Assessment of Acne Rosacea Prevalence and Quality of Life between Individuals Aged 18 Years and Over in Mahmudiye District Center, Eskisehir, Turkey (A Population-Based Study)

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Abstract

Objective: The aim of this study was to determine the prevalence of acne rosacea among adults, examine some related variables and evaluate the quality of life. **Methods:** This cross-sectional study including 2226 individuals with an age of 18 years old-above who lived in Mahmudiye-Eskisehir, Turkey. The study group was visited in their houses individually and agreed to participate the study. The researchers completed the survey forms during face-to-face interviews, performed the examinations. The Short Form-36 scale was used to assess the quality of life. The Chi-square, Mann-Whitney U test, Logistic Regression Analysis were used in the statistical analyses. **Results and Conclusions:** Of the study group 910 (40.9%) were male. Their ages ranged from 18-95 years (Mean age: 47.2±16.7). The prevalence of acne rosacea was 22.6% ($n = 504$). Being over the age of 55, obesity, primary school or lower education, history of complaints related to the face, family history of acne rosacea and personal history of head and/or neck treatment were identified as important risk factors for acne rosacea. Participants with acne rosacea had low quality of life based on the physical function subscale. It may be useful to perform intermittent screening, directing suspect cases to a specialist physician for early diagnosis- treatment and raise awareness.

Keywords: Acne rosacea, population-based study, quality of life, Turkey

Introduction

Acne rosacea (AR) is a common skin disorder with a not completely known etiology and usually beginning in the range of 30 and 50 years.[1] The standard diagnostic criteria of AR are one or more of the findings of transient-persistent erythema, telangiectasia, papules, and pustules, symmetrically located on the face.[2,3] The AR prevalence was reported between 4% and 22% in different studies.[4-8] AR affects every skin type and is more common in women and individuals with fair skinned.[1,9]

Although different theories have been proposed, still precise etiology and pathophysiologic mechanisms of AR remain unknown. The development of AR is multifactorial and may occur by genetic factors, environmental factors (ultraviolet[UV] radiation, reactive oxygen species, including superoxide and hydroxyl radicals, hydrogen peroxide, hot or cold, etc.), infectious reasons (*Helicobacter pylori*, *Demodex folliculorum*), gastrointestinal system (GIS) disease (dyspepsia, gastric hypochlorhydria), and psychological factors (such as major stressful life events and anxious and immature personality).[10-14] As AR primarily affects the face, it can cause patients to lose their emotional state, causing feelings of shame, anxiety, loss of self-esteem, and depressed feelings. In addition, findings such as papules, pustules, and redness may lead to physical discomfort.[15]

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Health-related quality of life, which is significantly affected by physical and mental well-being, deteriorates in these patients because both physical and psychological factors accompany with AR.[15]

There is no community-based prevalence study with AR patients in Turkey population. For this reason, the aim of this study was to determine the prevalence of AR among adults living in Mahmudiye district center, to examine some variables thought to be related with AR, and to evaluate the quality of life.

Materials and Methods

The study was a cross-sectional study that conducted between November 1, 2014, and February 28, 2015, in a study group of individuals aged 18 years and above living in Mahmudiye district center of Eskisehir. Eskisehir is a province located in Central Anatolia (near the capital of Turkey) with a total population of 844,842 people and is a reflection of the developed regions of Turkey. Eskisehir has 14 districts in total and 87% of the total population living in two districts, the city center. In Mahmudiye, one of the periphery districts of Eskisehir, the total population of 18 years and over is 3455.[16]

The ethical committee approval was taken by before the study. The rules of the Declaration of Helsinki were complied with when collecting data.

A questionnaire was prepared using the literature of the study.[17-21] The questionnaire contains information about individuals of the sociodemographic characteristics, the presence of AR and variables thought to be related, and the questions about the health-related quality of life scale short form (SF) 36. A total of 2226 people (64.4%), each of whom were visited in their home and who agreed to participate in the study, formed the study group during the study period. After being informed about the subject and the purpose of the study, verbal approvals were received from those who agreed to participate in the study. Questionnaires were filled via face-to-face. In our study, it was accepted as "AR exists" in case of at least one of the presence of lesions of erythema-telengiectasia, papules, pustules, or granulomatous lesions on the face.[2] The examinations were carried out by researchers who have been educated about the subject by a dermatologist; the patients diagnosed with AR reexamined again by the dermatologist.

Skin-type evaluation was done according to the Fitzpatrick Skin Type Classification. This scale has six skin types. The most lighted skin tones are defined as type 1, while the darkest tones are defined as type 6.[22]

SF-36 health-related quality-of-life scale was used to assess the quality of life in this study. This scale was developed by Ware and Sherbourne in 1992.[23] The validity and reliability study in Turkey were conducted by Kocyigit *et al*. in 1999.[24] The SF-36 is a self-assessment scale, based on the status of individuals within the last 4 weeks. There are eight subscales of the scale and the scores that can be taken from each subscale range from 0 to 100. As the scores get higher, the quality of life increases.

Employees who are actively involved in any income-generating business in our study are defined as "working." The family income situation was evaluated as "good, moderate, and bad," according to the individual's own perceptions. In this study, smokers smoking at least 1 cigarette per day on a regular basis were considered "smoking."[25] Those who consume more than 30 g of ethyl alcohol per week were defined as "consuming alcohol."[26] Those who consume 1 cup of coffee per day regularly were evaluated as "consuming coffee."

The presence of at least one of the complaints of redness, burning, stinging, and itching on the face was evaluated as "there is a complaint on the face." At least one of the treatment methods such as cauterization, cryotherapy, laser therapy, radiotherapy, and surgical operation for any reason in the head-and-neck region has been defined as "having any treatment story about the head-and-neck region."

The age groups were grouped as ≤34, 35–54, and ≥55 years considering the literature data and ethnicity.

Analysis of the obtained data was done in the Data were analyzed using SPSS 15.0 statistical software (SPSS Inc, Chicago, Illinois, United States). The data of the study group were given as measures of central tendency (proportion, mean, and ratio) and dispersion (standard deviation and range). Chi-square test and Mann–Whitney U-test were used for the analyses. Logistic regression analysis was also applied to determine the factors that affect AR. The level of statistical significance was accepted as $P \leq 0.05$.

Results

Of the study group, 910 (40.9%) were male and 1316 (59.1%) were female. Their ages ranged from 18 to 95 years, with a mean of 47.2 ± 16.7 years. The AR prevalence in this study was 22.6% ($n = 504$). There was flushing in 149 (26.5%), erythema-telangiectasia in 359 (63.8%), papulopustular in 45 (8.0%), and granulomatous lesions in 10 (1.7%) people. The distribution of AR and non-AR according to some sociodemographic characteristics in the study group is given in Table 1 and according to some diseases and complaints is given in Table 2.

The results of logistic regression analysis comprised from the variables (age group, education status, complaints on the face, AR history in the family, and a treatment for head-and-neck region) related with AR, which were detected by the analyses performed, are presented in Table 3.

Approximately two-thirds of the participants in the study group had skin types 3 and 4. No individuals with skin-type 6 were encountered. Distribution of AR and non-AR according to the skin type in the study group is given in Table 4.

In the study group, the median scores of those with AR from the "physical functioning" subscale of the SF-36 scale were

Table 1: Distribution of acne rosacea and non-acne rosacea according to some sociodemographic characteristics in the study group

Sociodemographic features	Acne rosacea			Test value (χ^2; *P*)
	No, *n* (%)[a]	Yes, *n* (%)[a]	Total, *n* (%)[b]	
Age group				
≤34	508 (84.9)	90 (15.1)	598 (26.9)	39.763; 0.000
35-54	665 (78.3)	184 (21.7)	849 (38.1)	
≥55	551 (70.7)	228 (29.3)	779 (35.0)	
Gender				
Male	696 (76.5)	214 (23.5)	910 (40.9)	0.820; 0.365
Female	1028 (78.1)	288 (21.9)	1316 (59.1)	
Education				
Primary and lower	882 (72.8)	329 (27.2)	1211 (54.4)	38.331; 0.000
Middle school	199 (78.3)	55 (21.7)	254 (11.4)	
High school	326 (82.5)	69 (17.5)	395 (17.7)	
University	317 (86.6)	49 (13.4)	366 (16.4)	
Family type				
Nuclear	1523 (77.7)	437 (22.3)	1960 (88.1)	0.773; 0.679
Extended	171 (76.0)	54 (24.0)	225 (10.1)	
Broken	30 (73.2)	11 (26.8)	41 (1.8)	
Family income situation				
Good	224 (80.3)	55 (19.7)	279 (12.5)	2.769; 0.250
Normal	1347 (77.4)	393 (22.6)	1740 (78.2)	
Bad	153 (73.9)	54 (26.1)	207 (9.3)	
Smoking status				
Smoking	475 (77.9)	135 (22.1)	610 (27.4)	3.760; 0.153
Nonsmoking	1087 (78.1)	305 (21.9)	1392 (62.5)	
Given up	162 (72.3)	62 (27.7)	224 (10.1)	
Alcohol				
No	1593 (77.6)	460 (22.4)	2053 (92.2)	0.320; 0.572
Yes	131 (75.7)	42 (24.3)	173 (7.8)	
Coffee				
No	1154 (77.2)	340 (22.8)	1494 (67.1)	0.110; 0.740
Yes	570 (77.9)	162 (22.1)	732 (32.9)	
Total	1724 (77.4)	502 (22.6)	2226 (100.0)	

[a]Percentage of row is taken, [b]Percentage of column is taken

lower than those without AR. The distribution of the median scores of subscales of the SF-36 scale in the study group with and without AR is given in Table 5.

DISCUSSION–CONCLUSIONS

Nowadays, the increasing prevalence of AR is an important health problem because it affects the external appearance of the people, causing cosmetic worries and affecting the quality of life related to health negatively.[27]

In our study, the AR prevalence was found to be 22.6%. The AR prevalence has been reported as 22% in Estonia, 12.3% in Germany, 11% in the USA, 10% in Sweden, and 5% in Russia.[5-8] The reasons for having different prevalence in the literature include the differences in the classification/diagnostic methods and the different genetic structure and skin type of the study population.

It is generally accepted that AR peaked in over 30 years of age.[2] In our study, the AR prevalence increased as the age progressed. We found that over 55 years of age in the study group was a significant risk factor for AR. Moustafa *et al.* in the US and Abram *et al.* in Estonia also reported similar results.[6,8] Among the reasons for increased AR prevalence with increasing age are increased exposure to environmental and climatic factors playing a role in the etiopathogenesis of AR and increased prevalence of chronic diseases.

AR is reported to be more frequent in females than in males.[1] In our study, there was no difference in the AR prevalence between males and females. Furue *et al.* reported that the AR prevalence in hospital-based studies in Japan was twice as high as that in females; on the other hand, the studies conducted in community-based studies have been reported equal prevalence between female and male in consistent with our results.[6,8,10] The reason for the higher prevalence of AR in hospital-based studies in women may be due to more cosmetic anxiety and more frequent medical treatment, as AR affects mainly the facial region.

Table 2: Distribution of patients with and without acne rosacea according to some diseases and complaints in the study group

Some diseases/complaints	Acne rosacea			Test value (χ^2; *P*)
	No, *n* (%)[a]	Yes, *n* (%)[a]	Total, *n* (%)[b]	
Complaint on the face				
No	1478 (85.4)	253 (14.6)	1731 (77.8)	280.680; 0.000
Yes	246 (49.7)	249 (50.3)	495 (22.2)	
Irritant substance exposure				
No	824 (77.3)	242 (22.7)	1066 (47.9)	0.026; 0.871
Yes	900 (77.6)	260 (22.4)	1160 (52.1)	
Gastrointestinal system complaints				
No	960 (78.6)	262 (21.4)	1222 (54.9)	1.916; 0.166
Yes	764 (76.1)	240 (23.9)	1004 (45.1)	
Presence of any skin disease other than acne rosacea				
No	1600 (77.9)	455 (22.1)	2055 (92.3)	2.581; 0.108
Yes	124 (72.5)	47 (27.5)	171 (7.7)	
Family history of acne rosacea				
No	1692 (77.8)	482 (22.2)	2174 (97.7)	6.812;0.009
Yes	32 (61.5)	20 (38.5)	52 (2.3)	
Any treatment history about the head-and-neck region				
No	1647 (78.1)	461 (21.9)	2108 (94.7)	10.608; 0.001
Yes	77 (65.3)	41 (34.7)	118 (5.3)	
Chemotherapy history				
No	1706 (77.5)	496 (22.5)	2202 (98.9)	0.083; 0.773
Yes	6 (25.0)	18 (75.0)	24 (1.1)	
Total	1724 (77.4)	502 (22.6)	2226 (100.0)	

[a]Percentage of row is taken, [b]Percentage of column is taken

Table 3: Results of logistic regression analysis (final step 4) generated with variables determined to be related to acne rosacea

Variables	β	SE	*P*	OR	CI
Age range (reference: ≤34 age)					
35-54	0.345	0.169	0.042	1.412	1.013-1.968
≥55	0.816	0.187	0.000	2.261	1.567-3.262
BMI (reference: Weak)					
Normal	1.166	0.627	0.063	3.210	0.940-10.960
Overweight	1.076	0.627	0.086	2.933	0.858-10.019
Obese	1.504	0.631	0.017	4.499	1.305-15.507
Education (reference: University)					
High school	0.370	0.219	0.091	1.448	0.942-2.226
Middle School	0.671	0.240	0.005	1.956	1.223-3.130
Ground school and lower	0.710	0.200	0.000	2.034	1.375-3.008
Complaints on the face (reference: None)					
Yes	1.918	0.123	0.000	6.810	5.352-8.665
Family history of acne rosacea (reference: none)					
Yes	0.715	0.330	0.030	2.045	1.070-3.908
Any treatment history about the head and neck region (reference: None)					
Yes	0.535	0.225	0.018	1.708	1.098-2.656
Constant	−3.989	0.635	0.000	-	-

SE: Standard error, OR: Odd's ratio, CI: Confidence interval, BMI: Body mass index

AR, which is characterized by chronic relapses and has a complex and long treatment, is a chronic disease that can be triggered by environmental (exposure to temperature extremes, hot or cold, moving to a warm or hot environment from a cold one, cold wind, and heat from sunlight and severe sunburn) factors.[28] For this reason, one of the most important steps of AR administration is patient education. Treatment compliance becomes complicated for those with a low level of education.

In our study, the AR prevalence in the primary and lower education levels was higher than the university graduates.

Cigarette smoking is a very common addictive habit and is well known for its harmful health effects. Cigarette smoking is a risk factor for many chronic diseases.[29] Smoking seems to prevent the development of several immune-mediated diseases and granulomatous diseases.[30,31] In our study, there could not be found any difference between smokers and nonsmokers in terms of the AR prevalence, while Abram *et al.* reported that the prevalence of AR was lower in smokers than nonsmokers.[6] This may be thought to be due to the anti-inflammatory effect of the cigarette affecting the onset or activation of AR.[19,32]

Drinks such as tea and coffee have been shown to trigger the AR after changes in the vascular structure with increased oral temperature rather than the caffeine they contain. For this reason, it is recommended to avoid hot drinks.[33] There was no correlation between caffeine intake and AR in the study. In Estonia, a similar result to ours was reported.[6]

Alcohol can trigger AR by dilating cutaneous vascular structures.[34] There was no difference in the AR prevalence between those who consumed alcohol and those who did not. Gupta *et al.* reported that there was no relationship between alcohol consumption and AR.[14] This result may be due to the low frequency of alcohol consumption in our study.

It was found that those with complaints such as "burning," "stinging," "itching," and "reddening" on the face were higher than those without AR. According to the logistic regression analysis, the complaint rate on the face increases the AR prevalence by 6.8 times. A study in Korea reported an association between focal acantholytic dyskeratosis and AR, and this association was linked to common etiologic factors such as UV–sun exposure.[35] Li *et al.* reported that basal cell carcinoma was more frequent in the skin of patients with AR in the USA.[36]

The relationship between GIS diseases and AR can be explained by the fact that diet and hormonal factors affect the structure of GIS enzymes, impair bacterial flora, and therefore prolong the duration of digestion time.[37] In a community-based cohort study conducted by Egeberg *et al.* in Denmark, AR has been found to be associated with GIS disorders such as Crohn's disease, celiac disease, ulcerative colitis, and *H. pylori* infection.[38] In our study, there was no difference between the patients with and without GIS complaints. As the diagnosis of GIS diseases is not elaborated and it is handled through GIS complaints, the relation may not be established.

Genetic susceptibility plays an important role in the etiology of AR. In the study done by Yazici *et al.*, it was revealed that there is a relationship between some genes and AR.[39] Thus, AR presence in any of the family members increases the risk of other family members. One of the risk factors for AR in our study was the presence of familial AR history. The study conducted by Abram *et al.* also supports our study result.[6] The fact that family members have similar genetic makeup and that they are exposed to similar environmental effects (UV and sun exposure) and dietary factors could lead to this conclusion.

Therapeutic methods (radiation and cryotherapy) applied to the head-and-neck region may induce leukocyte activation and thus the formation of histopathological changes of AR by stimulating the inflammatory process in the skin.[40] In our study, we found 1.7 times more AR prevalence in those who had a local treatment of head-and-neck region. Treatment

Table 4: Distribution of acne rosacea and nonacne rosacea according to skin types in the study group

Skin type	Acne rosacea		
	No, *n* (%)[a]	Yes, *n* (%)[a]	Total, *n* (%)[b]
1	40 (69.0)	18 (31.0)	58 (2.6)
2	203 (64.9)	110 (35.1)	313 (14.1)
3	629 (73.3)	229 (26.7)	858 (38.5)
4	755 (84.4)	140 (15.6)	895 (40.2)
5	97 (95.1)	5 (4.9)	102 (4.6)
Total	1724 (77.4)	502 (22.6)	2226 (100.0)

χ^2=81.872; *P*=0.001, [a]Percentage of row is taken, [b]Percentage of column is taken

Table 5: Distribution of median scores of subscales of the short form-36 scale among those with and without acne rosacea in the study group

Domains	SF-36 score			Test value (*Z*; *P*)
	Acne rosacea, median (minimum-maximum)			
	No	Yes	Total	
Physical functioning	95.0 (0.0-100.0)	90.0 (0.0-100.0)	90.0 (0.0-100.0)	2.022; 0.043
Role-physical	50.0 (0.0-50.0)	50.0 (0.0-50.0)	50.0 (0.0-50.0)	1.214; 0.225
Bodily pain	74.0 (0.0-100.0)	74.0 (0.0-90.0)	74.0 (0.0-100.0)	1.419; 0.156
General health perception	65.0 (0.0-100.0)	67.0 (0.0-100.0)	67.0 (0.0-100.0)	1.196; 0.232
Vitality	65.0 (0.0-100.0)	65.0 (0.0-100.0)	65.0 (0.0-100.0)	0.363; 0.717
Social functioning	100.0 (0.0-100.0)	100.0 (0.0-100.0)	100.0 (0.0-100.0)	0.180; 0.857
Role-mental	100.0 (0.0-100.0)	100.0 (0.0-100.0)	100.0 (0.0-100.0)	0.504, 0.614
Mental health	68.0 (0.0-100.0)	68.0 (8.0-100.0)	68.0 (0.0-100.0)	0.262; 0.793

SF: Short form

methods such as radiation and cryotherapy applied to the head-and-neck region in the study group may have caused this result by stimulating the inflammatory process.

UV radiation and chemicals have been shown to be associated with chronic inflammatory skin diseases. Irritants cause the formation of free oxygen radicals and can initiate the inflammatory process by creating vascular and dermal matrix damage. In addition, UV can cause areas such as telangiectasia in AR's histopathology by increasing cutaneous angiogenic factors (vascular endothelial growth factor–fibroblast growth factor).[41] It is therefore expected that AR patients with fair skinned will be more affected by UV damage. In our study, there was no difference between patients with and without irritant exposure, and the highest prevalence of AR was found in skin type 2 patients. In a study conducted in Estonia, it was reported that having type 1 and 2 in terms of skin type increased AR risk by 2.76-fold.[6]

Because AR affects mostly the face region, emotional disturbances can occur in people due to physical appearance, decreased self-esteem, and social phobia. In all these aspects, the health-related quality of life of the people is degraded.[15]

The scores of the SF-36 quality-of-life scale from the physical function subscale were lower than those without the AR. However, for the other subscale of the SF-36 scale, no difference was found between those with and without AR. In the study conducted by Salamon *et al.*, SF-36 scores were reported to be lower on physical function, general health, mental health, emotional state, and pain subscale in patients with AR.[42] In a study conducted by Aksoy *et al.* in Turkey, it has been shown that AR affects the quality of life of people negatively.[21] AR may have altered the quality of life of the physical subdomain in a negative way, since it affects people's physical appearance and disrupts their daily work.

There are limitations of the present study. First, it was performed in a single district; therefore, the sample may not be representative of Turkish population. Second, limitation is that this study was a cross-sectional study.

AR is an important health problem among adults. Participants with acne rosacea had low quality of life based on the physical function subscale. It may be useful to perform intermittent screening for early diagnosis and treatment, directing the suspected cases to a specialist physician, and conducting informative studies to raise awareness.

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Conflicts of interest
There are no conflicts of interest.

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