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The incidence of demodex in the Faculty of Science Students and measurement of these Students' knowledge level about demodex

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Abstract
This study was purposed to unveil prevalence of Demodex in faculty of science students and to measure the level of knowledge about Demodex. The study population consisted of Ordu University Faculty of Science students. Participants were selected by random sampling method. A questionnaire including socio-demographic questions was applied. Standard superficial skin biopsy method was employed. In the study, after student volunteers filled out and signed Patients Informed Form, standardized surface skin biopsy from the face after signed (SYDB) samples were taken and analyzed. In the study, 34 (22.7%) of the subjects were males, 116 (77.3%) were females. The mean age of subjects with the standard deviation was 20.10 ± 2.11. 69 (46%) students were found as Demodex spp. All of the students were 1^{st}, 2^{nd}, 3^{rd} and 4^{th} year Science Faculty students. The study demonstrated that Demodex spp. is a widespread health problem in the faculty of Science students, but the level of knowledge about the Demodex spp. isn't high enough.

Keywords: Demodex, surface skin biopsy, prevalence

Introduction

Demodex folliculorum (D.f.) and Demodex brevis (D.b.) are the most common parasites found on humans [1]. D.Folliculorum is generally found in the follicular infundibulum and D.Brevis in the sebaceous and meibomian glands. The mites are usually found on the forehead, molar areas of the cheeks, nose and nasolabial fold, but can occur anywhere on the face or around the ears, and sometimes on other parts of human skin. The prevalence of Demodex mites in healthy adults varies between 23.5% and 100%. Some researchers reported that the infestation rate of Demodex could be higher than 90% in college students [2].

The role of Demodex in the pathogenesis of skin disorders in adult patients has been widely discussed. Only increased numbers of the mites –more than 5 individuals on 1 $cm^2$of skin-are closely relationship with pathogenic activity [3-10].

Demodex can cause a number of lesions in human skin. Demodex has been relationship with the development of papular and papulopustular rosacea, perioral dermatitis, seborrheic dermatitis, pustular eruption, blepharitis, seborrheic alopecia and other skin lesions although much controversy persists. Moreover, it is also uncertain that Demodex infestation could be one of the triggering factors of carcinogenesis in eyelid basal cell carcinomas [11] and sebaceous adenoma [12]. The pathogenesis of demodicosis and the immune response to mite invasion are poorly understood [5]. Methods like cellophane tape, skin scraping, punch biopsy and standardized skin surface biopsy (SSSB) are used in its diagnosis [13].

We goal to examinate Demodex spp. prevalence among faculty of science students in Ordu, and to determine epidemiological factors thought to affect Demodex spp. prevalence in our study.

Material and Methods

This study was made between the years 2014- 2015. Participations were selected by random sampling method. Questionnaire was made by researcher and Participation's answers were accepted true. Knowledge level of students about demodex was determined by their answers.

In this study, Demodex spp. was examinated among students of Ordu University with methods of standard superficial skin biopsy (SSSB). It involved placing a drop of cyanoacrylic adhesive on a microscope slide, applying the adhesive-bearing surface of the slide to skin, and removing it gently after it had been allowed to dry (about 1 min). Initially, a standard surface area of 1 cm^2 was drawn on the opposite face of the slide with a waterproof marker. After removal from the skin, each sample was clarified with two to three drops of immersion oil, and then covered with a coverslip. The samples were studied

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microscopically at standard magnifications (× 40,× 100). Of the examined samples, the ones that were detected to have 5 and more Demodex spp. per sqcm were accepted positive. Approval of Ethics Committee and other necessary permissions were taken before this study, and each of the students were requested to fill in Informed Patient Consent Form and were informed the subject. In addition, students were asked to fill in another survey questioning their demographical information, personal hygiene habits and environment they lived in that were thought to affect Demodex spp. prevalence. Samples were collected cheeks of each patient included in the study by SSSB.

Datas were shown number (N) and percent (%). SPSS software version 20.0(SPSS Inc. Chicago, USA) was utilized for statistical analysis of the data, Pearson X^2, Yates's continuity correction and Fisher's exact X^2 was performed for the comparison of cases that based on factors that can affect Demodex spp. prevalance. P<0.05 was admitted statistically significant.

Results

Demographic characteristics of the subjects were tabulated in Table 1.

Table 1. The Descriptive Statistics of Sociodemographic Variables

	Demodex				Total	Statistics (x^1) P=
	Positive		Negative			
	n	%	N	%		
Gender						
Male	15	10	19	12.7	34	0.956
Female	54	36	62	41.3	116	
Age Group						
17-22	63	42	77	51.3	140	
23-28	5	3.3	4	2.7	9	0.458
29-34	1	0.7	0	0	1	
Marital Status						
Single	65	44.2	79	53.7	144	0.592
Married	2	1.4	1	0.7	3	
Working Status						
Student	69	46	81	54	150	
Home living Situation						
Alone	1	0.7	2	1.3	3	
Public or private dorm	37	24.7	48	32	85	0.233
With my friends	12	8	15	10	27	
Nuclear family	12	8	12	8	24	
Extended family	2	1.3	4	2.7	6	
Others	5	2.3	0	0	5	
Knowledge of Demodex						
Good	0	0	8	5.5	8	0.006
Moderate	29	20	18	12.4	47	
Low	16	11	18	12.4	34	
No	22	15.2	34	23.4	56	

Of the subjects, 34 (22.7%) were males, 116 (77.3%) were females. Mean age of subjects was 20.10± 2.11. Among the subjects, 144(96%) were single and 3(2%) were married. Of the subjects 146(97.3%) were university, 1(0.7%) high school. Of the subjects 150(100%) were student at the university. 85 subjects (56.7%) stayed in the dormity, 3 (2%) were live alone. 69 students (46%) were determined as Demodex spp. All of the students were 1^{st}, 2^{nd}, 3^{rd} and 4^{th} years Science Faculty students. The students answers to the questionnaire were given Table 2. Such variables gender, age, skin type,cosmetical applications weren't statistically significant.

Table 2. The Survey Questions

	Demodex				Total	Statistics
	Positive		Negative			
	n	%	N	%		
Skin type						
Oily	29	19.6	24	16.2	53	0.138
Dry	9	6.1	19	12.8	28	
Mixed	29	19.6	38	25.7	67	
Sun Screen						
Yes	8	5.4	15	10.1	23	0.363
No	60	40.3	66	44.3	126	
Epilation						
Yes	1	0.7	3	2	4	0.625
No	68	45.3	78	52	146	
Laser						
Yes	1	0.7	3	2	4	0.623
No	68	45.9	76	51.4	144	
Daily face washing frequency						
One time a day	8	5.5	15	10.3	23	0.334
Twice a day	57	40.4	59	40.4	116	
Sometimes	4	2.7	2	1.4	6	
Never	0	0	1	0.7	1	
Cosmetical applications						
Yes	31	20.9	49	33.1	80	0.057
No	37	25	31	20.9	68	
Itching on face						
Yes	6	4.1	11	7.5	17	0.463
No	62	42.5	67	45.9	129	
Skin disease						
Yes	7	4.8	20	13.7	27	0.036
No	60	41.1	59	40.4	119	
Towel type						
Paper Towel	5	3.3	4	2.7	9	0.036
Cotton Towel	64	42.7	77	51.3	141	

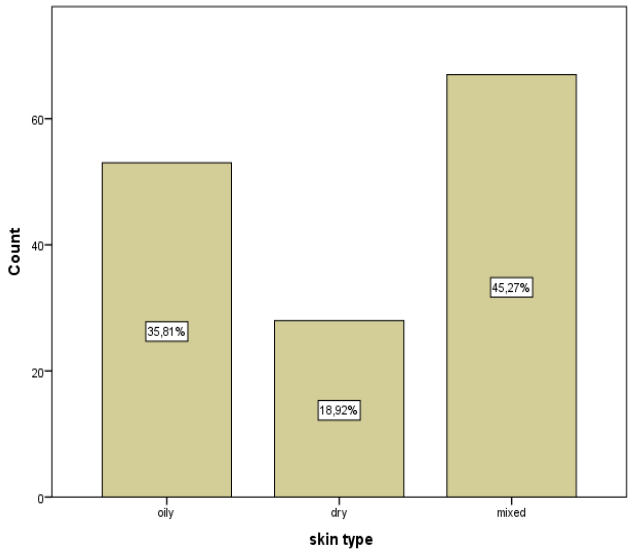

Figure 1. Percent distribution of students' skin type

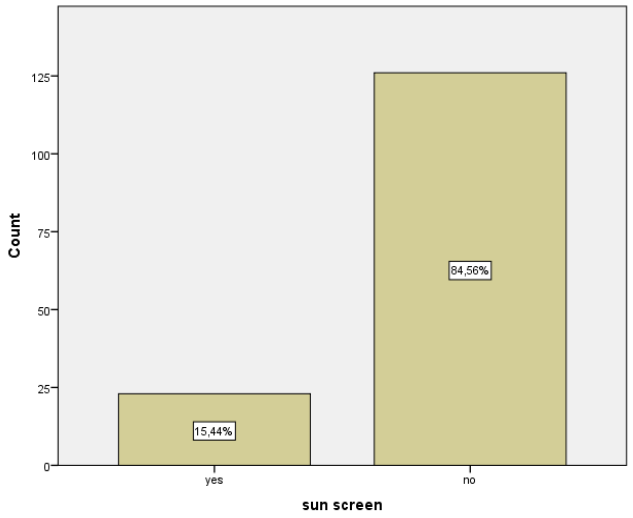

Figure 2. Percent distribution of students using sun screen

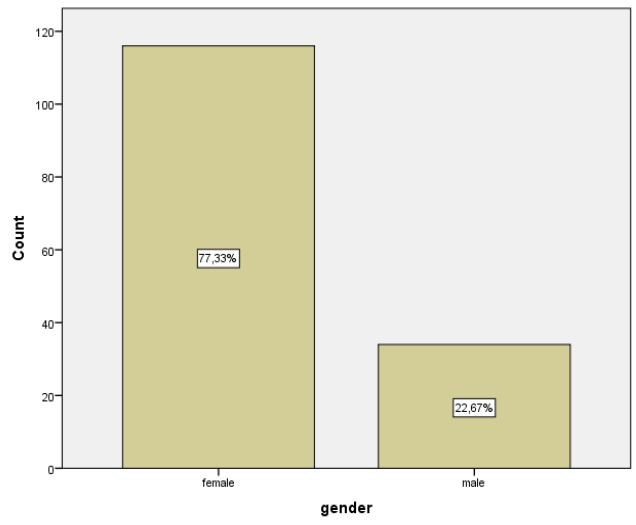

Figure 3. Percentage distribution of students according to gender

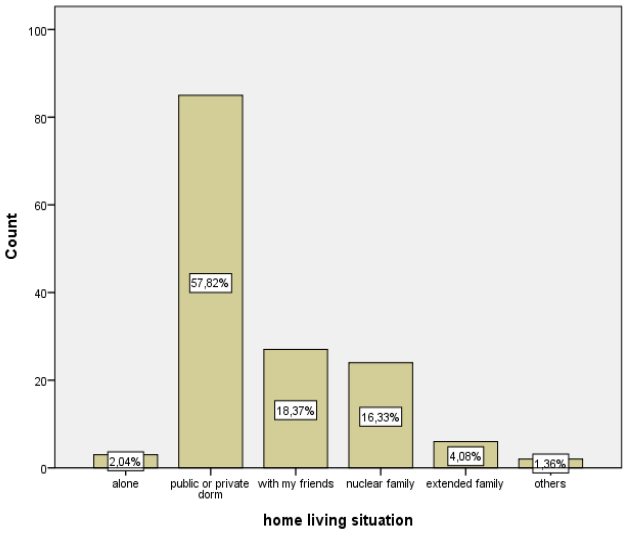

Figure 4. Percentage distribution of students according to their home life situations

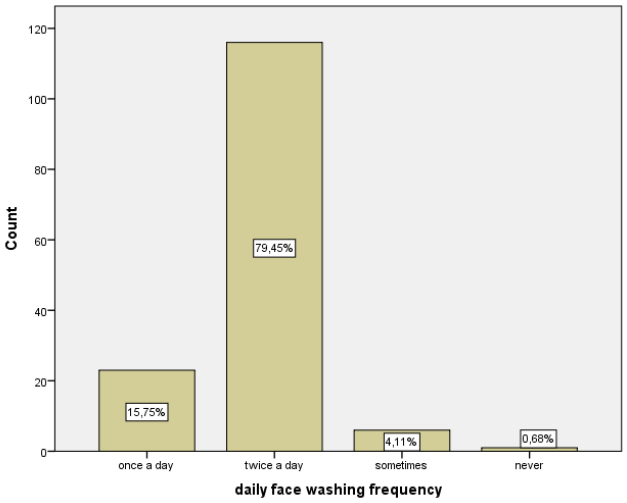

Figure 5. Percentage distribution of students' daily face washing frequency

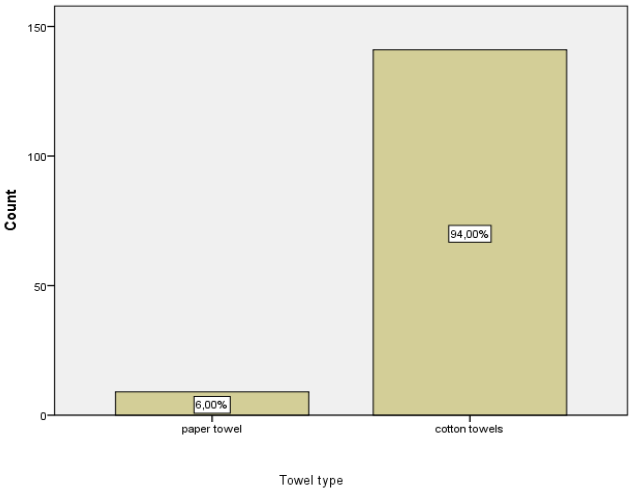

Figure 6. Percentage distribution of students according to the type of used towels

Discussion

There are different opinions about the demodex which forms pathological and clinical symptoms in human [6,7-9]. Some researchers reported that the settlement of demodex spp. into pilosebaceous follicles, while others reported that rosacea, acne vulgaris, blepharitis, perioral dermatitis, pustular folliculitis, scalp papülo-pustular lesions and acquired immune in the pathogenesis of the disease pustular in syndrome lesions could be the role of D. Folliculorum [10,14,15].

Demodex spp. can be found different parts of the human body such as nasolabial region, the eyelashes, chin, forehead, external ear canal, nipple, back, hips and penis [16].

In the different studies Demodex spp. ratio was found by Wang and Zhang [17] 30.81% among students in medical school, Raszej et al. [18], perioral dermatitis, rosacea, and seborrheic dermatitis 27%, respectively, in samples taken from patients of hair follicles, 45% and 28%, Czepit et al [19] 58% in patients with chronic blepharitis and Moravvej et al. [20] the rate of 38.6% in patients with acne rosacea.

The studies on the epidemiological of demodex species indicated that, the intensity of d.folliculorum was significantly higher than the control group in the diabetic patients [21]. In the other study conducted in patients with chronic renal failure the parasite was found with the 12.76% of the 47 patients [22]. In a different study the secretion of the external ear of 613 healthy high school students examined and Demodex was detected in 11.58% of students [23].

Also, Aycan and his friends [24] examined 117 rosacea, 29 acne vulgaris and 51 other allergic complaints for a total of 197 patients by the method Standard Superficial Skin Biopsy (SYDB). They reported (49.23%) flow positive. Again, Karaman and his friends encountered parasite ratio 43.2% by the hematoxylin eosin (HE) method [4].

Different studies were made on the incidence face of the Demodex species. Demodex species of incidence was reported to increase in parallel with increasing age [25]. In a study ≤20 years age group were found demodex 21% and in over 20 age group were found Demodex by 53.5% [26]. Again Baysal et al. [27] evaluated the relationship between age groups and the presence of Demodex species in the 11-15 age groups and were found 8.3%, while in the 16-20 age group, were found parasite 12.7%.

References

1. Desch C, Nutting WB. Demodex folliculorum (Simon) and D. brevis akbulatova of man: redescription and reevaluation. J Parasitol. 1972;58(1):169-77.
2. Tsai YJ, Chung WC, Wang LC, Ju YT, Hong CL, Tsai YY, Li YH, Wu YL. The dog mite, Demodex canis: prevalence, fungal co-infection, reactions to light, and hair follicle apoptosis. J Insect Sci. 2011;11:76.
3. Unat EK. UNAT'ın tıp parazitolojisi: insanın ökaryonlu parazitleri ve bunlarla oluşan hastalıkları: İstanbul Üniversitesi; 1991.
4. Karaman Ü, Şener S, Çelik T, Atambay M, Aydın E, Daldal N. Derinin Enfeksiyoz ve Benign Durumlarında Histopatolojik Yöntemle Demodex spp. Araştırılması. İnönü Üniversitesi Tıp Fakültesi Dergisi. 2008;15(1):5-7.
5. Erbagci Z, Ozgoztasi O. The significance of Demodex folliculorum density in rosacea. Int jDermatol. 1998;37(6):421-5.
6. Morsy TA, Fayad ME, Morsy AT, Afify EM. Demodex folliculorum causing pathological lesions in immunocompetent children. J Egypt Soc Parasitol. 2000;30(3):851-4.
7. Pena GP, Andrade Filho JS. Is demodex really non-pathogenic? Rev Inst Med Trop Sao Paulo. 2000;42(3):171-3.
8. Baima B, Sticherling M. Demodicidosis revisited. Acta Derm Venereol. 2002;82(1):3-6.
9. Wesolowska M, Baran W, Szepietowski J, Hirschberg L, Jankowski S. [Demodicidosis in humans as a current problem in dermatology]. Wiad Parazytol. 2005;51(3):253-6.
10. Roihu T, Kariniemi AL. Demodex mites in acne rosacea. J Cutan Pathol. 1998;25(10):550-2.
11. Erbagci Z, Erbagci I, Erkilic S. High incidence of demodicidosis in eyelid basal cell carcinomas. Int J Dermatol. 2003;42(7):567-71.
12. Dhingra KK, Saroha V, Gupta P, Khurana N. Demodex-associated dermatologic conditions--A coincidence or an etiological correlate. Review with a report of a rare case of sebaceous adenoma. Pathol Res Prac. 2009;205(6):423-6.
13. Yolasığmaz A. D. folliculorum'un Rosacea, Akne Vulgaris, Perioral Dermatit, Seboreik Dermatit ve Blefaritin Patogenezindeki Yeri ve Tedavisi: Ege University; 1996.
14. Magro CM, Crowson AN. Necrotizing eosinophilic folliculitis as a manifestation of the atopic diathesis. Int J Dermatol. 2000;39(9):672-7.
15. Forton F, Seys B. Density of Demodex folliculorum in rosacea: a case-control study using standardized skin-surface biopsy. Br J Dermatol. 1993;128(6):650-9.
16. Smith KGV, Clay T, Smart J, Smart J. Insects and other arthropods of medical importance: British Museum (Natural History); 1973. 17,462.
17. Wang G, Zhang Y. [Investigation of Demodex infection among medical students]. Zhongguo Ji Sheng Chong Xue Yu Ji Sheng Chong Bing Za Zhi. 2006;24(2):156-7.
18. Raszeja-Kotelba B, Jenerowicz D, Izdebska JN, Bowszyc-Dmochowska M, Tomczak M, Dembinska M. Some aspects of the skin infestation by Demodex folliculorum. Wiad Parazytol. 2004;50(1):41-54.
19. Czepita D, Kuzna-Grygiel W, Kosik-Bogacka D. Investigations on the occurrence as well as the role of Demodex follicuforum and Demodex brevis in the pathogensis of blepharitis. Klin Oczna. 2005;107(1-3):80-2.
20. Moravvej H, Dehghan-Mangabadi M, Abbasian MR, Meshkat-Razavi G. Association of rosacea with demodicosis. Arch Iran Med. 2007;10(2):199-203.
21. Akdeniz S, Bahceci M, Tuzcu AK, Harman M, Alp S, Bahceci S. Is demodex folliculorum larger in diabetic patients? J Eur Acad Dermatol Venereol. 2002;16(5):539-41.
22. Ozçelik S, Sümer Z, Değerli S, Ozyazici G, Hayta SB, Akyol M, Candan F. The incidence of Demodex folliculorum in patients with chronic kidney deficiency. Türkiye Parazitol Derg. 2007;31(1):66-8.

23. Ding Y, Huang X. Investigation of external auditory meatus secretion demodex folliculorum and demodex breuis infection in college students. Lin chuang er bi yan hou ke za zhi= J clinical otorhinolaryngol. 2005;19(4):176-7.

24. Aycan OM, Otlu GH, Karaman Ü, Daldal N, Atambay M. Frequency of the appearance of Demodex sp. in various patient and age groups. Türkiye Parazitol Derg. 2007;31(2):115-8.

25. Clifford CW, Fulk GW. Association of diabetes, lash loss, and Staphylococcus aureus with infestation of eyelids by Demodex folliculorum Acari: Demodicidae. J Med Entomol. 1990;27(4):467-70.

26. Dong H, Duncan LD. Cytologic findings in Demodex folliculitis: a case report and review of the literature. Diagn Cytopathol. 2006;34(3):232-4.

27. Baysal V, Aydemir M, Yorgancıgil B, Yıldırım M. Akne vulgaris etyopatogenezinde D. folliculorum'ların rolünün araştırılması. Türkiye Parazitol Derg. 1997;21:265-8.