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POLYENDOCRINE METABOLIC OVARIAN SYNDROME (PMOS), FORMERLY POLYCYSTIC OVARY SYNDROME (PCOS): SOUTH ASIAN AND GLOBAL BURDEN – A REVIEW

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Abstract

Polyendocrine metabolic ovarian syndrome (PMOS) is a relatively prevalent and heterogeneous endocrine-metabolic condition which occurs predominantly in the reproductive age of the female population and was formerly classified as polycystic ovary syndrome (PCOS). In 2026, following an international global consensus process, PMOS was renamed, becoming the new name and reflecting the multisystem nature of the condition rather than the ovarian cysts, which are not the only components involved in PMOS [1]. The current epidemiological evidence indicates that prevalence estimates can differ dramatically, depending on the diagnostic criteria and the population. According to a global systematic review and meta-analysis in 2026, the prevalence of PCOS among women in adulthood was 12.1% by Rotterdam criteria, 7.9% by original NIH criteria and 12.7% by AE-PCOS criteria [2]. South Asia is a major region of interest in the area of PMOS/PCOS studies. According to GBD 2021 analyses, there is a considerable population burden in South Asia, with an estimated 10.75 million prevalent cases by 2021 and a trend of increasing prevalence between 1990 and 2021 [3,4]. The 2025 GBD analysis [3] indicated that India had the highest age-standardized prevalence rate amongst South Asian countries. There are a number of clinically significant studies in Pakistan, however, often samples are selected from hospital settings or other settings. So individual estimates of prevalence for Pakistan should not be considered as national prevalence estimates [5,6,9].This overview highlights the evidence regarding terminology, prevalence, regional differences, clinical presentation, metabolic and psychological burden, reproductive outcomes, diagnosis, management and the research gaps, especially in South Asian context and in Pakistan. It also makes a key methodological observation: that a modelled GBD case count is a type of evidence different from a community prevalence estimate and the proportion of features found in a sample of cases already diagnosed in the clinical setting.

INTRODUCTION

PMOS/PCOS is a multi-system endocrine disorder, which has reproductive, hormonal, metabolic and dermatological and psychological symptoms. They share similar symptoms such as menstrual irregularity, ovulatory dysfunction,

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hyperandrogenism, infertility, insulin resistance, obesity, dyslipidemia and poor quality of life [1,7,10,11]. The disease is not homogeneous and, therefore, two women with the same diagnosis may present in different ways. The various types of this heterogeneity contribute to differences in diagnosis and epidemiological estimates between studies [13,14]. The prevalence of PCOS is now estimated at 10–13% of women of reproductive age, and many women with PCOS are likely not to be diagnosed [50]. The 2026 name change consensus is not an indication of the emergence of a new disease but the renaming of an old disease. Please note that most of the earlier studies still refer to PCOS, therefore both PMOS and PCOS should be used when looking for or interpreting scientific literature. Beyond its reproductive manifestations, PMOS/PCOS has important implications for women's overall health and long-term well-being. The condition may affect several aspects of daily life, including menstrual health, physical appearance, fertility, emotional stability, and social confidence. Its association with insulin resistance and disturbances in glucose and lipid metabolism also makes it an important concern from a public health perspective. However, the severity and combination of symptoms vary considerably among affected individuals, which can make early recognition and appropriate management challenging. In many cases, women may seek medical advice for individual symptoms, such as irregular menstruation, acne, excessive hair growth, or difficulty conceiving, without initially recognizing that these problems may be related to the same underlying disorder. Differences in awareness, healthcare access, diagnostic practices, and the availability of specialist services may further influence the identification and management of the condition. Therefore, understanding the broader clinical and epidemiological aspects of PMOS/PCOS is essential for improving awareness, supporting timely diagnosis, and developing appropriate healthcare strategies. These considerations are particularly relevant in South Asian countries, including Pakistan, where locally representative epidemiological evidence remains limited and further research is needed to understand the extent of the condition and its associated health burden. Understanding the global, South Asian, and Pakistani burden of PMOS/PCOS is therefore essential for identifying research priorities and improving healthcare planning. A comprehensive assessment should not focus only on prevalence but should also consider differences in diagnostic criteria, clinical manifestations, metabolic complications, psychological wellbeing, infertility, quality of life, and access to appropriate care. In Pakistan in particular, nationally representative studies using standardized diagnostic criteria are needed to establish a more reliable estimate of the true population burden. Such evidence could support earlier diagnosis, improve disease awareness, strengthen preventive strategies, and guide the development of appropriate reproductive and metabolic healthcare services. This review therefore examines the current evidence concerning PMOS/PCOS, with particular emphasis on its global prevalence, regional distribution, South Asian burden, and available evidence from Pakistan. It also discusses major clinical manifestations, metabolic and psychological consequences, diagnostic considerations, management approaches, current research gaps, and future directions for PMOS/PCOS research and healthcare in Pakistan.

1. Change in Terminology: From PCOS to PMOS

In May 2026, an international, patient and professional informed consensus process suggested a new name for this condition, previously called PCOS, polyendocrine metabolic ovarian syndrome (PMOS). This process engaged 56 academic, clinical and patient organizations and was supported by surveys to people living with PCOS and multidisciplinary health professionals around the world with 14,360 responses [1]. The terms 'estrogen and/or metabolic dysfunction' and 'with ovarian dysfunction' were chosen to highlight estrogen and/ or metabolic dysfunction, along with ovarian dysfunction, while not implying the presence of ovarian cysts. The change is expected to occur gradually. The two terms should be used together as a linked term for many years to come, as the term PCOS will remain in existing literature and clinical records, and in guidelines and databases [1,8]. The change is then largely one of

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nomenclature and communication, and not a change in the concept or biological state.

2. Global Prevalence of PMOS/PCOS

Determination of the prevalence of PMOS/PCOS in the world is complicated by the fact that prevalence is dependent on the diagnostic criteria, age distribution, sampling method and method of determining cases. Previous systematic reviews suggested around 6% based on the NIH criteria and about 10% based on Rotterdam or AE-PCOS criteria [11]. A subsequent systematic review and meta-analysis published in 2024 revealed an overall global prevalence of 9.2%, with 5.5% using NIH criteria, 11.5% using Rotterdam criteria and 7.1% using AE-PCOS criteria [12]. The most comprehensive recent global review included 119 unique studies, from which 92 studies contributed to pooled analyses [2], and was based on a search of over 16,000 records. Pooled prevalence among adult women was 12.1% by Rotterdam criteria, 7.9% by NIH and 12.7% by AE-PCOS criteria. The high statistical heterogeneity found in these analyses does not allow the pooled values to be used as prevalence values for each country but rather as indication of the epidemiology.

Diagnostic approach	Estimated prevalence	95% CI	Interpretation
Rotterdam	12.1%	9.8–14.8	Adult women; pooled global estimate
NIH	7.9%	6.2–9.9	Adult women; pooled global estimate
AE-PCOS	12.7%	8.2–17.9	Adult women; pooled global estimate
Self-report	7.8%	5.8–10.0	Adult women; pooled global estimate

There are also significant differences by the region. The pooled prevalence for the WHO Eastern Mediterranean Region in 2026 was 15.1% and 14.3% in the WHO South-East Asia Region, while it was 11.7% in Europe, 10.5% in the Americas and 9.1% in the Western Pacific Region [2]. Ethnicity-based evidence has also demonstrated that prevalence is different across populations and that part of

South Asia is an important context for PMOS/PCOS research due to its large population and the presence of reproductive that variation can be accounted for by variation in diagnostic criteria [8,11].

Soe and metabolic risk factors. The prevalence of PCOS in South Asia also has an uptick from 1990 to 2021, with average annual percentage change of 1.87% (95% CI 1.85–1.88) [3] according to the 2025 GBD-based analysis. In 2021 the age-standardized prevalence rate in India was the highest in the region at 269.8 per 100,000 population. In 2021, an approximate estimate of 10,749,370 prevalent PCOS cases was found in South Asia with the uncertainty interval of 7.76–15.12 million [4]. It also estimated 220,589 incident cases and 94,328 DALYs. These are estimated population-level prevalence rates that should not be directly translated into clinical prevalence percentages. Variation is also seen at the country level in studies. According to a systematic review and meta-analysis of Indian studies, the pooled prevalence was about 11.3% [10] and a meta-analysis of Chinese studies estimated the prevalence to be 10.01% [21]. These differences are indicative of the fact that South Asia is not a homogeneous epidemiological population.

Indicator	South Asia, 2021	Evidence type
Prevalent cases	10,749,370	GBD 2021 modeled estimate

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Incident cases	220,589	GBD 2021 modeled estimate
DALYs	94,328	GBD 2021 modeled estimate
AAPC in prevalence, 1990–2021	1.87%	GBD 1990–2021 trend analysis

5. PMOS/PCOS in Pakistan

There are several studies published in Pakistan on PMOS/PCOS but the evidence is geographically and methodologically not uniform. The majority of the studies available are conducted at hospitals, specialist clinics or selected community groups, and are held for women. Hence, they can be employed to describe clinical patterns but not automatically used to estimate prevalence on a national level [5,6,9]. A study conducted in Hyderabad reported PCOS prevalence of 48.5% (Rotterdam criteria) amongst 200 women [5]. The sample was collected in a tertiary care center, therefore the findings must be interpreted as study specific prevalence of PCOS in Pakistani women and not as the prevalence of PCOS in all Pakistani women. A 2026 geographical review also found great differences in prevalence across the various regions, and highlighted the impact of diagnostic criteria and phenotype/sampling on prevalence estimates [8]. Another Pakistani study included 440 women with PCOS in healthcare facilities of Abbottabad, Kohat and Islamabad. Obesity (80.0%), irregular menstruation (71.8%), hirsutism (68.0%), acne (67.3%), hyperglycemia (63.2%) and hyperandrogenism (77.7%) were the reported clinical features [6]. These percentages are for women already diagnosed with PCOS, so do not reflect prevalence of those features in the general Pakistani population.

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Clinical feature	Number (n=440)	Percentage
Obesity	352	80.0%
Irregular menstruation	316	71.8%
Hirsutism	299	68.0%
Acne	296	67.3%
Hyperglycemia	278	63.2%
Multiple cystic follicles on ultrasound	268	61.0%
Hyperandrogenism	342	77.7%
Infertility	146	33.2%
Hypertension	87	19.8%
High cholesterol	85	19.3%

Anjum et al. conducted their study in a tertiary endocrine care center among 153 women meeting Rotterdam criteria in Karachi. Menstrual irregularity was a frequent problem and metabolic syndrome was found in 46.4%, obesity and dyslipidemia were also common [9]. Hormonal patterns, hyperandrogenism, vitamin D status and physical activity and phenotype distribution have also been studied in the Pakistani population as part of the Pakistani research, highlighting the importance of wider population-based study [31,32,33,34].

3. Clinical and Dermatological Burden

While the clinical manifestations are not restricted to menstruation and fertility. In some cases hyperandrogenism can manifest itself as hirsutism, acne, androgenetic hair changes or biochemical excess of androgens. According to a worldwide meta-analysis that was done, about 43% of women with PCOS experienced acne, while about 21% of the healthy controls did the same. Age and diagnostic criteria were partially responsible for the discrepancies between studies. Obesity and body composition changes are also prevalent but not universal. However, the relationship between PCOS prevalence and obesity prevalence is complex and an epidemiological study of 58 population studies

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in 2024 found no simple relationship between prevalence of obesity and prevalence of PCOS, across all diagnostic systems [35]. There is particular importance of metabolic phenotype, with obese women with PCOS having less favorable lipid profiles than non-obese women with the syndrome [36].

4. Metabolic Burden

Insulin resistance is an important component of the metabolic phenotype of PMOS/PCOS. Modern studies refer to abnormalities in insulin response at several tissues, including hyperandrogenism, obesity, genetic factors and other biological factors [37]. Women with PCOS demonstrated increased risk of impaired glucose tolerance and type 2 diabetes in a systematic review and meta-regression, the strength of which was adjusted for ethnicity and obesity [15].

There is also longitudinal evidence of the rise in cardiometabolic risk. Wecker and colleagues found higher risks of hypertension and type 2 diabetes in women with PCOS and increased risk of non-fatal cerebrovascular events [16]. Another meta-analysis also identified an increased risk for type 2 diabetes among women with obesity and PCOS [17]. More recent cardiovascular analyses also confirm a greater cardiovascular risk but, again, with different results and different findings. A 2024 meta-analysis of previous studies identified women with PCOS as being at higher risk of cardiovascular disease [28], and a 2023 guideline evidence review of over one million women showed women with PCOS were at higher risk of composite cardiovascular disease, ischemic heart disease, myocardial infarction, and stroke [29]. Increased risk of hypertension, stroke and cardiovascular disease was also observed in a 2025 meta-analysis, which noted significant variation [30].

5. Psychological Health and Quality of Life

Psychological wellbeing is an important part of the PMOS/PCOS burden. Psychological aspects and quality of life are recommended to be taken into account in the comprehensive treatment of the patient [7]. A large systematic review and meta-analysis found a significantly increased prevalence of depression and anxiety, and decreased quality of life in women with PCOS compared to controls [18]. Adolescents and young women have also been specifically studied and there is evidence that they have higher levels of depression and anxiety [20]. One systematic review of studies from low- and middle-income countries (LMICs) has recently been published, and reported pooled prevalence of 51% for depression and 45% for anxiety [19] should be interpreted with caution, due to the high level of heterogeneity observed in the studies. Infertility, menstrual issues, hirsutism, acne, weight issues and body image may have an impact on quality of life. Systematic reviews have consistently shown adverse effects on health-related quality of life [24,25] and a recent meta-analysis indicated increased body-image problems in women with PCOS compared with controls [38]. The Pakistani study by Sidra et al. also showed significant impairment of the quality of life among women with PCOS treated [6].

6. Sleep and Other Comorbidities

Sleep health is increasingly recognized as part of PCOS care. A meta-analysis found obstructive sleep apnea in approximately 35% of women with PCOS [26]. A newer evidence synthesis used to inform the international guideline estimated pooled OSA prevalence at about 37% in PCOS compared with 6% in non-PCOS groups, although results varied by age and BMI [27].

Endometrial health is another concern, particularly in women with prolonged untreated anovulation. A 2023 meta-analysis reported higher odds of endometrial cancer in women with PCOS [31], and an updated 2022 meta-analysis similarly found an association with endometrial cancer while finding no clear association with breast cancer [32]. These findings support appropriate evaluation of persistent menstrual irregularity rather than treating PCOS as a purely cosmetic or fertility-related condition.

7. Reproductive and Pregnancy Burden

One of the major clinical presentations of PMOS/PCOS is anovulation and infertility. Ovulation induction is chosen as per the clinical situation in women with anovulatory infertility. In 750 women with PCOS, the landmark randomized trial by Legro et al. [39] gave important evidence for modern fertility management: letrozole and clomiphene. In another meta-analysis of 50 trials, letrozole was also shown to have superior ovulation

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and pregnancy rates compared to clomiphene [40]. There may be other risks during pregnancy. A systematic review and meta-analysis of 104 studies with over 106,000 pregnancies revealed increased risk of miscarriage, gestational diabetes, gestational hypertension, pre-eclampsia and cesarean section among women with PCOS [41]. These results support the suggested guidelines for PCOS to be identified during the planning period for pregnancy and during antenatal care [7].

8. Diagnostic Criteria

Definitions are not always the same and vary with time. An extension of the clinical spectrum was provided by the 2003 Rotterdam consensus, which identified the three main domains (ovulatory dysfunction, hyperandrogenism and polycystic ovarian morphology), and diagnosis was made when two of the three were present after the exclusion of other causes [42]. The AE-PCOS is more expansive, with a greater focus on hyperandrogenism [11,12] whereas the NIH definition requires a more specific focus. In 2023, the international guideline was updated, which now clarifies the diagnostic concept and recommends using anti-Müllerian hormone as a new alternative to ultrasound in certain situations to determine polycystic ovarian morphology in adults [7]. Diagnostic reviews are now based on the fact that none of these symptoms, laboratory findings or ultrasound findings on their own are enough to make a diagnosis [14]. However, diagnosis in adolescents demands a bit more attention as irregular cycles and acne can be a normal part of puberty. It is therefore important to note that the 2023 international guideline offers age-specific recommendations and highlights the risk of overdiagnosing in cases of normal pubertal development and still diagnosing PCOS [7].

9. Management

Management needs to be tailored to the symptoms, reproductive intentions, metabolic risk, and psychological health and wishes of the individuals. The 2023 guideline for international practice highlights the importance of health habits and the management of menstrual irregularity and hyperandrogenic symptoms, metabolic risk assessment, psychological care and fertility treatment, if needed [7]. You can still continue to manage your lifestyle. Another 2023 review highlighted the importance of management going beyond diet and physical activity and incorporating sleep, emotional wellbeing and other health behaviors [42]. Individualized, PCOS specific lifestyle advice and multidisciplinary support were identified as important facilitators by PCOS individuals and by health care professionals in the 2025 mixed-method systematic review [43]. Metformin may have value for some metabolic parameters. Moderate-certainty evidence indicated that modest improvements in BMI, insulin resistance and fasting glucose were seen with the use of a systematic review to inform the 2023 guideline, versus placebo, and that the effects were associated with a higher prevalence of mild gastrointestinal adverse effects [44]. The review comparing metformin with COCP showed that the selection of treatment should be guided by the symptoms and individual preferences [45]. Although much has been studied, the evidence is not as conclusive as is sometimes thought when it comes to inositol. A systematic review conducted in 2024 reported potential benefits of some metabolic outcomes and ovulation, with a moderate amount but not conclusive evidence [46]. In women who are not trying for pregnancy the combined oral contraceptive pill may be used to control cycles and hyperandrogenic symptoms. There are benefits of cycle regulation from evidence reviews, and limited certainty of benefits for some other outcomes [47,48]. Pharmacological interventions and bariatric surgery have also been explored for specific women with obesity, with fewer outcomes available compared to standard lifestyle and guideline-directed treatment [49].

12. Research Gaps and Future Directions

One important epidemiological missing link in Pakistan is the lack of a comprehensive and representative prevalence study based on a consistent and uniform diagnostic framework. Studies that are already available are useful but are often conducted with specific clinical groups. Women of other provinces, urban and rural areas, socioeconomic groups and age groups should be included in future work. It is also important to undertake longitudinal studies. The extent of risk of diabetes, cardiovascular disease, endometrial

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disease, psychological disorders and changes in phenotype throughout the life course are important unanswered questions [13,16,50]. Genetic and metabolic investigations can be useful to understand the clinical variations among individuals and populations [34]. Other potential factors that influence diagnosis and care delivery such as awareness, cost, access to specialist services, cultural factors, and continuity of follow-up should also be explored in future studies conducted in Pakistan. It is not just a matter of obtaining one prevalence percentage, but it is the matter to build a reliable picture of disease burden, access to diagnosis, access to treatment, and outcomes in the long run.

13.Case Burden and Ratio Summary

Population/region	Estimate	Approximate ratio	Type of evidence
Global adult women	12.1%	~1 in 8	2026 systematic review; Rotterdam
WHO Eastern Mediterranean	15.1%	~1 in 6.6	2026 pooled regional estimate
WHO South-East Asia	14.3%	~1 in 7	2026 pooled regional estimate
South Asia	10,749,370 cases	Not directly expressed as ratio	GBD 2021 modeled estimate
Pakistan, Hyderabad study	48.5%	~1 in 2.1	Study-specific clinical estimate
Pakistan, 440 diagnosed women	Not a prevalence estimate	—	Clinical manifestation study

Note methodological: The estimate of Pakistanis (48.5%) is not a national prevalence estimate; the modeled number of South Asians (10.75 million) is a modeled case count. There are no direct comparisons that should be made between the two and a community prevalence percentage [2-6].

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14. Conclusion

Previously called PCOS, PMOS is a common, multi-system endocrine-metabolic condition that affects the reproductive, metabolic, dermatological and psychological systems. In 2026, the international consensus takes place, and the new name PMOS is adopted to allow the term to reflect this. Evidence at this time seems to indicate a prevalence of approximately 12.1% when using the Rotterdam criteria, but this figure has been widely variable depending on the geographic location and the diagnostic criteria used [2]. South Asia is a significant population burden, with both GBD analyses indicating prevalent cases were numerous in the years 1990–2021, and that they were increasing over time [3,4]. However, Pakistan has crucial clinical evidence, and currently available studies do not provide any one nationally representative prevalence estimate of support. Despite this, studies of women with PCOS in Pakistan show a significant reproductive, metabolic, dermatological and QoL burden [5,6,9]. To develop a stronger evidence base in Pakistan, large population-based studies and standardized diagnostic methods and long-term follow-up will be needed. There is also evidence that there is a wider approach to the care of a woman with PMOS/PCOS that is also supported by the existing evidence, encompassing metabolic health, mental health and wellbeing, fertility, pregnancy, sleep and quality of life, rather than concentrating purely on the ovarian morphology or menstrual symptoms.

15. Declarations

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Reference verification notes

All 50 references above were checked against PubMed, publisher pages, or an authoritative WHO source during preparation of this revision. Where a paper is not freely available as a full article, the PubMed record is provided through its PMID or DOI so that the bibliographic record can be independently verified. The review deliberately distinguishes population-level estimates from hospital-based findings and from modeled GBD estimates