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FEATURES OF SOMATOTYPE COMPONENTS AND BODY MASS COMPOSITION PARAMETERS IN UKRAINIAN MEN WITH ALOPECIA AREATA

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It was established that in Ukrainian men with alopecia areata overall, as well as in those with grade I, II, and III severity, compared with practically healthy men, the value of the ectomorphic somatotype component (respectively decreased by 43.87 % – 30.57 % – 51.79 % – 59.55 %) and the bone component of body mass calculated according to Matejko's formulas (respectively decreased by 16.24 % – 18.01 % – 14.29 % – 16.02 %) were significantly lower. In contrast, the muscle and fat components of body mass according to Matejko (respectively increased by 14.00 % – 11.07 % – 15.34 % – 18.09 % and by 11.61 % – 6.00 % – 15.43 % – 15.82 %), as well as, except for grade I severity, the muscle component of body mass calculated according to the formulas of the American Institute of Nutrition (respectively increased by 11.55 % – 13.39 % – 17.30 %), were significantly higher or showed a tendency toward higher values. Among Ukrainian men with alopecia areata, most comparisons demonstrated tendencies toward higher values in patients with grade II severity for the endomorphic somatotype component (by 7.37 %) and fat mass according to Matejko (by 10.03 %), as well as in patients with grade III severity for muscle mass according to Matejko (by 7.90 %) and the American Institute of Nutrition (by 10.48 %), and fat mass according to Matejko (by 10.46 %), compared with patients with grade I severity.

Key words: skin diseases, alopecia areata, practically healthy and sick Ukrainian men, somatotype components, component composition of body weight.

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ОСОБЛИВОСТІ КОМПОНЕНТІВ СОМАТОТИПУ ТА ПОКАЗНИКІВ КОМПОНЕНТНОГО СКЛАДУ МАСИ ТІЛА У ХВОРИХ НА ГНІЗДОВУ АЛОПЕЦІЮ УКРАЇНСЬКИХ ЧОЛОВІКІВ

Встановлено, що у хворих на гніздову алопецію українських чоловіків загалом, 1-го, 2-го та 3-го ступеня тяжкості, порівняно з практично здоровими чоловіками, величина екоморфного компоненту соматотипу (відповідно на 43,87 % – 30,57 % – 51,79 % – 59,55 %) та кісткового компоненту маси тіла за визначеного за формулами Матеїко (відповідно на 16,24 % – 18,01 % – 14,29 % – 16,02 %) достовірно менші, а м'язового та жирового компонентів маси тіла за Матеїко (відповідно на 14,00 % – 11,07 % – 15,34 % – 18,09 % та на 11,61 % – 6,00 % – 15,43 % – 15,82 %), а також, за винятком 1-го ступеня тяжкості, м'язового компоненту маси тіла визначеного за формулами Американського інституту харчування (відповідно на 11,55 % – 13,39 % – 17,30 %) – навпаки достовірно більші або мають тенденції до більших значень. Між хворими на гніздову алопецію українськими чоловіками в більшості випадків встановлені тенденції до більших значень у хворих 2-го ступеня тяжкості ендоморфного компоненту соматотипу (на 7,37 %) та жирової маси тіла за Матеїко (на 10,03 %), а також у хворих 3-го ступеня тяжкості м'язової маси тіла за Матеїко (на 7,90 %) й Американського інституту харчування (на 10,48 %) та жирової маси тіла за Матеїко (на 10,46 %) порівняно з хворими 1-го ступеня тяжкості.

Ключові слова: шкірні захворювання, гніздова алопеція, практично здорові та хворі українські чоловіки, компоненти соматотипу, компонентний склад маси тіла.

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Alopecia areata is a condition that leads to a significant deterioration in patients' quality of life. Despite its non-lethal nature and the absence of pronounced impairment in physical well-being, the disease exerts a substantial impact on the psychological sphere of an individual's life. A study by Vélez-Muñoz R.D. et al. [11], based on a survey of 100 patients with alopecia areata, demonstrated a mean DLQI score of 7.5±5.2 points; symptoms of depression were identified in 30% of patients and anxiety in 25 %. The authors reported a correlation between disease duration and the level of psychological distress ($r=0.41$; $p<0.01$).

A review of 60 sources on this topic revealed a wide range of DLQI values, from 5 to 14 points. The

same variability was observed for the prevalence of depression and anxiety disorders ranging from 20 % to 50 % and exceeding 60 %, respectively. Between 30 % and 40 % of patients experienced reduced work productivity (4-8 days per month according to some studies) [6]. Another review, which combined data from 73 studies, reported a prevalence of depression from 9 % to 53 %, anxiety disorders from 12 % to 60 %, and DLQI scores of 4-13 points; notably, 5–13 % of patients reported suicidal ideation [9]. A meta-analysis including data from more than 7,000 patients with alopecia areata demonstrated a pooled prevalence of depression of 25 % (95 % CI approximately 21-29 %) and anxiety of 29 % (95 % CI approximately 24-34 %); this study emphasized a

statistically significant reduction in psychoemotional indicators ($p < 0.001$) among children with this condition [10].

In particular, a study comparing quality of life in children and adults with alopecia areata was conducted by Liu L.Y. et al. [5]. Survey data from 176 adults and 117 children showed mean DLQI scores of 9.2 ± 6.0 points in adults and 6.3 ± 5.4 points in children. A statistically significant association was identified between disease severity and DLQI scores ($p < 0.001$).

Gender differences in the psychoemotional course of alopecia areata were investigated by Davis D.S. and Callender V.D. [3]. A review of more than 20 clinical studies revealed that mean DLQI scores in women ranged from 6 to 13 points. The prevalence of depressive symptoms ranged from 21 % to 38 %, while anxiety disorders were reported in up to 40 % of cases. Compared with men, women demonstrated statistically significantly higher levels of emotional distress ($p < 0.05$). In several studies utilizing the SF-36 questionnaire, mental health scores were reduced by 10-20 points compared with normative values.

Given such a pronounced impact on patients' lives, the search for mechanisms to predict the risk of developing this condition and to identify high-risk groups that could implement preventive measures—either through pharmacological interventions or lifestyle modification is a relevant and necessary area of research.

The purpose of the study was to find out the features of somatotype components and body mass composition parameters in Ukrainian men with alopecia areata.

Materials and methods. 81 Ukrainian young adult men with alopecia areata (25-44 years according to the WHO age classification, 2015), examined on the basis of the Military Medical Clinical Center of the Central Region (Vinnytsya) and the Department of Skin and Venereal Diseases with the Postgraduate Education Course of National Pirogov Memorial Medical University, Vinnytsya, from September 2023 to July 2024, underwent clinical-instrumental examination and anthropological assessment in accordance with the recommendations of Shaparenko P.P. (2000). The Committee on Bioethics of National Pirogov Memorial Medical University, Vinnytsya (Protocol No. 4 dated 18.03.2023) determined that the study did not contradict the fundamental bioethical principles of the Declaration of Helsinki, the Council of Europe Convention on Human Rights and Biomedicine (1977), relevant WHO regulations, or the legislation of Ukraine.

The diagnosis of alopecia areata was established using the ARAMO ASW 300 dermatoscope-trichoscope (Korea). The severity of

alopecia areata was assessed according to Shutskiy I.V. [1]. The distribution of male patients was as follows: grade I severity – 35 individuals; grade II severity – 33 individuals; grade III severity – 12 individuals.

Somatotype components (endomorph – FX; mesomorph – MX; ectomorph – LX) were evaluated according to the Heath–Carter method (Carter J.L., Heath B.H., 1990). Body mass composition parameters (muscle mass – MM; bone mass – OM; fat mass – DM) were determined using the formulas of Matiegka (Matiegka J., 1921), as well as the formula of the American Institute of Nutrition (AIN) for the muscle component of body mass (MA) (Shephard R.J., 2005).

The control group consisted of somatotype components and body mass composition parameters of 82 practically healthy Ukrainian young adult men obtained from the database of the research center of National Pirogov Memorial Medical University, Vinnytsya.

Statistical analysis was performed using the licensed software package “Statistica 6.0.” Mean values and standard deviations were calculated for each studied parameter. The significance of differences between independent quantitative variables was assessed using the nonparametric Mann–Whitney U test.

Results of the study and their discussion. It was established that the value of the endomorphic somatotype component only in Ukrainian men with grade II alopecia areata (3.394 ± 0.519 points) demonstrated a slight tendency toward higher values ($p = 0.087$) compared with practically healthy men (3.230 ± 1.046 points). When comparing this parameter among patients with different severity grades of alopecia areata, only a pronounced tendency ($p = 0.058$) toward higher values was observed in patients with grade II severity compared with those with grade I severity (3.144 ± 0.533 points) (Fig. 1-A).

The value of the mesomorphic somatotype component showed neither statistically significant nor tendency-level differences both between practically healthy men and patients with alopecia areata, and among patients with different severity grades (Fig. 1-B).

The value of the ectomorphic somatotype component in Ukrainian men with alopecia areata, both overall (1.410 ± 1.395 points) and according to severity grade (1.744 ± 1.635 points in grade I; 1.211 ± 1.149 points in grade II; 1.016 ± 1.182 points in grade III), was significantly lower ($p < 0.01-0.001$) than in practically healthy men (2.512 ± 1.253 points). When comparing this parameter among patients with different severity grades, no statistically significant or tendency-level differences were identified (Fig. 1-C).

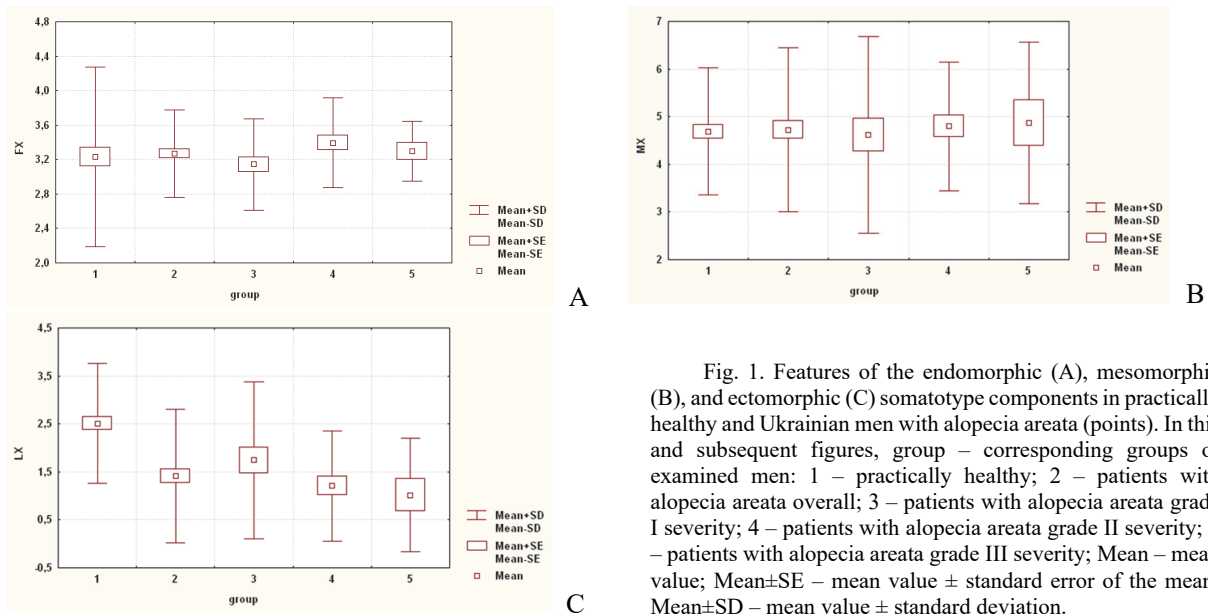


Fig. 1. Features of the endomorphic (A), mesomorphic (B), and ectomorphic (C) somatotype components in practically healthy and Ukrainian men with alopecia areata (points). In this and subsequent figures, group – corresponding groups of examined men: 1 – practically healthy; 2 – patients with alopecia areata overall; 3 – patients with alopecia areata grade I severity; 4 – patients with alopecia areata grade II severity; 5 – patients with alopecia areata grade III severity; Mean – mean value; Mean±SE – mean value ± standard error of the mean; Mean±SD – mean value ± standard deviation.

The value of the muscle component of body mass according to Matiegka in Ukrainian men with alopecia areata, both overall (39.79±7.47 kg) and according to severity grade (38.48±8.55 kg in grade I; 40.42±7.08 kg in grade II; 41.78±4.80 kg in grade III), was significantly higher ($p<0.05-0.001$) than in

practically healthy men (34.22±5.88 kg). When comparing this parameter among patients with different severity grades, only a slight tendency ($p=0.083$) toward higher values was observed in patients with grade III severity compared with those with grade I severity (Fig. 2-A).

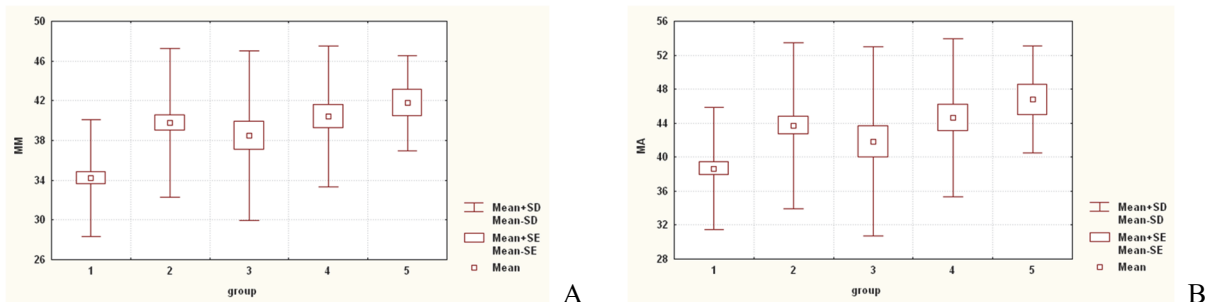


Fig. 2. Features of the muscle component of body mass according to Matiegka (A) and according to the American Institute of Nutrition (B) in practically healthy and Ukrainian men with alopecia areata (kg).

The value of the muscle component of body mass according to the American Institute of Nutrition (AIN) in Ukrainian men with alopecia areata overall (43.72±9.79 kg), as well as in grade II (44.65±9.30 kg) and grade III (46.76±6.30 kg) severity, was significantly higher ($p<0.01-0.001$) than in practically healthy men (38.67±7.20 kg). When comparing this parameter among patients with different severity grades, only a tendency ($p=0.067$) toward higher values was observed in patients with grade III severity compared with those with grade I severity (41.86±11.11 kg) (Fig. 2-B).

The value of the bone component of body mass according to Matiegka in Ukrainian men with alopecia areata, both overall (9.222±1.454 kg) and according to severity grade (9.027±1.645 kg in grade I; 9.437±1.365 kg in grade II; 9.246±1.139 kg in grade III), was significantly lower ($p<0.001$ in all cases) than in practically healthy men (11.01±1.30 kg). When comparing this parameter among patients with different severity grades, no statistically significant or tendency-level differences were found (Fig. 3-A).

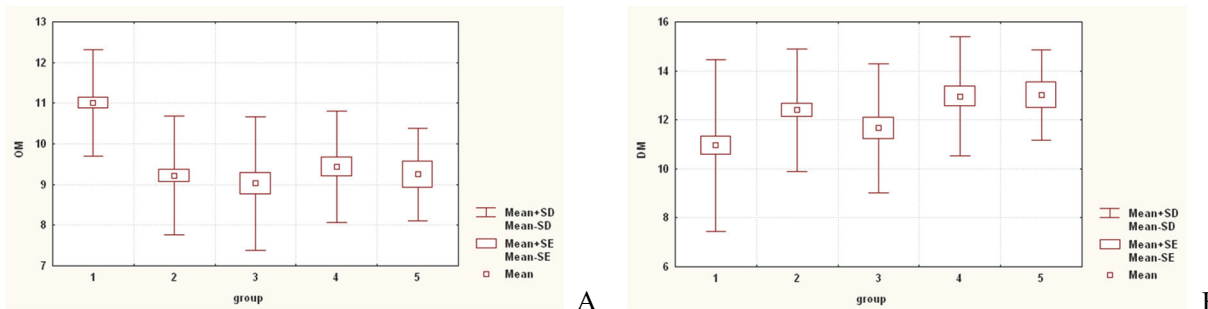


Fig. 3. Features of the bone (A) and fat (B) components of body mass according to Matiegka in practically healthy and Ukrainian men with alopecia areata (kg).

The value of the fat component of body mass according to Matiegka in Ukrainian men with alopecia areata, both overall (12.40 ± 2.49 kg) and according to severity grade (11.66 ± 2.64 kg in grade I; 12.96 ± 2.43 kg in grade II; 13.02 ± 1.85 kg in grade III), was significantly higher ($p < 0.05-0.001$) or showed a tendency toward higher values ($p = 0.074$) compared with practically healthy men (10.96 ± 3.50 kg). When comparing this parameter among patients with different severity grades, significantly higher values ($p < 0.05$) or a pronounced tendency ($p = 0.057$) toward higher values were observed in patients with grade II and grade III severity compared with those with grade I severity (Fig. 3-B).

Thus, among the somatotype components, only the ectomorphic component in Ukrainian men with alopecia areata, both overall and in grades I, II, and III severity, was significantly lower compared with practically healthy men (respectively by 43.87 % – 30.57 % – 51.79 % – 59.55 %). When comparing somatotype components among Ukrainian men with alopecia areata of different severity grades, only a pronounced tendency toward higher values of the endomorphic component (by 7.37 %) was observed in patients with grade II severity compared with those with grade I severity.

Among the body mass composition parameters, muscle and fat mass according to Matiegka in Ukrainian men with alopecia areata, both overall and in grades I, II, and III severity, were significantly higher or showed a tendency toward higher values compared with practically healthy men (respectively by 14.00 % – 11.07 % – 15.34 % – 18.09 % and by 11.61 % – 6.00 % – 15.43 % – 15.82 %), while muscle mass according to the American Institute of Nutrition was significantly higher only in patients overall and in grades II and III severity (respectively by 11.55 % – 13.39 % – 17.30 %); bone mass, conversely, was significantly lower compared with practically healthy men (respectively by 16.24 % – 18.01 % – 14.29 % – 16.02 %). When comparing body mass composition parameters among Ukrainian men with alopecia areata of different severity grades, only tendencies toward higher values of muscle mass according to Matiegka (by 7.90 %) and according to the American Institute of Nutrition (by 10.48 %) were observed in patients with grade III severity compared with those with grade I severity; as well as significantly higher values or a pronounced tendency toward higher fat mass according to Matiegka in patients with grade II (by 10.03 %) and grade III (by 10.46 %) severity compared with those with grade I severity.

There is no doubt that the causes of alopecia areata involve a combination of external and internal factors. In particular, genetic studies have demonstrated that more than 100 genetic loci are associated with the risk of developing this pathology, including HLA regions and genes related

to immune regulation, which explains the frequent association of this disease with others, such as thyroiditis, vitiligo, and atopic conditions (with a prevalence ranging from 16 to 20 %). The pathogenesis of alopecia areata involves the interaction of CD8+ T cells and interferon- γ [8]. All of the above emphasizes the importance of investigating the influence of anthropometric parameters that may be associated with alopecia at the genetic and pathogenetic levels.

A study by Lie C. et al. found that among patients with alopecia areata, the prevalence of metabolic syndrome ranged from 21 to 48 %, which significantly exceeded the values in the control group (9-24 %). In addition, a statistically significant increase in triglyceride levels, fasting glucose, and the HOMA-IR index ($p < 0.05$) was identified [4]. Evidence that metabolic syndrome is common among individuals with alopecia is also presented in other publications. In particular, one study demonstrated a statistically significant difference in body mass index compared with the control group ($p < 0.05$), as well as in vitamin D levels ($p < 0.01$) (higher in the first case and lower in the second). It was also found that BMI correlated with the severity of alopecia ($r = 0.32$; $p < 0.05$) [12].

Androgenetic alopecia is also associated with metabolic syndrome. Data from a meta-analysis of 19 studies showed that the pooled odds ratio for the presence of metabolic syndrome in individuals with this pathology was 2.19 (95 % CI 1.70-2.83). In particular, statistically significant differences were identified for triglyceride levels and waist circumference ($p < 0.05$), which were higher in individuals with alopecia [13]. Similar results were obtained in a study conducted by Chinese researchers. An examination of more than 3,000 individuals showed that metabolic syndrome was more prevalent among patients with alopecia than among healthy individuals (23 % versus 14 %, respectively; $p < 0.01$), yielding an adjusted odds ratio of 1.82 (95 % CI 1.35-2.45). The strongest associations were observed in men under 40 years of age (OR > 2.0) [14].

Not only external anthropometric parameters differ markedly in individuals with alopecia. In the study by Pancar Yuksel E. et al. [7], in addition to statistically significantly higher BMI values ($p < 0.05$) in patients compared with the control group, significantly higher values ($p < 0.01$) of pulse wave velocity, prolongation of the QT interval, and an increase in QTc ($p < 0.05$) were also identified.

The presence of pronounced anthropometric markers of increased risk for skin and skin appendage diseases has been established not only for alopecia. Within the Ukrainian population, a study on this topic was conducted by Aladwan A.M. et al. [2], who investigated the relationship between human body parameters and urticaria. Discriminant analysis of the

obtained indicators allowed the development of models for predicting the occurrence of various forms of this disease in Ukrainian women. The classification accuracy of the models ranged from 72.4 % to 81.3 %. The anthropometric parameters most frequently included in the models were body weight, body mass index, skinfold thickness, and somatotype ($p < 0.05$). The contribution of individual anthropometric parameters to the model varied from 8 % to 19 %.

Thus, the results of our study are fully consistent with the findings of both domestic and international studies.

Conclusions

1. In Ukrainian men with alopecia areata overall and across different severity grades, compared with practically healthy men, lower values of the ectomorphic somatotype component and bone mass according to Matiegka were identified, along with higher values of muscle mass according to Matiegka and the American Institute of Nutrition (with the exception of patients with grade I severity) and fat mass according to Matiegka.

2. Among men with alopecia areata of different severity grades, higher values of muscle mass according to Matiegka and the American Institute of Nutrition, as well as fat mass according to Matiegka, were observed in patients with grade III severity compared with those with grade I severity; additionally, higher values of the endomorphic somatotype component and fat mass according to Matiegka were identified in patients with grade II severity compared with those with grade I severity.

References

- Serbina IM. Patohenetychne obgruntuvannya dyferentsiiovanoho pidkholu v terapii hnizdovoi alopetsii. *Dermatolohiia ta venerolohiia*. 2018;3(81):46-50. [in Ukrainian].
- Aladwan AM, Chaika HV, Belik NV, Smolko DG, Obertynska OG. Modeling using discriminant analysis of the possibility of occurrence and features of the course of various forms of urticaria in ukrainian women depending on the features of anthropo-somatypological indicators. *Reports of Vinnytsia National Medical University*. 2023 Sep 9;27(3):360-5. doi: 10.31393/reports-vnmedical-2023-27(3)-01.
- Davis DS, Callender VD. Review of quality of life studies in women with alopecia. *International journal of women's dermatology*. 2018 Mar 1;4(1):18-22. doi: 10.1016/j.ijwd.2017.11.007.
- Lie C, Liew CF, Oon HH. Alopecia and the metabolic syndrome. *Clinics in dermatology*. 2018 Jan 1;36(1):54-61. doi: 10.1016/j.clindermatol.2017.09.009.
- Liu LY, King BA, Craiglow BG. Alopecia areata is associated with impaired health-related quality of life: a survey of affected adults and children and their families. *Journal of the American Academy of Dermatology*. 2018 Sep 1;79(3):556-8. doi: 10.1016/j.jaad.2018.01.048.
- Muntyanu A, Gabrielli S, Donovan J, Gooderham M, Guenther L, Hanna S, et al. The burden of alopecia areata: a scoping review focusing on quality of life, mental health and work productivity. *Journal of the European Academy of Dermatology and Venereology*. 2023 Aug;37(8):1490-520. doi: 10.1111/jdv.18926.
- Pancar Yuksel E, Sahin G, Sahin MC, Ozdemir Karadavut S, Yuksel S, Aydin F. Evaluation of Anthropometric Measurements, Arterial Stiffness and ECG Parameters in Alopecia Areata Patients. *Medicina*. 2025 Nov 28;61(12):2122. doi: 10.3390/medicina61122122.
- Pratt CH, King LE, Messenger AG, Christiano AM, Sundberg JP. Alopecia areata. *Nature reviews Disease primers*. 2017 Mar 16;3(1):17011. doi: 10.1038/nrdp.2017.11.
- Toussi A, Barton VR, Le ST, Agbai ON, Kiuru M. Psychosocial and psychiatric comorbidities and health-related quality of life in alopecia areata: a systematic review. *Journal of the American Academy of Dermatology*. 2021 Jul 1;85(1):162-75. doi: 10.1016/j.jaad.2020.06.047.
- van Dalen M, Muller KS, Kasperkovitz-Oosterloo JM, Okkerse JM, Pasmans SG. Anxiety, depression, and quality of life in children and adults with alopecia areata: a systematic review and meta-analysis. *Frontiers in Medicine*. 2022 Nov 29;9:1054898. doi: 10.3389/fmed.2022.1054898.
- Vélez-Muñiz RD, Peralta-Pedrero ML, Jurado-Santa Cruz F, Morales-Sánchez MA. Psychological profile and quality of life of patients with alopecia areata. *Skin Appendage Disorders*. 2019 Aug 14;5(5):293-8. doi: 10.1159/000497166.
- Wróblewska-Kończalik K, Pawlaczek M, Kolasieński J, Kolenda M, Miechowicz I, Seraszek-Jaros A, et al. Non-cicatricial alopecia and its association with anthropometric measurements and nutritional laboratory markers. *Life*. 2024 May 9;14(5):609. doi: 10.3390/life14050609.
- Yueqi QI, Xingyu ZH, Siqi FU, Shuaihantian LU, Yaping LI. Systematic review and meta-analysis of the association between metabolic syndrome and androgenetic alopecia. *Acta dermato-venereologica*. 2022 Feb 8;102:1012. doi: 10.2340/actadv.v101.101.
- Zhu H, Guo H, Gao Y, Wei Y, Mao T, Yang J. A community-oriented survey on the association between androgenetic alopecia and metabolic syndrome in Chinese people. *Frontiers in medicine*. 2022 Nov 10;9:1009578. doi: 10.3389/fmed.2022.1009578.

Conflict of interest. The authors have no conflicts of interest to declare.

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