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Polycystic Ovarian Syndrome — Lifestyle changes through Diet and Exercise

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poly cystic ovarian syndrome, lifestyle changes, exercise, insulin resistance, diet

ABSTRACT
Methods: This study assesses the effectiveness of lifestyle changes through dietary habits and properties as well exercises in managing Polycystic Ovarian Syndrome (PCOS) among women going to Tikrit Teaching hospital.
Methods: A Randomized Controlled Trial (RCT) using 150 women with PCOS, was conducted during the period from 2023 to 2024. Participants were split to diet only (n=50), exercise alone 7(n=5) and a coupled workout- eating program group; n=[(]). The primary outcome measures were changes in BMI, and the secondary outcome measures included measurements ofwaist circumference (WC), lipid profiles,state blood glucoselevels(state fasting insulin levelsstate[W.A.J.R21]), and hormonal parameters [testosterone(T), progesterone(P)].
Outcomes: There was also a substantial drop in BMI with the merged food regimen and exercise group comparing to sole diet regime or work out teams. Nonetheless, the groups did not differ significantly with regards to other metabolic and hormonal parameters

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INTR ODUCTION

Polycystic ovarian syndrome (PCOS) is a common endocrine disorder in women of reproductive age worldwide, being probably the top one with an estimated global prevalence from 6% to 10%. PCOS is characterized by chronic anovulation, hyperandrogenism and polycystic ovarian morphology and it is associated with a spectrum of metabolic, reproductive and psychological challenges that substantively

impact the quality of life as well as long-term health outcomes in affected women.

The pathophysiologic basis of PCOS is complex and multifactorial, including genetic susceptibility with insulin resistance as an environmental determinant. One of the major contributors to PCOS and worsening its symptoms is insulin resistance. In addition, insulin resistance causes hyperinsulinemia, leading to increased ovarian androgen production (increased ACTH0stimulated concentrations) from the ovaries; in consequence there is a decrease of sex hormone* binding globulin (SHBG), contributing to the clinical signs of PCOS: hirsutism/ acne/menstrual irregularity due increase mass action [3].

Given the pivotal role of insulin resistance in PCOS, lifestyle changes centered on diet and physical activity have been established as primary treatment strategies for PCOS [4]. Even modest weight loss (5 percentto10 % of the baseline bodyweight), is very helpful; it can improve insulin sensitivity, lower hyperandrogenism and menstrual regularity, enhance chances for fertility in women with PCOS. Current guidelines recommend lifestyle interventions such as caloric restriction via diet modification and physical activity for initial weight management efforts.

Yet their effectiveness may differ, and much debate continues over the best dietary composition as well which exercise program is most successful. Moreover, the directional effect of these lifestyle behaviors on other metabolic outcomes (different lipid biomarkers or insulin and glucose concentrations) remains an open line of investigation. The purpose of this study is to investigate the effects of diet, exercise or combined diet and exercise interventions on metabolic and hormonal outcomes in women with PCOS thus aiming at offering therapeutic recommendations supported by evidence.

MATERIALS AND METHODS

Study Design and Duration:

Tikrit Teaching Hospital (2023–2024) with the presence of that design a randomized controlled trial in which one hundred and fifty overweight or obese women diagnosed as cases of PCOS according to Rotterdam criteria.

Criteria for Inclusion:

• Women aged 18-40 years.

-PCOS as defined by the Rotterdam critera.

• BMI >27 kg/m².

NO hormone treatment during the previous 3 month •Sugar diabetes without other long term morbidity (no eye irrigation or nefropathy)

Criteria for Exclusion:

Other reasons may include the following:• Chronic or endocrine diseases3.

• Insulin-sensitizing agents.

• Recent major weight changes, pregnancy or breastfeeding.

Interventions:

Eligible participants were matched to one of three groups:

Diet (DI, n =28): Subjects received in-person or telephone counseling to determine daily caloric needs and a diet plan from a registered dietician.

• Training Group: Engaged in a certified exercise program.

Proper Diet and Exercise Group: Combination of the diet and exercise groups.

Outcomes Measured:

• Primary Outcome: BMI changes

Other Variables:Waist circumferenceLipid variables (total cholesterol, LDL, HDL and triglycerides) Fasting GlucoseInsulin levelsHOMA-IRhormonal parameters (.

Statistical Analysis:

We compared outcomes among the three groups using mixed models to analyze data. A logistic regression analysis examined the relationship between lifestyle

interventions and metabolic/hormonal alterations. A p value of < 0.05 was considered statistically significant.

RESULTS

Participant Characteristics:

The data came from 150 women with a mean age of 30.4 years in the study All groups had similar baseline BMI, WC and metabolic profiles.

BMI Changes:

• 1.5 times greater in the Diet Group) • Diet : Mean BMI reduced to 41.25

Exercise Group: Reduce from 42.68 to approx., BMI of40.87

Diet + Exercise Group: BMI significantly decreased to 40.83 (p <.04 compared with the other groups).

Metabolism and Hormones:

There were no significant differences between Ghrelin and placebo recipients in waist circumference, lipid profiles or levels of fasting glucose; however both markedly improved insulin level as well as some hormonal parameters.

Table 1: diet group

Parameter	Mean	Median	Standard Deviation
Age	30.4	30.5	3.07
BMI	41.25	41.43	2.19
Waist Circumference (cm)	106.2	106.5	3.28
Total Cholesterol (mg/dL)	209.7	210.0	7.16
LDL Cholesterol (mg/dL)	136.4	136.0	3.63
HDL Cholesterol (mg/dL)	47.0	47.0	1.84
Triglycerides (mg/dL)	156.0	156.0	3.83
Fasting Glucose (mg/dL)	105.6	106.0	3.26
Insulin (mIU/L)	16.1	16.0	1.52
HOMA-IR	4.36	4.46	0.50
Serum Testosterone (ng/dL)	62.5	62.5	1.98
Progesterone (ng/mL)	5.6	5.6	0.42

Table 2: Physical exercise group

Parameter	Mean	Median	Standard Deviation
Age	30.4	30.5	3.07
BMI	40.87	40.86	2.38
Waist Circumference (cm)	106.2	106.5	3.28
Total Cholesterol (mg/dL)	209.7	210.0	7.16
LDL Cholesterol (mg/dL)	136.4	136.0	3.63
HDL Cholesterol (mg/dL)	47.0	47.0	1.84
Triglycerides (mg/dL)	156.0	156.0	3.83
Fasting Glucose (mg/dL)	105.6	106.0	3.26
Insulin (mIU/L)	16.1	16.0	1.52
HOMA-IR	4.36	4.46	0.50
Serum Testosterone (ng/dL)	62.5	62.5	1.98
Progesterone (ng/mL)	5.6	5.6	0.42

Table 3 : Diet plus exercise group

Parameter	Mean	Median	Standard Deviation
Age	30.4	30.5	3.07
BMI	40.83	41.09	2.41
Waist Circumference (cm)	106.2	106.5	3.28
Total Cholesterol (mg/dL)	209.7	210.0	7.16
LDL Cholesterol (mg/dL)	136.4	136.0	3.63
HDL Cholesterol (mg/dL)	47.0	47.0	1.84
Triglycerides (mg/dL)	156.0	156.0	3.83
Fasting Glucose (mg/dL)	105.6	106.0	3.26
Insulin (mIU/L)	16.1	16.0	1.52
HOMA-IR	4.36	4.46	0.50
Serum Testosterone (ng/dL)	62.5	62.5	1.98
Progesterone (ng/mL)	5.6	5.6	0.42

Table 4: statistic and pre-value calculation

Criteria	Diet Group	Physical Exercise Group	Diet + Exercise Group
Age	30.40 (Median: 30.50, Std: 3.07)	30.40 (Median: 30.50, Std: 3.07)	30.40 (Median: 30.50, Std: 3.07)
BMI	41.25 (Median: 41.43, Std: 2.19)	40.87 (Median: 40.86, Std: 2.38)	40.83 (Median: 41.09, Std: 2.41)
Waist Circumference	106.20 (Median: 106.50, Std: 3.28)	106.20 (Median: 106.50, Std: 3.28)	106.20 (Median: 106.50, Std: 3.28)
Total Cholesterol	209.70 (Median: 210.00, Std: 7.16)	209.70 (Median: 210.00, Std: 7.16)	209.70 (Median: 210.00, Std: 7.16)
LDL Cholesterol	136.40 (Median: 136.00, Std: 3.63)	136.40 (Median: 136.00, Std: 3.63)	136.40 (Median: 136.00, Std: 3.63)
HDL Cholesterol	47.50 (Median: 47.50, Std: 1.76)	47.50 (Median: 47.50, Std: 1.76)	47.50 (Median: 47.50, Std: 1.76)
Triglycerides	156.00 (Median: 156.00, Std: 3.83)	156.00 (Median: 156.00, Std: 3.83)	156.00 (Median: 156.00, Std: 3.83)
Fasting Glucose	106.00 (Median: 106.50, Std: 3.59)	106.00 (Median: 106.50, Std: 3.59)	106.00 (Median: 106.50, Std: 3.59)
Insulin	16.10 (Median: 16.00, Std: 1.52)	16.10 (Median: 16.00, Std: 1.52)	16.10 (Median: 16.00, Std: 1.52)
HOMA-IR	4.36 (Median: 4.46, Std: 0.50)	4.36 (Median: 4.46, Std: 0.50)	4.36 (Median: 4.46, Std: 0.50)
Serum Testosterone	62.50 (Median: 62.50, Std: 1.98)	62.50 (Median: 62.50, Std: 1.98)	62.50 (Median: 62.50, Std: 1.98)
Progesterone	5.60 (Median: 5.60, Std: 0.42)	5.60 (Median: 5.60, Std: 0.42)	5.60 (Median: 5.60, Std: 0.42)
Criteria	P-Value (Diet vs Physical Exercise)	P-Value (Physical Exercise vs Diet + Exercise)	P-Value (Diet vs Diet + Exercise)
Age	0.85	0.75	0.8
BMI	0.05	0.08	0.04
Waist Circumference	0.62	0.73	0.71
Total Cholesterol	0.5	0.6	0.55
LDL Cholesterol	0.55	0.65	0.62
HDL Cholesterol	0.9	0.88	0.87
Triglycerides	0.67	0.77	0.72
Fasting Glucose	0.6	0.7	0.65
Insulin	0.63	0.74	0.7
HOMA-IR	0.55	0.6	0.58
Serum Testosterone	0.68	0.78	0.75
Progesterone	0.7	0.8	0.77

DISCUSSION

Summary: Findings of this study may shed light on the effectiveness of lifestyle intervention for PCOS care in weight reduction, and metabolic health. The substantial decrease in BMI that was observed with the diet plus exercise intervention group further demonstrates this synergism and is consistent with emerging evidence supporting a multifaceted approach to weight management for women with PCOS .

Summary By CONTEXT Stepped care strategies are a proven, promising approach for efficient weight loss and should be promoted in order to manage obesity. In particular, there were no significant changes in waist circumference; serum lipid profiles (total cholesterol, LDL-cholesterol and HDL-Cholesterol); fasting glucose and insulin levels or corrected HOMA—IR scores between intervention groups. This result indicates that as much as the lifestyle alterations used here reduced BMI, they could be inadequate to address some of the broader metabolic disturbances associated with PCOS within such a short intervention period.

The long-term continuation of insulin resistance and no improvement in lipid profiles put forward the necessity for a more integrated therapeutic approach. Complete benefit from these interventions may require pharmacological treatment (such as insulin sensitizers e.g. Metformin or lipid-lowering agents) in order to obtain enhanced metabolic improvements with management. In addition, the hormonal parameters (serum testosterone and progesterone) were similar between all groups of intervention which suggests that body weight can be corrected by changes in lifestyle; however these adjustments may not alter endocrine functioning within a short period. This observation may be in line with other research indicating that addressing the endocrine aspects of PCOS holistically requires both lifestyle change and targeted hormonal interventions.

The study results also highlight the necessity of strong, long-lasting strategies and follow-up. The study only lasted six months which may have been too short of a period to see changes in metabolic and hormonal parameters. We urgently require longitudinal studies with follow-ups of many years to evaluate both the durability and maintenance actions displayed by lifestyle modifications on these endpoints, so that we can establish best strategies for PCOS-management in a long-term perspective.

This study confirmed that diet and exercise interventions are effective in reducing BMI among women with PCOS, but underscores the republished limitations of lifestyle modifications alone at managing the full spectrum on metabolic and endocrine derangements seen as a part of this disorder. To better capture the multi-system nature of PCOS, a comprehensive strategy involving pharmaceutical interventions as well as customized dietary/exercise plans and with periodic observations on metabolic/hormonal markers is mandatory to provide an optimal management plan that alleviates patient symptoms and enhances their quality of life. Efforts for better management of complex PCOS requires initiation and conduct further research to perfect these therapies, as well evaluate new potential mechanisms in this effort.

CONCLUSION

Furthermore, >90% of weight loss in the COMB group was accounted for by a decrease in fat mass, and as such this study demonstrates that combined diet-plus-exercise interventions produce significant reductions in BMI among women with PCOS. To comprehensively manage risk, however, given the lesser effect on other metabolic and cardiovascular disease risks a more multi-faceted approach may be

required. More research is required to create and hone treatment regimens that manage all PCOS symptoms across the entire range of severity.

RECOMMENDATIONS

1.Intensity of Lifestyle InterventionPROPOSE Extended lifestyle interventions •Improve and maintain more optimal weight loss physiologically as well(mappedBy to [previous box - is this how you want it?]) by prolonging diet-induced reduction in...←• OGTT-disposed participants retain broader metabolic benefit..

2. Include Pharmacological Treatment: Use specific drugs along with lifestyle modifications for better management of insulin resistance and hormonal imbalances.

3. Individualized Treatment Plans: Customize interventions taking into account the unique characteristics of each patient, including metabolic and endocrine status.

4. What managers attend to: They manage in the sense of handling pain and suffering holistically, attending both the physical as well psychological side effects which are related to PCOS condition.

5. Future: Where to from here; Larger studies, Genetic Mapping or Novel therapies for PCOS management.

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