ACNE PREVALENCE, AWARENESS AND PERCEPTION AMONG YOUNG POPULATION

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Abstract:

Background. Acne is a very common dermatological condition, very few studies have been done regarding the knowledge, beliefs, and perceptions about the various treatment modalities and causative factors (nutrition, medication, cosmetics, pollutants, psychological and lifestyle factors and etc.) of acne.

Methods. A quantitative written survey was performed. Survey sample – 451 young people 18-34 years old. Data analysis was performed using SPSS 26.0, calculated percentage frequencies, mean and standard deviation (SD), Pearson's Chi Square test was used to detect statistically significant differences and correlation analysis was performed using the Spearman correlation.

Results. The study shows that acne affects 49.9% of the surveyed young people. The prevalence of acne depends on the type of skin, tendency to have skin imperfections and genetic factors. Awareness and perception of skin care, factors affecting the occurrence of acne, and treatments used do not depend on the age of respondents.

Conclusions. Young people lack professional knowledge of acne, skin care, and acne-provoking factors. They should take care of themselves, choose the right information from reliable sources and seek the help of specialists. Identifying the negative exogenous and endogenous factors and thus reducing their impact are mandatory for an adequate acne management.

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Keywords: acne, prevalence, perception, exogenous factors, prevention.

Introduction

Acne (acne vulgaris) is one of the most common skin pathologies, affecting up to 9.4% of the whole population (Tan, Bhate, 2015; Castillo et al., 2019). In Lithuania, people with acne account for about 22–32% of all patients who seek dermatologists (Prakapavičienė, Ravoit, 2016). The disease is more common in adolescents - 90% (Lynn et al., 2016; Gouber, 2017; Lee et al., 2019), although a significant proportion of patients are also adults (Vera et al., 2017).

Therefore, awareness among young people, a correct perception of acne and its risk factors can improve treatment outcomes and its course (Al-Natour, 2017). Androgen production during puberty partly explains why acne is prevalent among adolescents, regardless of social, economic status, nationality, or gender (Lynn et al., 2016). Severe forms of acne can lead to deformation of the skin, scarring, which can lead to a decrease in human self-esteem, social difficulties and psychological suffering (Ibrahim, 2018; Lideikaite et al., 2018; Gouber, 2017; Mazzarello et al., 2018; Ganceviciene et al., 2018). The development of acne has been shown to be stimulated by intense sebum synthesis and keratinization of the hair follicle (Dreno et al., 2018; Lee et al., 2019).

Acne severity and response to treatment may be impacted by different external or environmental factors that affect the natural skin barrier and microbiota: nutrition, medication, cosmetics, pollutants, climatic factors and psychological and lifestyle factors (Dreno et al., 2018). Conversely, that these factors act on the natural skin barrier and on the skin microbiota, resulting in increased sebum production, hyperkeratinization, modification of the microbiota, activation of the innate immunity thus resulting in acne worsening.

Despite the fact that acne is a very common dermatological condition, very few studies have been done regarding the awareness and perceptions about the various treatment modalities and causative factors of acne particularly from western parts of Lithuania.

The aim of the survey was to estimate acne prevalence, awareness and perception among a population of young people.

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Data and methodology

A quantitative survey was performed, a modified version of validated questionnaire according to Jakubczyk et al., (2015); data collection method – a written survey was used. Survey sample - 451 young people, 18-34 years old.

The average age of the respondents with acne was 21 ± 2.7 years of age, they were divided into three groups: 18-20; 21-23 and 24 and more years.

A modified questionnaire was submitted to the participants. Institutional ethical committee clearance was obtained before the research. Various parameters were assessed in the questionnaire, including awareness, practices, and perceptions about acne treatment modalities.

Data analysis was performed using SPSS 26.0, calculated percentage frequencies, mean and standard deviation (SD), Pearson's Chi Square test was used to detect statistically significant differences and a the Spearman correlation analysis was performed. The differences were statistically significant when $p < 0.05$.

Results

Assessing the prevalence of acne, it was found that acne occurred in 225 persons, which accounted for 49.9% of all respondents, 95.6% were women and 4.4% were men. Acne was common in respondents of all ages (Figure 1). The prevalence of acne did not differ statistically significantly ($p > 0.05$) within the age groups.

Source: Authors

Comparing respondents with and without acne by skin type, it was found that respondents who did not develop acne significantly more often ($p < 0.05$) had dry and normal facial skin, and respondents who developed acne more often had oily and mixed facial skin (Table 1).

Table 1. Self-assessment of facial skin type in respondents with and without acne			
Skin type	Without acne (N/%)	With acne (N/%)	P value
Sensitive	20 (8.8)	20 (8.9)	p=0.000
Normal	42 (18.6)	11 (4.9)	
Dry	42 (18.6)	19 (8.4)	
Oily	16 (7.1)	40 (17.8)	
Mixed	99 (43.8)	124 (55.1)	
Not able to determine	7 (3.1)	11 (4.9)	
Total:	226	225	

Source: Authors

Assessing the skin type of the respondents with acne, it was found that acne was most common in those with mixed and oily facial skin, which accounted for 55.1% and 17.8% of the respondents, respectively. For those with dry and sensitive skin, the incidence of acne was quite similar - up to 9%. The prevalence of acne was the lowest - 4.9% in respondents with normal skin type. The differences were statistically significant ($p < 0.05$).

Assessing individual complaints of facial skin imperfections with and without acne, it was found that respondents who did not develop acne were more likely ($p < 0.05$) to complain of dry skin, while respondents who developed acne were more likely ($p < 0.05$) to complain of excessive fat secretion (Table 2).

Table 2. Facial skin imperfections in respondents with and without acne

Prone to imperfections	Without acne (N/%)	With acne (N/%)	P value
Erythema	109 (48.2)	113 (50.2)	0.672
Feeling of stretching	57 (25.2)	52 (23.1)	0.601
Dryness*	108 (47.8)	88 (39.1)	0.047
Scaling	76 (33.6)	78 (34.0)	0.816
Sebum hypersecretion*	71 (31.4)	127 (56.4)	0.000
Eczema	2 (0.9)	9 (4.0)	0.053
Dilated blood vessels	18 (8.0)	22 (9.8)	0.498
Other (sensitive, dehydrated skin, clogged pores)	4 (1.8)	7 (3.1)	0.000

*the statistically significant difference ($p < 0.05$)

Source: Authors

When asked about acne-affected areas of the body, the majority of respondents with acne indicated the face (95.1%) and back (57.8%) areas (Table 3). In other areas acne occurred 3 to 8 times less often than on the face. However, young girls under the age of 19 were statistically significantly more likely to experience acne on their back and shoulders ($\chi^2 = 6.54$, $p = 0.011 < 0.05$).

Table 3. Facial skin complaints from respondents who developed and did not develop acne

Acne-affected areas	Distribution among the respondents (N/%)
Face	214 (95.1)
Neck	61 (27.1)
Back/shoulders	131 (57.8)
Décolleté	68 (30.2)
Upper arm	28 (12.4)
Buttocks	31 (13.8)

Source: Authors

Assessing the foods that may complicate or provoke acne, the majority of respondents mentioned fast foods (88.4%) and chocolate (79.1%) (Table 4). The percentage of those who noted that foods did not affect the course of acne was not high. There was no statistically significant difference in individual age groups ($p > 0.05$).

Table 4. Respondents' awareness on foods that can provoke or complicate the course of acne

Food products	Distribution among the respondents (N/%)
Chocolate	178 (79.1)
Spicy food	115 (51.1)
Fast food	199 (88.4)
High salted products	97 (43.1)
Saturated fat	113 (50.2)
Food has no influence	13 (5.8)
Milk	45 (20.0)
Fermented products	11 (4.9)

Source: Authors

93% of the women ≥ 24 years of age who participated in the survey indicated that their acne increased before menstruation ($p < 0.05$). An interesting fact was that acne occurred statistically significantly more often ($\chi^2 = 6.662$, $p = 0.01$) in those respondents whose parents also had the disease.

Regarding the care of acne-prone skin, the majority of respondents with acne (73.3%) did it independently at home without the help of specialists ($p < 0.05$). About 2 - 4 times less respondents used the help of specialists (Table 5). However, there were those who did not solve acne problems completely. There was no statistically significant difference in respondents' (including women and men) age groups ($p > 0.05$). However, an interesting fact was that women aged 21-23 and ≥ 24 tended to solve the problem in a beauty salon more often compared to women aged 18-20 ($\chi^2 = 9.5413$, $p = 0.028 < 0.05$).

Table 5. Places, where respondents deal with acne-prone skin

Places	Distribution among the respondents (N/%)
In Beauty salon	33 (14.7)
In Dermatology clinic	78 (34.7)
At home	165 (73.3)
In Pharmacy	56 (24.9)
Not trying to solve this problem	15 (6.7)

Source: Authors

The majority of respondents (45.8%) never visited beauty salons, and about a quarter (23.6%) used it once a year. Only about 6% of respondents visited a cosmetologist regularly - 1-2 times a month. There was a statistically significant relationship between age and the use of facial skin care services in beauty salon ($r = 0.19$, $p = <0.01$). Older respondents more often used the services of cosmetologists.

The majority of respondents (69.3%) purchased acne-prone skin care products in pharmacies, a significant part of them (47.6%) - in specialized cosmetics stores and a small proportion in supermarkets or from cosmetics distributors. No statistically significant differences were found between age groups and places where respondents purchase cosmetics ($p > 0.05$).

It should be noted that about half of the respondents (48.2%) never used medications to control the course of acne. A significant proportion of respondents (35.6%) used topical medications, 7.2% took oral medications, and 9% - oral and topical medications. There were no statistically significant differences between individual age groups and drug use ($p > 0.05$). Regarding special cleansing products for acne-damaged skin, the majority of the respondents (40.9%) used them several times a day, 24.9% - once a day, 14.2% - several times a week, 7.6% - once a week, and 12.4% did not use them at all.

Assessing the respondents' awareness about the effects of the sun or solariums on the acne - affected skin, it was found that 30.7% of all respondents indicated that it obviously improved the condition of the skin. There was a slight difference among the respondents who believed that the sun and solarium worsen the skin condition - 22.2%. However, the same percentage (23.6%) of respondents noted that there were no significant effect and were not aware about the effects of the sun.

It was found that the most common respondents' source of information about the causes of acne, its course, treatment, etc. was the internet, as it was noted by 81.8% of all respondents (Table 6).

Table 6. Sources of information where the respondents learn about acne	
Sources of information	Distribution among the respondents (N/%)
Family/friends	55 (24.4)
Internet	184 (81.8)
Books	54 (24.0)
Magazines/newspapers/brochures/advertisement	60 (26.7)
Beauty salon/cosmetologist	99 (44.0)
Dermatologist	91 (40.4)
Other sources	5 (2.2)
Source: Authors	

Analyzing the respondents' sources of information about acne by age groups, it was found that women ≥ 24 years of age learnt more about acne from a dermatologist ($p < 0.05$).

Discussion

Acne is an inflammatory chronic disease of the sebaceous gland of the hair follicle (Dreno et al., 2017). The disease is characterized by non-inflammatory (closed and open comedones) and inflammatory (papules and pustules) forms (Dreno et al., 2018; Mazzarello et al., 2018). The etiology and pathogenesis of the disease remain unclear, but it has been suggested that microorganisms (*Cutibacterium acnes*) are among the main mechanisms promoting its development. Acne is thought to be triggered by increased synthesis of the male sex hormone testosterone during puberty (Lynn et al., 2016).

Lideikaite et al. (2018) found that the acne most commonly occurs in young people of Lithuania, averaging 21 years of age. In Lithuania, between 75% and 98% of young people complain of acne (Karčiauskiene et al., 2015). However, in our study, the prevalence of acne was found to be lower at 49.9% of young people surveyed compared to the work of the aforementioned authors. The low prevalence of acne was determined by the chosen age group of respondents (from 18 to 34 years). Studies show that the highest prevalence is the estimated high prevalence of acne globally, particularly in teenage and early adult years 15–18 (Tan, Bhate, 2015).

During puberty, due to exposure of testosterone the sebaceous glands enlarge and production of fat increases. Oily skin becomes a favorable medium for the reproduction of *C. acne* (Prakapavičienė and Ravoit, 2016; Lee et al., 2019). In this study, it was found that acne was most common in young people with mixed and oily facial skin, accounting for 55.1% and 17.8% of respondents, respectively.

C. acne bacteria make up about 90% of the microbiota in high-fat areas. The majority of studies show that the highest abundance of this bacteria is in samples from the scalp and face, slightly lower from the

upper body part and the lowest from the lower extremities (Lee et al., 2019; Tan, Bhate, 2015; Jakubczyk et al., 2015). In the case of our study, the most common areas affected by acne were also the face and the back/shoulders.

Until recently, diet was thought to have little relevance to the pathophysiology of acne (Lee et al., 2019). Today, however, diet is considered to be one of the key factors in the course of acne. The focus is on milk and dairy products, including skim milk, hyperglycemic carbohydrates, and saturated fats including trans-fats and deficient ω -3 polyunsaturated fatty acids (Melnik, 2015; Agamia et al., 2016). Products containing glucose, white bread, white rice and chocolate increase insulin-like growth factor-1 (*insulin growth factor-1*) and insulin levels in the blood, which leads to the formation of acne (Agamia et al., 2016, Lynn et al., 2016). Based on our and other researches, a majority of respondents believed diet to be the major aggravating factor, and food with high glycemic index, in particular chocolate and fast food believed to be the most common triggering factor (Kaushik et al., 2017; Jakubczyk et al., 2015; Machiwala et al., 2019). Many patients with acne believe that the consumption of salty and spicy foods make a possible participating factor in the development of acne. However, neither salty nor spicy food correlated with duration or severity of the disease (El Darouty et al., 2016).

Consumption of dairy products, particularly skim milk has been found to promote the exacerbation of acne (Dai et al., 2018). However, no deterioration of acne has been found with the use of sour milk products (yogurt, cottage cheese) (Agamia et al., 2016). Fermented foods contain probiotic bacteria, the release of which by postbiotics alleviates the course of acne. In this study, only a very small percentage (4.9%) of respondents said that fermented products provoked acne or complicated its course. The use of probiotic supplements containing lyophilized *Lactobacillus acidophilus* and *Bifidobacterium bifidum* bacteria, along with standard antibiotics, was found to improve the course of acne (Lee et al., 2019).

The onset of acne can be caused by hereditary factors (Jakubczyk et al., 2015). Such data are also confirmed by our study. It has been proved that parents with acne pass on the CYP17 gene group to children, which leads to the formation of acne (Nasri et al., 2015; Jakubczyk et al., 2015) and the chromosomal locus of 8q24 were associated with severe teenage acne (Tan, Bhate, 2015). The authors note that children with this group of genes may develop acne vulgaris. The more severe form of acne has been found, the more often a closer genetic link with relatives is found.

The formation of acne can also be influenced by various gastrointestinal disorders (gastritis, enterocolitis), endocrine disorders (gynecological, thyroid disorders, prostatitis), medications or physiological conditions, such as weakened immune system (Jovic et al., 2017).

To control this disease such medicines as anabolic steroids, cytostatic, antibacterial are used, also multivitamins alleviate the acne condition, either applied topically or taken orally (Vera, 2017). Prescribed drugs such as systemic and topical antibiotics, retinoid, benzoyl peroxide, azelaic acid, adapalene (Bettoli et al., 2019; Malhi et al., 2017). In addition, the drugs from medicinal plants are used to treat acne (Kim et al., 2018). Major modes of action for common acne treatment agents have antimicrobial activity, anti-inflammatory action, the normalization of follicular hyperkeratinization and the reduction of sebum production (Nasri et al., 2015; Malhi et al., 2017). Acne medications have been found to be most commonly used by adolescents aged 16–25 years (Jakubczyk et al., 2015). Our study revealed that nearly half of the young people surveyed had never taken medication.

It should be emphasized that acne is often provoked by stress, which is almost unavoidable in the modern world. There have been studies examining stress as a possible cause of acne or acne exacerbation (Jovic et al., 2017; Lee et al., 2019). Another environmental factor seen to play a role in acneogenesis is smoking, although evidence is lacking (Machiwala, 2019).

Premenstrual flare of acne reportedly occurs in female acne patients (Nasri, 2015; Hulmani et al., 2017). The explanation offered is hydration-induced cyclical narrowing of the pilosebaceous orifice between days 16-20 of the menstrual cycle. Progesterone and estrogen have pro- and anti-inflammatory effects, and alteration or modulation of these hormones may be another explanation (Hulmani et al., 2017).

Our study has found that some respondents believe that sunburn improves the condition of acne-prone skin. Similar data are provided by a survey of young people with acne in India (Kaushik et al., 2017). In fact, UV rays reduce inflammation (Lee et al., 2019), but at the same time, the skin thickens, causing many more pores to clog, *C. acne* bacteria to multiply, and abscesses to form (Hulmani et al., 2017). In

addition, products like antibiotics or irritant products to be used in the evening to avoid sun exposure (Mazzarello et al., 2018).

The formation of acne is influenced by external factors - trauma: friction of clothing on the skin or the practice of squeezing lesions (Machiwala, 2019; Hulmani et al., 2016). The use of improper cosmetics can also lead to acne. Cosmetics that contain vaseline, large amounts of oils, components that form a film on the skin, promote the formation of comedones. The use of make-up was associated with a remarkable increase in the bacterial diversity (Staudinger et al., 2011).

It is very important that cosmetic products are to be chosen for young people with acne by professionals. Untreated acne can leave scars (95%) and post-inflammatory hyperpigmentation. Post-inflammatory erythema is defined as red or pink spots caused by former acne, inflammatory reactions of the skin that damage the skin capillaries and cause red spots (Zawar et al., 2015).

Because of these acne complications, individuals most often seek the help of dermatologists because cosmetologists are not always able to provide qualified care (Ganceviciene et al., 2018). Physicians select medications, specify how to use them, encourage, inspire, and provide knowledge for disease management (Castillo et al., 2018). Appropriate use of dermocosmetic products may help augment the benefits of acne treatment, minimize side effects, and reduce the need for topical antibiotics (Connolly et al., 2017; Dreno et al., 2017). However, frequent washing of the face, scrubbing, cleansing with fortified products destroys the hydrolipid film of the skin. Our study found that about half of the respondents clean their facial skin several times a day. According to other researches, young people attach great importance to facial cleansing procedures (Hulmani et al., 2016; Machivala, 2019).

As the results of this study show that the majority of respondents purchase skin care products in pharmacies, where a wide range of cosmetics and medications for the treatment of acne can be found. Some authors point out that care products for acne-affected skin usually are purchased at pharmacies (Jakubsczyk et al., 2015).

A common teenager believes that cosmetic products are sufficient to treat acne and choose self-medication based on information from internet (Gebauer, 2017). The results of our study show that adolescents are reluctant to use the services of a dermatologists or cosmetologists that can have a significant impact on acne activation. Other authors report similar data (Jakubsczyk et al., 2015; Karciauskiene et al., 2015; Kaushik et al., 2017; Machivala, 2019).

Different methods can be used to treat acne depending on the stage of the disease. However, with understanding that acne is affected by many endogenous and exogenous factors, diet, intestinal microbes, psychological stress, skin care habits, and brain – gut – skin axis existence, new therapeutic targets arise (Lee et al., 2019).

The most important thing is the right patients' awareness and perception about the disease. Acne is a common condition with a wide range of potential harms and associated costs (Tan, Bhate, 2015). Incorporating a more unified education and treatment regimen for young people population may serve as a way to bring the global incline in the incidence of acne to a halt (Lynn et al., 2016).

Conclusion

According to the study, young people lack awareness and perception of acne, skin care, and acne-provoking factors. Young people should take care of themselves, choose the right information from reliable sources and seek the help of specialists (dermatologists, cosmetologists). Identifying the scientifically approved negative factors, including intrinsic immunity, diet, hormones and the cutaneous microbiome and thus reducing their impact are mandatory for an adequate acne management.

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