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ORIGINAL ARTICLE

Investigation of Demodex Spp. prevalence among managers and workers of health hazard bearing and sanitary establishment

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Background/Purpose: Two Demodex species are known to live on people. *Demodex folliculorum* lives in the openings of hair follicles alone or in groups. *D brevis* lives in the depths of the sebaceous glands alone. There are different related on the epidemiology of Demodex species have been published.

Method: In this study, taking into account that the parasite is transmitted through close contact from person to person, we aimed to evaluate the relation between the presence of Demodex spp with gender and age among the Health hazard bearing and sanitary establishment operators and workers who came for porter examination.

Results: For this purpose, 862 male and 215 female patients with a total of 1077 volunteers from the face area of the standard superficial skin biopsy (SSSB) method and studied samples were taken. More than five mites in 1 cm² density was defined as positive. In investigated samples 37.3% Demodex spp. positivity was detected. Only two were found to be *D brevis* and the others were *D folliculorum*. The study revealed statistically significant relationships between the positivity of parasites with the occupational group, age and sex.

Conclusion: Since the prevalence of Demodex among healthy individuals without any complaint was found to be 37%, we believe Demodex spp should be investigated in porter examinations of people who have dermatological complaints.

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Introduction

Demodex folliculorum is a mite commonly seen in the skin of humans. It has been shown to be responsible for acne and other seborrheic lesions, pigmentation, and even epithelioma. Nonetheless, it has been suggested to be partially non-pathogenic by some authors, leading to suspicions about its role. However, there is a widespread belief that it might be a potential risk factor for skin diseases.^{1–6} Demodex (D) infestation is known to be widespread across the world and does not show any gender or race predilection but does demonstrate a positive relation between its prevalence and aging. The adult form of the parasite has a worm-like or cigar-like appearance. The body consists of a cephalothorax, formed by a fused head and chest, and an abdomen. The cephalothorax has thin lines with random directions, whereas the elongated abdominal segment bears horizontal lines. *D. folliculorum* has been reported to be more frequently observed among diabetic patients and its presence is known to intensify in cases where the immune system is compromised or suppressed.^{3,5,7–9}

In the present study, considering the human-to-human transfer of mites through close contact, we aimed to investigate the correlation between Demodex spp. and profession, gender, and age in managers and workers from establishments with health hazards and sanitary establishments who visited us for a porter examination.

Materials and methods

Before beginning the study, approval of the Malatya Health Directorate was acquired and informed consent was obtained from each participant.

Our study population consisted of sanitary and non-sanitary enterprise managers and workers who visited us between January 2007 and May 2009 for Demodex porter examination at Malatya Public Health Laboratory (Malatya, Turkey). Individuals who were visiting the laboratory regularly at certain intervals were informed about the study by the parasitologist responsible for specimen collection and those who volunteered were included in the study.

In total, specimens were obtained from the facial region of 1077 patients by Standardized Skin Surface Biopsy (SSSB). The preparations were examined under x10 and x40 light microscopy. The results were recognized as positive when there were more than five mites in an area of 1 cm². Patients who tested positive for the parasite were referred to the related polyclinics and recommended to have a follow-up visit after the treatment.

The data were analyzed by SPSS version 15.0 (SPSS Inc., Chicago, IL, USA). The X² test and Student's t test were employed for statistical analyses. A p value <0.05 was recognized as statistically significant for the entire study.

Results

Our study population included people aged 16–65 years; the mean age of men and women were 33.02±8.77 and 29.37±8.84 years, respectively; there was no statistically significant difference between the mean ages (p>0.05). No

difference was found between the occupations relative to mean age (p>0.05). In the present study, 37.3% of the studied specimens were positive for Demodex spp. Among the positive results, only two were *D. brevis*; all others were *D. folliculorum* (Figs. 1 and 2).

Table 1 shows the distribution of Demodex spp. prevalence by professions. Demodex spp. positivity was determined in 44.4% of butchers, 44.3% of cooks, 40.8% of restaurant owners, 38.7% of nightclub hostesses, and 37.3% of bakery workers. There was no statistically significant correlation between Demodex spp. positivity and profession (p>0.05). As shown in Table 2, Demodex spp. tests were positive in 38.4% of men and 33.0% of women; the difference between was not statistically significant (p>0.05). As shown in Table 3, Demodex spp. positivity was 35.4% in the 16–30 year age group, 38.6% in the 31–46 year age group, and 37.3% in people above 47 years of age. The prevalence of Demodex spp. was statistically significantly different in people above 47 years of age compared with the other age groups (p < 0.05).

Discussion

In Turkey, Saygi et al.¹⁰ determined the first Demodex spp. case by cellophane tape preparation. *D. folliculorum* was detected in 40% of preparations obtained from 29 acne vulgaris and one acne rosacea cases by Koc et al.,¹¹ 12 (33.3%) of 36 cases with prediagnosis of acne rosacea by Yereli et al.,¹² 11.8% of 101 acne vulgaris cases by Baysal et al.,¹³ and 15.3% of 78 acne vulgaris cases by Polat et al.¹⁴ In our study, we determined parasitic presence in 37.3% of the examined specimens.

In the present study we obtained a high prevalence of Demodex spp. in managers and workers from establishments with health hazards and sanitary establishments. However, there is no clinical study regarding the identification of the relationship between the diseases and Demodex spp.⁹



Figure 1 *D. folliculorum* egg.



Figure 2 *D. folliculorum* adult.

In the study by Baysal et al.¹³ which evaluated the relationship between Demodex spp. presence and age groups, one (8.3%) person in the 11–15 year age group and seven (12.7%) people in the 16–20 year age group were found to be positive for the mite. Demodex spp. has been noted to exhibit growing prevalence beginning of adult ages and reach peak levels during elderly years. Similarly, we found parasites in 42.5% of people above 47 years of age, which was a significantly higher prevalence than those of the other age groups ($p < 0.05$).

In our study, we examined 1077 people from nine different professions, and the highest prevalence of Demodex spp. was found in butchers and cooks. However, there was no significant difference with regard to Demodex spp. positivity among the occupations ($p > 0.05$).

In the study of Aycan et al.,¹⁵ who investigated frequency of Demodex spp. among various patient and age groups, 97 of the patients examined by SSSB were positive for Demodex spp. In another study performed in Sivas, specimens from cheek skin and eyelashes of 47 chronic

Table 1 Distribution of Demodex Spp. prevalence by profession.

Profession	Parasite		
	Positive	Negative	Total
	Number (%)	Number (%)	Number (%)
Butcher	44 (44.4)	55 (55.6)	99 (100.0)
Cook	39 (44.3)	49 (55.7)	88 (100.0)
Restaurant owner	82 (40.8)	119 (59.2)	201 (100.0)
Nightclub hostesses	12 (38.7)	19 (61.3)	31 (100.0)
Bakery workers	63 (37.3)	106 (62.7)	169 (100.0)
Workers in food markets	60 (34.1)	116 (65.9)	176 (100.0)
Canteen workers	41 (33.3)	82 (66.7)	123 (100.0)
Grocer, Greengrocer and Managers	29 (33.3)	58 (66.7)	87 (100.0)
Food factory workers	32 (31.1)	71 (68.9)	103 (100.0)
Total	402 (37.3)	675 (62.7)	1077 (100.0)

$p = 0.34$.

Table 2 Distribution of Demodex spp. by gender.

Gender	Parasite		
	Positive	Negative	Total
	Number (%)	Number (%)	Number (%)
Male	331 (38.4)	531 (61.6)	862 (100.0)
Female	71 (33.0)	144 (67.0)	215 (100.0)
Total	402 (37.3)	675 (62.7)	1077 (100.0)

$p = 0.14$.

renal failure (CRF) patients (study group) and 38 healthy young individuals were examined. Six (12.76%) of 47 CRF patients demonstrated *D. folliculorum* in the eyelash follicles and 12 (23.33%) exhibited positivity in the face, whereas the control group demonstrated *D. folliculorum* positivity in the eyelash follicles and face of two (5.26%) and seven (18.42%) individuals, respectively.¹⁶

Yazar et al.¹⁷ conducted a study on 171 students (75 male and 96 female) in order to investigate prevalence of Demodex spp., and according to the microscopic examination of cellophane tape preparations obtained from the nasal root, jowl, and forehead areas, Demodex spp. was detected in five (2.9%) individuals. In another study, Ding et al.¹⁸ analyzed external auricular canal secretions of 613 students and detected Demodex spp. in 11.58%. In the current study, parasite prevalence was 37.3%. The varying nature of the acquired results may be secondary to differences between the preferred methods. In this study, SSSB, which is reported to be an efficient technique in diagnosis of parasites and determination of mite density,¹ was applied. Studies show that parasite prevalence may be 23.5–100% among healthy individuals. This is consistent with the result (37.3%) obtained in this study.^{19,20}

Demodex spp. mites are obligatory ectoparasites of the pilosebaceous unit and they can only survive on human hosts. Demodex spp. have been reported to transmit from human to human via close physical contact.²¹ In Turkish culture, people greet each other by handshakes and cheek kissing. Therefore, because of the high likelihood for workers to come into close physical contact with clients during the work hours, transmission risk increases. This situation may be a reason for the high prevalence of Demodex spp. in healthy individuals.

In conclusion, since the prevalence of the parasite among healthy individuals without any complaint was found to be 37%, we believe that Demodex spp should be

Table 3 Distribution of Demodex Spp. by age group.

Age group	Parasite		
	Positive	Negative	Total
	Number (%)	Number (%)	Number (%)
16-30 years	185 (35.4)	337 (64.6)	522 (100.0)
31-46 years	186 (38.6)	296 (61.4)	482 (100.0)
>47 years	31 (42.5)	42 (57.5)	73 (100.0)
Total	402 (37.3)	675 (62.7)	1077 (100.0)

$p = 0.038$.

investigated in porter examinations of patients who have dermatological complaints.

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