

## Demodex spp. Prevalence among University Students

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### Summary

*Demodex* spp. was investigated in the 258 university students that participated in the study aimed to investigate *Demodex* spp. prevalence among university students in Elazığ with the methods of cellophane band and standard superficial skin biopsy (SSSB). Of the students, 26 (10.07%) were established as *Demodex* spp. positive. *Demodex* spp. prevalence was observed as high among advanced age groups; and *Demodex* spp. prevalence was also established to decrease with the frequency of taking a shower and antibiotics use in the last 6 months.

**Keywords:** *Demodex* spp., University students, Standard superficial skin biopsy

## Üniversite Öğrencilerinde *Demodex* spp. Görülme Sıklığı

### Özet

Elazığ'da üniversite öğrencilerinde *Demodex* spp. görülme sıklığının araştırılması amacıyla yapılan çalışmaya katılan 258 öğrencide selofan bant ve standart yüzeysel deri biyopsisi yöntemleri ile *Demodex* spp. araştırıldı. Öğrencilerin 26'sında (%10.07) *Demodex* spp. pozitif bulundu. *Demodex* spp. sıklığının ileri yaş gruplarında yüksek olduğu, banyo yapma sıklığı ve son altı ay içinde antibiyotik kullanımı ile *Demodex* spp. görülme sıklığının azaldığı görülmüştür.

**Anahtar sözcükler:** *Demodex* spp., Üniversite öğrencileri, Standart yüzeysel deri biyopsisi

### INTRODUCTION

Two types of acari of *Demodex* genus from Arachnida class settle in human body as ectoparasites and can be found at any period in life except for infancy <sup>1-3</sup>. *D. folliculorum* is known to live in pilosebaceous canal and *D. brevis* in sebaceous and meibomian glands. *Demodex* genus are found on such various human body parts as more on nasolabial region, chin, forehead, eyelids, and less on outer ear canal, nipples, back, hips, and penis <sup>1-3</sup>. *Demodex* genus plays a role in blepharitis, acne, and acne rosacea etiology and causes suppurative dermatitis in some individuals <sup>4,6</sup>.

*Demodex* spp. prevalence demonstrates changes based on such characteristics of the selected study group as being ill or healthy and age groups, in addition to the adopted method, place and number of samples <sup>7-9</sup>. Besides, even the experience of the author affects the prevalence <sup>10</sup>. In studies conducted in various countries, prevalence was reported as between 32-90.2% for patient groups and 11.9-23% for healthy control groups <sup>4,5,11</sup>. In various studies

carried out in our country, it was reported to range between 7.5-65% in different patient groups and between 2.9-47.3% in healthy control groups <sup>7-10,12-19</sup>.

Any studies conducted on *Demodex* spp. prevalence in Elazığ have not been found. Therefore, we aimed to investigate *Demodex* spp. prevalence among university students in Elazığ, to compare two distinct diagnostic methods, and to determine epidemiological factors thought to affect *Demodex* spp. prevalence in our study.

### MATERIAL and METHODS

In our study, *Demodex* spp. was investigated among students of Fırat University with the methods of cellophane band and standard superficial skin biopsy (SSSB). "Approval of Ethics Committee" and other necessary permissions from the rectorate were obtained before the study, and each of the students were requested to fill in "Informed



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Patient Consent Form" and were informed on the subject. In addition, students were asked to fill in another survey questioning their demographical information, personal hygiene habits and the environment they lived in that were thought to affect *Demodex* spp. prevalence. Samples were taken foreheads and cheeks of each patient included in the study by cellophane band and SSSB. Cellophane bands cut in 5 cm lengths and stuck on microscope slide were used in the cellophane band method, and the bands were administered by adhering to and taking off from regions previously cleaned with ether. In SSSB method, a drop of adhesive containing cyanoacrylate was put on microscope slides, then adhered to regions previously wiped by ether, and the sample was obtained by keeping it adhered for one minute and taken off. The collected samples were immediately sent to Parasitology Department laboratory and were examined under light microscope at x100 and x400 magnifications following immersion was dropped and lamellas were thus closed. Of the examined samples, the ones that were detected to have 5 and more *Demodex* spp. per sqcm were deemed positive. Student established to have *Demodex* spp. were referred to relevant departments for their treatments.

SPSS software pack was used for statistical evaluation of the data, and X<sup>2</sup> test was utilized for the comparison of cases that were established to have parasites or clear from them based on factors that may affect *Demodex* spp. prevalence. P values higher than 0.05 was deemed statistically significant.

## RESULTS

A total of 258 students 135 of which were male and 123 were female with ages ranging between 18 and 43 (21±4) participated in our study. Of these students, 26 (10.07%) were established as *Demodex* spp. positive. Ninety two of

the voluntarily participating students were 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> year Medicine Faculty students and 166 were students at Health Vocational School of Health (VSH). *Demodex* spp. prevalence of students based on gender, age group, and faculty are given in [Table 1](#).

*Demodex* spp. prevalence of the students that participated in the study based on their personal hygiene habits and the environments they lived in are given in [Table 2](#).

*Demodex* spp. prevalence based on such factors as cosmetics applications and drug use that might affect *Demodex* spp. prevalence is given in [Table 3](#).

In the examination of samples taken by cellophane band method, any samples with 5 and more parasites per sqcm were not found in our study.

## DISCUSSION

*Demodex* infestation is common around the world <sup>1-3</sup>. *Demodex* infestation has been first reported in 1841 <sup>3</sup>, Saygı et al. found it the first time in our country in 1984 <sup>20</sup>.

Due to the fact that *Demodex* infestation commonly exists without any complaints or symptom, there are suspicions about the pathogenesis of the parasite. However, in studies conducted on patients with blepharitis and rosacea, they have been reported to play a role in these diseases or at least acted as a co-factor <sup>4,5</sup>. These parasites have been reported to cause such events as the blockage of follicles and tubules by sebaceous glands, reactive hyper keratinization, and epithelial hyperplasia <sup>6</sup>. In addition, they have also been demonstrated to act as mechanical vector for bacteria, cause host inflammatory response of chitin layer as foreign object, and create a humoral and cellular immune response thanks to their wastes <sup>5,6</sup>.

**Table 1.** Demodex spp. prevalence of students based on gender, age group, and faculty

**Tablo 1.** Öğrencilerin cinsiyeti, yaş grubu ve fakültelerine göre Demodex spp. sıklığı

Demographic Factors	Demodex spp.				Total	Statistics (X <sup>2</sup> ) P=
	Positive		Negative			
	n	%	n	%		
<b>Gender</b>						
Male	15	11.1	120	88.9	135	0.563
Female	11	8.9	112	91.1	123	
<b>Age Group</b>						
18-20 age	8	4.6	166	95.4	174	0.000
21-23 age	10	18.2	45	81.8	55	
24-26 age	6	42.9	8	57.1	14	
27 or more years	2	13.3	13	86.7	15	
<b>Faculty</b>						
VSH	23	13.9	143	86.1	166	0.007
Medicine Faculty	3	3.3	89	96.7	92	

**Table 2.** *Demodex spp.* prevalence of the students that participated in the study based on their personal hygiene habits and the environments they lived**Tablo 2.** Kişisel hijyen alışkanlıkları ve yaşadıkları ortam özelliklerine göre *Demodex spp.* sıklığı

Personal Hygiene and Habits	<i>Demodex spp.</i>					Statistics (X <sup>2</sup> ) P=
	Positive		Negative		Total	
	n	%	n	%		
<b>Daily Hand-face Washing Frequency</b>						
1-2 times	21	13.5	135	86.5	156	0.096
4-5 times	4	5.1	74	94.9	78	
More	1	4.8	20	95.2	21	
<b>Frequency of Taking A Shower</b>						
Every day	9	19.1	38	80.9	47	0.039
1-2 times a week	17	8.3	189	91.7	206	
<b>Common Towel Use</b>						
No	17	10.1	152	89.9	169	0.943
Present	9	10.3	78	89.7	87	
<b>Keeping Pets</b>						
No	23	10.3	201	89.7	224	0.460
A few months	3	11.5	23	88.5	26	
Few years	-	-	7	100	7	
<b>The Number of People Living Together</b>						
1-3 people	9	9.8	83	90.2	92	0.220
4-6 people	9	7.3	114	92.7	123	
7-9 people	4	15.4	22	84.6	26	
10 and above	4	23.5	13	76.5	17	

**Table 3.** *Demodex spp.* prevalence based on such factors as cosmetics applications and drug use**Tablo 3.** Kozmetik uygulama ve ilaç kullanımına göre *Demodex spp.* sıklığı

Cosmetics and Drug Use	<i>Demodex spp.</i>					Statistics (X <sup>2</sup> ) P=
	Positive		Negative		Total	
	n	%	n	%		
<b>Facial cosmetic applications</b>						
No	10	8.1	114	91.9	124	0.256
Present	16	12.4	113	87.6	129	
<b>Chronic diseases</b>						
No	24	10.3	210	89.7	234	0.863
Present	2	9.1	20	90.9	22	
<b>Continuous drug use</b>						
No	23	9.9	209	90.1	232	0.690
Present	3	12.5	21	87.5	24	
<b>Antibiotic drugs in the last 6 months</b>						
No	19	16.7	95	83.3	114	0.002
Present	7	5.0	134	95.0	141	

Such methods as cellophane band skin scrapings, punch biopsy, and SSSB are in use for *Demodex spp.* diagnosis. Among the most common and noninvasive methods, cellophane band method was reported to demonstrate changes in results depending on the quality of the band <sup>19</sup>. In our study, stationary type band was

used and a good result was not possible even though the application area was cleaned from any grease with ether in order to improve adhesion. There are also studies reporting that duct tape produce good results <sup>19</sup>. However, we believe that SSSB method reported as more suitable for detecting parasite density per sqcm accepted as

pathogenicity criteria<sup>8</sup> would be beneficial.

*Demodex* spp. prevalence demonstrated quite a change based on the characteristics of selected study groups. The facts that the study group is ill or healthy, age groups, region where the sample is taken, and the sample count affect the prevalence. In results reported from various countries, *Demodex* spp. prevalence was established to range between 32% and 90.2% in patient groups<sup>4,5,11</sup>. The study groups generally seem to have blepharitis and rosacea. In our country, quite a few numbers of studies exist on such patient groups, and *Demodex* spp. prevalence was reported to have a range between 7.5% and 65%<sup>7,9,12,15,16</sup>. However, as it is the case in our study, the number of studies conducted on healthy individuals is very low. *Demodex* spp. prevalence in healthy individuals determined as control group ranges between 2.9% and 47.3% in our country and between 11.9% and 23% in other studies<sup>7-19</sup>. Our results are similar to the ones reported through healthy individual controls. In a study conducted on university students by cellophane band method, Yazar et al.<sup>19</sup> reported that they established *Demodex* spp. prevalence as 2.9%. In our study carried out with a similar age group, we believe the fact that the rate we found (10.07%) was higher than the results by Yazar et al. might stem from the use of SSSB instead of cellophane band method.

That *Demodex* spp. prevalence does not show any changes based on gender and increases as age advances has been reported by many authors<sup>1-3,7,9,16</sup>. Similar results were also produced by our study. *Demodex* spp. prevalence was established that it does not change based on gender but increased in advanced age groups.

Okuy et al.<sup>8</sup> reported that such hygienic and cosmetic applications as living conditions in crowded groups, daily face washing, and lotion use does not have any effect on *Demodex* spp. prevalence. Our study investigated *Demodex* spp. prevalence based on personal hygiene habits and living environment; and *Demodex* spp. prevalence did not show any change due to the questioned daily hand-face washing frequency, common towel use, keeping pets, and the number of people living together; and *Demodex* spp. prevalence was established to significantly rise in individuals having a high frequency of taking a shower. It can be considered that the high frequency of taking a shower cause skin pores to open, and follicles and tubules being open can lead to the facilitation of parasite settlement. Yet, we believe that further studies are needed to be able to comment on the issue.

Our study investigated *Demodex* spp. prevalence based on cosmetic applications and drug use, and demonstrated that the prevalence did not change by facial cosmetic applications, presence of chronic diseases, or continuous drug use, however, *Demodex* spp. prevalence did decrease with the use of antibiotic drugs in the last 6 months.

Consequently, it was established that *Demodex* spp.

prevalence among university students in Elazig was 10.07% and that SSSB method proved to be more appropriate than cellophane band in *Demodex* spp. diagnosis. *Demodex* spp. prevalence was observed as high among advanced age groups; and *Demodex* spp. prevalence was also established to decrease with the frequency of taking a shower and antibiotics use in the last 6 months.

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