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Review Article

Hyper-Androgenic Symptoms and Infertility in Northern Upper Egypt: Impact of Lifestyle Modification

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Abstract

Background: Obese women with hyperandrogenism require dietary changes and regular exercise as first-line treatments.

Aim: Study the impact of a lifestyle adjustment program on overweight and obese hyperandrogenic infertile women.

Subjects and Methods: A purposive sample of 116 hyper-androgenic infertile overweight women at gynecological/infertility clinics/specialized medical centers at Beni-Suef university hospital used a quasi-experimental research design. Tools: (1): Arabic A structured interview questionnaire contains: (a) basic sociodemographic characteristics. (b) modified Ferriman-Gallwey, Global Acne Grading System, and Ludwig Scale. (2): Lifestyle habits, and Block Adult Physical Activity Screener.

Results: After intervention, significant associations were observed between alopecia, hirsutism, and vulgaris levels and physical activity/lifestyle dietary habits among infertile overweight and obese women ($p<0.05$). All women (100%) reported negative pregnancy tests before-intervention, while 36.2% got positive tests post-intervention. A statistically significant relationship was observed between the study and control group after lifestyle modification program implementation ($p<0.05$).

Conclusion: Lifestyle modification significantly improves androgenic alopecia, acne vulgaris, and hirsutism levels in infertile overweight and obese women, thereby enhancing their fecundity-related decline and hyper-androgenism.

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.

Kew Words: lifestyle; modification; infertile women; hyper-androgenic symptoms

Introduction

Hyper-androgenism, often exacerbated by obesity, is the primary cause of poly cystic ovary syndrome (PCOS), characterized by excessive androgen synthesis and overexpressed luteinizing hormone receptors (Zeng et al., 2020). Hyperandrogenemia, a clinical sign of PCOS, occurs when estrogen's negative feedback to the brain decreases, leading to increased frequency of the LH puls (Morshed et al., 2021). Approximately 60% and 100% of PCOS patients have hyperandrogenism, which manifests both clinically (as in the case of hirsutism, alopecia, and acne) and biochemically (Ashraf et al., 2019). Biochemical hyperandrogenism, defined as testosterone, androstenedione, and/or DHEA-S levels above the top 95th percentile in 98 healthy, non-hirsute eumenorrheic women, is challenging to assess due to lack of consensus on detection methods (Kanbour et al., 2022).

Clinical signs of high levels of androgen in females are hirsutism, acne, and female pattern hair loss (formerly known as androgenic alopecia). Hirsutism, or excessive terminal hair growth with a masculine pattern distribution, affects 60%–70% of PCOS patients (Kamenov & Gateva, 2020). Adolescent females often experience comedonal acne, but moderate or severe cases during early puberty or mild inflammatory acne during 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). Female androgenetic alopecia (FAGA) is a common non-scarring alopecia in women, causing generalized hair loss in the center scalp, with the frontal hairline typically preserved (Kamenov & Gateva, 2020). Lifestyle modification is the first-line treatment for hyper-androgenic symptoms, which have been found to restore ovulation and increase pregnancy rates in overweight or obese anovulatory patients (Gu et al., 2022; Sheha et al., 2018; Mohamed et al., 2024; Hassan et al., 2019; Hassan & Farag, 2019; Hassan et al., 2025). Nurses can positively impact women with hyper-androgenic symptoms through counseling, education, and support. They can help patients with low self-esteem, educate them about

risk factors, encourage healthier habits, and suggest support groups (Wright et al., 2020; Hassan et al., 2015; Mostafa et al., 2018; Nady Fet al., 2018; Mohammed et al., 2018).

Significance Of the Study

Hyperandrogenism's stigmatizing clinical features like hirsutism, acne, alopica, and infertility may contribute to anxiety and emotional discomfort (Wang & Li, 2021, Hassan & Farag, 2019). In Upper Egypt, infertility is a significant social burden for women, leading to childlessness and social stigma, causing feelings of incompleteness, blame, pressure, and threats to marriage (Hassan, 2016; Gamel et al., 2019; Hassan et al., 1015). Researchers suggest diet, exercise, and weight loss as the first line of treatment for PCOS girls, prior to pharmacological treatment (Afefy et al., 2019). Medical professionals can help PCOS-affected girls adjust their lifestyles, as even a 5% weight loss can improve hyperinsulinemia, decrease testosterone levels, and restore menstrual periods (Mani et al., 2018). Obese women with hyperandrogenism benefit from dietary changes and exercise, as even small lifestyle changes can significantly improve insulin sensitivity and reestablish ovulation (Yesiladali et al., 2022). So, this study will be conducted to evaluate the effect of lifestyle modification on hyper-androgenic symptoms among infertile obese and overweight women, and therefore, enhance fertility and alleviate infertility.

Operational definitions:

Lifestyle Modification Interventions

Lifestyle modification interventions are behavioral strategies aimed at altering various lifestyle health behaviors.

Hyper-Androgenism

In this study discusses a condition where the ovaries produce abnormal amounts of androgens, typically present in women in small amounts.

Aim of the study:

This study aims to evaluate the impact of lifestyle modification on hyper-androgenic symptoms in infertile obese and overweight women, aiming to improve fertility and alleviate infertility.

Study hypotheses:

Hyper-Androgenic infertile overweight and obese women who will receive lifestyle modification interventions will experience an improvement and decrease hyper-androgenic symptoms, that in turn will that improve their fertility than those who don't attend.

Subject and methods:

Research design:

A quasi-experimental design (Study-Control) was utilized to fulfill the purpose of this study.

Study setting

The study was conducted at gynecological and infertility outpatient and inpatient clinics and specialized medical center for the treatment of infertility and delayed childbearing affiliated with Beni-Suef University Hospital.

Sample

Sample type and size:

A purposive sample of hyper-androgenic infertile overweight and obese women will be selected, meeting specific criteria for hyper-androgenism, reproductive age (18-40 years), and body mass index >25kg/m2.

Sample size calculation

The equation for calculating sample is size adopted from Kadam & Bhalerao (2010) at power of 80%, confidence level of 95% and margin of error of 5%. The sample size was estimated to be 115 women (Study-control). Using the following equation:

$$\mathbf{n}' = \frac{\boldsymbol{n}}{\mathbf{1} + \frac{\boldsymbol{z}^2 \times \hat{\mathbf{p}}(\mathbf{1} - \hat{\mathbf{p}})}{\boldsymbol{\varepsilon}^2 \ \mathbf{N}}}$$

The variables in this formula are: n & n' are sample size, z is the z score which is 1.96, ε is the margin of error which is 0.05, N is the population size which is 163, p̂ is the population, proportion which is 50 % or 0.5

Sampling procedure:

The study aims to compare lifestyle modification for women with hyper-androgenism, with 116 women divided into two groups: the experimental group, receiving lifestyle modification, and the control group, taking routine care. Patients will be interviewed twice before and after interventions.

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

Tool (1): Arabic Structured interviewing questionnaire adapted from Mostafa et al., (2012) divided into two parts**:**

Part I. The data includes basic demographic information such as telephone number, age, residence, marital status, employment, length in centimeters, and weight in kilograms, waist circumference, and thigh circumference.

Part II. Features of hyper-androgenism included questions about hirsutism, acne, and androgen-related alopecia.

1. Hirsutism: Terminal hair, pigmented and medullated, was assessed in nine male body areas, including the upper lip, chin, neck, chest, abdomen, thighs, upper back, lower back, and upper arms (Kahraman & Erdoğan, 2021). The modified Ferriman-Gallwey (mFG) was utilized to assess the degree of hirsutism in participants, visually scoring each area from one (little invisible hair growth) to four (very thick hair) (Kahraman & Erdoğan, 2021).
2. **Scoring system:** The total score, based on Kahraman & Erdoğan's (2021) method, ≤33.3% indicates mild hirsutism (0-12), >33.3%-66.6% moderate hirsutism (>12-24), and>66.6%-100% severe hirsutism (>24-36).
3. **Acne vulgaris:** The Global Acne Grading System (GAGS) was used to assess acne severity in participants, focusing on six primarily masculine body areas. Each area was visually scored from zero (no pills) to four (inflammatory and non-inflammatory acne) with more than one nodular acne, to determine the overall score.
4. **Scoring system:** Shahbag's (2017) total score categorizes acne into levels: no acne 25% (0-6), mild acne >25%-50% (>6-12), moderate acne >50%-75% (>12-18), and severe acne >75%-100% (>18-24).
5. **Androgenic alopecia:** Androgenic alopecia is a condition causing diffuse hair thinning over the scalp (Carmina et al., 2019). It was evaluated in all patients, scoring head hair from

one (minor thinning not noticeable) to two (hair loss with visible scalp) to three (severe hair loss with baldness) (Kahraman & Erdoğan, 2021).

Scoring system: The Ludwig scale assesses androgenic alopecia severity, ranging from Stage I, which begins with head thinning, to Stage II, where the scalp shows, and Stage III, where hair loss occurs.

Tool (2): Lifestyle and habits characteristics that divided into:

Part I: The study collected data on women's nutrition habits, including food and soft drinks, using a five-point scale and assessing their total score using sub-scores (0=daily, 1=4-5 per week, 2= 2-3 times a week, 3=once, and 4=rarely). Poor habits are those with scores below 60% of total scores, ranging from 0-21.5, and good habits are those with scores are 21.6-36.

Part II: The Block Adult Physical Activity Screener is a tool used to predict physical activity levels in adults. It assesses job-related, daily life, and leisure activities, using data from a large US sample. The tool measures responses on nine items, with sub-scores ranging from mild to vigorous. (Sternfeld et al., 2009). The total score was assessed by summation of sub-scores different levels of physical activity, ranging from moderate to vigorous, based on the total score; Mild physical activity (sedentary life) if score is < 25% of total score that mean (9-15), Moderate physical activity if score is 25%-50% of the total score, that means (16-30), Vigorous physical activity if score is 50%-75% of the total score, that means (30-45).

Validity of Tools:

Five qualified experts reviewed and modified an instrument for content accuracy, internal validity, completeness, and clarity, incorporating suggestions and incorporating suggestions into the instrument for overall validity.

Reliability of Tools:

The instrument's reliability was computed by the researcher to test its internal consistency. The researcher used test-retest reliability. It was accomplished by giving the same instrument to the same subjects in comparable circumstances two or more times. Scores from repeated testing were compared to the consistency of the results over time. All dimensions of the instrument were internally reliable, with Cronbach's α scores ranging from 0.70 to 0.97 for tool (I) and 0.80 to 0.95 for tool (II).

The researcher tested the instrument's internal consistency using test-retest reliability, administering it to participants under similar conditions on multiple occasions. Results showed internal reliability, with Cronbach's α scores ranging from 0.70 to 0.97 for tool (I) and 0.80 to 0.95 for tool (II).

Administrative approvals:

An official letter was taken from the Dean of the Faculty of Nursing, Menoufia University contain the title and objectives of the study and was submitted to the director of Beni-Suef university hospital to obtain the official agreement to conduct the study. An official permission was obtained to carry out the study from the directors of the above-mentioned settings.

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:

A pilot study was conducted on 10% of the study sample (10 women) to assess applicability, efficiency, tool clarity, and feasibility of fieldwork, identifying potential obstacles.

Field Work:

The study, which spanned six months, began in October 2023 and concluded in March 2024, involving preparatory, interviewing, data gathering, planning, implementation, follow-up, and evaluation phases.

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 (1I): 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 below 29 kg/m^2 within six months. The study participants were provided with a lifestyle change program through three educational sessions with duration of approximately 60 minutes for each session. Hyper-androgenism definition, symptoms, and complications, in addition to the importance of weight reduction, were discussed during the 1st session, while the 2nd and 3rd sessions were concerned with instructing the women about energy-restricted diet, eating behaviors, and physical activity.

Supportive material (Arabic Booklet): The researcher created a handout booklet in Arabic, detailing the definition, symptoms, risk factors, diagnosis, medical treatment, and lifestyle modification for polycystic ovary syndrome, including exercise and diet.

Phase V: Evaluation phase (Follow-up Schedule and Outcomes Evaluation)

Arabic card was constructed by the researcher to assess the outcome measures. Follow-up card examination documented assessment signs of hyperandrogenism (Hirsutism, Acne, and Androgenic alopecia). The study followed up with monthly interviews, SMS or phone calls, regular appointments, and weekly logs to track diet and exercise patterns. After 6 months, researchers evaluated anthropometry, menstrual cycle, hirsutism, and acne grade. The evaluation (posttest) was carried out two weeks to one month after the completion of the program for both the control and study groups. The control group received only routine care during the intervention period, and they were given the educational booklet after the posttest for ethical aspects.

Statistical Analysis: -

The data was analyzed using SPSS (version 25), Excel, and chi-square ($\chi 2$) test, and presented in frequency distribution tables, numbers, and percentages. The significance level was set at a P value of <0.05.

Results

Figure 1 shows the total hirsutism levels among the studied women. It reveals that 45% of the study group had moderate hirsutism, before the intervention, compared to 23% after the intervention and 66% of the studied women had no visible terminal hair. However, no changes occur with the control group.

Figure (2) describes the total acne vulgaris levels; 13% of the study had severe acne before intervention, compared to 4% after the intervention and 84% of the studied women had mild acne. However, no changes occur with the control group.

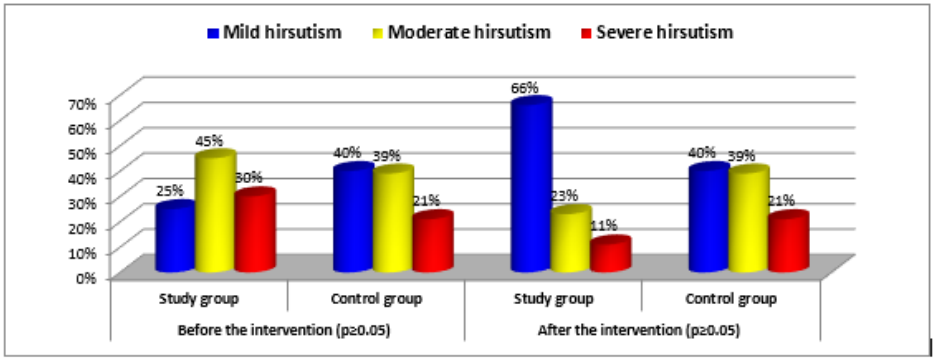
Figure (3) portrays the total alopecia levels and reveals that 43.1% of the studied group was stage II, before intervention, compared to 27.7% after intervention and 69% of the studied women had stage I. However, minimal changes occur with the control group.

Figure 4 presents the total lifestyle and daily habits levels. It reveals that 27.5% of the studied group had good habits before the intervention, compared to 70.7% after the intervention. However, no changes occur with the control group.

Figure 5 shows the total physical activity levels; 18% of the studied group had moderate physical activity before intervention, compared to 62% after intervention. However, no changes occur with the control group.

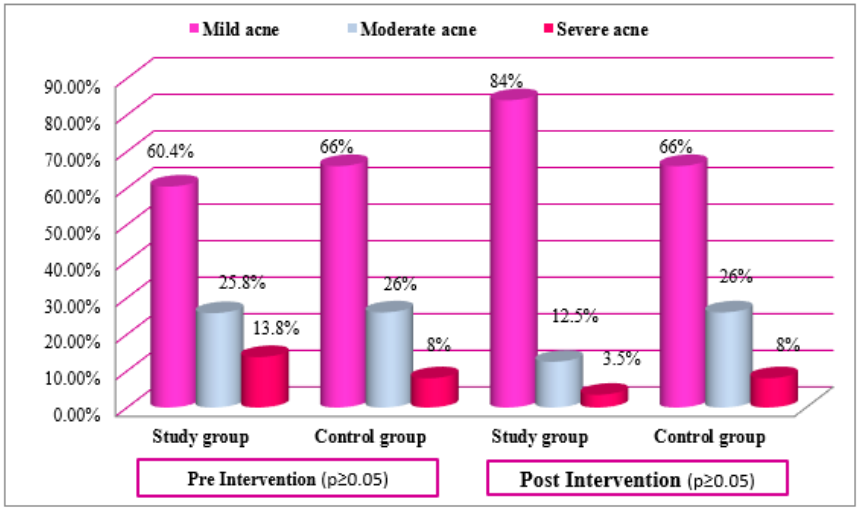
Table 1 showed that there was a significant association between hyper-androgenic features, physical activity levels, and lifestyle dietary habits among the study group of infertile overweight and obese women ($p<0.05$). About 14.3% and 23.1% of good nutrition habits and moderate activity, respectively, of the studied group of women have had stage III androgenic alopecia levels before intervention compared to 0% after intervention. Severe acne was observed in 100% and 25%, respectively, of the studied group women before intervention, compared to 50% and 50%, respectively, after intervention for poor habits and moderate activity women. mild hirsutism was observed in 64.3% and 11.5%, respectively, of the studied group of women before intervention, compared to 92.3% and 23.1% after intervention for good habits and moderate activity women

Figure 6 shows pregnancy rate levels (pregnancy test rate; HCG) before/during/after the intervention. It reveals that 100% of the studied women had negative pregnancy tests before intervention, compared to 63.8% after intervention. However, 36.2% of the studied women had positive pregnancy tests after intervention. Statistically significant relationship was observed between study and control group after life style modification program implementation ($p<0.05$).



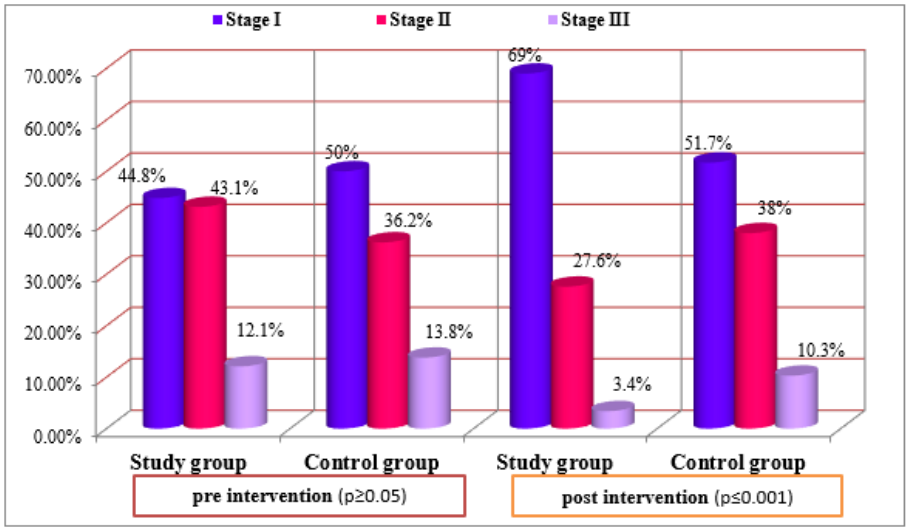
NB: ns non- statistically significant ($p\geq0.05$)

Figure 1: Total Hirsutism Levels among the Studied Hyper-Androgenic Infertile Overweight and Obese Women



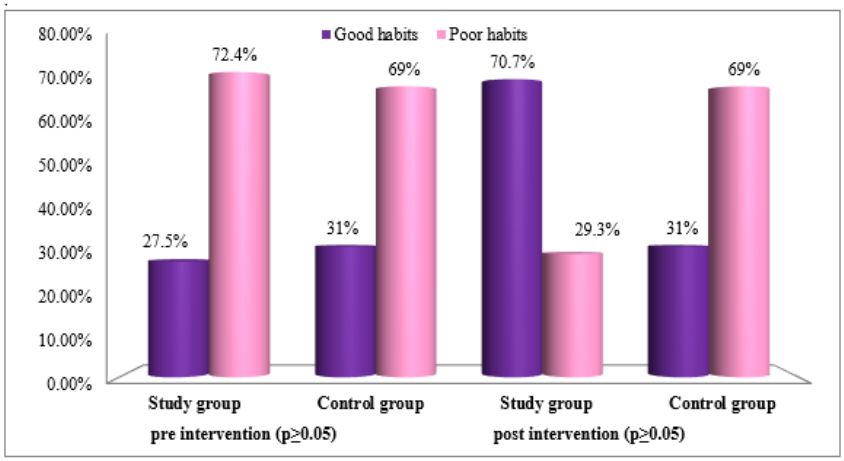
NB: ns non- statistically significant ($p\geq0.05$) * statistically significant ($p\leq0.05$)

Figure 2: Total Acne Vulgaris Levels among the Studied Hyper-Androgenic Infertile Overweight and Obese Women



NB: ns non- statistically significant (p≥0.05) **highly statistically significant (p≤0.001)

Figure 3: Total Alopecia Levels among the Studied Hyper-Androgenic Infertile Overweight and Obese Women



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

Figure 4: Total lifestyle and daily habits Levels among the Studied Hyper-Androgenic Infertile Overweight and Obese Women

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

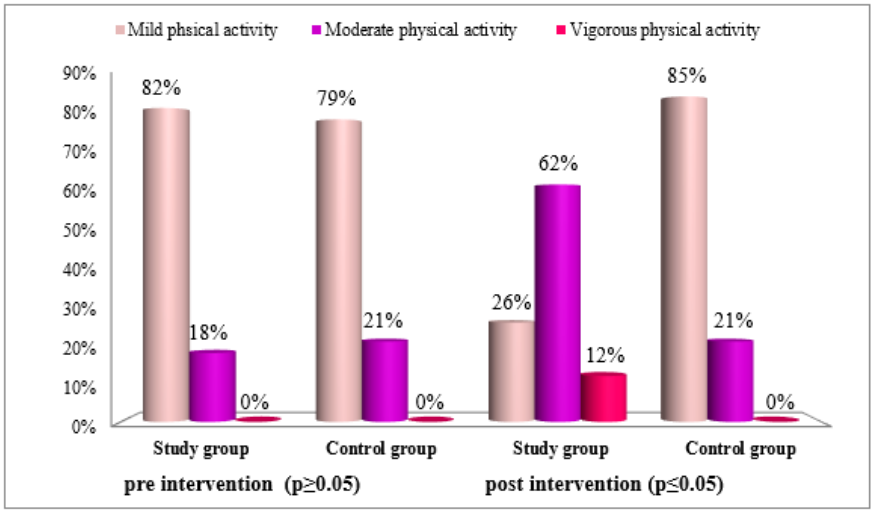
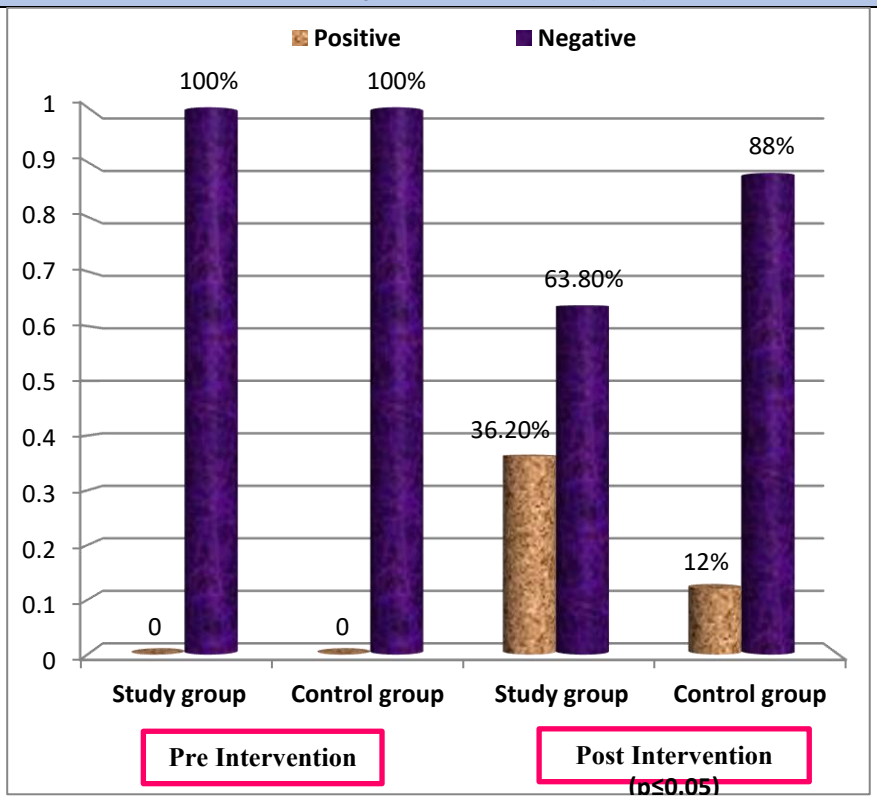


Figure 5: Total Physical Activity Levels among the Studied Hyper-Androgenic Infertile Overweight and Obese Women

Variables	Before the intervention											After the intervention										
	Poor habits N=42		Good habits N=16		Mild activity (sedentary lifestyle) N=47		Moderate activity N=11		Severe activity N=0		total	Poor habits N=17		Good habits N=41		Mild activity (sedentary lifestyle) N=15		Moderate activity N=36		Severe activity N=7		total
	No	%	No	%	No	%	No	%	No	%		No	%	No	%	No	%	No	%	No	%	
Androgenic Alopecia Levels																						
Stage I	16	61.5	10	38.5	20	76.9	6	**23.1**	0	0	26	2	5	38	**95**	3	7.5	32	**80**	5	12.5	40
Stage II	20	80	5	20	22	**88**	3	12	0	0	25	13	81.2	3	18.8	10	62.5	4	25	2	12.5	16
Stage III	6	**85.7**	1	**14.3**	5	71.4	2	28.6	0	0	7	2	100	0	**0**	2	100	0	0	0	0	2
Acne vulgaris Levels																						
Mild acne	24	68.6	11	31.4	29	**82.9**	6	17.1	0	0	35	11	22.4	38	**77.6**	10	20.4	33	**67.3**	6	12.3	49
Moderate acne	10	66.6	5	33.4	12	80	3	20	0	0	15	5	71.4	2	28.6	4	57.1	2	28.8	1	14.1	7
Severe acne	8	**100**	0	0	6	75	2	**25**	0	0	8	1	**50**	1	50	1	50	1	**50**	0	0	2
Hirsutism Levels																						
Mild hirsutism	5	35.7	9	**64.3**	7	50	7	50	0	0	14	3	7.7	36	**92.3**	4	10.2	31	**79.6**	4	10.2	39
Moderate hirsutism	21	80.8	5	19.2	23	88.5	3	**11.5**	0	0	26	9	69.2	4	30.8	7	53.8	3	**23.1**	3	23.1	13
Severe hirsutism	16	88.9	2	11.1	17	94.4	1	5.6	0	0	18	5	83.3	1	16.7	4	66.6	2	33.4	0	0	6
χ^2 P – value	**0.437 >0.05ns**				**> 0.05 ns**							**<0.001****				**<0.001****						

NB: ns non- statistically significant (p≥0.05) **highly statistically significant (p≤0.001)

Table 1: Relationship between Hyper-Androgenic Features, Physical Activity Levels, and Lifestyle Dietary Habits among the Studied Group of Infertile Overweight and Obese Women (n=58)



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

Figure 6: Pregnancy Rate Levels among the Studied Hyper-Androgenic Infertile Overweight and Obese Women

Discussion:

The current study findings revealed that nearly half and more than one-third of the study and control groups had moderate hirsutism before the intervention, respectively. After the intervention, about two-thirds of the study group had no terminal hair visible. Meanwhile, there were no statistically significant differences between study and control groups, neither before nor after the intervention. These findings came in agreement with Niranjani et al. (2022). Their study found that the non-interventional group showed no improvement in the Modified Ferriman Gallwey scale (Hirsutism) score during Pre-test through Post-test 2, while group A and group B showed a 1 score decrease. However, the study contradicts Pramod et al.'s (2023) findings, which found less than 25% of overweight and obese women with PCOS had dark hair growth, possibly due to different populations. Regarding acne vulgaris levels, the study found an improvement in acne vulgaris levels after an intervention, with most participants experiencing milder acne, but no significant differences were found between the study and control groups. This was in concordance with Niranjani et al. (2022), who 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 have a good body image and conceive in the future and, therefore, had a greater incentive to adhere to the change in their lifestyle. The study contradicts Smith et al.'s (2007) findings, which found no acne-fighting effect of chocolate compared to a placebo bar. The study's findings differences may be due to differences in overweight and obese women with PCOS. Regarding androgenic alopecia levels among the studied hyper-androgenic infertile overweight and obese women, the current study findings revealed that there is an improvement in alopecia levels after the intervention for the study group. Two-fifths of the study group suffered from stage II (hair loss with visible scalp) androgen alopecia before the intervention, which was reduced to one-quarter. Moreover, more than two-thirds of them were having stage I (minor thinning not noticeable) after the intervention. Meanwhile, there were statistically significant differences between study and control groups after the intervention.

These findings came in agreement with Niranjani et al. (2022), and supported by Roya et al. (2021), who studied "study of prevalence, phenotypic features, and lifestyle modifications of polycystic ovarian syndrome patients". They revealed that Lifestyle modification (LSM) can improve hyperandrogenism symptoms and PCOS severity by promoting an active lifestyle and healthy dietary habits, which reduce weight, insulin resistance, free testosterone, and hair loss. Regarding pregnancy rate, the current study findings revealed that there were significant improvements in fertility and ovulation after the lifestyle modification intervention; about more than one-third of the study had positive pregnancy tests after intervention. The current results are supported by **Alwahab et al. (2018),** who studied “A ketogenic diet may restore fertility in women with polycystic ovary syndrome” and revealed that half of the study group had a positive pregnancy test after intervention. On the contrary, these findings were incongruous with those of **Hamadi (2018)**, who studied “Public Health Nutrition Intervention to Enhance Healthy Eating and Lifestyle Modification among Lebanese Women with Polycystic Ovarian Syndrome", who showed that nearly three-quarters of the study group had a positive pregnancy test after lifestyle intervention. These differences might be attributed to populations’ cultural differences and lifestyles between Egyptian and Lebanese women.

The study shows improvement in lifestyle and daily habits among hyper-androgenic infertile overweight and obese women, with most exhibiting improved habits post-intervention, while less than one-third of the control group showed improvement. These results came in agreement with Eleftheriadou et al. (2015), who study “Dietary Habits in Adolescent Girls with Polycystic Ovarian Syndrome" and found that adolescent PCOS patients' poor eating habits may lead to obesity in later life, requiring early lifestyle interventions to address long-term health risks. Furthermore, George (2021) found that poor lifestyle dietary habits among participants contribute to increased body weight and long-term health risks, requiring early lifestyle interventions. 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.

These results came in agreement with Wang et al. (2021), who studied “Effectiveness of a 6-month lifestyle intervention on diet, physical activity, quality of life, and markers of cardio-metabolic health in women with PCOS and obesity and non-PCOS obese controls” and showed that A 6-month lifestyle intervention led to a decrease in high-calorie snacks and increased moderate to vigorous physical activity among women, benefiting health, reduced morbidity, and improved mood, and predicting long-term weight maintenance. Moreover et al., (2023) revealed significant improvements in hyperandrogenism and dyslipidemia can be achieved with lifestyle changes (diet and exercise) that result in a small to moderate weight loss of about 5%-10%. However, Zhang et al. (2018) found no significant differences in physical activity between the PCOS and control groups, contradicting the current study. Also, Mutsaerts et al. (2013) found that women with PCOS did not exhibit a significant change in lifestyle or physical activity compared to non-PCOS obese controls. This disagreement may be attributed to the type and intensity of physical activity.

The current study findings revealed that there is a statistically significant association between of hyper-androgenic feature (Hirsutism, Acne, Alopecia) improvement and lifestyle habits in the study group of hyper-androgenic infertile overweight and obese women. Abdolahian et al.'s 2020 meta-analysis supports the findings, indicating that dietary and physical activity modification can enhance hirsutism. Patnode et al. (2017) and Fathey et al. (2022) conducted meta-analyses, revealing that exercise intervention did not positively affect androgenic traits. The disagreement may stem from differences in interventions and populations studied, but low-calorie diets may improve reproductive system dysfunctions, menstrual irregularities, and fertility in women (Mani et al., 2018). 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 modification interventions have a significant positive effect on androgenic alopecia, acne vulgaris, and hirsutism levels for infertile

overweight and obese women, which in turn improve women's fecundity-related decline hyper-androgenism.

1. Women's fecundity-decline-related hyper-androgenism, 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.
3. Maternity and gynecologic health nurses should be fitted with the appropriate sciences, knowledge, and skills that were necessary to help people adjust to the daily problems and related difficulties. Also, we may need additional and continuous training for nurses who are employed in fertility settings to make them more aware of the psychological and social domains and their impacts on clients.
4. Duplicate this study using a large sample and in various settings to generalize results for subsequent research.

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