Effect of Lifestyle Modification Strategy based on 5A's Model on Body Image and Quality of Life among Women with Polycystic Ovary

Ola Abdel-Wahab Afifi Araby[1], Fatma Mansour Abdel Azeem Baraka[2]، Amira Mohamed Salama[3]

[1,3] Assistant professor of Obstetrics and gynecological Nursing, Faculty of Nursing, Benha University, Benha, Egypt.

[2] Lecturer in maternity and newborn health nursing department, faculty of nursing Helwan University

Abstract

Background: Polycystic Ovarian syndrome is associated with hormonal disturbance and adverse psychological consequences, resulting in reduced self-efficacy and quality of life. **Aim:** This research aimed to evaluate effect of lifestyle modification strategy based on 5As model on body image and quality of life among women with polycystic ovary **Design**: A quasi-experimental research design (one group, ″pre –posttest″). **Setting**: The present research conducted at obstetrics and gynecological outpatient clinic at Benha University hospitals in Qaliobya governorate, Egypt. **Sample**: A purposive sample of 64 infertile women medically diagnosed with PCOS. **Tools:** Five tools (A structured self-administered questionnaire, Body Image Scale, Women's lifestyle questionnaire, Polycystic Ovary Syndrome Health-Related Quality of Life Questionnaire and Satisfaction with Life Scale). **Results:** There was a high statistically significant difference among mean scores regarding the body-image, women's PCOS health-related quality of life domains and all items of women's satisfaction with life at pre-implementation, 4 weeks and 3 months post-implementation phases with (p- value<0.001) in the favor of 4 weeks post-implementation phase. **Conclusion:** The implementation of 5As model was effective in reducing body image dissatisfaction, improving lifestyle and health-related quality of life and raising satisfaction with life among woman with PCOS. **Recommendation:** All medically diagnosed women with PCOS should receive printed booklets and brochures containing lifestyle guidelines based on 5As model. These booklets should be kept available in all obstetrics and gynecological outpatient clinics.

Keywords: 5A Model, Body image, Infertile Women, Quality of life, Polycystic Ovary

Introduction

Polycystic ovarian syndrome (PCOS) is prevalent endocrine disorder that affects 4%–22.5% of women during reproductive age. It is characterized by an imbalance in the female sex hormones *(2020, Orbetzofa).* Anovulation, hyperandrogenism, and disease morphology are the hallmarks of PCOS *(Zeng et al., 2020).* The woman's quality of life (QOL) is reduced and the self-image deteriorates as a result of the disease's complexity and related problems *(Sánchez-Ferrer et al., 2020).*

Woman's body image can evidently have impacted by the physical symptoms of PCOS. PCOS-affected women could experience pressure to meet society's ideals of beauty, which place a premium on thinness and pristine skin. Negative consequences such as disordered eating patterns and body dissatisfaction might result from this pressure *(Nautiyal, 2022).* Moreover, a woman's psychological health may be significantly impacted by infertility, a major side effect of PCOS. According to *Zaman et al. (2023),* women with PCOS may experience feelings of loss, grief, and worry associated with their infertility. A poorer quality of life and a negative body image can result from these feelings.

The interaction between individual's requirements and the subjective sense of life

satisfaction is known as quality of life (QOL). PCOS symptoms are commonly linked to a marked decline in life satisfaction and body image satisfaction, which can have detrimental effects on issues related to sexual and social wellness, psychological health, and physical health *(Wulfovich et al., 2022)*. The evidence suggests that women with PCOS appear to have a lower quality of life (QOL) than women with other chronic illnesses such diabetes, back pain, and arthritis *(Guo et al., 2023)*.

Furthermore, numerous studies have noted that women with PCOS have lower quality of life and inferior body image. PCOS women often exhibit psychological morbidities such as low self-esteem, poor body image, and a lack of femininity. These symptoms negatively impact one's personal, professional, and work environments, which in turn lowers one's quality of life in terms of health. *(Cao et al., 2023) (Sánchez-Ferrer et al., 2020)*.

In addition, women with PCOS who wish to become pregnant may worry about infertility; approximately 80% of infertility with anovulatory cycle is related to PCOS *(Giampaolino et al., 2021)*. Because of the detrimental impacts of infertility and other symptoms connected to the disorder, infertile women with PCOS have repeatedly reported a higher risk of anxiety and depression. *(Wang et al., 2021)*. As a result, among infertile women with PCOS, these variables significantly impaired quality of life *(Naumova et al., 2021)*.

Therefore, women diagnosed with PCOS need to be provided with educational and lifestyle modifications programs to get clear and accurate information about PCOS and take chance to ask questions to obtain the information they require which encourage women to set plans to positively adapt healthy practice which in turn make women feel more satisfied with body image and have better quality of life *(Abobaker et al., 2021)*.

5A's model is a behavior change model that centers on the individual's cognition of the situation and assists the client in creating operational plans for modifying the life comprising five stages (assess, advise, agree, assist & arrange) *(Mateo et al., 2018)*. Thus, the 5A model plays a crucial role in empowering women to take charge of their own living circumstances and to find more behaviors that can be changed that could improve quality of life. *(ZareMobini, 2022)*.

Maternity nurses play a crucial role in helping women with PCOS deal with the physical symptoms of the disease. By helping these women avoid negative self-perception and long-term health issues, they can positively impact PCOS women. Nursing education promotes healthy lifestyle changes in women by educating them about the syndrome and the risk factors that are linked to it *(Abobaker et al., 2021)*. In order to help women develop coping skills, nurses advise them to adopt healthier lifestyles and connect them to neighborhood support groups *(Ismayilova and Yaya, 2022)*.

Moreover, nurses are in a unique position in offering personalized and comprehensive care to women with PCOS by reduce the detrimental effects on quality of life and demonstrate appropriate awareness of the physical, emotional and psychosocial effects of PCOS. Making educated decisions and managing one's lifestyle, including stress and weight loss, are essential to PCOS management **(Denga, 2021)**.

Significance

Globally, PCOS prevalence in 2020 is estimated to be between 2.2 and 48%. One in fifteen women worldwide suffer with PCOS, a heterogeneous endocrine disorder. *(Chatterjee Bandyopadhyay, 2020)*. According to estimates, 13% of fertile Egyptian women and 37.5% of secondary

infertile women have PCOS **(Ibrahim et al., 2023).** Research has indicated a growing trend in PCOS prevalence since the late 1900s *(Deswal, 2020; Goh et al., 2022).*

Polycystic ovarian syndrome has a significant effect on women's life quality. In addition, PCOS can cause frustration symptoms which negatively affecting self-acceptance, body image, and sense of identity *(Sioma-Markowska et al., 2021).* Therefore, to enhance women's quality of life and prevent more severe consequences from PCOS, Studies in the fields of maternity and nursing education are essential for enlightening women about these matters. (*Abobaker et al., 2021).*

Additionally, it is important to help women with PCOS to modify lifestyle and accept body image which in turn improve overall quality of life using the 5As model stages which enables women to find more modifiable behaviors that have the potential to improve their quality of life and are encouraged to adopt healthy habits in a positive way as women with PCOS may experience more obstacles to manage lifestyle and have lower rates of achieving the health goals *(Arentz et al., 2021).*

Aim of the study:

This research aimed to evaluate effect of lifestyle modification strategy based on 5As model on body image and quality of life among women with polycystic ovary.

Research hypotheses:

H1: The studied women will exhibit better lifestyle after application of lifestyle modification strategy based on 5As model than before.

H2: The studied women will be more satisfied with body image after application of lifestyle modification strategy based on 5As model than before.

H3: The studied women will exhibit higher quality of life after application of lifestyle modification strategy based on 5As model than before.

H4: The studied women will be more satisfied with life after application of lifestyle modification strategy based on 5As model than before.

Conceptual definitions:

Quality of life: Quality of life can be defined as "individuals' perceptions of person's status in life as regards their objectives, expectations, standards, and worries, as well as the culture and value system in which they live". **(Morshedi et al., 2022).**

Body-image: Body image is a concept that covers an individual's health status, physical appearance and perceptions related to their sexuality, forming the physical nature of the self. *(Aba& Aytek Şik, 2022).*

Operational definition:

5A's model: It is an evidence-based practical paradigm for behavior change under various settings that aids the client in creating operational strategies for lifestyle improvement. The five steps of the 5 A's model are assessment, advise, agreement, assistance, and arrangement. (***Burtin et al., 2023).***

In this research, the 5 A's model was applied as follow: firstly, *assess step* depended on assessing the women's body mass index, body image dissatisfaction and lifestyle, and then, *advice step* applied according to the findings of assessment. Then the women and the researchers then agree on the behavior modification objectives and the essential strategies for reaching the objectives during *the agree step*. In the assist phase, women received the required guidance or training. and in the *arrange step*, follow‑up were planned to evaluate the new changes.

Subjects and Methods

Research Design:

A quasi-experimental research design (one group, ″pre –posttest″) was used. An empirical interventional study without randomization that aims to ascertain the causal impact of an intervention on the target population is called a quasi-experiment. *(Iowa State University of Science and Technology, 2020).*

Study Setting:

The study was carried out in obstetrics and gynecological outpatient clinic in Benha University hospitals in Qaliobya governorate, Egypt. It is the primary hospital serving a large portion of Benha City and the Qaliubya Governorate, offering care for women from a variety of socioeconomic backgrounds. All patients at these hospitals receive affordable and complimentary services. Many women with various health issues visit the hospital in large numbers to receive care.

Sampling:

Sample type and criteria: A purposive sample of women was chosen from the aforementioned research settings; based on the following *inclusion criteria:* aged 20-40 years old, medically diagnosed with PCOS, suffered from PCOS related infertility (try to get pregnant), free from any other gynecologic, psychological nor medical chronic problems and can read and write.

Sample Size and technique: A purposive sample of 64 women after the removal of women who didn't meet the requirements for inclusion. According to *Benha university Hospitals statistical center, 2022,* flow rate of the women medically diagnosed with PCOS suffering from infertility who visited the study setting were 76 women in year of 2022.

The following formula was used to determine the sample size *(Mani et al, 2015).* Wherever: n= size of sample, N= size of population (152), e=Margin of errors which is±0.05

$$n = \frac{N}{1+N(e)^2}$$

Tools of data collection:

Five tools were used to collect data:

Tool I: A structured self-administered questionnaire: researchers created it after reading through relevant literature. There were three parts:

Part (1): **Socio-demographic data of women:** it consisted of four items (age, residence, education and occupation).

Part (2): **Anthropometric measurements of women:** Weight (kg) and Height (cm), then Body mass index calculated as following:

BMI = Weight (kg)/height² (m) according to *WHO, (2021).* BMI Categories are:

- If <18.5 = Underweight
- If 18.5–24.9 = Normal weight
- If 25–29.9 = Overweight
- If ≥ 30 = Obesity

Part (3): **Infertility profile:** it included four items (Age of marriage, type of infertility, family history of infertility related to PCOS and duration since diagnosis of PCOS).

Tool II: Body Image Scale (pre/posttest): This tool was adopted from *(McDermott et al., 2014).* It is a simple and valid tool or questionnaire included 9 items for determining women's dissatisfaction of body image in with PCOS.

Scoring system:

Women scored from 0 ("Not at all"), 1 (A little), 2 (Quite a bit) to 3 ("Very much") on each question so the lowest

possible total score was 0 and the highest 27, with higher scores indicating increasing body image dissatisfaction.

Tool III: **Women's lifestyle questionnaire (pre/posttest):** it was constructed by researchers after looking up a related literature *(Salama and Elbana, 2019 & Abobaker et al., 2021)* to assess women's lifestyle. It included 3 domains as following: *nutritional pattern domain* (18 items) as (Balanced meals, Small, frequent meals every day 4 – 5 times, Decreased calorie intake, Fish diet rich in omega-3 such as salmon or tuna, Olive oil instead of butter or ghee, Beans and other legumes rich in protein instead of meat, Non-starchy vegetables such as leafy greens, Whole grains, such as brown rice or barley, Drink plenty of water, Reduce refined white sugar and replace it with honey, Limit salt intake ,Reduce dairy and gluten products…..etc) , *physical activity domain* (3 items) as (exercising regularly to strengthen muscles two to five times a week, walk quietly for 20 minutes daily and Walking instead of taking the car when going to work or the market) and *domain of compliance with treatment protocol* (6 items) as (commitment to prescribed medications, avoid taking medication without consulting a doctor, commitment to follow up visits as determined by physician, decreasing weigh of 5 – 10%, avoid psychological stress, and anxiety and prevent smoking and minimize alcohol intake).

Scoring system:

Every item was evaluated using a continuum of Likert scales with three points. Each item was given a score (2) if it was usually done, a score (1) if it was sometimes done, and a score (0) if it was never done practiced. The total lifestyle score was calculated by adding the item-by-item scores. Higher scores indicated more engagement in a healthy lifestyle. The range of scores obtained was 0 to 54. *Total*

lifestyle score was categorized into two levels:

- Satisfactory level: if the total scores (≥60% -100%) = (Score from 33 to 54)
- Unsatisfactory level: if the total scores (< 60 %) = (Score from 0 to 32)

Tool IV: The Polycystic Ovary Syndrome Health-Related Quality of Life Questionnaire (PCOSQ): It was adopted from *(Nasiri-Amiri et al., 2018).* It consisted of 43 items, the subjects were asked to rate each item over the previous four weeks using a 5-option Likert scale to assess their QOL. The following six domains were created from these items: (9 items for psychosocial and emotional domain), (4 items for 'self-body image domain), (9 items for fertility domain), (7 items for sexual function domain), (8 items for obesity and menstrual disorder domain), and (6 items hirsutism domain). Additionally, the coping factor items were integrated into other factors and the self-body image factor was added to the structure.

Scoring system:

A 5-point Likert scale with the options "always, often, sometimes, rarely, and never" was used to score **each** item. The scale went from 1 for the worst conditions to 5 for the best conditions. The overall score range was 43 to 215 demonstrating the lowest to highest QOL. The number of items determined the range for each subscale. By dividing the total number of answered items by the sum of the answered item scores, the average score for each domain was determined. Better function is indicated by higher scores. *Total* QOL *score was classified as follow:*

- High QOL: if the total scores (≥ 75 %) = (Score from 172 to 215)
- Moderate QOL: if the total score (60 % - < 75%) = (Score from 147 to 171)
- Low QOL: if the total score (<60 %) = (Score from 43 to 146)

Tool V: Satisfaction with Life Scale (SWLS): It was adapted from *(Diener et al.,*

1985 & Pavot et al., 1991). A brief 5-item is used to gauge women's overall cognitive assessments of their level of life satisfaction. these statements are (My life is generally quite close to my ideal, everything in my life is going great., I am happy with my life, so far I have gotten the important things I want in life & If I could live my life over, I would change almost nothing). Respondents fill out the Likert scale, which typically takes only a minute or so to complete. The overall score's categorization had little modification in order to facilitate statistical analysis.

Scoring system:

Each item was judged based on a 7-point Likert scale. The women were asked to indicate openly and honestly their degree of agreement with each item by placing the appropriate number on the line preceding that item. The degree of responding for each item was rated as following: 7 for strongly agree, 6 for agree, 5 for slightly agree, 4 for neither agree nor disagree, 3 for slightly disagree, 2 for disagree and 1 for Strongly disagree. The sum of the scores for each item determines the final score. There is a 5-35 possible score range, and a score of 20 indicates the neutral point on the scale. A respondent who scores between 5 and 19 is not satisfied with life, while a respondent who scores between 21 and 35 is satisfied.

Administrative approval:

The director of Benha University Hospitals received a formal written approval from the dean of the nursing faculty, which was subsequently forwarded to the director of the department of obstetrics and gynecology, who was informed of the study's purpose and asked for their consent to proceed.

Tools validity and reliability:

Three jury experts from Benha University who specialize in obstetrics and gynecological nursing assessed the validity of the questionnaires to make sure the instruments were applicable, clear, relevant,

and thorough. Sentences had to be formulated with only minor changes. From the experts' perspective, the tools were considered valid.

Tools reliability:

The reliability of tools was done by Cronbach's Alpha coefficient test, which illustrated that the internal consistency of each tool as following:

Ethical considerations:

Ethical aspects will be considered before starting the study as the following: The scientific research ethics committee of Benha University's faculty of nursing granted study approval, enabling the study to

Tool	**Cronbach's alpha value**
Tool II: Body Image Scale.	(α =0.70).
Tool III: Women's lifestyle questionnaire.	(α =0.86).
Tool IV: The Polycystic Ovary Syndrome Health-Related Quality of Life Questionnaire (PCOSQ).	(α =0.92).
Tool V: Satisfaction with Life Scale (SWLS).	(α = 0.74).

proceed. Formal consent from the chosen study settings was acquired to carry out the study. The researchers gained the confidence and trust of the women by explaining the purpose and significance of the study prior to using the tools. The researchers obtained oral consent from women to participate in the study and confidentialities were assured. The study didn't have any psychological, social or physical risks on the women. Following statistical analysis, all instruments were destroyed in order to protect the privacy of the involved women. Also, tools

respect human rights and women could stop participating in the study when she needs.

Pilot study:

Ten percent of the total sample size (7 women) participated in the pilot study to evaluate the tools' clarity, objectivity, viability, and applicability and to find out the possible obstacles to the statements, such as the order of questions and clarity, and to learn about any potential challenges and issues that could arise for the researchers and obstruct the gathering of data. Clarifications of certain items were made based on the pilot study's results, and the pilot sample was removed from the study to prevent sample contamination.

Field work:

The research was carried out from the beginning of June, 2023 and completed at the end of November 2023 covering six months. The researchers conducted the study three times/ week (Saturdays, Mondays and Wednesdays) from 9.00 a.m. to 12.00 p.m. at previously mentioned setting until completion of the predetermined sample size. An intervention program was developed using lifestyle modification strategy based on 5As model in order to provide lifestyle counseling by researchers. A handout (booklet) about PCOS and leading a healthy lifestyle was left at the outpatient clinic after ending of the study for use by all women.

The booklet designed specifically for women in simple Arabic language to suit their level of understanding and to satisfy the studied women's deficit knowledge regarding PCOS and its healthy lifestyle. Sessions contents were determined according to the five stages based on 5A's model.

Additionally, a variety of teaching techniques and educational resources were employed, including brainstorming, group discussions, critical thinking, and problem solving. To accomplish the study's goals, instructional materials such as the booklet were given to each recruited woman from the first session.

Prior to starting the study, the researchers looked over relevant local and international literature on the topic of the study. This guided the researchers in preparing the necessary data collection tools and helped them understand the scope and magnitude of the issue. Three experts received the tools, and the jury's verdict was completed.

The researchers greeted the woman, gave her a brief introduction, explained the goal of the study, gave her all the information she needed to know about it, and obtained her oral consent to participate in the research at the start of the interview. *Tool (I)* was disseminated to each woman to assess personnel characteristics, anthropometric measurements and infertility profile of women.

To fulfill the purpose of this study, the following **five stages** based on **5A's** model were adopted; **A**ssess stage, **A**dvise stage, **A**gree stage, **A**ssist stage and **A**rrange stage. Each of the five phases was given separately over the course of four 45–60 minute sessions. *(ZareMobini et al., 2022):*

- **Assess stage,** which is the first session, body mass index, knowledge, and lifestyle regarding dietary habits and physical activity were assessed. This stage could be attained through dissemination of *Tool (II):* **Body Image Scale** for assessing body image dissatisfaction in women with PCOS, *tool (III): Women's lifestyle questionnaire* to assess lifestyle of women regarding PCOS, *Tool (IV): PCOSQ* to assess QOL over the past 4 weeks and *Tool (V): Satisfaction with Life Scale (SWLS)* to assess judgments of satisfaction with woman's life. This stage's data collection provided the baseline (act as pre-test) for subsequent

comparisons to assess to evaluate the effect of using the 5A model.

- **Advice stage,** which is the second session, the illness was described along with how lifestyle choices affect the disease's course and symptoms, as well as behavioral issues related to exercise and diet. In order to balance the number of calories consumed and received, computational skills were also explained. Giving the women guidance on the following topics could help them reach this stage:
  - *Nutritional pattern* as (balanced meals "very low carbohydrate, high protein low-fat diets and high fibers", small, frequent meals every day 4 – 5 times, decreased calorie intake, fish diet rich in omega-3 such as salmon or tuna, olive oil instead of butter or ghee, beans and other legumes rich in protein instead of meat, non-starchy vegetables such as leafy greens, whole grains, such as brown rice or barley, drink plenty of water, reduce refined white sugar and replace it with honey, limit salt intake ,reduce dairy and gluten products…..etc)
  - *Physical activity* as (exercising regularly to strengthen muscles two to five times a week, walk quietly for 20 minutes daily and walking instead of taking the car when going to work or the market)
  - *Compliance with treatment protocol* as (commitment to prescribed medications, avoid taking medication without consulting a doctor, commitment to follow up visits as determined by physician, decreasing *weigh* of 5 – 10%, avoid psychological stress, and anxiety and prevent smoking and minimize alcohol intake).

- **Agree stage,** which is the third session, "behavioral goals were determined by taking into account the interests and priorities of each woman. A practical plan to change behavior was then agreed upon with the participant. At this point, the woman and the healthcare provider decide on a particular plan of action regarding nutrition, exercise, and weight. This agreement can be illustrated by giving this example:

  - *Researchers:* ''How can we work to make sure you are getting in the right fluids?''
  - *Woman:* ''I can stop drinking soda. I can also drink no more than a cup of juice and at least 5 or 6 cups of water every day.''

- **Assist stage,** in this fourth session, the women received assistance in discussing obstacles to putting lifestyle modification and barrier removal strategies into practice. Additionally, each woman received assistance from researchers in locating social support networks for nutrition or physical activity related to her issue, based on the previously mentioned barriers. These barriers such as (poor dissemination of awareness, lack of credible information, time restraints, a perceived lack of patient motivation for weight management, and a lack of funding, limited access to resources, inadequate social support, family motivation, lack of positive health expectancies following behavior change and inappropriate communication between woman and health provider). The researchers should assist the women to overcome these barriers through different barrier removal strategies that is suitable for each woman.

- **In the Arrange stage,** based on the women's preference, their progress regarding dietary behaviors and physical

activity was followed through the telephone call. Additionally, researchers arrange for follow-up with provider, nutritionist, or social worker. To further clarify this stage, the following example could be given:

– **Researchers**: ''I am aware of your difficulties in obtaining wholesome food. Would you like to discuss that with a social worker?''
– **Researchers**: ''appears that you are struggling to decide what to eat. I want you to discuss that with a nutritionist''.

After implementation of the lifestyle modification strategy based on 5A Model, the researchers evaluated the effectiveness of this lifestyle modification strategy based on 5As model using the same format of tools (Tool II, Tool III, Tool VI & Tool V) which used during the assess stage. The researchers evaluated the women's 4 weeks and three-month post- implementation as a follow up from the last session or stage and during outpatient visits or via telephone in case of absence.

Statistical analysis:

Data were checked before being entered into the computer. The gathered data will be coded, computerized, arranged, and examined using the proper statistical procedures and tests. Version 22.0 of the Statistical Package for Social Sciences (SPSS) was employed. Standard deviations, means, and frequencies and percentages were all included in descriptive statistics. The study hypothesis was tested using inferential statistics, specifically the ANOVA test. The relationship between the study variables' total scores was examined using the correlation coefficient. P-value > 0.05 indicated no statistically significant difference, $P \leq 0.05$ indicated a statistically significant difference, and $P \leq 0.001$

indicated a highly statistically significant difference for all statistical tests conducted.

Limitations

The antenatal clinic's waiting area can occasionally be packed and noisy. In order to help the women, feel free during educational sessions, the researchers may have to wait a long time until the room is quiet and empty. Additionally, some of the women were not consistent in attending the educational sessions, so phone calls were made to remind them of their appointments.

Results

Table (1): shows that (51.6%) of studied women were in age group 20 – <30 years old with a mean age of 30.28±4.27 years. Concerning the residence, (76.6%) of them were from rural areas. Furthermore, (54.7%) had secondary or technical education. Pertaining to the occupation, (60.9%) of them were housewives.

Table (2): shows that, the mean BMI of them were 27.45±4.28 kg/m2, 25.78±3.09 kg/m2 and 26.02±3.07 kg/m2 at pre-implementation, 4 weeks and 3 months post-implementation phases respectively with statistically significant difference between the three phases of implementation (p≤0.05).

Fig. (1): elaborates that, (60.9%), (46.9%) and (50.0%) of studied women suffered from overweigh at pre-implementation, 4 weeks and 3 months post- implementation phases respectively; which reveals marked reduction in BMI throughout the three phases of implementation.

Table (3): illustrates that, (50.0%) of studied women married at the age of 20-<30 years. In relation to type of infertility, (64.1%) of them are suffering from primary infertility; and only (12.5%) had family history of infertility related to PCO. As well as, (48.4%) of them diagnosed with PCO since 5-10 years.

Table (4): indicates that, there was a high statistically significant difference among mean scores regarding women's lifestyle domains at pre-implementation, 4 weeks and 3 months post-implementation phases with (p- value<0.001). The total mean score of lifestyle of studied women was raised from 27.78±4.22 to 40.81±6.60 and 39.31±6.30 throughout program phases; in the favor of 4 weeks post-implementation phase.

Figure (2): displays that, (12.5%), (79.7%) and (78.1%) of studied women had satisfactory level of lifestyle regarding PCO at pre-implementation, 4 weeks and 3 months post-implementation phases respectively.

Table (5): reveals that there was highly statistically significant difference between mean scores of all items of the body-image for studied women at pre-implementation, 4 weeks and 3 months post-implementation phases with (p- value<0.001).

Figure (3): illustrates that the total mean score of body-image of studied women was decreased from 16.15±3.26 at pre-implementation phase to 9.32±2.95 and 10.46±2.65 at 4 weeks and 3 months post-implementation phases respectively; in the favor of 4 weeks post-implementation phase; whereas lower mean scores indicating decreasing body image dissatisfaction.

Table (6): indicates that, there was a highly statistical significant difference among mean scores regarding women's PCOS health-related quality of life domains at pre-implementation, 4 weeks and 3 months post-implementation phases with (p-value<0.001). Additionally, the total mean score of PCOS health-related quality of life of studied women was raised from 93.71±14.44 to 154.65±13.24 and 150.25±11.41 throughout program phases; in the favor of 4 weeks post-implementation phase.

Figure (4): displays that, (12.5%), (64.1%) and (59.4%) of studied women had high PCOS health-related quality of life at pre-implementation, 4 weeks and 3 months post-implementation phases respectively.

Table (7): indicates that, there was a highly statistical significant difference among mean scores regarding all items of women's satisfaction with life at pre-implementation, 4 weeks and 3 months post-implementation phases with (p- value<0.001). The total mean score of satisfaction with life of studied women was raised from 13.01±3.53 to 20.59±3.61 and 19.54±2.99 throughout three phases; in the favor of 4 weeks post-implementation phase.

Figure (5): displays that, (20.3%), (61.0%) and (65.2%) of studied women were satisfied with their life at pre-implementation, 4 weeks and 3 months post-implementation phases respectively.

Table (8): clarifies that; there was a highly significant statistical negative correlation between total lifestyle score and total scores of body image dissatisfaction of the studied women regarding PCOS at pre-implementation, 4 weeks and 3 months post-implementation phases (P≤ 0.001). Meanwhile, there was a highly significant statistical positive correlation between total lifestyle score and total quality of life of the studied women regarding PCOS at the three phases

Table (9): clarifies that; there was a highly significant statistical positive correlation between total quality of life score and total score of satisfaction with life of the studied women regarding PCOS at pre-implementation, 4 weeks and 3 months post-implementation phases (P≤ 0.001).

Table (1) Distribution of the studied women according to personnel characteristics (n=64).

Personnel characteristics	No.	%
Age (in years)		
20 – <30	33	51.6
30 – 40	31	48.4
Mean ± SD = 30.28±4.27		
Residence:		
Rural	49	76.6
Urban	15	23.4
Level of education:		
Read/write	4	6.3
Primary education	7	10.9
Secondary or technical education	35	54.7
University education	18	28.1
Occupation:		
Housewife	39	60.9
Employee	17	26.6
Free working	8	12.5

Table (2): Mean scores of studied women's Body Mass Index (BMI) before the implementation, four weeks and three months after the implementation of 5As model (n=64).

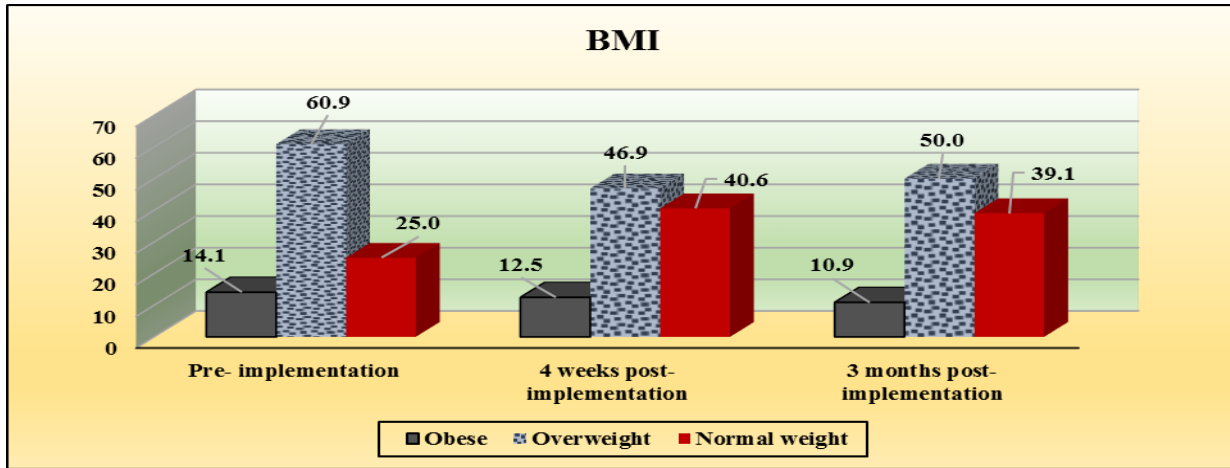| Program phases	Pre-implementation	4 weeks post-implementation	3 months post-implementation	ANOVA	
	Mean ± SD	Mean ± SD	Mean ± SD	F	p-value
Body Mass Index	27.45±4.28	25.78±3.09	26.02±3.07	4.21	0.016*

*A Statistical significant p $\leq$ 0.05

Figure (1): Percentage distribution of studied women regarding BMI throughout the three phases of implementation (n=64).

Table (3): Distribution of the studied women regarding infertility profile (n=64).

Infertility profile	No.	%
Age of marriage (in years)		
<20	20	31.3
20-<30	32	50.0
30-40	12	18.8
Type of infertility		
Primary	41	64.1
Secondary	23	35.9
Family history of infertility related to PCOS:		
Yes	8	12.5
No	56	87.5
Duration since diagnosis of PCOS (in years)		
<5	27	42.2
5-10	31	48.4
>10	6	9.4

Table (4): Mean scores of studied women's lifestyle domains before the implementation, four weeks and three months after the implementation (n=64).

Lifestyle domains	Min./Max. score	Pre-implementation	4 weeks post-implementation	3 months post-implementation	ANOVA	
		Mean ± SD	Mean ± SD	Mean ± SD	F	p-value
Nutritional pattern	0/36	18.30±4.45	27.39±6.14	26.22±6.15	49.22	0.000**
Physical activity	0/6	1.53±1.12	3.44±1.22	3.27±0.98	57.43	0.000**
Compliance with Treatment protocol	0/12	7.95±2.33	9.98±1.17	9.83±1.03	31.09	0.000**
Total score	**0/54**	**27.78±4.22**	**40.81±6.60**	**39.31±6.30**	**96.47**	**0.000****

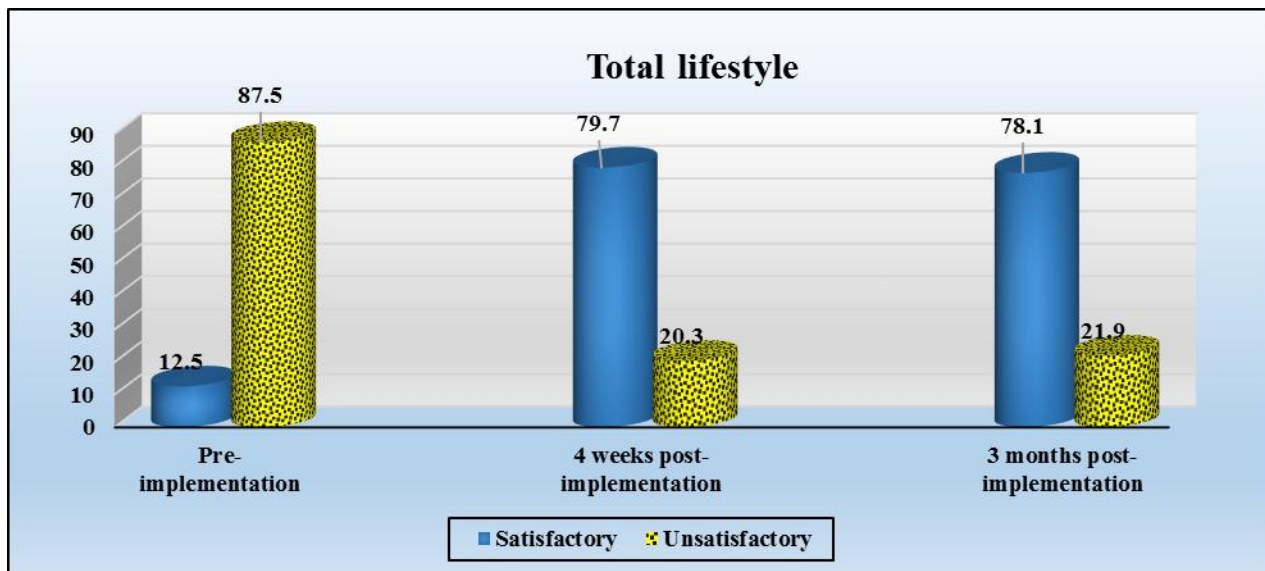**A Highly Statistical significant p ≤ 0.001

Figure (2): Percentage distribution of studied women regarding their total lifestyle score regarding PCOS before the implementation, four weeks and three months after the implementation (n=64).

Table (5): Mean scores of studied women's body-image before the implementation, four weeks and three months after the implementation of 5As model (n=64).

Body-image items	Min./Max. score	Pre-implementation	4 weeks post-implementation	3 months post-implementation	ANOVA	
		Mean ± SD	Mean ± SD	Mean ± SD	F	p-value
Being self-conscious about how you look	0/3	2.14±0.66	1.30±0.88	1.45±0.95	18.06	0.000**
Feeling that a disease or treatment has made one less physically attractive	0/3	1.95±0. 89	1.38±0.78	1.41±0. 81	9.73	0.001**
Dissatisfied with how you look when you're dressed	0/3	1.77±0.90	1.06±0.94	1.31±0.95	9.31	0.001**
Feeling less manly or feminine as a result of a medical condition or therapy	0/3	1.81±0.73	0.91±0.88	1.05±0.86	22.12	0.000**
Find it difficult to look at your naked	0/3	1.66±0.69	0.67±0.64	0.81±0.71	38.83	0.000**
Feeling that a disease or treatment has made one less attractive sexually.	0/3	1.86±0.90	1.31±0.79	1.34±0.84	8.39	0.000**
Stay away from people because the way you feel about your appearance	0/3	1.52±0.79	0.69±0.77	0.83±0.76	20.68	0.000**
Feel like your body is less whole as a result of the illness or treatment	0/3	1.47±0.87	0.67±0.71	0.81±0.75	18.89	0.000**
Feel dissatisfaction with the body	0/3	1.98±1.00	1.34±0.87	1.45±0.87	8.91	0.000**
Total score	**0/27**	**16.15±3.26**	**9.32±2.95**	**10.46±2.65**	**97.10**	**0.000****

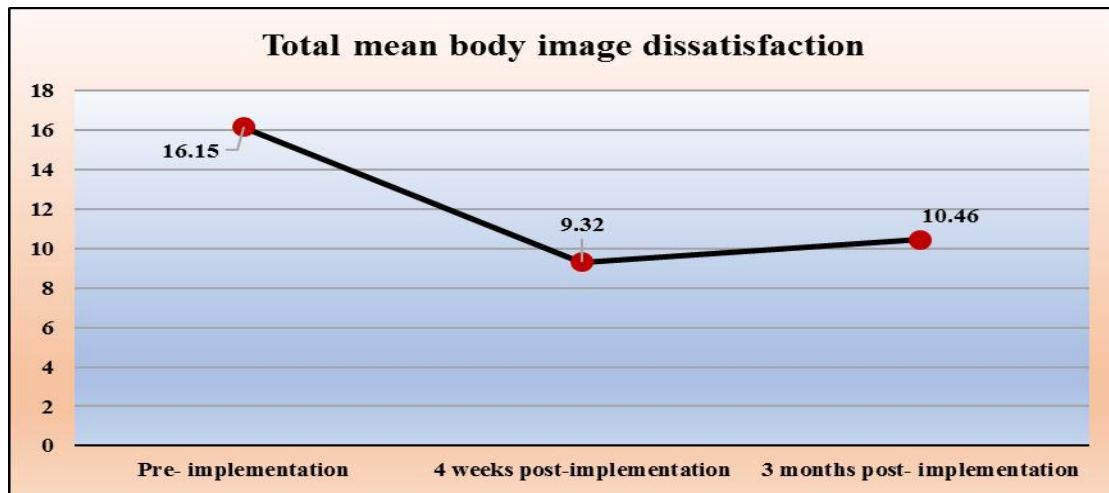**A Highly Statistical significant p ≤ 0.001

Figure (3): Total mean score of Body-image dissatisfaction of studied women at pre-implementation, 4 weeks and 3 months post-implementation phases (n=64).

Table (6): Mean scores of studied women's Polycystic Ovary Syndrome Health-Related Quality of Life (PCOSQ) domains before the implementation, four weeks and three months after the implementation (n=64).

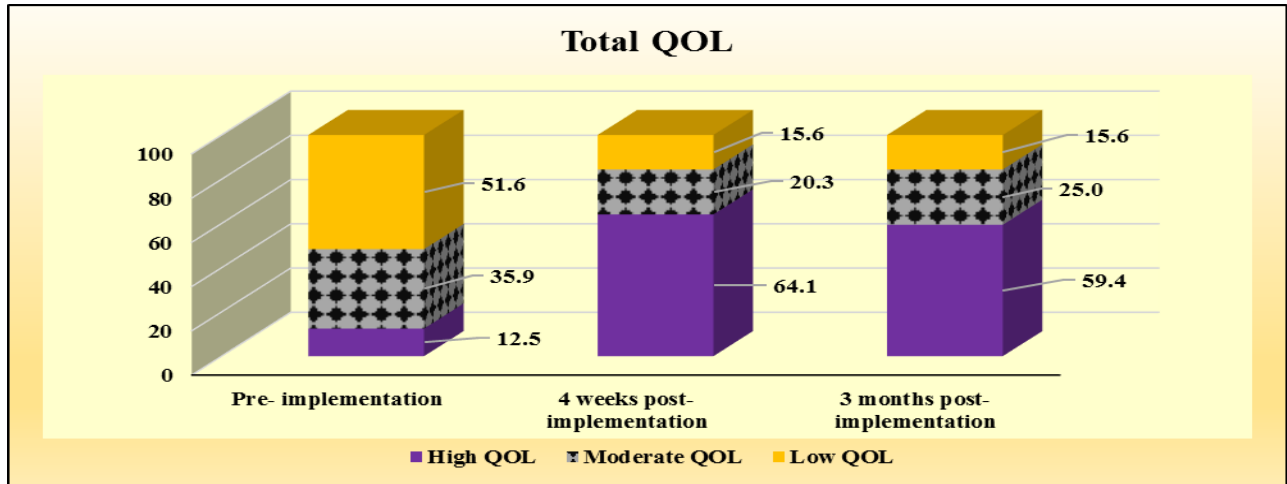| (PCOSQ) domains	Min./Max. score	Pre-implementation	4 weeks post-implementation	3 months post-implementation	ANOVA	
		Mean ± SD	Mean ± SD	Mean ± SD	F	p-value
Psychosocial and emotional	9/45	22.13±6.16	37.17±6.15	36.70±5.39	133.90	0.000**
Self-body image	4/20	11.00±4.14	14.42±3.17	14.22±3.10	19.19	0.000**
Fertility	9/45	12.69±3.47	26.88±6.14	26.16±6.03	142.19	0.000**
Sexual function	7/35	20.30±7.99	28.16±3.95	26.92±4.22	35.23	0.000**
Obesity and menstrual disorder	8/40	14.61±3.40	26.20±5.08	24.75±4.59	130.85	0.000**
Hirsutism	6/30	13.00±4.09	21.83±4.50	21.50±3.92	91.72	0.000**
Total score	**43/215**	**93.71±14.44**	**154.65±13.24**	**150.25±11.41**	**431.03**	**0.000****

**A Highly Statistical significant p ≤ 0.001

Figure (4): Percentage distribution of studied women regarding total PCOS health-related quality of life before the implementation, four weeks and three months after the implementation (n=64).

Table (7): Mean scores of studied women's Satisfaction with Life Scale (SWLS) before the implementation, four weeks and three months after the implementation (n=64).

(SWLS) items	Min./Max. score	Pre-implementation	4 weeks post-implementation	3 months post-implementation	ANOVA	
		Mean ± SD	Mean ± SD	Mean ± SD	F	p-value
My life is pretty close to my ideal in most aspects.	1/7	2.45±0.95	3.66±1.13	3.59±1.01	27.23	0.000**
Everything in my life is going great.	1/7	1.98±0.96	3.84±1.14	3.63±1.00	61.11	0.000**
I'm happy with the life I have.	1/7	2.36±1.10	3.78±1.06	3.52±0.94	33.94	0.000**
I have thus far achieved the major goals I have set for myself.	1/7	3.63±1.71	5.19±1.13	4.86±1.25	22.40	0.000**
There is not much that I would change if I could start over in my life.	1/7	2.59±1.25	4.13±1.45	3.95±1.44	23.43	0.000**
Total score	**7/35**	**13.01±3.53**	**20.59±3.61**	**19.54±2.99**	**93.81**	**0.000****

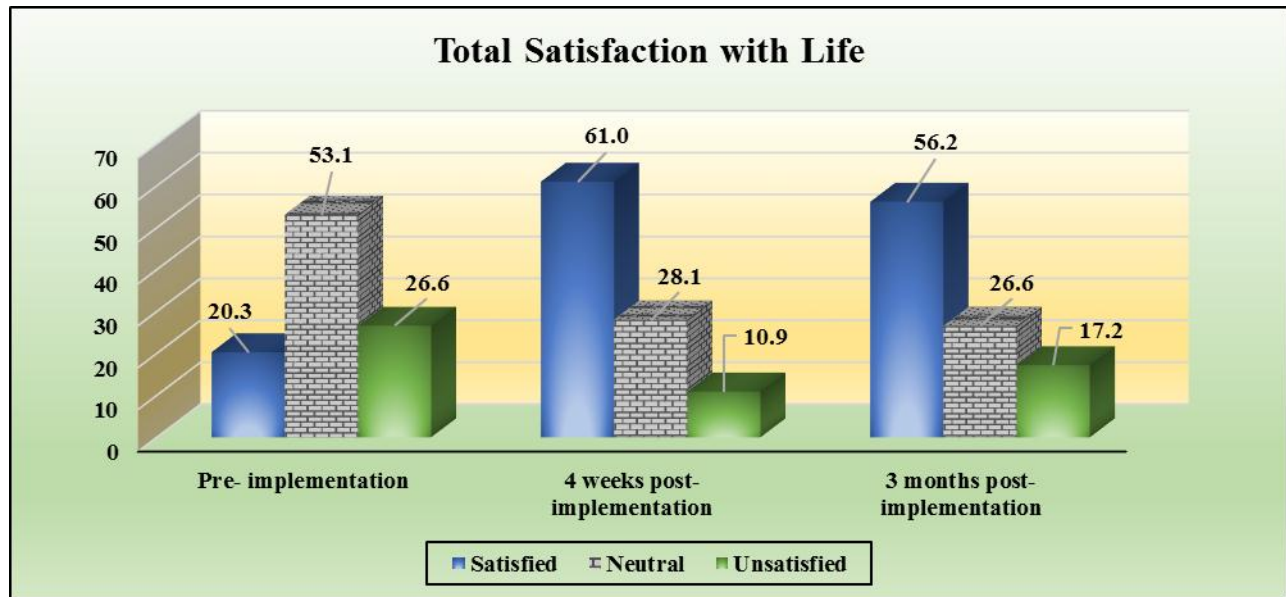**A Highly Statistical significant $p \leq 0.001$

Figure (5): Percentage distribution of studied women regarding their total satisfaction with life before the implementation, four weeks and three months after the implementation (n=64)

Table (8): Correlation between total lifestyle score and total scores of (total body image dissatisfaction and total quality of life) of the studied women regarding PCOS before the implementation, four weeks and three months after the implementation (n=64).

Variables	Total lifestyle					
	Pre- implementation		4 weeks post-implementation		3 months post-implementation	
	r	P-value	r	P-value	r	P-value
Total body image dissatisfaction	- 0.528	0.000**	- 0.664	.000**	- 0.557	0.000**
Total quality of life	0.459	0.000**	0.513	.000**	0. 547	0.000**

**A Highly Statistical significant p ≤ 0.001

Table (9): Correlation between total quality of life and total satisfaction with life scores of the studied women before the implementation, four weeks and three months after the implementation (n=64).

Variables	Total quality of life					
	Pre- implementation		4 weeks post-implementation		3 months post-implementation	
	r	P-value	r	P-value	r	P-value
Total satisfaction with life	0.643	0.000**	0.653	.000**	0. 716	0.000**

**A Highly Statistical significant p ≤ 0.001

Discussion:

Studying the quality of life and body image satisfaction of women in reproductive age is important because of the high prevalence of polycystic ovary syndrome and the associated risk of infertility, anxiety, and depressive disorders. *(Naumova et al., 2021)*. The 5As model can assist women with PCOS in planning and coordinating their goals for changing their lifestyles and improving their quality of life **(ZareMobini et al. 2022).**

The aim of present research aimed to evaluate effect of lifestyle modification strategy based on 5As model on body image and quality of life among women with polycystic ovary.

Concerning personal characteristics, the findings of the present study showed that, with a mean age of 30.28±4.27 years, more than half of the women under study belonged to the age group (20–<30 years). These findings were in line with those of *Abd Elaziz et al. (2023)*, who reported that with a mean age of 28.91 ± 7.35 years, over half of subjects were in the 18–25 age group. Also, *Dybciak et al. (2022)* discovered that the majority of PCOS-afflicted women were between the ages of

26 and 30. This might be the result of PCOS, a prevalent disorded that typically affects women who are in reproductive age.

Furthermore, the findings of the recent study showed that less than two-thirds of them were housewives and that over half of them had completed secondary or technical education. These findings agreed with those of *Abd Elaziz, et al., (2023)* and *Mahowd et al., (2020)* who also found that less than half of the women in their study had a secondary education and that over 75% of them were housewives.

Regarding residence, more than three-quarters of them lived in rural areas. These findings might be explained by the fact that Benha University Hospital is the primary healthcare facility in Benha, serving a sizable patient base, particularly from the nearby villages and rural areas. This finding is consistent with that of *Alkhamis (2021)*, who discovered that the majority of participants were married and came from rural areas.

According to the current study's infertility profile, half of the women who were studied got married between the ages of 20 and 30. Of those experiencing infertility, less than two thirds have primary infertility, and a smaller percentage have a

family history of PCOS-related infertility. Furthermore, fewer than half of them have had a PCOS diagnosis for five to ten years. This may be due to infertility is one prominent feature of PCOS.

These findings concur with those of *Bahadori et al. (2022),* who found that higher mean domain was infertility had more problems in women with PCOS. However, these findings contradict those of *Rao et al. (2022),* who discovered that acne, rather than infertility, was the domain with the highest health-related quality of life score among women with PCOS.

Research indicates that women with PCOS most need to change the lifestyles in order to improve physical, clinical, and metabolic parameters as well as the overall quality of life. Furthermore, for these women, following a weight-loss diet is one of the best ways to treat their insulin resistance and infertility (**Nunes et al., 2019).**

When comparing the mean scores of the women's lifestyle domains under study, there was a significant statistical difference at the pre-implementation, 4-week, and 3-month post-implementation phases (p-value<0.001). Furthermore, there was an increase in the overall mean score after implementation as opposed to before. In the researcher's point of view, this could be because the 5A's model is applied, which offers the chance to clear up misconceptions and give women the psychological support they need to change their lifestyle. Similarly**,** *Ribeiro et al., (2021)* found that following eight weeks of a stress management program, women with PCOS experienced improvements in their quality of life. For overweight and obese PCOS women, lifestyle modification and cognitive-behavioral therapy enhanced quality of life.

The aforementioned outcomes supported the first research hypothesis which stated that the studied women will exhibit better lifestyle after application of lifestyle modification strategy based on 5As model than before.

Concerning the body mass index, the mean BMI of the studied women were 27.45±4.28 kg/m2, 25.78±3.09 kg/m2 and 26.02±3.07 kg/m2 at pre-implementation, 4 weeks and 3 months post-implementation phases respectively with statistically significant difference between the three phases (p≤0.05). This may be due to all the studied women were diagnosed with PCOS so a high percentage of them suffered from overweigh. Also, *Cao et al., (2023)* stated that the average BMI was 27.02 kg/m2 (SD = 4.57). With an average duration of infertility of 3.62 (SD = 2.27), 86.2% of women were childless.

Regarding the average scores of the body-image items for the women under study, there was a highly significant statistical difference at the pre-implementation, 4-week, and 3-month post-implementation phases (p-value<0.001). Additionally, the total mean score of body-image of studied women was decreased at post-implementation phases compared to pre-implementation phase whereas lower mean scores indicating decreasing body image dissatisfaction. This may be due to that women's self-esteem and self-image are negatively impacted by PCOS symptoms that are specifically linked to physical appearance, which worsens the quality of life associated with health. In the meantime, lifestyle counseling during the application of the 5A's model offers the chance to change eating habits and physical activity levels, both of which have a positive impact on controlling weight. Following implementation, all of these changes result in a decrease in body image dissatisfaction.

The above-reported results agreed with *Malik et al., (2021)* who indicated that women with PCOS require the assistance of healthcare professionals in order to make changes because they are more likely to experience depression and body image issues. Also, *Wright et al., (2021)* showed that women with PCOS have unique barriers to exercise (including poor body image, depression, and stigma-related stress).

The above-mentioned results supported the *second study hypothesis* which stated that the studied women will be more satisfied with body image after application of lifestyle modification strategy based on 5As model than before.

Regarding the health-related quality of life domain mean scores of the women under study, there was a highly statistically significant difference at the pre-implementation, 4-week, and 3-month post-implementation phases with (p-value<0.001). Additionally, compared to the pre-implementation phase, the overall mean score of the women under study for PCOS health-related quality of life increased. This may be due to women who take part in the 5A's model have the chance to plan changes to their lifestyle that will improve their quality of life.

The above-mentioned results agreed with *Ibrahim et al., (2023)* who concluded that compared to pre-intervention, women with PCOS had significantly higher scores on the post-life modification assessment and quality of life (emotion, weight, body hair, irregular menstruation, and infertility). Additionally, *D'Souza et al., (2022)* revealed a highly significant difference in the intervention group's satisfaction with health and a highly significant difference in all domains of quality of life, while the control group's scores stayed constant after six months. Similarly, *Agrawal et al., (2022)* who reported that polycystic ovary syndrome had negative impacts on health related quality of life. Also, *Joshi et al., (2022)* who found that health related quality of life is reduced in women with PCOS when compared with general population.

The above-mentioned results supported *the third research hypothesis* which stated that the studied women will exhibit higher quality of life after application of lifestyle modification strategy based on 5As model than before.

Regarding women's satisfaction with life, there was a high statistically significant difference among mean scores regarding all items of women's satisfaction with life at pre-implementation, 4 weeks and 3 months post-implementation phases with (p- value<0.001). Additionally, studied women were satisfied with life at post-implementation more than pre-implementation. In the researchers' point of view, these results may be due to the symptoms of PCOS can lead to a significant reduction in quality of life as PCOS is associated with low level of satisfaction with body image and low self-esteem that causing low QOL while after implementation of 5As model women had chance to change lifestyle and set goal to play on reducing the weight and adapt healthy nutritional behavior. All these factors play an important role in making women more satisfied with life.

The above-mentioned results agreed with *Nunes et al., (2019)* revealed that, after six months, the scores of the control group stayed constant, but there was a highly significant difference in the intervention group's perception of their quality of life and level of satisfaction with their health. Also, *Rzońca et al., (2018)* who stated that compared to the other groups under study, the women with PCOS had lower levels of life satisfaction.

The above-mentioned results supported *the fourth research hypothesis* which stated that the studied women will be more satisfied with life after application of lifestyle modification strategy based on 5As model than before.

Regarding correlations between variables, at the pre-implementation, 4-week, and 3-month post-implementation phases, there was a statistically significant negative correlation (P≤0.001) between the overall lifestyle score and the total scores of body image dissatisfaction of the women under study with regard to PCOS. In the meantime, the three phases of the study showed a highly significant statistical positive correlation between the overall lifestyle score and the overall quality of life of the women with PCOS. This could be

because women with PCOS require dietary guidance, exercise, psychological support, and heightened self-efficacy to manage the illness, which ultimately results in a higher quality of life and a reduction in body image dissatisfaction. The results above were in line with those of *Malik et al. (2021),* who found a highly significant statistically negative correlation between body image dissatisfaction and lifestyle score.

Regarding correlation between total quality of life and total satisfaction with life scores of the studied women before the implementation, four weeks and three months after the implementation, there was a highly significant statistical positive correlation between two variables. Similarly, *D'Souza et al., (2022)* a highly significant difference in the intervention group's perception of their quality of life and level of satisfaction with their health, while the control group's scores stayed unchanged after six months.

Conclusion:

The findings of current research concluded that the implementation lifestyle modification strategy based on 5As model was effective in reducing body image dissatisfaction, improving lifestyle and health-related quality of life and raising satisfaction with life among woman with PCOS. In addition, the total mean score of body-image dissatisfaction was reduced at 4 weeks and 3 months post-implementation phases compared to pre implementation with highly statistical significance difference. As well as, total health-related quality of life and total satisfaction with life of studied women showed significant improvement in 4 weeks and 3 months post intervention compared to pre intervention. As a result, the study's aim was achieved and the hypotheses were supported.

Recommendations:

Based on research findings it was recommended that:

- − All women with PCOS should receive printed booklets and brochures containing lifestyle guidelines based on 5As model. These booklets should be kept available in all obstetrics and gynecological outpatient clinics.
- − Women with PCOS should receive continuous structured education programs emphasizes on lifestyle modification and psychological support.

Further researches:

- − Providing maternity nurses with specialized training on the 5As model steps application to create a care plan for women with PCOS.
- − To ensure more generalization of the results, replication of the study on large representative probability sample is recommended

References:

Aba, Y. A., & Aytek Şik, B.. (2022): Body image and sexual function in women with polycystic ovary syndrome: a case-control study. Revista Da Associação Médica Brasileira, 68(9), 1264–1269. https://doi.org/10.1590/1806-9282.20220367.

Abd Elaziz S S., Hasneen S A., El-Sayed H A., & Abd Elmordy Z R., (2023): Knowledge and Quality of Life of Women with Polycystic Ovary Syndrome. *Journal of Nursing Science Benha University*. Volume 4, Issue 2, DOI: 10.21608/jnsbu.2023.310629

Abobaker R M., Fouad A L., Flordeliza M U., ET AL., (2021): Effect of Educational Program on

Quality of Life among Women with Polycystic Ovarian Syndrome. Egyptian Journal of Nursing & Health Sciences. 3(1): 134-154

Agrawal K. H., Belgaumkar V. A., Chavan R. B. and Deshmukh N. S., (2022): Impact of Hirsutism on the Quality of Life: A Cross-Sectional Pilot Study from Dermatology Life Quality Index Western India. *Journal of Skin and Stem Cell*; 9(2): 31-32.

Alkhamis, F., (2021): Polycystic Ovary Syndrome, A Local Perceptual Study. *Scholars International Journal of Obstetrics and Gynecology*; 4(9): 348-355.

Arentz S, Smith CA, Abbott J, Bensoussan A., (2021): Perceptions and experiences of lifestyle interventions in women with polycystic ovary syndrome (PCOS), as a management strategy for symptoms of PCOS. BMC Women's Health. 2021; 21(1):107.

Bahadori F., Jahanian Sadatmahalleh S., Montazeri A. and Nasiri M., (2022): Sexuality and psychological well-being in different polycystic ovary syndrome phenotypes compared with healthy controls: a cross-sectional study. *BMC women's health*; 22(1): 1-12.

Benha University Hospitals Statistical Census Center (2022): Annual obstetric and gynecological department census at Benha University Hospitals.

Burtin A, Clet E, Stevens N, Kervran C, Frevol M, Ratel R, Moysan P, Alla F; Factors associated with the implementation of the 5As model of smoking cessation support during pregnancy: A scoping review. *Tobacco Induced Diseases*. 2023 Aug 30;21:110. doi: 10.18332/tid/169623. PMID: 37654503; PMCID: PMC10467347.

Cao, Y., Li, G. & Ren, Y., (2023): Association between self-reported sedentary behavior and health-related quality of life among infertile women with polycystic ovary syndrome. *BMC Women's Health* 23, 67 (2023). https://doi.org/10.1186/s12905-023-02222-5

Chatterjee M, Bandyopadhyay S., (2020): Assessment of the prevalence of polycystic ovary syndrome among the college students: A case–control study from kolkata. *Journal of Mahatma*

Gandhi Institute of Medical Sciences. 25(1):28.doi: 10.4103/jmgims.jmgims_62_19.

D'Souza P, Rodrigues DE, Kaipangala RG, Leena KC.(2022): Effectiveness of Multimodular Interventions of Lifestyle Modification on Symptoms of Polycystic Ovarian Syndrome and Quality of Life among Women- A Pilot Study, *Journal of Clinical and Diagnostic Research*. 16(2), LC27-LC31. https://www.doi.org/10.7860/JCDR/2022/50394/16 030.

Denga, A., (2021): Oxford Handbook of Women's Health Nursing, Fertility and subinfertility,2nd ed., Oxford University Press, United State, P.518.

Deswal R, Narwal V, Dang A, Pundir CS., (2020): The prevalence of polycystic ovary syndrome: A brief systematic review. *Journal of Human Reproductive Sciences;* 13(4):261. doi: 10.4103/jhrs.JHRS_95_18

Diener E, Emmons RA, Larsen RJ and Griffin S. (1985): The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49: 71-75. http://internal.psychology.illinois.edu/~ediener/SW LS.html

Dybciak, P., Humeniuk, E., Raczkiewicz, D., Krakowiak, J., Wdowiak, A. and Bojar, I., (2022): Anxiety and Depression in Women with Polycystic Ovary Syndrome. *Medicine:* 58(7): 942.

Giampaolino P, Foreste V, Di Filippo C, Gallo A, Mercorio A, Serafino P, Improda FP, Verrazzo P, Zara G, Buonfantino C, et al., (2021): Microbiome and PCOS: state-of-art and future aspects. *International Journal of Molecular Sciences.* 22(4):2048.

Goh JE, Farrukh MJ, Keshavarzi F, Yap CS, Saleem Z, Salman M, Ramatillah DL, Goh KW and Ming LC (2022): Assessment of prevalence, knowledge of polycystic ovary syndrome and health-related practices among women in klang valley: A cross-sectional survey. *q*13:985588. doi: 10.3389/fendo.2022.985588

Guo, Y., Liu, Y., Ding, R. et al. (2023): A structural equation model linking health literacy, self-efficacy, and quality of life in patients with polycystic ovary syndrome. *BMC Women's Health*

23, 98 (2023). https://doi.org/10.1186/s12905-023-02223-4

Ibrahim A A, Ghoneim HM, Elsaid NMAB, Shalaby NS., (2023): Effectiveness of Lifestyle Modification on Health-Related Quality of Life among Women with Polycystic Ovary Syndrome. *Iranian Journal of Nursing and Midwifery Research*. 21;28(3):286-292. doi: 10.4103/ijnmr.ijnmr_380_21. PMID: 37575505; PMCID: PMC10412787.

Iowa State University of Science and Technology (2020): Research Methodologies Guide (Quasi-Experimental Design). Available at: https://instr. iastate.libguid e s.com/research methods. Accessed on October 10, 2023, 9 am.

Ismayilova, M. and Yaya, S., (2022): "I felt like she didn't take me seriously" a multi-methods study examining patient satisfaction and experiences with polycystic ovary syndrome (PCOS) in Canada. *BMC women's health*; 22(1): 1-21.

Joshi B., Patil A., Kokate P. P., Akula A. J., Shaikh S. A., Tandon D.and Nayak A. S., (2022): Assessment of Health-Related Quality of Life Using PCOSQ Tool, Its Determinants and Coping Mechanisms Used by Women with Polycystic Ovarian Syndrome Attending Multidisciplinary Clinic in Mumbai, India. *The Journal of Obstetrics and Gynecology of India*; 43(1):1-8.

Mahowd, F., Hassan, S., Fekry, N. and Barkat, R., (2020): Sexual health of women with polycystic ovarian syndrome. *Mansoura nursing journal*; 7(2): 76-100.

Malik N, Ahmed M (2021): Body Image Dissatisfaction, Depression and Quality of Life in Women with Polycystic Ovary Syndrome. *Clinical Psychiatry;* 7(6):111.

Mani H, Khunti K, Daly H, Barnett J and Davies M. (2015): Education and self-management for women with polycystic ovary syndrome: A narrative review of the literature. *Ibnosina Journal of Medicine and Biomedical Sciences.*7:1–9. (https://doi.org/10.4103/1947-489X.210263).

Mateo, K. F. et al., (2018): Development of a 5As-based technology-assisted weight management intervention for veterans in primary care. BMC

Health Services Research. 18(1), 47. https:// doi. org/ 10. 1186/ s12913- 018- 2834-2 (2018).

McDermott E, Moloney J, Rafter N, Keegan D, Byrne K, Doherty GA, Cullen G, Malone K and Mulcahy HE. (2014): The Body Image Scale: A Simple and Valid Tool for Assessing Body Image Dissatisfaction in Inflammatory Bowel Disease, *Inflammatory Bowel Diseases*,20(2):286-290, https://doi.org/10.1097/01.MIB.0000438246.68476.c4.

Morshedi T, Salehi M, Farzad V, Hassani F, Shakibazadeh E., (2022): The status of relationship between coping strategies and quality of life in women with polycystic ovary syndrome. *Journal of Education and Health Promotion* 2021;10:185.

Nasiri-Amiri F, Tehrani FM, Simbar M, Montazeri A and Mohammadpour RA. (2018): The Polycystic Ovary Syndrome Health-Related Quality-of-Life Questionnaire: Confirmatory Factor Analysis International Journal of Endocrinology and Metabolism |; 16(2): e12400.

Naumova I, Castelo-Branco C, Kasterina I, Casals G. (2021): Quality of life in infertile women with polycystic ovary syndrome: a comparative study. *Reproductive Sciences* ;28(7):1901–9.

Nautiyal H, Imam SS, Alshehri S, Ghoneim MM, Afzal M, Alzarea SI, et al., 2022: Polycystic ovarian syndrome: a complex disease with a genetics approach. *Biomedicines* 2022; 10(3): 540.

Nunes DL, Santos D, Cobucci R, Pichini GS, Soares GM, de Oliveira Maranhão ., (2019): Lifestyle interventions and quality of life for women with polycystic ovary syndrome. *Medicine*. 2019; 98(50):71-79.

Orbetzofa, M., (2020): Polycystic Ovarian Syndrome, Clinical impact of insulin resistance in omen with PCOS, 1st ed., Intech Open, London, P.33.

Pavot, WG, Diener E, Colvin CR AND Sandvik E. (1991): Further validation of the Satisfaction with Life Scale: Evidence for the cross-method convergence of well-being measures. *Journal of Personality Assessment*, 57, 149-161.

Rao V., Cowan S., Armour M., Smith C. A., Cheema B., Moran L., and Ee, C., (2022): A Global Survey of Ethnic Indian Women Living with Polycystic Ovary Syndrome: Concerns, Diagnosis Experiences, Quality of Life, and Use of Treatment Methods. *International Journal of Environmental Research and Public Health*; 19(23): 15850.

Ribeiro VB, Lopes IP, Dos Reis RM, Silva RC, Mendes MC, Melo AS, et al., (2021): Continuous versus intermittent aerobic exercise in the improvement of quality of life for women with polycystic ovary syndrome: *A randomized controlled trial. Journal of Health Psychology*; 26:1307-17.

Rzońca E, Bień A, Wdowiak A, Szymański R, Iwanowicz-Palus G., (2018): Determinants of Quality of Life and Satisfaction with Life in Women with Polycystic Ovary Syndrome. *International Journal of Environmental Research and Public Health*; 22;15(2):376. doi: 10.3390/ijerph15020376. PMID: 29470449; PMCID: PMC5858445.

Salama AM and Elbana HM, (2019): Effect of Self Instructional Module on awareness of Polycystic Ovarian Syndrome among Adolescent Students. *American Journal of Nursing Research*, 6(7):1009-1019.

Sánchez-Ferrer, M.L., Adoamnei, E., Prieto-Sánchez, M.T. (2020): Health-related quality of life in women with polycystic ovary syndrome attending to a tertiary hospital in Southeastern Spain: a case-control study. Health Quality Life Outcomes 18, 232. https://doi.org/10.1186/s12955-020-01484-z

Sioma-Markowska U., & Milena O., (2021): Polycystic ovary syndrome and the perception of body image by women. Gin Pol Medical Project 1 (59): 028-03

Wang Y, Ni Z, Li K., (2021): The prevalence of anxiety and depression of different severity in women with polycystic ovary syndrome: a meta-analysis. *Gynecological Endocrinology*. 2021; 37(12):1072–8.

WHO. (2021): Draft Recommendations for the Prevention and Management of Obesity over the Life Course, Including Potential Targets. (Version dated 19 August 2021).

Wright PJ, Corbett CL, Pinto BM, Dawson RM, Wirth MD., (2021): The impact of exercise perceptions and depressive symptoms on polycystic ovary syndrome-specific health-related quality of life. *Women's Health* (Lond). doi: 10.1177/17455065211065865. PMID: 34913389; PMCID: PMC8689599.

Wulfovich, S., Buur, J., and Wac, K., (2022): Quality of Life, Unfolding the Quantification of Quality of Life, 1st ed., Springer, Switzerland, P 12.

Zaman S., Yunus S., Asif U., Noor K., Hayat R., Khan A., Noor K., Misha K., (2023): Assessment of Body Image Distress in Women with Polycystic Ovarian Syndrome. *Pakistan Journal of Medical & Health Sciences*. 17(4):299-302. DOI: https://doi.org/10.53350/pjmhs2023174299

ZareMobini F, Farajzadegan Z, Kazemi A, Salehi M., (2022): Effect of using 5A's model for lifestyle counseling on psychological symptoms in women with polycystic ovary syndrome: a randomized field trial. *Scientific Reports*.17;12(1):21847. doi: 10.1038/s41598-022-26274-z. PMID: 36528714; PMCID: PMC9759549.

Zeng X, Xie YJ, Liu YT, et al., (2020): Polycystic ovarian syndrome: Correlation between hyperandrogenism, insulin resistance and obesity. *Clinica Chimica Acta Journal.* 2020; 502:214–21.