

## POLYCYSTIC OVARY SYNDROME (PCOS) FEMALE HORMONE IMBALANCE

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Polycystic ovary syndrome, Endocrine disorder, Reproductive disorder, Hyperandrogenism, Menstrual irregularity, Hormonal dysfunction, Insulin resistance Metabolic syndrome

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### Abstract

Polycystic ovary syndrome (PCOS) is most common endocrine hormonal disorder affecting women's reproductive system in childbearing age. It's characteristics are excessive level of male hormones growth like androgen and testosterone and also driven insulin resistance which cause multiple complications like chronic an-ovulation, females hormones dysfunction and high risk of metabolic syndrome. Globally, 1 of the 3rd female is affected by this complication and most of the females are unaware and ignore their physical symptoms like obesity, irregular periods, lower abdominal fat, miscarriage, anemia, facial hairs, acne. The major metabolic risk factors are type II diabetes, fatty liver, high cholesterol and inflammation. The main causes of this condition is genetics, environmental factors and some other includes lifestyle habits. To manage this disorder for reduce their further risk factors includes lifestyle modifications like balance BMI, reduce sedentary lifestyle, healthy balance nutrient dense diet with sup

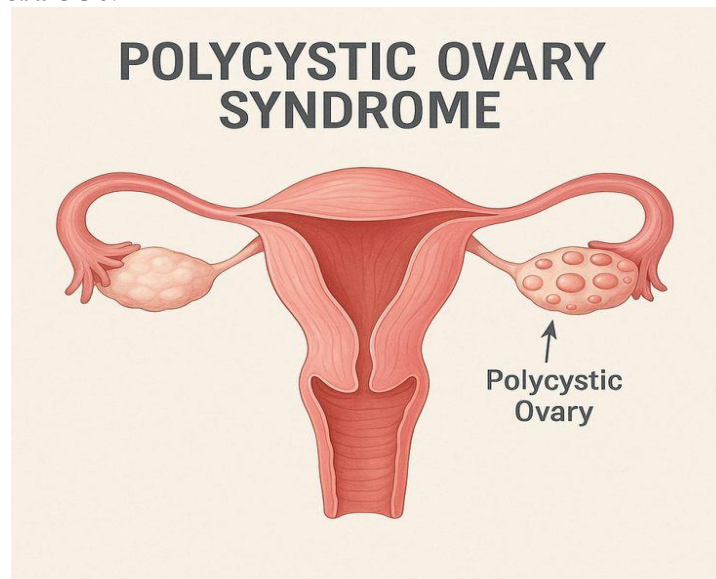
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### INTRODUCTION:

Polycystic Ovary Syndrome (PCOS) is a multifaceted hormonal problem that can affect during the reproductive years of woman's and cause irregular menstrual cycle, excessive levels of male hormones like androgen and somehow testosterone and major leading to fertility challenges and presence of multiple tiny follicles cells inside the ovaries that resemble like a cysts structure. Currently, this disorder is affecting millions of women worldwide. Its show a various range of physical symptoms such as weight gain, facial hair, acne, lower body abdomen (visceral

fat), change appearance also PCOS closely linked to diabetic issues due to insulin resistance, apparently show pigmentation and thickening on neck (Darkening of the skin) and gradually increasing cardiovascular diseases like hypertension, Stroke (risks of dyslipidemia abnormal cholesterol level high triglycerides & LDL) and also contributes to metabolic syndromes. PCOS raises multiples risks factors like chronic low-grade inflammation, lipid metabolism, arterial damage and vascular health.

## Global Epidemiology of PCOS:

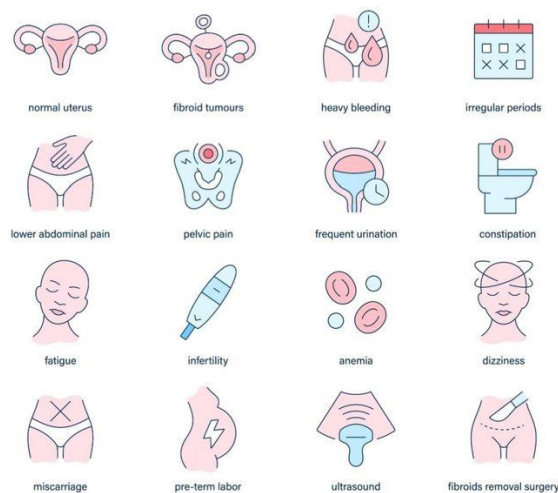


Globally, the current estimated range of women which are suffering PCOS around 6%- 13% in reproductive age (childbearing age). The rising percentage started from 1990 – 2022 and now 1 of the 3<sup>rd</sup> females suffering in this complication. Although, more than 70% are unaware of this and

ignore their symptoms of facial hair, acne, obesity, dark neck and irregular period. Current studies of Asian women including Pakistan are totally unaware of this and oftenly these diagnoses after marriages duration the conception period and females lead to infertility and anovulation.

## Pathophysiology:

### UTERINE FIBROIDS



PCOS is quite complex which involves hormonal, metabolic and genetic components that

dysfunction the normal ovaries system and imbalance hormones. The mainly cause starts

from insulin resistance (hyperinsulinemia) elevated level stimulates to produce male hormones like androgen such as testosterone which disturb the other metabolic functions like ovulation and imbalance multiple female hormones like (estrogen, lutein, progesterone) results in anovulation, irregular periods. The major symptom which occurs in the ovaries formation of small tiny cysts and cause lead to infertility. brain, pituitary gland release 2 hormones, FSH (Development of birth), LH (Ovulation).

In this case, its increase luteinizing hormone (LH) secretion relative to follicle-stimulating hormone (FSH) further promotes androgen production and impairs follicle maturation. When the LH increase, they produce theca cells and always increase of androgen level and decrease level of estrogen level. Chronic low-grade inflammation and altered adipokine levels also contribute to the endocrine and metabolic disturbances seen in PCOS. we have greater antigen in the body and less estrogen and more androgen in the body and cause side effects.

**Hyperandrogenism** excessive secretion of male hormone testosterone, androsterone and androstenedione in female's body. **Insulin resistance** inability of cells in muscles, fats and liver to respond to insulin and inability to use glucose from blood as energy. **Acanthosis nigricans** is a skin condition that cause dark discoloration of body folds and creases, also cause thickened skin having velvety patch like appearance. It's may lead to increases the risk of GDM. These interconnected mechanisms not only affect reproductive health but also increase the risk of metabolic syndrome, type 2 diabetes, and cardiovascular disease in affected individuals.

**Stage of PCOS: Dysmenorrhea:** characterized by severe and frequent menstrual cramps during periods. **Oligomenorrhea:** characterized by for having infrequent menstrual periods. **Amenorrhea:** absence of menstrual periods. **Polyamenorrhea:** referred to interval of less than 21 day.

## Symptoms and Causes of PCOS:

The exact causes behind this syndrome are unknown and unclear hormonal disorder with systemic effects. These are some of the symptoms of PCOS:

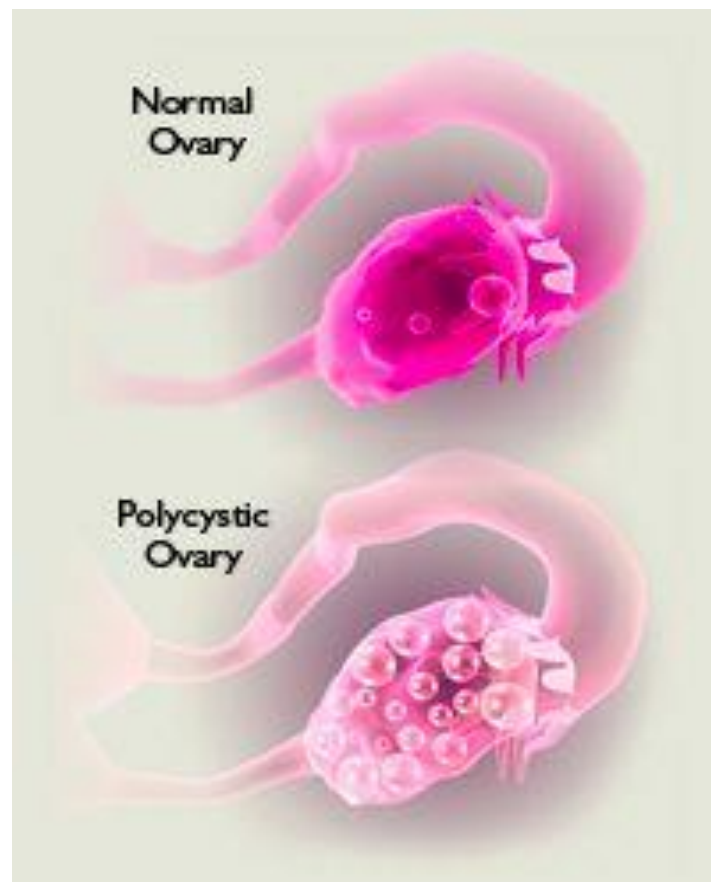
- Infrequent, Absent, or Irregular Periods mainly due to imbalance hormones especially, LH and androgen and effecting the uterus wall of lining leading to missed or irregular periods.
- Infertility or difficulty getting pregnant failure to release egg which become difficulty in conception.
- Excess hair growth (Hirsutism) due to elevated level of androgen testosterone and effects seems on the face, chest, back, armpit, underlegs, legs or toes.
- Acne, oily skin, or dandruff due to increase sebum oil production in skin due to androgen which clogged pores lead acne, excessive oil on scalp contributes to dandruff.
- Enlarge ovaries cause Pelvic Pain, cysts or chronic anovulation leads to discomfort or cramping.
- Weight Gain or Obesity (especially around the waist) due to insulin resistance and hormonal imbalances which cause fat accumulate around lower abdomen makes a stubborn fat more difficult to loss.
- Long-term insulin resistance cause Type II Diabetes. The body struggles to regulate blood sugar, increasing diabetes risk.
- Metabolic dysfunction and insulin resistance cause high cholesterol disturbance and elevated LDL (bad cholesterol) and triglycerides, and reduced HDL (good cholesterol).
- High blood pressure cause obesity, insulin resistance, and inflammation. And Increased strain on the heart and blood vessels.
- Male-Pattern Baldness or Thinning Hair Cause Androgenic alopecia from high testosterone levels. And Hair thins at the crown or temples, similar to male hair loss patterns.
- Obesity and hormonal changes affecting airway muscles cause sleep Apnea and effect interrupted breathing during sleep, leading to fatigue and poor rest.

- Insulin resistance, poor sleep, and hormonal imbalance cause Fatigue & effect seems like Persistent tiredness, even after rest.
- Hormonal fluctuations, body image concerns, and chronic inflammation cause Anxiety and Stress and Effect appears in body like Mood swings, irritability, and emotional distress.
- Darkening of the Neck (Acanthosis Nigricans) Cause of High insulin levels stimulate

skin cell growth and pigmentation and Effect like Dark, velvety patches on the neck, underarms, or groin.

- Insomnia Cause of Hormonal imbalances, stress, and sleep apnea and Effect like Difficulty falling or staying asleep, leading to daytime fatigue.

## Diagnosed:



PCOS cannot be diagnose with one single test. Multiple combination of tests like medical history, physical test, blood test, lifestyle history, dietary habits and imaging. Commence with, the discussing the symptoms such as irregular periods, acne, facial hair, hair growth on chest, hair thinning, weight measurement like examine lower body fat, thigh fat, arm fat then perform pelvic exam to check the abnormalities in the uterus. Ultrasound test and biomedical test like blood

test, HB1Ac, hormonal test. Then, the nutritionist measures the weight, waist hip, chest, arm, thigh, calf circumference with the use of measuring tool. The most widely accepted criteria involve identifying at least two of the following: irregular ovulation, excess androgen activity, or polycystic ovaries on ultrasound.

Women with PCOS have these characteristics are mostly seen after their complete examination of physical and biochemical test which are High

levels of male hormones, also called androgens, An irregular or no menstrual cycle. May or may not have many small cysts (fluid-filled sacs) in their ovaries

## Complication:

- ✚ GDM, if get pregnancy that caused the miscarriage
- ✚ Lack of egg formation
- ✚ Extremely bleeding
- ✚ Cancer of uteri lining.
- ✚ Diabetes type II
- ✚ Thyroid
- ✚ Difficulty in weight loss
- ✚ Lipid Profile

## Objectives to control symptoms:

- Lose body weight and maintain normal BMI (5% weight loss in 2-3 months) encourage balanced nutrition, regular physical activity, and stress management that will help to manage insulin and glucose level and risk of type 2 diabetes. Improve anxiety, mood, body image and quality of life that link to PCOS. Reduce serum androgens and improve menstrual regularity. Support ovulation and increase chances of conception for women trying to get pregnant and reduce risk of endometrial hyperplasia. Decrease risk of endometrial cancer that will prevent heart problems, stroke and heart attack, improve lipid profile.

## Measurement types:

Measurement type	Target / Goal
BMI	Reduce by 5-10% if overweight/ obese
Waist Circumference	Less than 80cm
HB1Ac	Normal range (less than 100mg/dL, fasting, Hb1Ac less 5.7%)
Lipid profile	LDL Less than 100mg/dL, HBL above than 50mg/dL
Blood pressure	120/80 mmhg
Exercise	Above than 150min/week moderate activity
Sleep	7-9 hours specially at night

## Medical Nutrition Therapy

- Weight control and exercise plan to meet weight goals, reducing 5lb10lb reduces the symptoms.
- Control BGL and lipid profile by eating complex Carbohydrates, MUFA & PUFA and omega 3 fatty acid rich diet.
- Reduction in dietary Carbohydrates reduces the level of circulating testosterone.
- Omega 3 fatty acid rich foods reduce insulin resistance.
- DASH diet with low salt & fat dairy products, more fruits and vegetables having low glycemic index and rich in fiber.

- Avoid fat and high CHO diet, starts to take 30%-40% fats, 45%-50% complex CHOs and 15%-20% proteins
- 20-35 g of fibers per day
- Consume nuts & seeds everyday
- Omega 3 fatty acid sources such as fish, walnuts and flaxseeds should be consumed daily
- Dietary supplemental must be added.

## Medication mostly recommended

- Progesterone
- Clomid
- Letrozole
- Metformin

## PCOS supplements combination

- Inositol
- Vitamins D
- Magnesium

## Weight loss combination

- L carnitine
- Green tea
- Berberine

## Androgen/ Hirsutin Combination

- Spearmint tea
- Zinc

## Drug-nutrient interaction/supplements

- Anti androgen medication such as birth control pills, spironolactone and flutamide reduces the symptoms
- Metformin improves blood glucose level, ovulation insulin sensitivity, reduce LH and testosterone but also cause GI distress such as diarrhea, nausea and flatulence
- Chromium picolinate (1000 ug) behaves as insulin sensitizer
- Myo-inositol reduces insulin resistance, body weight and improve ovarian functioning

## Nutrition education, awareness and management

- Counsel about importance of weight loss, fat loss in stubborn parts, visceral fat with good nutrition and physical activity.
- Regular, small meals (6/day) reduce cravings and overeating.
- Reduction of sedentary lifestyle by regular exercises must be 5 days.
- Supplements and medication should be on time for reduce the symptoms as much as possible for early conception.
- Improve lifestyle by managing sleep-wake cycle, reduction in screen time particularly during nighttime.
- Reduce stress with the help of multiple activity that will help to reduce cortisol hormones and also balance other hormones.
- Avoid Junk food, processed food, deep fry item and mostly those items which are made of white flour, salt, sugar and fats.
- Avoid sugary beverages like juices, drinks.

- Avoid High fat meat, High fat milk and yogurt and other high fat sources.
- Diet plans should be planned by nutritionist with measurement of calories and gradually reduce the decrease and the food options and recipes should be nutrient dense not be calories dense.
- Focus on quality of food with the nutrient dense meal and must burn the calories.

## Monitoring and evaluation

- Weight and BMI
- Waist circumference
- Food diary
- Serum testosterone levels
- Thyroid profile
- Ultrasound
- Lipid profile
- Regularity of menstruation (28-day cycle)
- HBA1C

## Used some ingredients:

This food items have been using from ages with these benefits cure to reduce the symptoms and even though there are multiples search on these ingredients and suggested to patients

- fenugreek seeds
- Probiotics
- Omega 3
- Cinnamon
- Turmeric
- Green tea
- Cod liver oil
- Aloe vera juice
- gooseberry juice
- black seeds
- Cumin seed
- Ashwagandha
- Basil seed
- Li quorice
- Beetroot powder
- Chia seeds
- Apple cider vinegar
- Eggs
- Walnut
- Pumpkin seeds
- Ginger
- Berries



## Treatment:

- Stop junk food/ processed food
- Stop Especially carbohydrates made of unrefined and white flour
- Stop high fat food which increase LDL/VLDL
- Do work or exercise
- Physical activity
- Eat good protein
- Increase intake of nutrient rich foods like fruits, vegetables

- High fiber
- Increase Complex, Iron and for absorption this take vitamin c sources through food and supplement
- Increase vitamin D, calcium sources and for absorption of this take vitamin K.
- Cut off coffee and tea
- Sound Sleep
- Less screen time

## Food groups:

### vegetable

To eat	not	sometimes
Asparagus	Turnip	Beetroot
Cabbage	pumpkin	Baked potat
Mushroom		
Tomato		
Cauliflower		
Broccoli		
Eggplant		
Raw carrot		
Lettuce		
Green beans		
Pepper onion		
Peas		
Sweet potato		

### Fruits

To eat	not	sometimes
Plum	Watermelon	Mango
Grapefruit	dates	Papaya
Peaches		Figs
Coconuts		pineapple
Kiwi		
Cherry		
Pear		
Dried apricot		
Prune		
Grapes		
Oranges		
Strawberry		

## Starches:

To eat	Not	sometimes
Spelt bread	White bread	Rye bread
Sour dough bread	Whole wheat bread	Oats
Whole grain	Naan	Basmati rice
Barley	Corn flakes	Brown rice
All bran cereals	Rice cake	Corn meal
Bugler	Soda cracker	Rice noodle
Refined flour Pasta	Cream of wheat	White rice
Quinoa	Rice crisps	Wild rice
Pop corn	Special k	Corn
Flaxseeds bread	Sticky rice	Pita breads
	White rice	Rye cracker

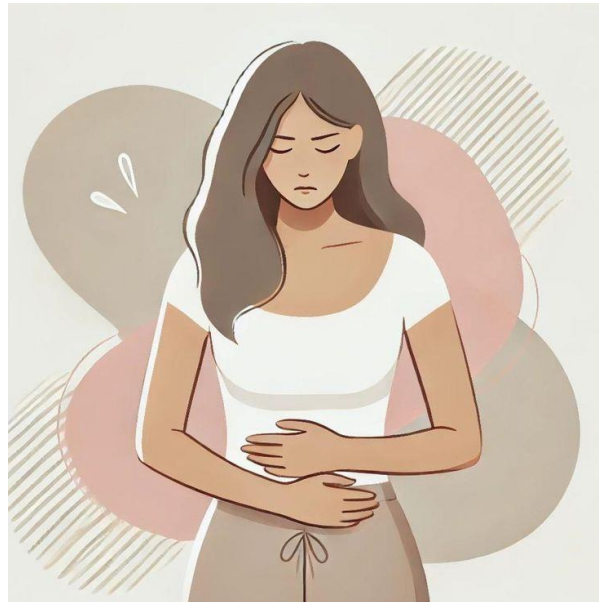
## Dairy products:

eat	not	sometimes
Soy milk	Fat milk	Ice creams
Skim milk	Fat yogurt	Butter homemade
Almond milk	High fat cream	
Coconut milk	High fat cheese	
Low fat yogurt	Shakes	
Low fat cheese		

## Beans and legumes

Eat	not	sometimes
Kidney beans		
Butter beans		
Chickpea		
Navy beans		
Red green lentils		
Pinto beans		
Black eyes beans		
Splits peas		





Being a nutritionist, working under supervision of medical physicians, multiples cases visit the hospital with this complication. When a female visits the hospital, all the medical evaluation and nutritional history is conducted to understand symptoms to evaluate reason behind and eating habit for personal goals. Then step by step take history of medical symptoms, diagnosed, dietary history, lifestyle factors, anthropometry measurement and personal goals. While collecting data, nutritionist design a individualize diet plan to target the complication and provide healthy nutrients dense food chart for improve overall quality. In a Current situation, this complication is now happening in under 18year girls. Most of the young girl visit the hospital with menstrual problems, acne, hair on face and chest, dark neck and after the evaluation the reasons comes from the unhealthy eating habits. Young generation is totally relying on processed food, high fat food and packaging items for craving. In my duty, consult them to give awareness and inform them for further complications. Counsel them and make personalize diet plan with measure calories to reduce the weight and symptoms.

From Instance, my recent case a 20y old girl, who is complaining of not having periods for the last 2.5 months. She has noticed a significant weight gain (20pound) over the last few months. Now her

current body weight is 84 kg. & her height is 5.4. She is facing some problems acne from age 17, severely abdomen pain that goes to back side, facial hair on jaw line, nausea, shoulder pain, headache, anxiety and sleep disturbance. Her family history mother has HTN, TYPE 2 DM, obesity & her father has DM II and high cholesterol. She is living a sedentary lifestyle late night excessive use of gadget and sleep of 4-5 hours. The gynecologist suggested her few tests like ultrasound, thyroid profile, blood test, hormonal test. when I got her medical history and then consult her to know her 24-hour dietary recall, eating habits. She has been taking more simple Carbs, such as cookies, fast foods, French fries, cola beverages. Calculated the calories of her 24 dietary recalls, which was above than 4000 kcal.

**Active complaints:** Missing of periods few months, abdominal pain, nausea, shoulder pain, back pain, anxiety, sleep disturbance, stomach upset

**Physical / clinical examination:** Acne, few hairs on jaw line, anxiety, sleep disturbance, hallucination, weight gain 20 pounds, dry frizzy hair, thinning hair.

**Medically diagnosed:** (Amenorrhea) PCOS

**Family history:** HTN, T2DM, Obesity, high cholesterol

**Lifestyle:** sedentary late night excessive use of gadgets sleep of 4-5 hours

**24 hours dietary recall:** More carbs, such as chips, cookies, fast food, French fries, unhealthy fat, processed food like nuggets etc

## ANTHROPOMETRIC MEASUREMENTS; SERVING SIZE

<b>Starch</b>	Complex Cereals 5-6 servings
<b>Fruits</b>	4-5 Serving But low Glycemic index
<b>Vegetables</b>	3 -5 Serving non-Starch vegetables
<b>Diary</b>	2 serving fat free
<b>Meat</b>	4-5 lean meat serving (complete protein sources)
<b>Fat</b>	Nuts and seeds, MUFA, PUFA

**Vitamins & minerals:** In the diet therapy of women in PCOS higher intake of B complex, Vitamin D, vitamin C, dietary fiber & calcium, Vitamin E rich food in therapeutic meals and supplements sources.

### 9 PCOS rules:

- No processed food
- Increase fiber
- Drink more water
- No refined sugar
- Less ingredients
- No alcohol/smoking
- Eat more smaller meals
- Balance Carbs and protein
- Eat good fat

### Summary:

In conclusion, the management of Polycystic Ovary Syndrome (PCOS) extends beyond medical treatment and requires a holistic approach where nutrition plays a central role. As a nutritionist, taking a detailed patient history allows for the identification of dietary patterns, lifestyle habits, and personal health goals that directly influence the condition. By providing individualized nutrition guidance, we help patients improve

**Weight gain:** over 6 months 20 pounds = 9kg

**BMI:** WEIGHT/ HEIGHT: 84/5, 4 = 31KGM2 (OBESE)

**Belly:** 42inches

**Hips:** 46inch

**Thighs:** 29inches

**Arm circumference:** 17inches

### AMDR:

- 50% Carbohydrates
- 20% Protein
- 30% fats
- 25g fiber

insulin sensitivity, regulate weight, and support hormonal balance. Ultimately, the nutritionist's role is not only to design meal plans but also to empower PCOS patients with sustainable lifestyle changes that enhance their overall health and quality of life. It involves guiding sustainable lifestyle changes, respecting cultural practices, and motivating patients toward long-term health improvements.

The nutritionist's contribution in PCOS management is central to holistic care. By combining evidence-based nutrition with compassionate counseling, we ensure that patients leave the hospital not only with medical advice but also with practical tools to enhance their quality of life.