# PREVALENCE AND RISK FACTORS RELATED TO POLYCYSTIC OVARIAN SYNDROME IN FEMALES WITH REPRODUCTIVE AGE

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## ABSTRACT

**Background:** Polycystic Ovarian syndrome (PCOS) is one of the frequent endocrine diseases in reproductive-age women. Objective of this current study was to estimate the prevalence and risk factors related to polycystic ovary syndrome (PCOS) among women of reproductive age.

**Methods:** An analytical cross-sectional study was carried out on 385 females of reproductive age 15-44 years that were selected with non-probability convenient sampling during May to August 2022 from general population of Gujrat. Selection of participants was done on the basis of the inclusion and exclusion criteria. NIH (1990) criteria were used as a diagnostic tool for the conformation of PCOS and hirsutism was observed by Modified Ferriman-Gallwey scale**.** Statistical Package for the Social Sciences (SPSS) version 24.0 was used to analyze the data at 95% confidence interval. Chi Square test applied to find the association of PCOS with factors.

**Results:** Out of 385 females of age 15 to 44 years, average age 28.95±7.90 years, BMI 28.46±5.00 kg/$m^2$ and age of menarche 12.80±1.40 years was observed. Out of total, 101 (26%) were diagnosed with PCOS. Menstrual interval longer than 35 days, abnormal menstruation, acne, family history of infertility, depression/ anxiety, lack of physical exercise and patient history of hypertension was found statistical significant with p-value <0.005 between PCOS and without PCOS

**Conclusion:** Prevalence of PCOS was observed fourth part of study population. Potential risk factors of PCOS females were observed menstrual cycle disorder, family history of infertility, depression, Acne and lack of physical exercise of female population. Hirsutism, acne, dysmenorrhea and oligomenorrhea were most common phenotype observed in PCOS. On the basis of findings concluded that more than half females of reproductive age were conformed to PCOS

***Keywords*:** Body mass index, hirsutism, polycystic ovarian syndrome (PCOS), national Institutes of health criteria (NIH), risk factors.

## INTRODUCTION

Polycystic ovary syndrome (PCOS) is the most common endocrine disease in women of childbearing age. [1] If left untreated, it can lead to significant health issues like diabetes and heart disease. PCOS affects between 5% and 10% of women of reproductive age (between ages 15 to 44. PCOS is most commonly discovered in women in their second and third decades of life. [2]

Women with PCOS are susceptible to reproductive, metabolic and CVD. [3] Symptoms of PCOS usually begin around puberty and continue throughout the reproductive period. [4] PCOS signs mainly seen in teens and early adolescence. It differs from one lady to the next. The signs may variety from slight to severe. It consists of irregular periods, excessive degrees of androgen and prolactin hormones, acne, fast weight gain, problem dropping weight, hirsutism, intellectual fitness problems, metabolic dysfunction, problem getting pregnant, weakening hair and hair damage on the skull, oily skin, despair and temper swings. [5] Many of the same probably modifiable danger elements, which includes obesity, bodily inactivity, and heavy drinking, also are danger elements for coronary heart ailment and stroke. [6]

Polycystic ovary syndrome (PCOS) is that the most typical explanation for anovulatory unproductiveness, disturbing a significant proportion of women of childbearing age.[7] Treatment options for PCOS include medication, diet, and lifestyle improvements. [8]

The analysis of PCOS is described primarily based totally on the presence or absence of 3 predominant symptoms (hyperandrogenism, ovulation problems and the presence of polycystic ovaries), and the situation PCOS has been differentiated into 4 unique phenotypes. [9] We also looked at the ovaries of women who had hirsutism but had regular menstrual cycles, a condition known as idiopathic hirsutism. [10]

The remedy for PCOS is decided on the symptoms. Slim down, birth control pills, cyclic progestogen, spironolactone, and finasteride are all used to treat symptoms of hyperandrogenism. [11] Obesity is a problem for many PCOS women. Women with PCOS don't ovulate on a regular basis, which is one of the main reasons they can't conceive. [12] Treatment have to be consist of metabolic abnormalities, androgen suppression and way of life change, pill, and probable operation for the prevention and control of extra weight, androgen suppression. [13] Infertility, PCOS, hyperandrogenism, menstrual irregularities, metabolic syndrome (MS), and insulin resistance are more prevalent in younger women with PCOS (IR). [14] The worldwide prevalence of PCOS was 4% to 20% in reproductive age women. [15] In our study prevalence 26% was

slightly high according to worldwide prevalence. Previous study conduct in Pakistan same age group women. The prevalence of study was 28.9% PCOS patient found According to NIH criteria.[16] Objective of the study was to calculate the prevalence and potential etiologies related to PCOS in females of reproductive age.

## METHODS

### *Design, study populating, duration and study setting*

An observational cross sectional study was carried out on 385 females of reproductive age during May to August, 2022 from the general female population of Gujrat, Punjab, Pakistan.

### *Selection, sample size and sampling technique*

Females of reproductive age 15-44 years were selected by nonprobability convenient sampling that were fulfilling criteria. Menarche with in past 2 years and women on oral contraceptive pills, intrauterine devices, diagnosed with ovarian cancers were not selected. Women who underwent hysterectomy or bilateral oophorectomy were also excluded from the study. Minimum 385 sample size was calculated by below mentioned formula to gain the 80% study power and 5% the effect size or precision. Fifty percentage proportion of disease was applied at 95% confidence Interval.

### *Measures and data collection*

A pre-tested and standard questionnaire based on NIH (1990) criteria was used as a diagnostic tool for the conformation of PCOS. [17] A pilot study was conducted to establish a questionnaire for risk factors that was validated and reliable with Cronbach's alpha=0.76). Hirsutism was observed by a Modified Ferriman-Gallwey Scale (MFGS).[18]

Firstly section was included the demographic detail like age, BMI and socioeconomic status. Second section included Clinical tool for diagnosis of polycystic ovary syndrome which include menstrual interval duration, body weight, milky discharge and hair growth. PCOS were diagnosed based on NIH (National International Health) criteria which include only presence of hyperandrogenism and oligo/amenorrhea anovulation. Clinical tool for diagnosis of polycystic ovary syndrome (If ≥ 2, consistent with diagnosis of PCOS. If <2, not consistent with diagnosis of PCOS). Sensitivity for the diagnosis of PCOS was 85.4% and specificity was 93.4%. Third section included the potential risk factors for PCOS like menstruation problem, family history,

mood swing and physical activity. Forth sections include Modified Ferriman-Gallwey scale for hirsutism.

### *Ethical approval*

Prior to conduct, this research was approved by institutional review board (IRB), University of Lahore, Punjab, Pakistan. Written consent was taken before the collection of data. Purpose and short review of the study was given orally to the participants.

### *Statistical Analysis*

Collected all information were entered and analyzed using SPSS Version 24. For descriptive analysis, mean ±SD were calculated for numerical data however frequencies and percentages were calculated for categorical variables. Chi-square test was applies to test the association of potential factors with PCOS. All data were analyzed at 95% confidence interval.

## RESULTS

A sample of 385 female of age 15 to 44 years was selected by nonprobability sampling. Average of age 28.95±7.90 years, BMI 28.46±5.00 kg/m$^2$ and age of menarche 12.80±1.40 years was **observed** in participants.

**Table 1: Socio-demographic details of participants**

| Variable | Responses | n(%) | Mean ±S.D |
|---|---|---|---|
| **Age (years)** | - | - | 28.95±7.90 |
| **BMI (Kg/m$^2$)** | - | - | 28.46±5.00 |
| **Age of menarche (years)** | - | - | 12.80±1.40 |
| **Marital status** | Married | 154(40) | - |
| | Unmarried | 231(60) | |
| **Socioeconomic status** | Upper class | 76(20) | - |
| | Middle class | 195(51) | |
| | Lower class | 114(30) | |
| **Occupation** | Student | 135(35) | - |
| | House wife | 140(36) | |
| | Office worker | 110(29) | |

From total population 231(60%) were unmarried female and more than 50% belonged middle class families however when occupation was observed than find it that, students, housewife and working females were approximately equal in study population.

**Table 2. Assessed parameters for PCOS diagnosis**

| Variable | Category | n(%) |
|---|---|---|
| **Menstrual interval** | 25-35 days | 241(56) |
| | >35 days | 171(44) |
| **Hair growth** | > 3 | 258(67) |
| | ≤3 | 127(33) |
| **Nipple discharge** | Yes | 183(48) |
| | No | 202(52) |
| **Obesity** | Yes | 176(46) |
| | No | 209(54) |
| **MFG scale** | NORMAL | 242(63) |
| | MILD | 73(19) |
| | MODERATE | 70(18) |
| **Prevalence of PCOS** | Yes | 100(26) |
| | No | 285(74) |
| **Total** | | 385(100) |

Mostly 56% females had 25 to 35 days of menstrual interval and hair growth score had >3 were found in 258(67%). Nipple discharge and obesity was observed 183(48%) and 176(46%) respectively. According to Modified Ferriman-Gallwey (MFG) scale, 73(19%) and 70(18%) female had mild and moderate hirsutism. Out of 385 women, 100(26%) females were conformed to PCOS according to NIH diagnostics criterion which was 4$^{th}$ part of selected total females shown in **Table 2**. Menstrual interval longer than 35 days, abnormal menstruation, acne, family history of infertility, depression/ anxiety, lack of physical exercise and patient history of hypertension was found statistical significant difference with p-value <0.005 between PCOS and without PCOS that was shown in **Table 3**.

**TABLE 3: Risk factors for PCOS**

| VARIABLE | Response | PCOS | NON-PCOS | P-Value |
|---|---|---|---|---|
| **Menstrual interval longer than 35 days** | Yes | 45% | 33% | 0.03* |
| | No | 55% | 67% | |
| **Abnormal menstruation** | Yes | 45% | 34% | 0.05* |
| | No | 55% | 66% | |
| **Acne** | Yes | 13% | 25% | 0.01* |
| | No | 87% | 75% | |
| **Family history of diabetes** | Yes | 24% | 20% | 0.40 |
| | No | 76% | 80% | |
| **Family history of infertility** | Yes | 9% | 20% | <0.001* |
| | No | 91% | 80% | |
| **Family history of PCOS** | Yes | 14% | 15% | 0.80 |
| | No | 86% | 85% | |
| **Bad mood** | Yes | 13% | 10% | 0.30 |
| | No | 87% | 90% | |
| **Depression/ anxiety** | Yes | 31% | 69% | <0.001* |
| | No | 69% | 86% | |
| **Lack of physical exercise** | Yes | 27% | 17% | 0.02* |
| | No | 73% | 83% | |
| **Patient history of diabetes** | Yes | 33% | 35% | 0.70 |
| | No | 67% | 65% | |
| **Patient history of hypertension** | Yes | 13% | 6% | 0.03* |
| | No | 87% | 94% | |
| **Total** | | **57%** | **43%** | **0.005*** |

"*" indicates that statistical significant difference that was calculated by Chi Square test

## DISCUSSION:

The study included 385 female from general population of Gujrat with age group of 15 to 44 years. The present questionnaire study was conducted to find out the prevalence of PCOS and its related risk factors among reproductive age women. The overall mean age of the female was 28.95±7.9 years.

The worldwide prevalence of PCOS was 4% to 20% in reproductive age women. In our study prevalence 26% was slightly high according to worldwide prevalence. [19] Previous study conduct in Pakistan same age group women. The prevalence of study was 28.9% PCOS patient found

According to NIH criteria. [20] In our study, prevalence of PCOS was 101(26%) and NON-PCOS was 284(74%) and in present study same NIH criteria used.

According to socioeconomic status, a larger number of PCOS girls (45%) belong to the middle socioeconomic class than non-PCOS girls (53%). As a result, middle-class ladies are more susceptible to PCOS than other classes. [21] In contrast previous study results socioeconomic status was found that most of the female belong to middle class 51% female.

A cross-sectional study conducted by Shreeyanta K.C et.al in 2020 to determine the prevalence of PCO in the Students at the Hospital. In this study researcher use clinical tool for diagnosis of PCOS. [22] Similarly, our study used same criteria for the diagnosis of PCOs. Previous research on hirsutism used the modified Ferriman-Gallwey (mFG) score, which scores 9 body locations from 0 (no hair) to 4 (freely virile). [23] In our study same scale used for hirsutism.

In this study mean age in which menarche attain was 13 years. Similarly, previous studies Purushotham Kusuma et.al in 2021 was same result of mean age at which menarche attain. [23] According to the study's findings, risk factors for PCOS include no proper periods routine, childlessness, and diabetes, as well as the mother's irregular periods, mood change, and sedentary lifestyle.[18] In our study show same risk factor occurs in PCOS women. In addition to being the common problematic in people with PCOS is abnormal menstruation. In the previous study, 33.2% of the patients had abnormal menstruation. [24] But in current study, 45% PCOS women had abnormal menstruation.

Study conducted by Sue D. Pedersen et.al in 2007 was 18% PCOS women had hypertension. [17] Similarly in our 13% PCOS women had hypertension present and 87% PCOS women had hypertension absent. One more study supports our study results conducted by Thaw D. Htet and their colleagues conclude that the prevalence of PCOS was higher in working patients compared to non-working women. [25] The current finding shows that 36% women was house wife, 29% women office worker and 35% women students.

In previous study BMI of female was 0.7 p-value. [18] Similarly our study have almost same p-value 0.8. In past survey based study in which most of the PCOS women had high health risk include infertility, diabetes and hypertension. [24] In our study, PCOS women had same health related issues like abnormal menstruation, infertility, diabetes, sedentary life style and hypertension. Confounding variables was not assessed in this study and nonprobability sampling

technique was applied that are the weaknesses of this study. Another limitation was assessed that was PCOS diagnostic criteria that could not assess PCOS properly and accurately.

## CONCLUSION

Findings of the study revealed that about fourth part of females with reproductive age were conformed to PCOS according to NIH diagnostics criterion. Menstrual interval longer than 35 days, abnormal menstruation, and acne, family history of infertility, depression / anxiety, lack of physical exercise and patient history of hypertension were conformed as potential risk factors. Current study was carried out with cross sectional study design but for risk factors case control study design is recommended.

**CONFLICT OF INTEREST:** None

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