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Correlation between Family History and the Age of Onset of Childhood Acne in Relation to Sex and Type of Acne

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ABSTRACT Acne vulgaris is a common chronic skin disorder of the pilosebaceous unit with a wide range of clinical presentations, which depend on the age of onset of acne, sex, family history of acne, and genetic factors, especially the genes affecting keratinization and desquamation. This retrospective study investigated pediatric acne using the patients' past medical history, with patients aged from newborns to 15 years of age. Acne were further stratified by 5 parameters: sex, age, family history, acne type, and localization. Our main aim was to investigate the possible association between selected parameters and the presence or absence of family history of acne. We did not find statistically significant correlation between sex, age of onset, and positive family history of acne. Furthermore, we did not find any association between age of onset and family history according to family members (mother/father/brother or sister). However, we found statistically significant correlation between sex and type of acne. This retrospective analysis of pediatric acne in Croatia did not reveal statistically significant correlation between positive family history and sex, age of onset, and clinical type of acne. In analyzing the correlation between family history and localization of acne, however, we found that the number of patients with acne localized on both the face and trunk and positive family history was statistically significant higher than expected.

KEY WORDS: childhood acne, pediatric acne, family history, epidemiologic data, family characteristics, acne severity

INTRODUCTION

Acne vulgaris is a very common skin disease that affects the pilosebaceous unit of the skin (1,2). Clinically, it is characterized by either non-inflammatory lesions (open and closed comedones) or inflammatory lesions, including papules, pustules, and nodules (3).

The pathogenesis of acne is complex and multifactorial, including sebum production by the sebaceous glands, colonization of pilosebaceous follicles with *P. acnes*, alteration in the keratinization process, and inflammatory events (4).

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Acne typically manifests in adolescence, with peak appearance between ages 14 and 16 in girls and 16 and 19 in boys (5,6). However, in one study the prevalence of acne in children aged 10-12 was found to be 76.4% and 41.6% in the 7-9 age group (7). Additionally, twin studies confirmed role of genetic factors in the pathogenesis of acne (8,9), with the suspected involvement of various genes, such as genes affecting keratinization and desquamation (10).

The main aim of our study was to investigate the association between family history of acne and the age of onset of acne, sex, and type of acne in pediatric patients referred to the Pediatric Dermatology Outpatient Clinics of the Department of Dermatovenerology of the Clinical Hospital Center Zagreb.

PATIENTS AND METHODS

We performed a retrospective analysis using patient records from the Pediatric Dermatology Outpatient Clinics. The study included 507 patients – 312 girls (38%) and 195 boys (62%) – who had been diagnosed with acne, aged from newborns to 15 years of age, who underwent the first examination at the Pediatric Dermatology Outpatient Clinics from January 2005 to December 2014.

Inclusion criteria were diagnosis of acne vulgaris on the first examination and onset of disease before the age of 15. None of included patients had been previously treated with any systemic therapy. Patients with onset of acne after the age of 15, acne steroidica, acne inversa, acne aestivalis, and those with insufficient data history were excluded from the study. We searched past medical history of patients who met our criteria. Stratification was performed using five parameters: sex, age, family history, acne type, and localization. Further analysis was performed by comparing patients with (n=121, 24.4%) and those without family history (n=375, 75.6%) of acne. Patients with positive family history were classified into the following groups: mother with history of acne, father with history of acne, both parents with history of acne, brother/sister with history of acne, and others (aunt, uncle, grandmother/grandfather).

According to the current classification of childhood acne, we divided our patients into five subgroups: neonatal (0-6 weeks), infantile (6 weeks-1 yrs.), mid-childhood (1-7 yrs.), preadolescent (7-12 yrs.), and adolescent (12-15 yrs.) (11). Parental reports were used for defining age of onset of acne. Acne

Table 1. Distribution of patients with positive and negative family history of acne according to age, sex, acne severity, and localization

Patients	Total n (%)	Positive family history n (%)	Negative family history n (%)	*P* value
Sex				* 0.85
Female	308 (62.1)	76 (62.8)	232 (61.9)	
Male	188 (37.9)	45 (37.2)	143 (38.1)	
Total	496 (100.0)	121 (24.4)	375 (75.6)	
Age group				** 0.33
0-6 weeks	10 (2.0)	1 (0.9)	9 (2.4)	
6 weeks-1 year	12 (2.4)	2 (1.6)	10 (2.7)	
1-7 yrs.	12 (2.4)	2 (1.6)	10 (2.7)	
7-12 yrs.	165 (33.3)	40 (33.1)	125 (33.3)	
12-15 yrs.	297 (59.9)	76 (62.8)	221 (58.9)	
Acne clinical type[a]				*** 0.18
1	102 (20.7)	20 (16.5)	82 (22.0)	
2	343 (69.4)	86 (71.0)	257 (69.0)	
3	28 (5.7)	11 (9.1)	17 (4.6)	
4	12 (2.4)	1 (0.9)	11 (3.0)	
5	9 (1.8)	3 (2.5)	6 (1.6)	
Localization				* 0.009
Face	230 (46.6)	45 (37.5)	185 (49.6)	
Trunk	9 (1.8)	-	9 (2.4)	
Face + trunk	255 (51.6)	75 (62.5)	180 (48.0)	

*: Results from Chi-Square Test; **: Results from non-parametric Mann-Whitney U Test; ***: Results from Fisher Test; [a]: Acne severity based on type of acne: 1 – mild-comedonal acne; 2 – moderate-papulopustular acne; 3 – severe-nodular/conglobate acne; 4 – neonatal acne; 5 – infantile acne (juvenile acne – insufficient data)

severity was defined as mild (comedonal), moderate (papulopustular), and severe (nodular/conglobate). Additionally, we noted two other clinical types of acne, neonatal and infantile acne vulgaris, as acne that appear during the first 6 weeks or the first year of life, respectively.

Classification of acne by localization was as follows: acne lesions only on the face (45.8%, n=231); face and trunk (47.7%, n=242); trunk and arms (1.4%, n=7); only the trunk (1.8%, n=9); face, trunk, and arms (3.1%, n=16).

RESULTS

The results clearly show that most of our observed patients were in the age group 12-15, i.e. in early adolescence, according to the age distribution of patients: 0-6 weeks (n=12), 6 weeks – 1 yrs. (n=13), 1-7 yrs. (n=13), 7-12 yrs. (n=167), and 12-15 yrs. (n=302).

Sex distribution between different age groups showed a statistically significant difference ($P<0.001$). In the age group 0-6 weeks, 91.7% (n=11) were male patients, and in 6 weeks - 1 yrs. age group all patients (100.0%) were male (n=13). However, in the age group 1-7 yrs., 69.2% of patients were female (n=9), similarly to those in the 7-12 yrs. group where 76.1% were female (n=127) (Figure 1).

No statistically significant correlation was found when comparing age of acne onset and family history of acne ($P=0.33$, results from non-parametric Mann-Whitney U Test).

Among patients with positive family history, 45 were male (37.2%) and 76 were female (62.8%), while in group with negative family history 143 were male (38.1%) and 232 were female (61.9%). According to the results, there was no statistically significant correlation between sex and family history of acne ($P=0.85$, results from Chi-Square Test) (Table 1).

Among the patients with comedonal and papulopustular acne, the ratio was women:men = 302:149. In nodular/conglobate, neonatal, and infantile acne, the ratio was men:women = 46:8, which suggests that earlier onset and more severe type of acne are more common in men (77%) (women:men = 7:23). The observed correlation was statistically significant ($P<0.001$) (Figure 2).

There was no statistically significant association between type of acne and family history of acne ($P=0.18$, results from Fisher Test) or between age of onset and family history of acne (according to family members) ($P>0.05$) (observed age groups were 1-7 yrs., 7-12 yrs., and 12-15 yrs., n=102).

Among patients with positive family history, there was less acne localized only on the face than expected, while there were more patients with acne localized both on the face and trunk than expected. This comparison was statistically significant ($P=0.009$, results from Chi-Square Test) (Table 1).

DISCUSSION

We analysed the correlation between family history of acne and the following parameters: sex, age of onset, acne clinical type, and their localization. Our main objective was to investigate possible influencing factors for acne among patients with positive family history and find out whether there was any correlation with factors correlated with negative family history. As we found no similar epidemiological study in our country and surrounding regions, we decided to collect data from our country and compare them with worldwide literature.

A previous community-based study of Tehran high school pupils showed that the most important family member with regard to acne family history increasing the risk of developing moderate to severe acne was the mother. These findings indicate a vertical transmission of a risk genetic factor that may be X-chromosome-linked (12). A community-based study among adolescents in Singapore did not reveal statistically significant correlation between sex and family history (13). Our study is consistent with that result. Cho *et al*. also showed that the age of onset

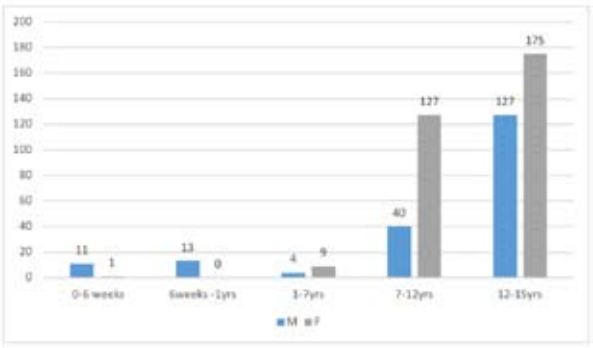

Figure 1. Sex distribution by age.

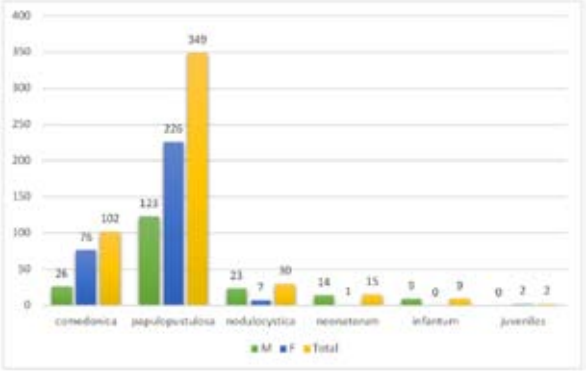

Figure 2. Type of acne by sex.

of the disease was significantly lower in patients with positive family history of acne (*P*=0.002) (6). Similarly, an epidemiological study in North East China demonstrated that in patients with family history of acne the average age of onset was statistically significant lower than in those without family history (14). In contrary to these results, we did not find statistically significant correlation between age of onset and family history (*P*=0.33).

In the study by Di Landro, family history of acne was the strongest predictor of moderate to severe acne (15). Our data show that family history of acne is associated with more severe clinical type of acne. We found that most patients had acne localized on both the face and trunk (47.7%), at rates higher than our expectations among those with positive family history. It is possible that family history of acne is associated with wider localization of acne due to genetic predisposition.

The limitations of our study were patient-reported (i.e. their parents) information about age of onset of acne and the reliability and precision of the data that include patient family history. Furthermore, the cutoff point for pediatric acne was based on general pubertal age for both sexes (14).

CONCLUSION

This retrospective analysis of childhood acne did not reveal statistically significant correlation between positive family history and sex, age of onset, and clinical type of acne, although correlation between sex and type of acne was shown to be relevant. Finally, we verified our expectations for localization of acne on the face and trunk being associated with more severe type and presence of positive family history of acne. Further epidemiological research of childhood acne is encouraged, which should include a multicentric approach and larger sample of patients with consideration of additional influencing factors.

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