

Acne Vulgaris among Infertile Women: Impact of Lifestyle Modifications.

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Abstract

Background: The Global Acne Grading method (GAGS) is a quantitative grading system used to assess acne severity, based on six regional subscores and the overall score of all acne-infected regions.

Aim: The study aimed to assess the impact of lifestyle modification on acne levels in infertile overweight and obese women with PCOs.

Subjects and Methods: A study was conducted on 116 overweight and obese women at Beni-Suef University Hospital, using a quasi-experimental design. Patients were divided into two groups: that receiving lifestyle modification intervention and those receiving routine care. The study utilized two tools: Tool (1): Arabic Structured interviewing questionnaire contains: (a) basic sociodemographic characteristics. (b) Features of acne level that contains Acne Grading System (GAGS), to determine severity of acne. Tool (2): Lifestyle and habits characteristics that divided into: Part I: Data about nutrition habits: Part II: Block Adult Physical Activity (PA) Screener was the predictor for physical activity.

Results: Prior to the intervention, 43% of the study group had several minor inflammatory lesions. After the intervention, 94.8% of them had clear skin free of any inflammatory or non-inflammatory blemishes. Severe acne was observed in 100% of the studied group women before intervention, compared to 50% after intervention for poor habits. Statistically significant association between acne vulgaris levels and lifestyle dietary habits among the studied group of infertile overweight and obese women was observed after program implementation ($p < 0.05$). Statistically significant association between acne vulgaris levels and physical activity level among the study/control groups of infertile overweight and obese women was observed after program implementation ($p < 0.05$).

Conclusion: Lifestyle modifications significantly improve acne vulgaris levels in infertile overweight and obese women with poly cystic ovarian syndrome.

Recommendations: Nurses as counselors should provide counseling and guidance and have the responsibilities to teach among infertile overweight women lifestyle modification, as it offers a great challenge in today's world.

Keywords: acne vulgaris; modifications; infertile women; PCOs

Introduction

Androgens promote lipolysis, which raises the levels of free fatty acids in the blood, which leads to the development of insulin resistance and the development of abdominal obesity, particularly visceral obesity, which is frequent in women with PCOS. The effects of too much androgen on pertinent tissues; acne, is among other sign of hyperandrogenism (Di

Lorenzo, et al., 2023; Hassan, 2016; Sheha et al., 2018; Mohamed et al., 2024; Hassan et al., 2016; Nady et al., 2014).

Polycystic ovarian syndrome (PCOS) was first discovered in 1935 by Doctors Stein and Leventhal, and for many years it was referred to as the Stein-Leventhal syndrome. PCOS, sometimes known as HA or Stein-

Leventhal syndrome, is a group of symptoms brought on by an imbalance in a woman's hormones (Mohamed & Hassan, 2020; Rana et al., 2023; Hassan et al., 2019b; Hassan & Farag, 2019; Emem & Hassan, 2017).

Polycystic ovarian syndrome poses a significant public health challenge that requires both prevention and treatment because it negatively impacts reproductive, metabolic, and psychological health. 75% of lean women and 95% of overweight women have insulin resistance (Moran et al., 2020).

Adolescent females frequently experience comedonal acne, but moderate or severe cases (defined as 10 or more facial lesions) during early puberty or mild inflammatory acne through the perimenarcheal years are rare (5% frequency) (Carmina, et al., 2022). Although biochemical hyperandrogenism and acne are linked, the prognostic significance of acne alone is uncertain. (DiVall, 2023).

A quantitative grading method called the Global Acne Grading method (GAGS) is used to gauge the severity of acne. The sum of six regional subscores (forehead, right cheek, left cheek, nose, chin, chest, and upper back) yields the overall severity score. The factor is multiplied by the grade for each region to create each subscore, and the sum of all regions with acne produces the overall score (Basfar, et al., 2023).

Treatment options for PCOS underlined are pharmacological, surgical intervention, and non-pharmacological interventions (Lifestyle interventions).

I. Pharmacological treatment

a) Anti-androgen: The most popular antiandrogens include flutamide, finasteride, spironolactone, and cyproterone acetate. As a result, all of the suggested medications have an antiandrogenic impact, although it's common practice to ignore any potential adverse effects of the various treatments (Armanini et al., 2022).

b) Treatment for acne: Oral contraceptives and antiandrogen medications can be used alone or in conjunction with traditional topical acne treatments, including retinoids, antibiotics, and benzoyl peroxide, to treat acne. In 50%–90% of affected patients, the counts of inflammatory acne decline by 30%–60%. Patients who have deep-seated acne or have relapsed on isotretinoin benefit the most from OCPs (Davariya, et al., 2022).

II. Non-pharmacological interventions (Lifestyle interventions):

The most recent global guidelines on PCOS from 2018 suggest that the first line of treatment for PCOS symptoms be lifestyle control by dietary changes, physical activity, behavioral modification, or a combination of these. All of the symptoms of PCOS can be alleviated by losing weight (Hoeger et al., 2023; Hassan et al., 2015; Nady et al., 2017; Hassan, 2019a; Gamel et al., 2019; Hassan et al., 2015). Although the majority of doctors advocate lifestyle changes for the management of PCOS, the majority of PCOS patients said that they infrequently receive recommendations for lifestyle changes from their therapists (Nemchikova & Frontoni, 2022; Mohammed et al., 2018, Hassan, 2020a; Nady et al., 2018b; Hassan, 2020b; Nady et al., 2018a; Mostafa et al., 2018).

Aim of the Study:

The study aimed to assess the impact of lifestyle modification on acne levels in infertile overweight and obese women with PCOs.

Acne Vulgaris, Modifications, Infertile Women, PCOs

Infertile overweight and obese women who will receive lifestyle modification interventions will experience an improvement and decrease acne level.

Subject and Methods:

Subject and Study setting

A quasi-experimental design (Study-Control) was utilized. The study was conducted at gynecological and infertility clinics and specialized medical centers affiliated with Beni-Suef University Hospital. A purposive sample of diagnostic PCOs infertile overweight and obese women was selected, meeting specific criteria. The sample size was estimated to be 116 women, divided into two groups: the experimental group receiving lifestyle modification intervention and the control group receiving routine care. Patients were interviewed twice before and after interventions.

Tools of data collection: two main tools were utilized in collecting data:

Tool (1): Arabic Structured interviewing questionnaire divided into two parts:

Part I. Telephone number, age, address, marital status, employment, length in centimeters, weight in kilos, waist circumference, and thigh circumference are examples of basic information and sociodemographic data.

Part II. Features of Acne vulgaris:

By applying the Global Acne Grading System (GAGS), the severity of acne was evaluated. Six regional sub-scores are added together to create the overall score. The factor was multiplied by the grade for each sub-region to determine its score, and the sum of all the sub-regions with acne was used to determine the overall score (Shahbag, 2017).

The Global Acne Grading System (GAGS), which evaluates the six primarily masculine body areas for acne, was used to determine the degree of acne in the participants. Each area was visually scored from zero (no pills) to four (inflammatory and non-inflammatory acne), with more than one nodular acne. Mild level indicates clear skin with no inflammatory or non-inflammatory lesions. Moderate level indicates almost clear; rare noninflammatory lesions with more than one small inflammatory lesion. Severe/Mild severity level indicates some non-inflammatory lesions with no more than a few inflammatory lesions (papules/pustules only)

Scoring system:

The total score was adopted from Shahbag (2017) and assessed by summation of sub-scores in the six areas:

- A total score of 25% indicates no acne (0-6)
- A total score of >25%-50% indicates mild acne (>6-12)
- A total score >50%-75% indicates moderate acne (>12-18)
- A total score >75%-100% indicates severe acne (>18-24)

Ethical Considerations: The study received official approval from ethical and research counsels at Menoufia University, and informed oral consent from all women after explaining the study's nature and purpose.

Pilot study: The pilot study was carried out on 10% of the total study sample (10 women) to evaluate the applicability, efficiency, clarity of tools, and assessment of the feasibility of fieldwork, besides detecting any possible obstacles that might face the researcher and interfere with data collection.

Field Work:

Phase I (preparatory phase): The researcher conducted a literature review, developed data collection tools, and tested their validity through a jury of experts to ensure content, knowledge, accuracy, and relevance of the tools.

Phase (II): Interviewing and data gathering phase: Researchers conducted a pre-test phase for hyper-androgenic infertile overweight and obese women, assessing socio-demographic characteristics, lifestyle habits, and baseline measures related to hyper-androgenism. Oral consent was obtained, and full anthropometric measurements were performed.

Phase III (Planning phase): The researcher surveyed women at gynecological and infertility outpatient clinics and specialized medical centers for treatment of infertility and delayed childbearing, based on assessment data and literature review.

Phase IV (the intervention phase) (program implementation for the study group only): The study implemented a lifestyle modification intervention for women aiming for 5-10% weight loss or a BMI < 29 kg/m² within six months. Participants were provided with three educational sessions, covering hyper-androgenism definition, symptoms, complications, weight reduction, energy-restricted diet, eating behaviors, and physical activity.

Phase V: Evaluation phase (Follow-up Schedule and Outcomes Evaluation): The study involved monthly interviews with women, regular follow-up appointments, and tracking diet and exercise. After six months, the program was evaluated for anthropometry, menstrual cycle, hirsutism, and acne grade. Posttests were conducted for both control and study groups, with the control group receiving routine care.

Statistical Analysis:

Data was entered and analyzed using SPSS (version 25). Graphics were done using the excel program as well as the SPSS package. Qualitative data were presented in the form of frequency distribution tables, numbers, and percentages. It was analyzed by the chi-square (χ^2) test. The level of significance was set at a P value of <0.05 for all significant tests.

Results

Table 1 shows the total acne vulgaris levels among the studied hyper-androgenic infertile overweight and obese women. It reveals that 25% and 13% of the study had moderate and severe acne before the intervention, compared to 14% and 4% after the intervention, respectively. Furthermore, after the intervention, 84% of the studied women had mild acne.

Figure 1 presents appearance of face acne resistant to treatment among the studied infertile overweight and obese women with polycystic ovary syndrome. It revealed that, prior to the intervention, 43% of the study group had several minor inflammatory lesions on the left and right cheeks in addition to nearly obvious, uncommon noninflammatory lesions. After the intervention, 94.8% of them had clear skin free of any inflammatory or non-inflammatory blemishes. Furthermore, before to the intervention, 75.9% of study participants had clear skin on their noses without any inflammatory or non-inflammatory lesions, but 93.1% of them did so after the intervention. Moreover, prior to the intervention, 20.5% of the participants in the study had multiple minor inflammatory lesions on the chin along with nearly obvious, uncommon noninflammatory lesions. There were no statistically significant changes between the control groups before and after the intervention, with 65.5% of them reporting clear skin with no inflammatory or non-inflammatory lesions.

Table 2 presented relationship between acne vulgaris levels and dietary habits among the study group of infertile overweight and obese women.

Severe acne was observed in 100% of the studied group women before intervention, compared to 50% after intervention for poor habits. Statistically significant association between acne vulgaris levels and lifestyle dietary habits among the studied group of infertile overweight and obese women was observed after program implementation ($p < 0.05$).

Table 3 presented relationship between acne vulgaris levels and physical activity level among the study group of infertile overweight and obese women. Severe acne was observed in 25% of the studied group women before intervention, compared to 50% after intervention for moderate activity women. Statistically significant association between acne vulgaris levels and physical activity level among the study/control groups of infertile overweight and obese women was observed after program implementation ($p < 0.05$).

Table 1: Total Acne Vulgaris Levels among the Studied Infertile Overweight and Obese Women with Polycystic Ovary Syndrome (n = 116).

Variables	Before the intervention				χ^2 P-value	After the intervention				χ^2 P-value
	Study n=58		Control n=58			Study n=58		Control n=58		
	No.	%	No.	%		No.	%	No.	%	
Total Acne vulgaris Levels										
- Mild acne	35	60.4%	38	66%	0.000ns > 0.05	49	84%	38	66%	3.752ns > 0.05
- Moderate acne	15	25.8%	16	26%		7	12.5%	16	26%	
- Severe acne	8	13.8%	4	8%		2	3.5%	4	8%	

NB: ns non- statistically significant ($p \geq 0.05$) *statistically significant ($p \leq 0.05$)

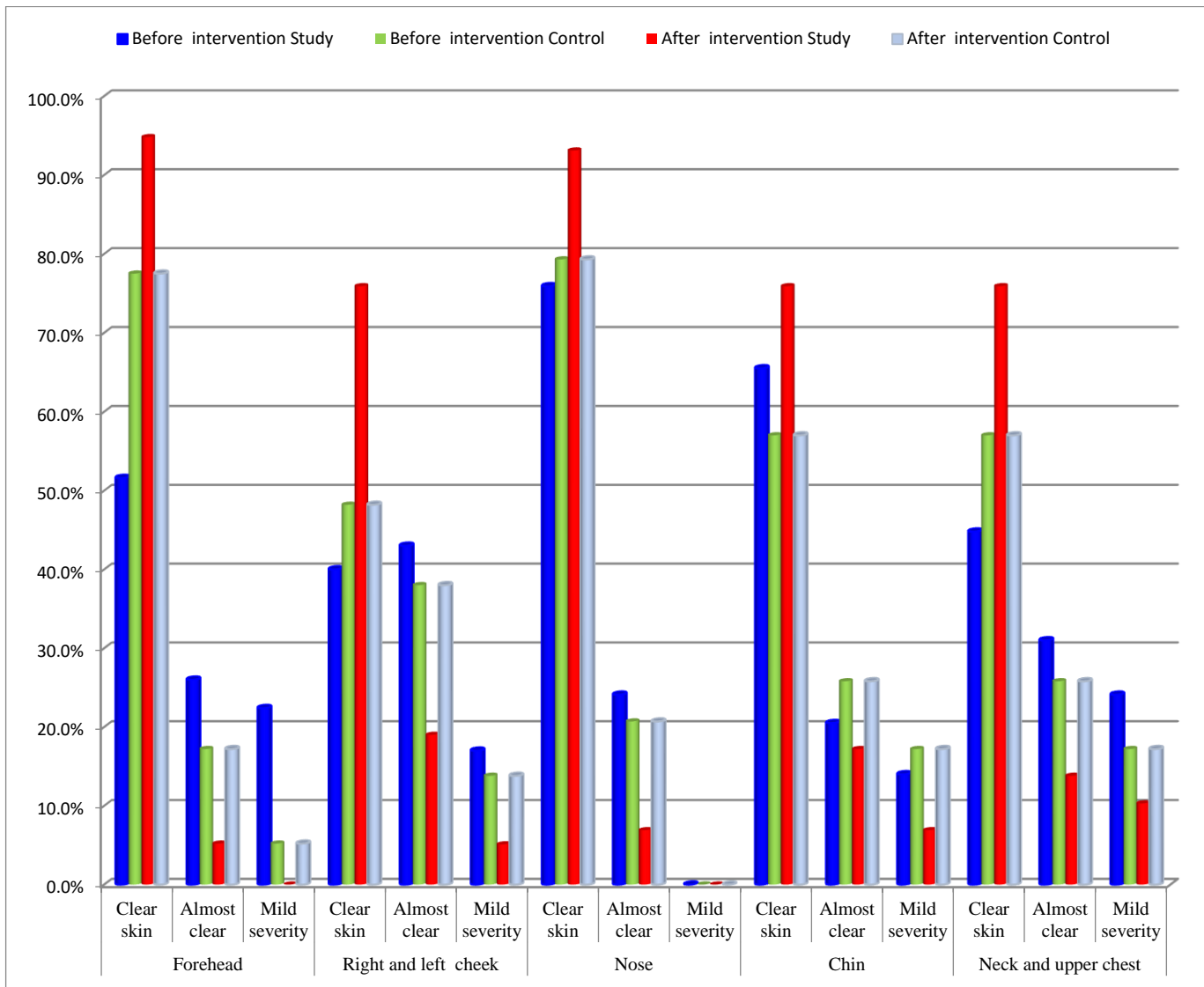


Figure 1: Face Acne Resistant to Treatment among the Studied Infertile Overweight and Obese Women with Polycystic Ovary Syndrome.

Table 2. Relationship between acne vulgaris levels and dietary habits among the Study group of Infertile Overweight and Obese Women with Polycystic Ovary Syndrome (n=58)

Variable	Dietary Habits Before the intervention					Dietary Habits After the intervention				
	Poor habits N=42		Good habits N=16		χ^2 P-value	Poor habits N=17		Good habits N=41		χ^2 P-value
	No	%	No	%		No	%	No	%	
Mild	24	68.6	11	31.4	32.82ns >0.05	11	22.4	38	77.6	65.55** <0.001
Moderate	10	66.6	5	33.4	15 5.41ns >0.05	5	71.4	2	28.6	64.02** <0.001
Severe	8	100	0	0	0.59 ns>0.05	1	50	1	50	69.48** <0.001

NB: ns non- statistically significant (p≥0.05)

**highly statistically significant (p≤0.001)

Table 3. Relationship between acne vulgaris levels and physical activity levels among the Study group of Infertile Overweight and Obese Women with Polycystic Ovary Syndrome (n=58).

Variable	Physical Activity Before the intervention						Physical Activity After the intervention							
	Mild N=47		Moderate N=11		Severe N=0		χ^2 P- value	Mild N=15		Moderate N=36		Severe N=7		χ^2 P- value
	No	%	No	%	No	%		No	%	No	%	No	%	
Mild	29	82.9	6	17.1	0	0	32.82 ^{ns} >0.05	10	20.4	33	67.3	6	12.3	65.55 ^{**} <0.001
Moderate	12	80	3	20	0	0	15 5.41 ^{ns} >0.05	4	57.1	2	28.8	1	14.1	64.02 ^{**} <0.001
Severe	6	75	2	25	0	0	0.59 ^{ns} >0.05	1	50	1	50	0	0	69.48 ^{**} <0.001

NB: ns non- statistically significant ($p \geq 0.05$)**highly statistically significant ($p \leq 0.001$)

Discussion

The current study findings revealed that there was an improvement in acne vulgaris levels after the intervention for the study group. About one-quarter of the study and control groups had moderate acne before the intervention, compared to most of them having mild acne after the intervention. Meanwhile, there were no statistically significant differences between study and control groups, neither before nor after the intervention.

This was in concordance with Niranjani et al. (2022), who studied "Effectiveness of cinnamon, exercise, and counseling on hyperandrogenic symptoms and level of anxiety among young girls with Polycystic Ovarian Syndrome." They revealed that in the global acne grading scale (acne), during pre-test through post-test 2, the non-interventional group showed no improvement in score, whereas group A and group B showed a 2 score decrease. This may be explained by the fact that the majority of girls had a wish to have a good body image and conceive in the future and, therefore, had a greater incentive to adhere to the change in their lifestyle.

On the contrary, these findings were incongruous with those of Smith et al. (2007), a crossover single-blind study that found no effect of chocolate on acne when compared with a placebo bar. However, a later examination of the ingredients in the placebo bar indicated that the fatty acid composition and sugar contents were virtually identical to those found in the chocolate. These differences might be related to the difference in populations' characteristics in their study on overweight and obese women with PCOS.

The current study findings revealed that there is an improvement in lifestyle and daily habit levels among the studied hyper-androgenic infertile overweight and obese women. It reveals that most of the study and control groups had poor habits before the intervention, which improved to most of the study, and less than one-third of the control group had good habits after the intervention, respectively.

Furthermore, these findings were supported by George (2021), who concluded that most of the studied participants suffered from poor lifestyle dietary habits. This may contribute to the increased body weight increases long-term health risks and should be tackled with lifestyle interventions early in life.

Regarding total physical activity levels among the studied hyper-androgenic infertile overweight and obese women. The current study findings revealed that there is an improvement in total physical activity. Most of the study and control groups had mild physical activity (sedentary lifestyle) before the intervention, compared to two-thirds of the study group after the intervention having moderate physical activity. There is a statistically significant difference between the study and control groups after the intervention.

The study found that women's lifestyles modifications significantly improve acne vulgaris levels in infertile overweight and obese women with polycystic ovarian syndrome following program sessions. Statistical analysis confirmed these changes. The success is attributed to educational lectures, and various teaching methods, including the use of Arabic booklets (Masters, 2013; Gamel et al., 2020; Hassan et al., 2025; Abd-Elfattah et al., 2026; Mohamed et al., 2026; Abd-ELghafar et al., 2026). These booklets, which should be concise, straightforward, and visually appealing, supported other educational efforts, aligning with Edgar Dale's Pyramid of Learning, which suggests varied retention rates based on learning methods (Abd-Elfattah et al., 2025; Mohamed et al., 2025; Hassan, 2019; Zaki et al., 2025; Said et al., 2026; Hassan et al., 2026; Gooda et al., 2026)

The current study findings revealed that there is a statistically significant association between hyper-androgenic features (Hirsutism, acne, and alopecia) improvement and lifestyle habits in the study group of hyper-androgenic infertile overweight and obese women. But was not similar to the meta-analysis of 14 studies involving 617 adult women achieved by Benham et al. (20180), who studied "Role of exercise training in polycystic ovary syndrome" and found out the impact of exercise interventions on reproductive function remained unclear. This disagreement could be due to differences in the type and duration of interventions and populations studied.

Conclusion

Lifestyle modifications significantly improve acne vulgaris levels in infertile overweight and obese women with polycystic ovarian syndrome.

Recommendations

Based on the results of the study, the following recommendations can be derived:

1. Women's infertility-related PCOs, our findings reinforce the need for collaboration gynecologists, nutritionists, and endocrinal specialists to look for curial roles in women undergoing infertility treatment.
2. Nurses as counselors should provide counseling and guidance and have the responsibilities to teach among infertile overweight women lifestyle modification, as it offers a great challenge in today's world.

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