



UNRAVELING THE TRIAD: POLYCYSTIC OVARIAN SYNDROME, GUT MICROBIOME AND LIFE STYLE INTERVENTIONS STUDY IN REPRODUCTIVE AGE WOMEN AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Polycystic ovary syndrome (PCOS) is both a metabolic and endocrine syndrome that affects 6-15% of reproductive-age women, or approximately 200 million globally, and is believed to be increasing in frequency. The aim is to assess the impact of targeted lifestyle interventions on both gut microbiome and PCOS symptoms. We conducted a cross-sectional questionnaire based observational study on 50 reproductive age(18-35yrs) women with PCOS for 6 months. : Out of 50 participants reported to have PCOS; majority of 18(36%) participants consumed high carbohydrate diet, 28% high fat diet, 20% high protein diet and the least being 16% high fibre diet, 54% had chronic mental stress related issues and only 12-15% indulged themselves in physical exercises, yoga and meditation. One such fascinating area is the intestinal microflora and its association with PCOS and lifestyle management.

KEYWORDS

Polycystic Ovarian Syndrome, Gut Microbiota, Healthy Diet, Lifestyle Management.

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is both a metabolic and endocrine syndrome that affects 6-15% of reproductive-age women, or approximately 200 million globally, and is believed to be increasing in frequency. According to the 2003 Rotterdam criteria, PCOS is defined by the presence of the two or more of clinical manifestations: clinical or biochemical hyperandrogenism, oligo- or anovulation, and polycystic ovaries.²

Hyperandrogenism causes dermatological issues like hirsutism, acne, and androgenic alopecia disrupting the hypothalamic-pituitary-gonadal (HPG) axis. Besides gynecologic issues, a number of metabolic disorders like hyperinsulinemia, insulin resistance (IR), obesity, type II diabetes, and cardiovascular diseases are associated with PCOS.³

With a deeper understanding of gut biology, the potential role of the gut in PCOS has become the center of attention. Gut microbiota, also known as the "second genome" of the host, can affect the metabolism and immune response of the host by interacting with the external environment.⁴

Lifestyle-induced changes in the gastrointestinal tract microbiome are another significant factor in the etiology of PCOS. Dysbiosis of the gut microbiota has been said to play a role in increased gastrointestinal permeability, initiating chronic inflammation, insulin resistance (IR) and hyperandrogenism.⁵

The human gut microbiome is diverse and lively, with a preponderance of bacterial species belonging to Bacteroidetes, Firmicutes, Proteobacteria, Actinobacteria, and other microorganisms.

The dysbiosis of gut microbiota (DOGMA) hypothesis describes the etiology of PCOS as: (1) an imbalance in gut flora is caused by obesity or a diet such as low dietary fiber, which disrupts intestinal epithelial cells, thereby increasing the permeability of gut mucosa, (2) IR is caused by the immune system activation that impedes insulin receptor functions due to leakage of lipopolysaccharide (LPS) in the gut, and (3) interfering with follicular growth or IR promotes testosterone.⁶

Previous studies suggest that unhealthy lifestyle factors like high calorific diet, stress, irregular sleep cycle, and lack of physical exercise are responsible for intestinal dysbiosis and these factors have an immediate impact in causing PCOS as well.³

METHODOLOGY.

AIMS AND OBJECTIVES:

1. To assess the impact of targeted lifestyle interventions on both gut microbiome and PCOS symptoms.

Source of data:

STUDY PLACE	Study was conducted in tertiary care hospital Adichunchanagiri Hospital and Research Centre, B G Nagara, Mandya district, Karnataka.
STUDY DURATION	6 months
STUDY SUBJECTS	Reproductive age women with PCOS(Age 18-35years)
STUDY DESIGN	Cross-sectional, questionnaire based observational study
STUDY SAMPLE	50

Method Of Data Collection:

All the reproductive age women with PCOS (Age 18-35years) attending Gynec clinic at Adichunchanagiri Hospital and Research Centre, B G Nagara, Mandya district, Karnataka, who were willing to participate were included in the study. All the study participants were given predesigned questionnaire to answer. Confidentiality and modesty of participating women was maintained throughout the study process.

Statistical Analysis:

Data thus obtained was compiled and entered in MS Excel spread sheet; descriptive statistics was applied, cross tables were constructed, data was expressed in terms of frequency and percentage.

RESULTS:

We had total 50 participants in our study, among them majority of the participants age with PCOS was between 21-25 years 40%. 10% of participants age with PCOS was between 18-20years. 22% of participants age with PCOS was between 26-30 years. 28% of participants age with PCOS was between 31-35years.

AGE	FREQUENCY	PERCENTAGE
18-20Years	05	10%
21-25 Years	20	40%
26-30Years	11	22%
31-35Years	14	28%

Out of 50 participants reported to have PCOS; majority of 18(36%) participants consumed high carbohydrate diet, 14(28%) participants consumed high fat diet, 10(20%) participants consumed high protein diet and the least being 8(16%) participants consumed high fibre diet.

DIET	FREQUENCY	PERCENTAGE
High Carbohydrate	18	36%
High Protein	10	20%
High Fat	14	28%
High Fibre	08	16%

Role of stress was studied among the 50 participants with PCOS; majority of them 54% participants had chronic mental stress related issues, 50% participants experienced disturbed sleep, 42% had

depressive symptoms and 10% anxiety issues.

ROLE OF STRESS	FREQUENCY	PERCENTAGE
Depression	21	42%
Anxiety	05	10%
Chronic mental stress	30	60%
Fear	06	12%
Disturbed sleep	25	50%

Role of sedentary life style was studied in 50 PCOS participants; among which only 14% practiced holistic yoga, 12% indulged themselves in physical exercise and 6% in meditation.

SEDENTARY LIFESTYLE	FREQUENCY	PERCENTAGE
Physical exercise	06	12%
Yoga	07	14%
Meditation	03	06%

Among 50 PCOS participants; 24% had nutritional deficiencies, 34% consumed alcohol and 26% indulged themselves in other unhealthy lifestyle practices.

DISCUSSION

This study is an attempt to assess the impact of targeted lifestyle intervention on both gut microbiome and PCOS symptoms. Here, we summarize the influence of high-fat, high-fiber, high-protein, and high-carbohydrate diets and lifestyle modification on the gut microflora in women with PCOS.

Zhang et al. reported that a high-fat diet destructs the intestinal homeostasis. Studies have commended that high-fat diet increases anaerobic and gram-negative bacteria especially Bacteroides. These bacteria release lipopolysaccharides (LPS) leading to an endotoxemic state.

A diet rich in fiber is highly effective against PCOS as the intestinal microbes decay the dietary fiber to yield three chief short-chain fatty acids (SCFAs) like acetate, propionate, and butyrate. SCFAs maintain the intestinal barrier and butyrate shows anti-inflammatory effects.

Singh et al. monitored the effect of animal and plant protein consumption on intestinal microbiota in humans: animal protein increases Bacteroides, Alistipes, and Bilophila, and decreases Bifidobacterium adolescentis.

Voigt et al. fed mice with saccharine and observed gut dysbiosis with a high Bacteroides and low Lactobacillus reuteri. To conclude, a diet with a low Glycemic Index and Glycemic Load that is free of artificial sweeteners is recommended for PCOS patients.

Chronic mental stress affects the intestinal barrier function leading to increased intestinal permeability. Circadian rhythm disruption causes gut dysbiosis particularly when it is paired with a high-fat diet or alcohol consumption. A meta-analysis proved that exercise improves FSH, SHBG, androgen, and total testosterone in women with PCOS although the mechanism remains unclear. Besides, physical activities also flourish beneficial gut microflora which responds quickly to the homeostatic and physiological alterations due to exercise.

Our study showed that the majority of PCOS participants followed high carbohydrate and fat diet with low fibre diet along with stress and sedentary lifestyle being the major concern.

CONCLUSION:

PCOS is indisputably one of the most confounding disorders rising as a global threat to women's health. The pathogenesis of PCOS remains uncertain due to the heterogeneous collection of various signs and symptoms. These raise new avenues of research in the fast evolving field of PCOS. One such fascinating area is the intestinal microflora and its association with PCOS. Studies on lifestyle management strategies are required along with the regular care and pharmaco therapy for clinical practice.

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