

Understanding the Epidemiology and Factors Contributing to Polycystic Ovary Syndrome: A Systematic Review

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ABSTRACT

Polycystic ovary syndrome (PCOS) is a hormonal disorder in females of reproductive age, affecting about 5–20% worldwide. In Asian women, both the frequency and the way PCOS appears are shaped by several influences. Family history and insulin resistance are central factors, and these often lead to related health issues such as type 2 diabetes and obesity. Studies have shown that Asian women are generally more insulin resistant than women from Western countries, and this tendency is often made worse by eating patterns that are high in carbohydrates, along with limited physical activity. Apart from this, fast industrial growth in many Asian regions has added another challenge, as women are more exposed to environmental pollutants and chemicals that disturb hormone function. Social expectations and family pressures also increase stress, which may aggravate PCOS symptoms further. PCOS is diagnosed differently across countries, which makes it difficult to compare results. This highlights the need for uniform criteria and health programs that address the different symptoms found in Asian women.

KEYWORDS: PCOS, Epidemiology, Risk Factors, Reproductive Health, Endocrine Disorders.

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INTRODUCTION

Polycystic ovary syndrome (PCOS) is a prevalent endocrine and metabolic illness, and occurs in nearly 5-20% of women worldwide of reproductive age.¹ However, there are considerable differences in its prevalence among the racial and ethnic subgroups.² Over time, PCOS patients might be observed with major health conditions such as atypical reproductive disorders, diabetes mellitus, dyslipidaemia, and depression, which finally result in unfavourable changes in women's appearance, such as alopecia, hirsutism, obesity, and skin breakouts. Primarily caused by hormonal abnormalities, which include normal or suppressed follicle-stimulating hormone (FSH) and increased luteinizing hormone (LH), which alter the ratio of LH to FSH.³ Furthermore, the clinical manifestations of hyperandrogenism are associated with hyperinsulinemia and insulin resistance. Some analyses have shown that variables related to weight, genetics, and environment all contribute to hyperinsulinemia, which predisposes people to PCOS. Ethnicity may be a major factor in normalizing PCOS diagnosis and therapy. The majority of hereditary variables influence the pathophysiology of PCOS. This study lists the risk factors linked with PCOS in Asia to provide a few clear guidelines⁴ for an accurate diagnosis (Table 1). Genetics, stomach dysbiosis, environmental toxins, and diet are perilous factors that contribute to the pathogenesis of PCOS and the consequent improvement of clinical, reproductive, and metabolic features in PCOS patients.

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Though the genetic factors contributing to PCOS remain poorly known, and the condition is extremely diverse, a higher prevalence of lipid abnormalities has also been linked to PCOS. It is essential to highlight several aspects of the causes of PCOS. This systematic review will help to increase the knowledge about all the circumstances. Women who are suffering from this syndrome should be counselled and provided with good treatment along with their stress-releasing therapies. In the present scenario, this syndrome is found at a very young age, which may lead to infertility later in life. So, by this review, we are trying to point out that such things happen in PCOS.

ETIOLOGY AND PATHOPHYSIOLOGY

It's a metabolic, heterogeneous, and reproductive condition. Among females that can procreate, the disease is prevalent in 8.7 to 17.8% of cases.⁵ Adolescence is the time

when PCOS first shows clinical signs. On the other hand, there is proof that the illness originated in the intrauterine environment, suggesting a genetic component.^{6,7} Epigenetic exposures are additional causative elements that emphasize the correlation between maternal androgens and syndrome-related phenotypes and intrauterine exposure.⁸ Environmental variables, including lifestyle and socioeconomic status, may be linked to ethnic differences in PCOS (Figure 1).⁹ The pathophysiology of PCOS still requires clarification despite a significant number of research investigations.¹⁰ Nonetheless, certain pathophysiological pathways are understood, such as changes in gonadotropin-releasing hormone production, an error in the synthesis of androgens, and the emergence of insulin resistance.¹¹

Numerous studies have also suggested that the primary pathophysiological factor contributing to the syndrome's development is insulin resistance. Insulin and LH work together to boost the ovary's theca cells' ability to produce androgens.¹² The adrenal cortex is another location where androgen is produced as a result of anomalies in cortical steroidogenesis that are facilitated by adrenocorticotrophic hormone activation.^{13,14}

EPIDEMIOLOGY OF PCOS

The incidence of PCOS varies greatly throughout Asian nations. Studies on the prevalence of PCOS in Asia have shown rates ranging from 2.4% to 26%, which reflects regional variations in genetic, environmental, and lifestyle variables.^{15,16} For instance, India's prevalence is as high as 22.5% but stands at 5.6% according to reports in China. Demographic factors such as nutrition, levels of physical activity, and urbanization have a significant impact on these rates. PCOS prevalence is higher among urban women due to changes in lifestyle and high stress levels.¹⁷ This heterogeneity is determined by genetic susceptibility among different Asian populations. Research contrasting the prevalence of PCOS between Asian and non-Asian women indicates that Asian women are more prone to metabolic issues associated with PCOS.¹⁸ This suggests an ethnic susceptibility to the metabolic characteristics of the disease. The epidemiological landscape is also complicated by the observation that PCOS symptoms may also be age-variable, occurring during puberty and in other instances not until advanced reproductive age.¹⁹ An additional complicating factor is the heterogeneity of diagnostic criteria, which may result in non-uniformly reported prevalence rates because different countries and clinicians might utilize differing standards, for instance, Rotterdam criteria, NIH criteria, or Androgen Excess Society criteria.²⁰ All of these elements point to the necessity of customized public health initiatives and standardized diagnostic procedures to treat PCOS in various Asian communities.²¹ In South Asian women, the prevalence is often reported at over 20%. In Europe, about 5%–10% of women are affected, while in North America, the figure is around 6%–10%. Early reports suggest that the prevalence in Africa is close to the global average.

Public Health Burden and Care Approaches

PCOS is a public health concern as it is linked with infertility, metabolic problems, and psychological issues. Management should include early detection, lifestyle changes, and emotional support, rather than depending only on medicines. Additional studies are needed to know the genetic and environmental causes of PCOS, which will help in developing better treatments and improving outcomes.

Risk Factors of Polycystic Ovarian Syndrome

PCOS is a complex endocrine disorder that affects females during their reproductive years and has consequences for both health and fertility.²² Studies that focus on Asian women²³

1. Genetic Factors

Family history is an important risk factor for PCOS. Several gene variants have been linked with the disorder in Asian women, such as CYP11a, CYP21, CYP19, CYP17, IRS1, IRS2, INS, INSR, CAPN10, AR, SHBG, LH, FSHR, AMH, FTO, and ADIPOQ. Having relatives with PCOS increases the chance of developing it, which makes genetic screening and counseling useful.²⁴

2. Insulin Resistance and Metabolic Syndrome

Insulin resistance is one of the main problems in PCOS. Asian women often show higher insulin resistance compared to Western women.²⁵ This leads to raised insulin levels in the body and makes symptoms like high androgen levels worse.

3. Lifestyle and Dietary Habits

Diet and exercise habits are major factors influencing PCOS risk. High carbohydrate intake, common in many Asian diets, can increase the chance of obesity and insulin resistance.²⁶ A sedentary lifestyle adds to the problem. The shift toward a Western-style diet along with declining physical activity in urban areas has likely contributed to the growing number of PCOS cases in Asia.

4. Environmental and Endocrine Disruptors

In many fast-growing Asian countries, women are exposed to high levels of pollution and chemicals that can disturb hormones. These exposures may add to the risk of PCOS.²⁷ More study is needed to understand their exact effect on reproductive health.

Psychological Stress

There is growing mark to show that psychological stress is a factor that contributes to PCOS progression and severity.²⁸ There is a correlation between the high societal and familial expectations that are prevalent in many Asian cultures and the development of chronic stress, which can disrupt hormonal equilibrium and make PCOS symptoms worse.²⁹ Support for mental health and measures for stress management are crucial components of comprehensive care for PCOS.+

MATERIALS AND METHODS

Study type: Systematic review analysis

Study design and research sample:

PRISMA (Preferred Reporting Items for systematic reviews and meta-examination) exhortation was continued in the lead of this review, which is a systematic review.³¹ A systematic review process was utilized to assemble pertinent literature on PCOS factors in Asian female populations (Figure 2).³² This study's example was made by together data from the PubMed data set and reviewing publications that were published between November 2015 and November 2023.

Operational definitions:

Polycystic Ovary Syndrome in Asian females is the dependent variable in this review, while genetics, insulin resistance, hormones, and obesity are the independent factors.³³

Research procedure:

Utilizing the catchphrases "risk factor, menstrual cycle problem, menstrual aggravations, physical activity, profound unsettling influences, genetics, metabolic syndrome, weight record, obesity, insulin resistance, reproductive periods, women, Asia, and polycystic ovary syndrome," the examination group gathered information for this review from the PubMed data set.³⁴ If an article fulfils any accompanying criteria, it will be precluded: a) it doesn't manage PCOS; b) it is excluded from the case-control. c) the information is inaccessible or the review is lacking.

Data Collection Technique

A web search is utilized to assemble information. The data accumulated is a unique English-language article that follows the organization's determinations. People were the main subjects of study. Possible titles - abstracts, just or the total text - will be analysed. The accumulated papers will be counted in light of the creator's name, the year the paper was published, the review area, and the number of exploration tests.³⁵ Concentrating on PCOS risk factors influencing Asian women was one of the inclusion criteria for this example. The examination was not fulfilled, and in the event that there was insufficient data provided for information extraction, they were the prohibition criteria were applied. Each article incorporated the accompanying data: the name of the main writer, the time of publication, the region, the kind of study, and the number of tests.

Data Analysis

Utilizing story amalgamation, information was investigated by taking examination discoveries from one article and interfacing them with those from different publications, then, at that point, broadly breaking down the outcomes and offering ideas at the end of the blend.³⁶

DIAGNOSIS OF PCOS

Patients with PCOS are linked to three separate criteria.³⁷ An arrangement of criteria for PCOS was the foundation for the gathering of a group of specialists in 1990 at the National Institutes of Child Health and Human Development (NICHD).³⁸ This gathering was organized by the National Institutes of Health (NIH). Over the succeeding decade, specialists arrived at the realization that ovarian morphology was a key component in the process of being diagnosed.^{39,40} A polycystic ovarian morphology on pelvic ultrasonography performed at the studio was permitted to be integrated into the criteria that were broadened by the National Institutes of Health and the National Institutes of Health.⁴¹ Ultimately, it was determined that to diagnose PCOS, approximately two of the three features must be achieved.⁴² This was the conclusion that was reached.

As shown in Table 1, modified by the criteria that have been established by the National Institutes of Health, the American Society for Reproductive Medicine, the European Society for Human Proliferation and Embryology, and the National Institute for Child Health and Human Development.^{43,44} Bringing to mind the Rotterdam device was the request that was made in 2006 by the Androgen Excess Society (AES) to amend the criteria that were used by the NICHD and NIH.⁴⁵ AES, 2006 proposal to modify the NICHD/NIH criteria brought the Rotterdam device to mind.⁴⁶ By the AES, polycystic ovaries, hyperandrogenaemia, hirsutism, oligo-ovulation/anovulation, and combinations of these characteristics are among the phenotypic characteristics of the diagnosis of PCOS.⁴⁷ A studio that specializes in evidence-based treatments for polycystic ovarian disease was given funding by the National Institutes of Health.⁴⁸ This studio was established in 2012. Even though every metric had its own set of advantages and disadvantages, the master board concluded that utilizing an excessive number of criteria would be confusing and would impede research on PCOS.⁴⁹

If polycystic ovarian syndrome is suspected, a pelvic ultrasound, blood tests, physical examination, and a comprehensive medical history should all be performed.⁵⁰ The medical history of the patient and the results of the physical examination provide the specialist with information on the patient's hypertension, abnormalities in the skin, changes in menstrual cycles, anomalies in the growth of male hair, and unexplained weight gain.⁵¹ An ultrasound of the pelvis is conducted, and blood is drawn to determine the levels of chemicals, glucose, and cholesterol.⁵² This is done to differentiate ovarian blisters. It is important to carry out this examination to eliminate the possibility of other factors contributing to problems with conception, endocrine function, and metabolism.⁵³

DISCUSSION

PCOS in Asian women, as the systematic review uncovers, provides a complete understanding of the epidemiology and determinants of PCOS. PCOS occurs in 2.4% to 26% of Asians; 5.6% of Chinese, and as high as 22.5% of Indians are suffering from the disease.⁵⁴ Several determinants, including lifestyle decisions, urbanization, genetic susceptibility, and economic status, all play a role in these differences.

The demand for genetic screening and counseling in high-risk individuals is underscored by the multiple gene variants of PCOS in Asian women. Genetic factors are relevant. Insulin resistance and metabolic syndrome are central to the pathogenesis of PCOS.⁵⁵ The rising levels of type 2 diabetes and obesity in Asian populations due to urbanization and lifestyle changes are closely associated with this metabolic derangement. An individual's physical activity level and dietary intake are significant determinants of lifestyle. Individuals with high carbohydrate intake and inactive lifestyles tend to be obese and insulin-resistant. This is very prevalent in Asian populations. The endocrine equilibrium is also complicated further, and PCOS pathogenesis is facilitated by exposure to.⁵⁶ Societal and family pressures may result in psychological stress, which exacerbates PCOS manifestations by disrupting the hormonal equilibrium. This makes diagnosis uneven and leads to differences in reported prevalence.

In Asian populations, the way PCOS appears can vary, which shows the need for common diagnostic standards and public health programs designed for regional needs.⁵⁷

CONCLUSION

There are considerable variances in the occurrence of PCOS among Asian women, as revealed by this systematic review, which gives a complete summary of the epidemiology and contributing factors of PCOS among Asian women. The occurrence of PCOS among Asian women shows wide variation. This review highlights the main factors influencing the condition, including genetic risk, insulin resistance, lifestyle, environmental exposure, and psychological stress⁵⁸ Because of this complexity, standard diagnostic guidelines are needed so that prevalence rates can be measured more consistently across regions.⁵⁹

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