

The prevalence of rosacea and its association with serum vitamin D levels: a population based study of adults in Lithuania, Kaunas city

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Background. The prevalence of rosacea in the general population of Caucasian adults in Europe differs from 2.3% to 12.3% in Germany, 5% in Russia, and 22% in Estonia. Only two studies on the relationship between serum vitamin D and rosacea prevalence have been performed, but the results are controversial. We performed the first population based study in Lithuania and investigated the prevalence of rosacea and its relationships with phenotypic traits and serum vitamin D levels in adults of Kaunas city.

Methods. A cross-sectional study was performed between February 2020 and March 2020, in Kaunas city, Lithuania. Subjects were randomly selected from the Lithuanian Population Register from the Kaunas city. Persistent erythema, phymatous changes, telangiectasia, inflammatory papules and pustules on the face were examined for each subject and the diagnosis of rosacea was established, if one or more symptoms were evaluated. Eye and hair color were recorded for each subject. Skin phototype (I-IV) was assessed in accordance with the Fitzpatrick classification. Also the body mass index was calculated. The skin examination was performed by 4 medical students and one resident who were trained by one experienced dermatovenereologist. We assessed the diagnostic validity of rosacea of each trained investigator in a sub-study of 30 volunteers. The clinical judgment regarding grading of each symptom of rosacea differed by less than 5% from the judgment of an experienced dermatovenereologist. Participants of the study were interviewed about vitamin D supplementation and ultraviolet exposure. Vitamin D concentration in serum was assessed in 117 participants, excluding those who have been taking vitamin D supplements or had an ultraviolet radiation exposure during the last four weeks.

Results. 247 subjects, with a mean \pm SD age of 51.5 ± 10.9 years were enrolled in the study. The rosacea was confirmed for 82 (33.2%) participants. Univariate logistic regression revealed that the prevalence of rosacea is higher in subjects in the age groups of 36-45 (OR 3.6, 95% CI 1.5 - 9.2) and 46-55 (6.7, 95% CI 2.7 - 14.3), as compared to participants in the 25-35 age group. We found correlation between rosacea and obesity ($p < 0.01$) (Table 1). The mean of vitamin D levels were found as 29.3 ± 19.6 nmol/L and 28.6 ± 19.3 nmol/L in patients and participants without rosacea, respectively (Table 3).

Conclusion. In our study we found a higher prevalence rate of rosacea compared with other studies. The prevalence of rosacea was higher in the obese group than normal and overweight groups (Table 1). Eye and hair color, skin phototype (Table 2) and vitamin D level (Table 3) were not associated with frequency of rosacea.

Table 1. Characteristics of all investigated subjects (n= 247)

Variable	Rosacea group n=82 (%)	No rosacea n=165 (%)
Age (in years)		
25-35	9 (11.0)***	53 (32.1)
36-45	13 (15.9)	42 (25.5)
46-55	21 (25.6)	33 (20.0)
56-64	39 (47.6)***	37 (22.4)
Mean \pm SD	51.5 ± 10.9 ***	43.2 ± 11.9
BMI (kg/m²)		
Underweight (<18.5)	0 (0.0)	7 (4.2)
Normal (18.5-24.9)	22 (26.8)**	73 (44.2)
Overweight (25.0-29.9)	34 (41.5)	53 (32.1)
Obesity (>30.0)	26 (31.7)**	32 (19.4)
Mean \pm SD	28.1 ± 4.9 **	26.1 ± 5.6

Table 3. The relationship between serum vitamin D level and rosacea (n=117)

Variable	Rosacea group n=82 (%)	No rosacea n=165 (%)
Vitamin D level ^a		
Normal	4 (10.0)	5 (6.5)
Insufficiency	15 (37.5)	28 (36.4)
Deficiency	21 (52.5)	44 (57.1)
Mean \pm SD	19.6 ± 29.3	19.3 ± 28.6
Median	22.9	22.8

Table 2. Characteristics of all investigated subjects (n= 247)

Variable	Rosacea group n=82 (%)	No rosacea n=165 (%)
Skin type^a		
I	11 (13.4)	24 (14.5)
II	38 (46.3)	64 (38.8)
III	21 (25.6)	47 (28.5)
IV	12 (14.6)	30 (18.2)
Eye colour		
Blue/grey	53 (64.6)	105 (63.6)
Green	19 (23.2)	30 (18.2)
Brown	9 (11.0)	29 (17.6)
Mixed	1 (1.2)	1 (0.6)
Hair colour		
Blond/white	9 (11.0)	21 (12.7)
Light brown	26 (31.7)	49 (29.7)
Dark brown	35 (42.7)	68 (41.2)
Black	12 (14.6)	24 (14.5)
Red	0 (0.0)	3 (1.8)

BMI - body mass index; a - according to the Fitzpatrick classification. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ as compared to the healthy group.

a - serum 25-hydroxyvitamin D: normal (61-200 nmol/L), insufficient (25-60 nmol/L) and deficiency (< 25 nmol/L). p - statistical significance. * $p < 0,05$; ** $p < 0,01$; *** $p < 0,001$ as compared to the healthy group.