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## Acne vulgaris and mental health

Mateusz Pawlicki<sup>1</sup>, Anna Łopuszyńska<sup>1</sup>, Magdalena Koziol<sup>1</sup>, Aleksandra Krasa<sup>1</sup>,  
Ewa Piekarska<sup>1</sup>, Halina Pieciewicz-Szczęśna<sup>2</sup>

<sup>1</sup>Student Scientific Association at Department of Epidemiology and Clinical Research  
Methodology Medical University of Lublin, ul. Radziwiłłowska 11, Lublin 20-080,  
Poland

<sup>2</sup>Department of Epidemiology and Clinical Research Methodology of the Medical  
University of Lublin, ul. Radziwiłłowska 11, Lublin 20-080, Poland

Corresponding author: Mateusz Pawlicki, [pawlak32@gmail.com](mailto:pawlak32@gmail.com)

### ORCID ID:

Mateusz Pawlicki <https://orcid.org/0000-0001-8318-6573>, [pawlak32@gmail.com](mailto:pawlak32@gmail.com)

Anna Łopuszyńska <https://orcid.org/0000-0001-5133-4180>, [lopuszynskaania@gmail.com](mailto:lopuszynskaania@gmail.com)

Magdalena Koziol <https://orcid.org/0000-0002-8671-5968>, [magdalena.koziol@icloud.com](mailto:magdalena.koziol@icloud.com)

Aleksandra Krasa <https://orcid.org/0000-0002-0733-202X>, [ola.AK62@gmail.com](mailto:ola.AK62@gmail.com)

Ewa Piekarska <https://orcid.org/0000-0002-4954-379X>; [piekarskaewaa@gmail.com](mailto:piekarskaewaa@gmail.com)

Halina Pieciewicz-Szczęśna <https://orcid.org/0000-0002-0573-7226>, [halpiec@gmail.com](mailto:halpiec@gmail.com)

### Abstract

Introduction: Acne vulgaris is one of the most common diseases in the world, which affects millions of people. Despite its objectively mild clinical severity, it is able to markedly change one's appearance. Moreover it is said to be one of many factors that are responsible for mental health impairments.

Results: Studies showed significant relation between acne and psychological disorders. Both depression and anxiety scores were higher in individuals with acne compared to healthy ones. Some studies reported an increased risk of suicide in this group as well. Research which included quality of life evaluation showed its impairment in larger part of respondents.

Conclusions: Acne vulgaris is linked with an increased risk of serious psychiatric disorders. Therefore it is important to think about them when this condition is diagnosed.

Key words: acne; mental health; depression; anxiety; suicide; quality of life

## **Introduction:**

Acne vulgaris is a chronic inflammatory skin condition manifested by the appearance of comedones, papules, pustules, nodules and cysts. It is one of the most common dermatologic problems in the world, especially among adolescents. The Global Burden of Disease Project ranks it at 8<sup>th</sup> place of the most common diseases worldwide with prevalence of 9,4% (1). At the same time, around 85% of young adults (12-25 year old) are affected (2). Women are more likely to develop this condition, however men tend to have more severe symptoms (1). The main factors that can cause acne are: excess sebum production, Cutibacterium acnes bacteria (formerly Propionibacterium acnes), inflammation and blockage of hair follicles by oil and dead skin cells (3). Face, forehead, chest and upper back with shoulders are therefore the most affected areas due to their high concentration of sebaceous glands.

Acne is not only about skin problems. Since parts of the body being touched the most are highly exposed and acne's symptoms are able to strongly influence patients' appearance, it can lead to problems with self-esteem. What is more, many studies suggest correlation between acne and various mental disorders. All of that, connected with age of onset and the society's pressure to focus on one's image, may lead to serious after-effects such as significantly lowered Quality of Life (QoL) or even suicidal behaviors.

It is also important to mention how common psychiatric conditions are. 264 million people worldwide suffer from depressive disorders and 163 million of them suffer from major depressive disorders. Anxiety disorders can be diagnosed in 284 million people (4). Unipolar depressive disorder was projected to be the second, after ischemic heart disease, leading cause of disability-adjusted life years (DALYs) with the score of 78,6 million worldwide and the main cause in developing countries (68,8 million) (5).

The aim of this study was to assess available literature in order to determine the association between acne vulgaris and the presence of psychiatric comorbidities. Mental health tends to be more and more important factor in today's life and hence it is important to look for factors which can shape its condition to obtain the best results in preventing its disorders.

## **Methods:**

Pubmed, Scopus and Google Scholar databases were searched using keywords "acne vulgaris", "depression" and "mental health". The articles had to be published between 2013 and 2021 to be assessed.

## Description of knowledge:

Research groups around the world use different measurement methods to evaluate how much acne affects patients' mental health. Scales that were used in studies below were: Symptom Check List 90 (SCL-90) and its revised version (SCL 90-R), Dermatology Life Quality Index (DLQI), Self-Rating Depression Scale (SDS), Self-Rating Anxiety Scale (SAS), Cardiff Acne Disability Index (CADI), Patient Health Questionnaire-9 (PHQ-9), General Anxiety Disorder-7 (GAD-7), Hamilton Anxiety Rating Scale (HAM-A), Hamilton Depression Rating Scale (HAM-D), Skindex-29, The Hospital Depression and Anxiety Scale (HAD Scale), Difficulties in Emotion Regulation Scale (DERS-16), Acne Quality of Life (AQOL), EuroQoL, Global Symptom Index (GSI) and Global Acne Grading Scale (GAGS). The most commonly used are: DLQI, CADI, Acne-QoL, HADS and Skindex-29 (6).

Studies conducted in the past few years show clear and obvious connection between acne vulgaris and the presence of mental disorders, mainly depression and anxiety and thus lowered quality of life. Koutou et al. examined one hundred eighty one patients aged between 13 and 56 in Cameroon. Eleven cases of depression (6,1%) and fourteen cases of anxiety (7,7%) were diagnosed. Ten out of eleven depression patients (90,9%) had clinically severe form of acne, while for anxiety, it was eleven out of fourteen (78,6%). Mean CADI (Cardiff Acne Disability Index) score was  $6,3 \pm 3,4$ . 9,4% of patients had severe change of QoL (7). Benham et al. gathered a group of one hundred and six patients 25,2% of whom had mild acne, 24,3% severe acne and 50,5% moderate form of the disease. They were then all evaluated using the SCL-90 (Symptom Check List 90) scale. Significantly more participants than controls required psychological consultant due to primary psychological symptoms. The most common ones were psychoticism (34,0%,  $P < 0,001$ ) and depression (31,1%,  $P < 0,001$ ) (8). Another study using the revised version of SCL-90 scale was performed by Gül and Çölgeçen. The scores of 40 patients enrolled to this study were much higher than healthy individuals' ones. This can be found in SCL-90 GSI ( $Z = -6,87$ ), somatization ( $Z = -6,43$ ), depression ( $Z = -7,00$ ) and anxiety ( $Z = -7,02$ ). Apart from previous study, no significant difference between acne patients and the control group were observed in terms of psychoticism ( $Z = -0,41$ ) (9). These findings were complementary to another research conducted by Vallenrad et al. and to metanalysis made by Samuels et al. First one compared 134 437 acne patients with 1 731 608 healthy controls. Over the 15-year follow-up, patients with acne had 18,5% probability of developing major depressive disorder, while the general population's probability was only 12%. The highest risk was observed during the first year after diagnosis and tended to decrease over time (10). Second one gathered 42 articles describing 35 studies (total number of participants was 1 029 299) about depression and 24 studies (total number of participants 21 634) about anxiety. A significant association between acne and both of these conditions was found ( $r = 0,22$  and  $0,25$  respectively). Additionally, authors proved their higher frequency among adult patients. However they explain this finding as the result of overrepresentation of adults in such studies and higher heterogeneity in adult groups (11). Kosaraju et al. narrowed their study only to rural setting. Seventy three patients were enrolled and PHQ9 with SKINDEX-29 scales were used. This time, moderate to severe depression was observed in 42 (57,6%) patients. Only 8 (11%) of them had it not diagnosed. The biggest group (23, 31,5%) had a mild form. In acne group, 6 out of 13 patients had moderate or worse form of depression. Skindex-29 total score showed that 5 of them were mildly affected, 7 moderately and 1 severely (12).

Meanwhile Guo et al. proved that acne had almost the highest influence in patients' quality of life compared with other dermatologic diseases, placing just behind psoriasis. After evaluating 277 acne patients (1127 total), the DLQI (Dermatology Life Quality Index) for that condition was  $11,57 \pm 6,85$  meaning that the effect was classified as "great" (13). Haroon et al. received data from 74 individuals out of 85 enrolled to their study and obtained mean DLQI of  $7,59 \pm 5,38$ . Only 9 (12,2%) patients had not effect on the quality of life and more than a half (41, 55,4%) had moderate or large effect. After assessment for depression, mean PHQ 9 (Patient Health Questionnaire-9) score was  $7,72 \pm 4,93$ . Six patients (8,1%) were healthy and 26 (35,1%) had moderate or moderately severe depression (14).

Lithuanian study performed by Lukaviciute et al. measured different skin diseases in the group of 1040 respondents with 543 patients (283 with acne). Researchers used HADS (The Hospital Depression and Anxiety Scale) scale to gather the information. Anxiety was present in 37,6% of patients, depression in 21,7% and suicidal thoughts in 9,8%. Control group results were 14,9%, 6,8% and 3,2% respectively. As it comes to acne, anxiety symptoms were present in 38,2% and depression in 21,9%. Thoughts about suicide had 12% of patients. They also had the highest mean score in the anxiety subscale ( $7,1 \pm 0,25$ ) and depression subscale, almost the same as rosacea ( $5 \pm 0,23$  acne,  $5 \pm 0,31$  rosacea) (15). The case of suicidal thoughts was also controlled in Altunay et al. research, where 213 acne patients from 13 European countries were analyzed using HADS, DLQI and EuroQol 5 scales. Eighty five (40%) of them had a high level of concern about their acne, 26 (12%) had suicidal ideation and 10 (5%) confessed that acne was its cause. Mean HADS anxiety scores were  $6,70 \pm 3,84$  for acne group compared to  $5,40 \pm 3,43$  in controls and the mean HADS depression scores were  $3,91 \pm 3,43$  vs  $2,71 \pm 2,71$  respectively. 15% had significant anxiety and 6% had depression. The mean DLQI score was  $6,2 \pm 5,2$  meaning that acne had moderate effect on their life. Thirty two (15%) patients had a DLQI score  $\geq 11$  and that indicates a very big or extremely large impact on quality of life (16). Another research on this subject was Xu et al. metanalysis involving 5 studies with total of 2 276 798 participants, 52 075 of which were with acne. It showed a positive association between acne and increased risk of suicide. Odds ratio was 1,50 with 95% confidence interval of 1,09-2,09. The authors, however, pointed out a significant heterogeneity as an important limitation of the study (17). One of the studies, performed by Yang et al. looked for association between the risk of major depression, suicide and sex of the patients. 47 111 subjects were identified (16 568 males and 30 543 females) using data gathered in National Healthcare Insurance of Taiwan. Major depressive disorder was prevalent in 0,77% of individuals taking part in this study. Despite the fact that this numbers are lower than in previously described studies, they were still higher than in controls (0,56%,  $P < 0,0001$ ). Furthermore, its prevalence in general population of Taiwan is 0,35%. Suicidal thoughts were present in 0,01% and was higher than in controls as well. However in this case, the risk did not reach statistical significance. Research team calculated odds ratios for both depression development and suicide. Men with acne have a 2,12-fold (95% CI 1,73 – 1,96) increased risk of developing major depression than healthy individuals. In women, this risk is 2,78-fold (95% CI 2,43-3,17). Interestingly, while men with acne do not have an increased risk of suicide when compared with men without (OR = 1,01, 95% CI 0,15-8,24), women have a strong relation. Risk of suicide in women with acne is increased by 3,17-fold (95%, CI 1,27-7,94) (18).

Only one study did not find serious impact of acne on patients' mental health. Ogedegbe and Henshaw recruited 160 adolescent students with acne. Mean severity of the

disease measured with GAGS scale was  $11,3 \pm 5,4$  for males and  $11,9 \pm 5,4$  for females. 89,4% of patients had mild form of the disease. The CADI score revealed some impairment in quality of life in 85% of them. 61,2% had mild, 21,5% moderate and 2,5% severe decrease in QoL. The mean overall CADI was  $3,4 \pm 3,0$  and turned out to be higher in man than in women ( $3,8 \pm 3,2$  vs  $3,1 \pm 2,7$ ). However, as already mentioned above, this data was not statistically significant (19).

#### Conclusions:

Many studies have taken up the topic of influence of acne vulgaris in patients' mental health and the vast majority confirmed that such association exists and should be taken into consideration in these subjects. Both anxiety and depression along with an increased risk of suicide may be very dangerous complication and have to be avoided. What is more, these patients are very likely to have their quality of life significantly lowered. Given that acne typically develops in adolescence, a turbulent stage of life linked with building one's identity, creating bonds and social skills, its effect may be even worse and harder to predict in further future than it seems. Therefore results described above shall be remembered in order to improve prevention of such events. Nevertheless more research is still needed to better understand these correlations and help us treat these types of cases better.

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