchy lesions, especially on the faces of patients diagnosed with depression.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Mustafa Kemal University Faculty of Medicine.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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