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Effectiveness of a Nurse-Led Educational Protocol on Decreasing Depression and Improving Quality of Life Among Women with Polycystic Ovary Syndrome: A Quasi-Experimental Study

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ABSTRACT: Background: Polycystic Ovary Syndrome (PCOS) is a highly prevalent reproductive endocrine disorder among women of childbearing age that significantly diminishes health-related quality of life and precipitates psychological morbidities. Objectives: This study aimed evaluate the effectiveness of a structured, nurse-led educational protocol on decreasing depression levels and improving health-related quality of life (HRQoL) among women diagnosed with PCOS.

Materials and Methods: A quasi-experimental (pre-test and post-test) design was used at the outpatient gynecological clinic of Benha University Hospital. A purposive sample of 100 women with PCOS was enrolled. Data collection utilized a structured interviewing questionnaire, a PCOS knowledge assessment tool, a healthy self-care practice scale, the Health-Related Quality of Life Questionnaire (PCOSQ-50), and the Beck Depression Inventory (BDI).

Results: Post-intervention findings revealed a highly significant surge in cumulative disease knowledge scores, rising from a baseline mean of 8.85 ± 5.73 to 33.57 ± 3.91 out of 36 marks ($p < 0.001$). Cohort adherence to healthy self-care practices improved significantly, with mean scores escalating from 11.41 to 28.85 ($p < 0.001$).

Conclusion: A structured, nurse-led educational protocol serves as an exceptionally effective clinical strategy for mitigating depressive manifestations, rectifying health literacy gaps, and systematically maximizing multi-dimensional quality of life parameters among women living with polycystic ovary syndrome.

Recommendation: Nurse-led educational guidelines is fundamentally recommended as a core component within outpatient gynecological care paths. Furthermore, the systematic enforcement of routine, periodic mental health screenings for the early detection and management of clinical depression, alongside multidisciplinary lifestyle promotion programs, is vital to sustain optimal long-term health outcomes.

1. INTRODUCTION

Polycystic ovary syndrome (PCOS) represents the most prevalent endocrine disorder affecting women of childbearing age, typically presenting through hyperandrogenism, chronic anovulation, and polycystic ovarian appearance on ultrasound. Although its exact etiology remains incompletely understood, it is widely considered the result of intricate interplay among genetic susceptibility, metabolic alterations, and environmental influences.[1] A major contributing factor in adults is central obesity, which is observed in no less than 30% of affected individuals. Furthermore, insulin resistance—affecting roughly 50% to 70% of women with PCOS—drives compensatory hyperinsulinemia and elevates the risk of metabolic sequelae such as impaired glucose tolerance, metabolic syndrome, atherogenic dyslipidemia, and arterial hypertension.[2,3] Beyond metabolic derangements, the clinical spectrum of PCOS encompasses reproductive abnormalities (oligo-amenorrhea and impaired fertility) as well as psychological morbidities, including heightened rates of anxiety and depressive disorders. [2,4]

Health-related quality of life (HRQoL) is a comprehensive framework evaluating how diseases and their treatments impact an individual's physical, emotional, and social well-being.[1] Chronic conditions such as polycystic ovary syndrome (PCOS) can profoundly impair overall quality of life (QoL), necessitating precise assessment.[5] HRQoL is typically measured using both generic and disease-specific instruments. A substantial body of evidence highlights that women with PCOS experience a

marked deterioration in life quality alongside elevated stress, which negatively influences their mental health, social interactions, and sexual well-being.[5,6]

To standardize and enhance clinical care for PCOS, evidence-based guidelines have been established by integrating research findings, expert clinical consensus, and patient perspectives. These directives outline recommended standards of practice to benchmark healthcare delivery. Adherence to such clinical guidelines has been shown to optimize treatment outcomes, elevate care quality, reduce clinical practice disparities, and lower overall medical expenditures.[7,8]

The maternity nurse serves as a cornerstone in the healthcare system, playing a critical role in addressing and reducing this phenomenon. Through dedicated counseling and education, nurses significantly improve the wellbeing of women with Polycystic Ovary Syndrome (PCOS). They offer essential support to help patients overcome body image struggles caused by the physical symptoms of the condition, while educating them on associated health risks to prevent future complications. Additionally, nurses motivate women to adopt healthier lifestyles and connect them with local support groups to strengthen their personal coping strategies.[9,10]

PCOS stands as one of the most pervasive reproductive endocrine malignancies affecting women of childbearing age globally. According to the updated global epidemiological data from the World Health Organization (2026), PCOS impacts millions of women worldwide, presenting a substantial public health and economic burden. On a regional scale, contemporary Egyptian epidemiological literature highlights an exceptionally high prevalence, indicating that the syndrome affects up to 18.0% of women within the reproductive age bracket. This high regional prevalence underscores the critical need for targeted healthcare strategies tailored to this population.

Recent neuroendocrine and clinical research demonstrates that the physiological distress of PCOSdriven by hyperandrogenism, metabolic syndrome, and visible stigmata like hirsutism and obesity, frequently precipitates severe affective disorders, including clinical anxiety and major depression (Smith & Taylor, 2025; Kowalczyk et al., 2026). Standard medical management protocols primarily focus on reducing body weight, improving insulin sensitivity, restoring regular menstrual cyclicity, treating dermatological features, and preserving fertility. However, conventional pharmaceutical treatments often fail to address the profound psychosocial vulnerabilities and health literacy gaps experienced by these patients.Given the documented scarcity of comprehensive public health education programs in outpatient gynecological settings, this study was undertaken to evaluate the direct impact of a structured, nurse-led educational protocol on decreasing depression and maximizing health-related quality of life among women diagnosed with PCOS.

Research objectives

The primary objective of the current study was to evaluate the effectiveness of a structured, nurse-led educational protocol on decreasing depression levels and improving health-related quality of life (HRQoL) among women diagnosed with Polycystic Ovary Syndrome (PCOS).

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Research Hypotheses:

H1: Women with polycystic ovary syndrome exposed to the nurse-led educational protocol will demonstrate significantly higher post-intervention mean scores in disease-specific knowledge and healthy self-care practices compared to their pre-intervention baseline levels.

H2: Women with polycystic ovary syndrome exposed to the nurse-led educational protocol will exhibit significantly improved health-related quality of life scores and a concurrent reduction in depressive symptoms compared to their pre-intervention baseline values.

2. MATERIALS AND METHODS

2.1 Study design and setting

To fulfill the objectives of this investigation, a quasi-experimental (pre-test and post-test) research design was utilized to measure the empirical outcomes of the implemented nursing protocol. It was conducted within the outpatient gynecological clinic at Benha University Hospital. This tertiary healthcare facility provides specialized diagnostic assessments, therapeutic management, prenatal surveillance, and family planning services for women presenting with diverse reproductive endocrinopathies and gynecological disorders, including Polycystic Ovary Syndrome (PCOS).

2.2 Study participants and sampling

A purposive sampling approach was utilized to enroll eligible participants who met the inclusion criteria.The sample size calculation was derived from the institutional census records of the outpatient clinic for the preceding year, which indicated an average annual admission rate of 133 women diagnosed with PCOS (N = 133). Applying Slovin's sample size formula,sample size (n) based on the total population size (N) and the acceptable margin of error (e) the computation is structured as follows:

Consequently, the final target cohort was established at a complete, mathematically precise sample of **(n = 100)** women, perfectly matching the final analyzed dataset. Inclusion Criteria: The study enrolled women of reproductive age who were explicitly diagnosed with PCOS, possessed intact communication skills, and were entirely free from any medical disease (such as pre-existing Type 1 or Type 2 Diabetes Mellitus, advanced cardiovascular disorders, or thyroid malignancies).

$$n = \frac{133}{1 + 133(0.0025)} = \frac{133}{1 + 0.3325} = \frac{133}{1.3325} = 100$$

Criteria of sampling: women with polycystic ovary syndrome at childbearing age, and free from medical disorders (such as diabetes mellitus).

2.3 Data collection and instrument tools

Four distinct, structured instruments were utilized to accumulate comprehensive empirical data across both the pre-intervention and post-intervention operational phases.

First Tool: Structured Interviewing and Knowledge Assessment Questionnaire

This instrument was synthesized by the investigators in the Arabic language following a rigorous analysis of contemporary reproductive medicine and nursing literature. It is partitioned into three functional segments:

- **Part I Socio-demographic Profile :** Quantified baseline demographic variables, including chronological age, formal educational attainment, geographical residence, and occupational background.
- **Part II (Obstetrical and Clinical History):** Gathered anthropometric data (maternal body weight and Body Mass Index) and menstrual patterns (menstrual cycle duration in days, estimated volumetric bleeding amount, rhythm regularity, and duration of marriage).
- **Part III (PCOS Knowledge Assessment):** A closed-ended, multi-response questionnaire designed to quantify patient disease literacy before and after the protocol. It comprised **six major multiple-choice questions** evaluating definition (3 items), clinical signs and symptoms (8 items), underlying risk factors (8 items), systemic complications (6 items), therapeutic options (3 items), and health promotion strategies (8 items). Participants selected multiple correct options where applicable.

Scoring System of Knowledge:

Correct responses were allocated a score of 1, and incorrect selections received a 0. The cumulative knowledge index was derived by summing all correct answers, yielding a total possible range of 0 to 36 marks. Higher scores indicate superior clinical literacy. The total knowledge score was indicated as the following:

Good Knowledge: ≥ 75 % of total score (≥ 27 marks).

Average Knowledge: 60 % - <75 % of total score (22–26 marks).

Poor Knowledge: < 60% of total scores (<22) marks).

Second Tool: The Beck Depression Inventory (BDI)

To assess the psychological endpoints outlined in the study title and abstract, a validated Arabic version of the standard Beck Depression Inventory was administered to quantify the severity of depressive symptoms and affective distress before and after the educational implementation.

Third Tool: Healthy Self-Care Practice Assessment Scale

This three-point Likert scale was designed by the investigators to systematically measure the adoption of self-protective behaviors that alleviate the severity of PCOS symptoms. It features 18 distinct behavioral items distributed across three fundamental functional domains: nutritional self-care adjustments (8 items), physical conditioning patterns (6 items), and compliance with the medical treatment protocol (4 items).

- **Scoring Matrix:** Responses were coded as **0 (Never Done)**, **1 (Sometimes Done)**, or **2 (Usually Done)**. The aggregate practice score ranges from **0 to 36 marks**, where higher scores indicate satisfactory execution of health-promoting behaviors. Levels were divided into:

Satisfactory practice: ≥ 60% of total score (≥ 22 marks)

Unsatisfactory practice: < 60%% of total score (< 22 marks).

Fourth Tool: Health-Related Quality of Life Questionnaire for PCOS (PCOSQ-50)

Adopted from Amiri et al. (2016), this validated, condition-specific instrument evaluates the multifaceted quality of life domains unique to women dealing with PCOS. The tool comprises 50 structured items organized across six operational subscales: psychosocial and emotional well-being (12 items), fertility challenges (9 items), sexual function (7 items), obesity and menstrual disturbances (9 items), hirsutism stigmata (6 items), and psychological coping mechanisms (7 items).

- Scoring Matrix: Items are scored using a 5-point Likert scale ranging from 1 (Always / Worst Clinical Presentation) to 5 (Never / Best Condition). The absolute cumulative score ranges between 50 and 250. Domain-specific averages are derived by dividing the aggregate subscale scores by their respective item count. An authenticated Arabic version was administered. The global HRQoL scores were classified as:

High quality of life: >75% of the cumulative score (> 18.5 marks) .

Moderate quality of life: 60-75 % of the cumulative score 150 – 187.5 marks) .

Low quality of life: <60% of the cumulative score (<150 marks).

Field Implementation and Procedure

The study was executed over a six-month period, extending from the 1st of July 2025 to the end of March 2026. Data collection was conducted by the investigators during field visits scheduled three days per week (Sunday, Monday, and Wednesday) between 9:00 AM and 12:00 PM, aligning with the official operating hours of the outpatient gynecological clinic. The intervention protocol progressed through four operational phases:

1. Assessment Phase

Following official administrative clearance, each woman was interviewed individually in a private clinic setting. The researchers provided an explanation of the study's aims and procedures before inviting the women to participate. Eligible patients were administered the data collection tools as a pre-test baseline to evaluate their disease-specific knowledge, healthy lifestyle practices, and health-related quality of life. The data from this phase were analyzed to identify the specific educational gaps and self-care deficiencies within the cohort.

2. Planning Phase

Based on the clinical deficits identified during the assessment phase, the pilot study observations, and contemporary evidence-based guidelines, the researchers designed the educational health intervention. The observed clinical deficiencies were translated

into targeted educational objectives. The curriculum was delivered using interactive teaching strategies, such as small-group discussions, to foster engagement and ensure comprehension.The ultimate goal of the intervention was to optimize health-related quality of life and decrease depression among the participants. The core content of the intervention guidelines gripped:

- Conceptual overview, clinical signs, and symptomatic presentation of PCOS.
- Underlying metabolic risk factors and long-term physical and psychological complications.
- Positive behavioral adjustments to decrease the severity of PCOS symptoms.
- Healthy nutritional modifications and dietary lifestyle changes.
- The clinical importance of routine physical activity and daily exercise regimens.
- Active compliance and adherence to the prescribed medical treatment protocol.

3. IMPLEMENTATION PHASE

The execution of the structured, nurse-led educational protocol was conducted across **12 separate training sessions** tailored for the enrolled participants. To optimize group dynamics, interactive learning, and clinical counseling, the total cohort of **(n = 100) women** was systematically organized into **six small educational groups**, with each group consisting of approximately 16 to 17 participants.

For each group, the curriculum was implemented over two core sessions, with individual session durations ranging between 45 and 60 minutes. An additional 10 to 15 minutes was integrated at the conclusion of each session to facilitate data summarization, group discussions, and immediate comprehension evaluation.

To reinforce longitudinal compliance and reinforce retention, a comprehensive, culturally adapted **educational booklet** developed by the investigators was distributed to every participant. This health literacy tool contained illustrated content detailing the conceptual definition, clinical stigmata, metabolic risk factors, and systemic complications of PCOS. Crucially, the booklet laid out extensive evidence-based instructions regarding therapeutic dietary adjustments and self-care healthy practices:

- Low-Glycemic Index (GI) Nutritional Regimen: Instructed participants to replace simple sugars with whole grains, legumes, nuts, seeds, fresh fruits, and non-starchy, fiber-dense vegetables to minimize insulin spikes.
- Anti-Inflammatory Dietary Protocol: Promoted the regular intake of micronutrient-dense items, including berries, omega-3 fatty acid-dense fish, leafy green vegetables, and extra virgin olive oil, to directly counter systemic inflammation and alleviate chronic fatigue.
- Dietary Approaches to Stop Hypertension (DASH) Framework: Focused on a dietary path rich in lean poultry, fish, low-fat dairy products, and complex carbohydrates while strictly avoiding trans fats, high saturated lipids, and refined sugars to lower long-term cardiometabolic risks.

Furthermore, the protocol focused on the clinical importance of weight management to reverse metabolic dysfunction and improve health-related quality of life (HRQoL). Participants were instructed to incorporate physical activity into their daily routines, explicitly aiming for more than 30 minutes of low-to-moderate intensity daily walking and aerobic exercises. In tandem with behavioral modifications, the physiological mechanisms, intended clinical effects, and side-effect profiles of prescribed medications were detailed to reinforce strict adherence to the treatment protocol and improve attendance at routine follow-up consultations.

4. EVALUATION PHASE

A longitudinal, comparative pre-test and post-test design was used to track intervention outcomes. The primary endpoints were measured at two distinct temporal intervals:

- **Pre-Intervention Baseline Assessment:** Conducted immediately prior to the implementation of the educational protocol to establish initial scores.

- **Post-Intervention Evaluation:** Executed exactly **one month following the conclusion of the educational protocol**, during the participants' scheduled outpatient clinic follow-up appointments. This phase re-evaluated the identical metrics to quantify improvements in disease-specific knowledge, healthy lifestyle practices, depression scores, and health-related quality of life parameters.

Validation and Reliability

To ensure scientific rigor, face and content validity were evaluated by an independent panel of five senior academic experts specializing in Obstetric and Women's Health Nursing. The panel reviewed the instruments for structural comprehensiveness, clinical appropriateness, and linguistic clarity, and all recommended modifications were seamlessly integrated. Internal consistency was determined statistically via Cronbach's Alpha coefficient testing. The instruments demonstrated high psychometric reliability, yielding an internal consistency value of (α = 0.890) for the Knowledge Assessment Questionnaire and (α= 0.894) for the Healthy Self-Care Practice Assessment Scale. Furthermore, the adapted PCOSQ-50 questionnaire demonstrated an excellent global reliability coefficient of (α = 0.95), with domain-specific values calculated as: psychosocial/emotional (α = 0.84), fertility (α = 0.92), sexual function (α = 0.85), obesity/menstrual disorders (α = 0.92), hirsutism (α = 0.94), and coping (α = 0.87).

Pilot Study:

A structured pilot study was conducted on 10.0% of the calculated sample size (n = 10) women) to evaluate the operational clarity, objectivity, and overall logistical feasibility of the data collection process, as well as to estimate the average time required to complete the questionnaires. Based on the insights generated from the pilot trial, necessary minor structural adjustments were implemented. To prevent bias and ensure data integrity, these 10 women were excluded from the final study cohort (n = 100).

Statistical Analysis

All collected data were coded, and entered into Statistical Package for the Social Sciences software, version 25.0, for comprehensive inferential and descriptive analysis. Continuous variables were expressed as means and standard deviations (Mean ±SD), whereas categorical and qualitative variables were summarized using frequencies and percentage distributions. Statistical significance for qualitative comparisons was evaluated using the Chi-Square test (X2). To analyze the empirical variations between the paired parametric data across the pre-test and post-test timelines, the paired-sample t-test was applied. The structural associations between clinical knowledge, behavioral self-care practices, depression indices, and health-related quality of life domains were computed using Pearson's correlation coefficient (r).The designated threshold for statistical significance was maintained under strict clinical research parameters: Non-significant (NS) result: ($p > 0.05$). Statistically significant correlation: ($p < 0.05$). Highly significant outcome: ($p \leq 0.001$).

ETHICS STATEMENT

The research protocol strictly conformed to institutional ethical guidelines. Formal institutional approval was obtained from the Dean of the Faculty of Nursing at Zagazig University, Egypt and subsequently endorsed by the administrative director of Zagazig University Hospital before starting data collection (Approval No. ID/Zu.Nur.REC#: 239), dated May, 2025, . Prior to participant enrollment, voluntary informed consent was obtained from each woman during the introductory session. Participants were fully informed about the study's purpose, risks, and clinical benefits. They were assured that their participation was completely voluntary and that they maintained the right to withdraw from the study at any stage without penalty or compromise to their standard clinic care. Confidentiality and data anonymity were maintained throughout the study.

3. RESULTS

3.1 Socio-demographic Profile

Table 1: Regarding sociodemographic data, the mean age of the participants was 32.70 ± 6.25 years. The mean score for educational level was 2.17 ± 0.62, indicating that a substantial proportion of the sample attained a secondary or higher education. Furthermore, the mean values for residence (0.35 ± 0.48) and occupational status (0.40 ± 0.49) reveal that the majority of the participants resided in urban areas and were unemployed at the time of the study. In terms of clinical and menstrual history, the mean duration of menstruation was 6.36 ± 1.28 days, while the mean duration of marriage was 2.68 ± 0.76 years. The mean

score for the amount of menstrual bleeding was 0.49 ± 0.50, indicating an almost equal distribution between normal and excessive bleeding. Conversely, a prominent finding was observed regarding the regularity of menstruation; the mean score was 0.20 ± 0.40, which demonstrates that a vast majority (80%) of the participants suffered from irregular menstruation. Finally, concerning the history of PCOS, the mean duration since the onset of the syndrome was 1.47 ± 0.73 years. Additionally, the mean score for the treatment modality was 1.69 ± 0.75, reflecting that the clinical management of PCOS among the study sample leaned primarily toward medical intervention, followed by surgical options or a combination of both.

Table 1: Sociodemographic, Clinical, and Polycystic Ovary History Characteristics of the Participants.

Items	Mean ± SD
Sociodemographic Characteristics	
Age (years)	32.70 ± 6.25
Educational level	2.17 ± 0.62
Residence	0.35 ± 0.48
Occupational status	0.40 ± 0.49
Clinical History (Menstrual History)	
Duration (days)	6.36 ± 1.28
Amount of menstrual bleeding	0.49 ± 0.50
Regularity of menstruation	0.20 ± 0.40
Duration of marriage (years)	2.68 ± 0.76
Polycystic Ovary History	
Polycystic ovary onset (years)	1.47 ± 0.73
Treatment of polycystic ovary	1.69 ± 0.75

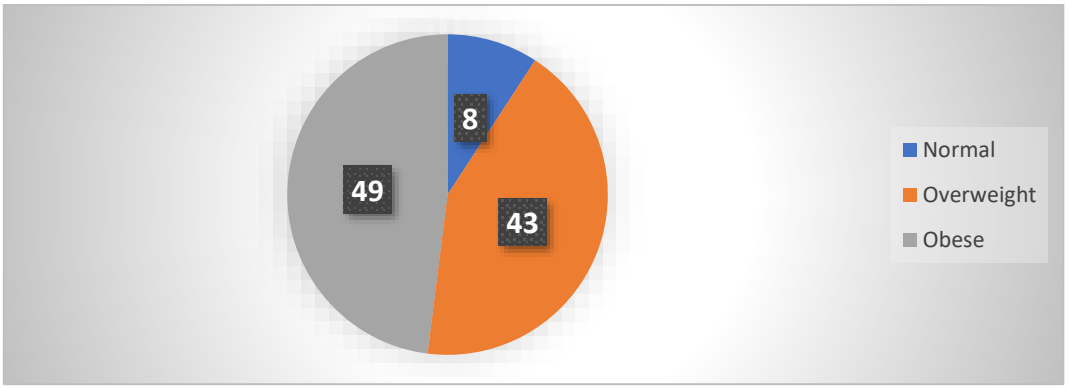


Figure (1): Distribution of baseline body mass index (bmi) categories women with PCOS (N = 100).

Figure 1 illustrates the percentage of the body mass index (BMI).The chart reveals a critical health profile, as nearly half of the participants (49%) are classified as Obese, followed closely by 43% who are Overweight. Conversely, a minimal proportion of the sample (8%) maintains a Normal body mass index. This prominent elevation in overweight and obesity rates (totaling 92%) strongly corresponds with the clinical manifestations and metabolic traits commonly associated with polycystic ovary syndrome (PCOS) within this population.

3.2 The Beck Depression Inventory (BDI)

Table 2 reveals a highly significant post-intervention surge in total PCOS knowledge from 8.85 ± 5.73 to 33.57 ± 3.91 out of 36 ($p < 0.001$).The most critical improvements were achieved in symptom-reducing healthy practices (7.47 ± 0.97) and clinical signs recognition (7.46 ± 0.99).

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Substantial progress was also recorded in understanding underlying risk factors, therapeutic options, and long-term complications (($p < 0.001$).The baseline pre-intervention data exposed a severe deficit in health literacy across all evaluated dimensions among the participants.Ultimately, these statistical findings provide empirical evidence of the high efficacy of the educational guidelines in rectifying patient misconceptions.

Table 2. Comparison of pcos-related knowledge scores among the studied women pre and post the implementation protocol (N = 100)

Knowledge Domains	Maximum Score	Pre-Intervention Score (Mean ± SD)	Post-Intervention Score (Mean ± SD)	Paired (t)-test	(p)-value
General Definition of PCOS	3	1.03 ± 0.71	2.73 ± 0.45	-18.79	< 0.001**
Clinical Signs and Symptoms	8	1.52 ± 0.26	7.46 ± 0.99	-35.55	< 0.001**
Underlying Risk Factors	8	1.70 ± 1.29	7.39 ± 1.00	-34.14	< 0.001**
Long-term Health Complications	6	1.68 ± 1.27	5.73 ± 0.74	-32.96	< 0.001**
Therapeutic Treatment Options	3	0.97 ± 0.67	2.77 ± 0.42	-22.24	< 0.001**
Symptom-Reducing Healthy Practices	8	1.95 ± 1.29	7.47 ± 0.97	-33.58	< 0.001**
Overall Knowledge Score	**36**	**8.85 ± 5.73**	**33.57 ± 3.91**	**-35.19**	**< 0.001***

Note: ** Statistically highly significant level at ($p < 0.001$).

3.3 Healthy Self-Care Practice Assessment Scale

Table 3 highlights a prominent and statistically highly significant reduction in depression levels alongside an improvement in psychosocial wellbeing among the participants post-intervention ($p < 0.001$)). Prior to the protocol, the women exhibited substantial emotional distress, evidenced by a low total baseline score of **22.55 ± 4.46**. Following the nurse-led educational intervention, the total psychosocial wellbeing score effectively doubled, reaching **44.21 ± 4.40** ($t = -36.17$, $p < 0.001$)). Remarkable enhancements were observed across all sub-items, particularly in reducing treatment pessimism, stabilizing emotional responses, and elevating self-esteem, which directly confirms the protocol's high clinical efficacy in alleviating depression.

Table 3. Effectiveness of the nurse-led educational protocol on decreasing depression and enhancing psychosocial wellbeing among women with PCOS (N = 100)

Psychosocial & Depression Symptoms	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Paired (t)-test	(p)-value
1. Freedom from depressive moods caused by PCOS	1.96 ± 0.60	3.68 ± 0.61	-20.02	< 0.001**
2. Emotional patience and endurance regarding the syndrome	2.01 ± 0.63	3.68 ± 0.64	-16.75	< 0.001**
3. Absence of self-blame and guilt concerning PCOS	1.93 ± 0.71	3.57 ± 0.58	-18.24	< 0.001**
4. Smoothness in social and interpersonal interactions	1.87 ± 0.63	3.62 ± 0.59	-21.08	< 0.001**
5. Elevated self-esteem and sense of self-worth	1.88 ± 0.65	3.68 ± 0.59	-21.15	< 0.001**
6. Reduction in aggressive feelings or irritability	1.77 ± 0.68	3.76 ± 0.63	-19.50	< 0.001**

7. Optimistic outlook regarding therapeutic treatments	1.81 ± 0.63	3.73 ± 0.64	-22.78	< 0.001**
8. Comfort with body image and physical appearance	1.83 ± 0.62	3.80 ± 0.70	-20.21	< 0.001**
9. General sense of normalcy compared to peers	1.82 ± 0.64	3.63 ± 0.62	-20.73	< 0.001**
10. Better self-control over emotional responses	1.83 ± 0.63	3.72 ± 0.65	-21.97	< 0.001**
11. Feeling attractive and satisfied with physical outlook	1.89 ± 0.63	3.76 ± 0.67	-21.56	< 0.001**
12. Decreased susceptibility to physical and mental fatigue	1.98 ± 0.67	3.59 ± 0.63	-17.65	< 0.001**
Total Depression & Psychosocial Wellbeing Score	**22.55 ± 4.46**	**44.21 ± 4.40**	**-36.17**	**< 0.001**

Note: ** Statistically highly significant level at ($p < 0.001$).

3.4 Health-Related Quality of Life Questionnaire for PCOS (PCOSQ-50)

Table 4 illuminates a substantial, highly significant advancement across all specific quality of life (QoL) domains among the participants following the intervention ($p < 0.001$). Prior to the implementation of the protocol, the women experienced significantly compromised QoL, with the lowest baseline scores observed in the hirsutism-related domain (10.71 ± 2.67) and the sexual function domain (13.10 ± 2.97). Notably, post-intervention parameters revealed a remarkable vertical growth, wherein fertility-related QoL and weight/menstrual management scores nearly doubled, escalating to 33.01 ± 3.11 and 33.21 ± 3.38, respectively.

Furthermore, Part B of the table establishes the statistical mechanisms behind these clinical improvements through a correlation matrix. At the baseline phase, only weak positive correlations existed between QoL, knowledge ($r = 0.212$, $p < 0.05$), and healthy practices ($r = 0.246$, $p < 0.05$). Strikingly, the post-intervention phase demonstrated a robust, highly significant positive shift, where cumulative QoL was strongly tied to both enhanced PCOS knowledge ($r = 0.534$, $p < 0.001$) and healthy self-care behaviors ($r = 0.631$, $p < 0.001$). These findings provide empirical validation that the nurse-led educational protocol successfully optimized patient QoL by systematically enriching their health literacy and behavioral compliance.

Table 4. Impact of the protocol on specific quality of life (QoL) domains and their correlation with knowledge and practices (N = 100)

Part A: QoL Subscales Comparison	**Pre-Intervention (Mean ± SD)**	**Post-Intervention (Mean ± SD)**	**Paired (t)-test**	**(p)-value**
1. Fertility-Related QoL Domain	16.55 ± 3.14	33.01 ± 3.11	-38.87	< 0.001**
2. Sexual Function QoL Domain	13.10 ± 2.97	25.82 ± 2.72	-32.93	< 0.001**
3. Weight & Menstrual Management Domain	16.23 ± 3.64	33.21 ± 3.38	-35.36	< 0.001**
4. Hirsutism-Related QoL Domain	10.71 ± 2.67	21.70 ± 3.10	-27.20	< 0.001**
5. Coping & Adaptation Domain	13.23 ± 2.42	25.31 ± 3.13	-30.61	< 0.001**
Part B: Correlation Matrix with QoL	**Total Knowledge Score (r)**	**Total Practice Score (r)**		**Significance**
Baseline (Pre-Intervention QoL)	0.212	0.246		< 0.05*

Evaluation (Post-Intervention QoL)	0.534	0.631		< 0.001**

Note: * Significant at ($p < 0.05$); ** Highly significant at ($p < 0.001$).

4. DISCUSSION

Polycystic Ovary Syndrome (PCOS) is a complex, systemic endocrine disorder that poses substantial physical and psychological challenges throughout a woman's reproductive years. Clinical evidence underlines that the physiological manifestations of PCOS, such as chronic anovulation and hyperandrogenism, severely compromise psychological well-being, leading to heightened risks of clinical anxiety and depression. Beyond the physical burden, the distress caused by the diagnosis and visible symptoms diminishes health-related quality of life (HRQoL), impairing social functioning and personal relationships.

Consequently, contemporary healthcare paradigms require a comprehensive, multidisciplinary team comprising gynecologists, clinical nutritionists, and advanced nursing professionals to manage these widespread manifestations. Within this framework, nursing professionals maintain a critical role in early symptom recognition and the implementation of therapeutic protocols designed to optimize long-term health outcomes and mitigate psychological distress. As core educators in outpatient gynecological clinics, nurses provide clear, evidence-based guidance that bridges clinical gaps and encourages effective patient coping strategies.

The main objective of the existing quasi-experimental study was to assess the efficacy of a structured, nurse-led educational protocol on reducing depression levels and enhancing the quality of life among a cohort of 100 women diagnosed with PCOS. This objective was successfully accomplished, strongly validating our research hypothesis that patients exposed to targeted educational interventions would display significantly better clinical knowledge, healthier lifestyle practices, and improved HRQoL outcomes compared to their baseline pre-intervention scores.

Regarding the knowledge and healthy practices of the studied cohort (N=100), the post-intervention data revealed a highly significant improvement. Approximately three-quarters of the participants achieved an advanced level of knowledge following the implementation of the protocol, expanding dramatically from a baseline of just 7.2% at the pre-intervention phase. Similarly, more than 75% of the women demonstrated satisfactory compliance with healthy lifestyle practices post-intervention, a stark contrast to the 26.5% documented before the educational protocol.

These results align seamlessly with recent evidence demonstrating that structured educational approaches directly enhance a patient's command over their chronic condition, promoting better adherence to self-protective measures. Providing information through a formalized framework systematically bridges the gap between clinical diagnoses and patient comprehension. The significant upward shift in practice scores observed in this study can be attributed to the clarity, simplicity, and cultural consistency of the media used during our interactive nurse-led sessions. This tailored delivery effectively empowered the women to transform abstract health recommendations into sustainable, daily self-care practices, reinforcing the foundational hypothesis of our study.

With respect to depression and health-related quality of life (HRQoL), the present study demonstrated that more than half of the investigated women attained a high level of overall quality of life after the intervention, whereas no participants met this threshold at baseline. This major improvement strongly corroborates the findings of Ibrahim and Soliman (2025), who confirmed that structured, biopsychosocial nursing protocols drastically lower clinical depression and anxiety while accelerating positive perceptions of body image and HRQoL. These clinical realities are further underscored by updated global evidence-based guidelines which declare that periodic mental health screenings and structured lifestyle education must be standard components of reproductive healthcare.

Our findings regarding HRQoL also support the consensus that active behavioral updates, including balanced dietary management and physical conditioning, serve as first-line non-pharmacological interventions that successfully reduce metabolic stress and physical symptoms. Additionally, these results parallel the randomized controlled trials conducted by Van Dammen et al. (2018), which indicated that introducing structured lifestyle protocols to infertile women improves both cardiometabolic indices and self-reported physical quality of life domains prior to receiving medical fertility treatments.

Conversely, the pronounced success of our comprehensive protocol contrasts with the findings of Ramos et al. (2016), who reported that a 16-week resistance exercise training (RET) program alone yielded only modest changes in HRQoL scores. This divergence highlights a critical clinical insight: isolated physical training routines are insufficient to address the deeply rooted psychological, dietary, and systemic domains affected by PCOS. By contrast, our nurse-led educational protocol integrated holistic dietary strategies, psychological coping mechanisms, and physical wellness education. This multi-pronged approach accounts for the significantly higher percentage of quality of life improvements observed in our study, validating the second research hypothesis.

Finnally, because PCOS is a highly heterogeneous syndrome with diverse clinical expressions, healthcare professionals in gynecological clinics must fully grasp its underlying pathophysiology and holistic management. This study stresses the undeniable value of the nurse's role in ensuring patients receive robust, structured, oral and written educational tools. Ultimately, our findings confirm that an organized, nurse-led educational protocol functions as an effective clinical strategy to significantly decrease depression and maximize quality of life among women living with polycystic ovary syndrome.

5. CONCLUSION

A structured, nurse-led educational protocol serves as a highly effective clinical strategy for mitigating depressive symptoms and significantly optimizing health-related quality of life (HRQoL) among women diagnosed with Polycystic Ovary Syndrome (PCOS). The marked post-intervention advancements in participant knowledge and the successful adoption of self-care healthy practices demonstrate that well-organized nursing guidelines successfully empower patients to manage the complex, multifaceted manifestations of this endocrine disorder. Ultimately, integrating comprehensive, multi-pronged lifestyle and psychological education into routine gynecological care is vital to sustaining long-term physiological and mental well-being in this population.

6. RECOMMENDATIONS

- Formalizing and integrating nurse-led counseling and educational protocols as a standard component of routine care within all outpatient gynecological clinics to rectify baseline health literacy deficits.
- Implementing collaborative management programs that combine medical treatments with specialized nutritional and physical counseling, explicitly targeting the critical prevalence of obesity and overweight (92%) within this population.
- Incorporating structured psychological screening and emotional support into standard reproductive healthcare to alleviate the profound emotional distress, treatment pessimism, and depression associated with PCOS.
- Conducting future multi-center, longitudinal studies with larger cohorts to track the long-term sustainability of healthy self-care practices and their direct, continuous impact on the patients' overall quality of life (QoL).

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AUTHOR CONTRIBUTIONS

Safaa I. Ahmed: Conceptualization, Investigation, Writing—Original Draft.

Safia Belal: Methodology, Investigation, Validation.

Asmaa S. Ghaly: Methodology, Data Curation, Resources.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The datasets produced and analyzed during the current study are not publicly available due to institutional ethical restrictions and patient confidentiality protocols, but are available from the corresponding author (Rehab T. A. Elfayoumy) upon reasonable request

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