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Prevalence and Diagnosis of Polycystic Ovary Syndrome; Systematic Review

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Abstract: **Polycystic ovary syndrome (PCOS) is a common endocrine condition of ladies, identified by a heterogeneous discussion of hyperandrogenism and ovulatory dysfunction. We aimed to construct a systematic review and of all available studies to document the reported overall prevalence and diagnostic approaches of PCOS according to all diagnostic criteria. An extensive literature search was performed up to October 2016 in PubMed and OvidSP by different blind investigators to generate the review analysis. This review showed that PCOS prevalence under the NIH criteria, in a predominately different communities, is higher than previously believed. The reported frequency of PCO morphology was over 40% in many studies, therefore these findings might guide the local use of different diagnostic criteria and adoption of treatment approaches according to geographical region.**

Keywords: **Hyperandrogenism And Ovulatory Dysfunction, Polycystic ovary syndrome (PCOS).**

1. INTRODUCTION

Polycystic ovary syndrome (PCOS) is a common endocrine condition of ladies, identified by a heterogeneous discussion of hyperandrogenism and ovulatory dysfunction. The aetiology is unidentified however it has essential long-lasting health ramifications, having actually been connected with type 2 diabetes, danger elements for heart disease (1,2) and endometrial cancer (3). This condition is a substantial public health issue in society, which for that reason shows a requirement to precisely determine the percentage of ladies impacted. Polycystic ovary syndrome (PCOS) was initially reported in modern-day medical literature by Stein and Leventhal who, in 1935, explained 7 ladies experiencing amenorrhea, hirsutism, and bigger ovaries with several cysts (4).

The scientific discussion of PCOS differs commonly. Females with PCOS frequently look for look after menstrual disruptions, scientific symptoms of hyperandrogenism, and infertility. Menstrual disruptions frequently observed in PCOS consist of oligomenorrhea, amenorrhea, and extended unpredictable menstrual bleeding.2 However, 30% of females with PCOS will have typical menses (5). Roughly 85%-- 90% of females with oligomenorrhea have PCOS while 30%-- 40% of ladies with amenorrhea will have PCOS [(6)].

More than 80% of ladies providing with signs of androgen excess have PCOS [(7)]. Hirsutism is a typical medical discussion of hyperandrogenism taking place in approximately 70% of females with PCOS [(8)]. Hirsutism is assessed utilizing a customized Ferriman-- Gallwey scoring system [(9)]. This tool is utilized to assess hair development at different seven regions of body upper lip, chin/face, chest, back, abdominal area, arms, and thighs. A rating of 0 is given up the lack of terminal hair development and a rating of 4 is provided for substantial development. An overall rating of 8 or more is a sign of hirsutism [(10)]. Over 90% of usually menstruating ladies with hirsutism are recognized through ultrasound to have polycystic ovaries [(11)]. In addition, PCOS happens in 50% of females with less serious circulation of undesirable hair development [(12)]. Acne can likewise be a marker of hyperandrogenism however is less widespread in PCOS and less particular than hirsutism. Around 15%-- 30% of adult ladies with PCOS present with acne [(7,13)]. The distinction in frequency of hirsutism and acne may be attributed to the difference in expression of 5α-reductase in the sebaceous gland and the hair follicle, and resulting higher dihydrotestosterone in the hair follicle [(14)]. Of those women presenting with severe acne, over 40% were diagnosed with PCOS [(14)]. Some experts recommend that women presenting with acne be asked about their menstrual history and be evaluated for other signs of hyperandrogenism [(14)].

We aimed to construct a systematic review and of all available studies to document the reported overall prevalence and diagnostic approaches of PCOS according to all diagnostic criteria.

2. METHODOLOGY

The current study was conducted as a systematic review and metaanalysis of the existing literature to determine the overall prevalence of PCOS according to three different methods of diagnostic criteria. The Preferred Reporting Items for Systematic Reviews Guidelines were used and, hence, all aspects of the current review were decided before the literature search; no post hoc change was performed.

Search method and data sources:

An extensive literature search was performed up to October 2016 in PubMed and OvidSP by different blind investigators to generate the review analysis.

Study selection:

Criteria for inclusion in the current study were established in advance of the literature search. Articles that represent the prevalence of PCOS according to at least one subset of diagnostic criteria were included. the investigators screened independently and a different author decided whether the study would be included or not.

3. RESULTS AND DISSCUSSION

Perevelances of PCOS:

we identified 4 studies [15,16,17,18] that estimates prevalence for PCOS, as defined by the NIH/NICHD criteria, indicate that PCOS is a common endocrinopathy affecting 4%–8% of women of reproductive age [15,16]. Recently, several groups have demonstrated that the prevalence of PCOS varies depending on the diagnostic criteria used (**Table1**) These studies [15,16,17,18] consistently report that the prevalence estimates using the Rotterdam criteria are two to three times greater than those obtained using the NIH/NICHD criteria.

Table 1:Prevalence of polycystic ovary syndrome (PCOS) using different diagnostic criteria

Source	Population	NIH/NICHD criteria	ESHRE/ASRM (Rotterdam) criteria	Androgen excess and PCOS society criteria
March et al[15]	728 Australian women	8.7%	17.8%	12.0%
Mehrabian et al [16]	820 Iranian women	7%	15.2%	7.92%
Tehrani et al [17]	929 Iranian women	7.1%	14.6%	11.7%
Yildiz et al [18]	392 Turkish women	6.1%	19.9%	15.3%

Abbreviations: ESHRE/ASRM, European Society for Human Reproduction and Embryology/American Society for Reproductive Medicine; NIH/NICHD, National Institutes of Health/National Institute of Child Health and Human Disease.

DIAGNOSTIC CRITERIA of PCOS:

Proposed detected requirements for PCOS consist of the NIH Consensus [19], specified, in 1992, as the existence of biochemical and/or medical hyperandrogenism and oligomenorrhea/anovulation (**Table2**). Later on, in 2004, the Rotterdam Consensus [20] presented the polycystic ovary look (PCO) on ultrasound as a brand-new requirement to be contributed to the 2 previous requirements of the NIH, and the diagnosis needs 2 from these 3 requirements. In turn, the Androgen Excess and PCOS Society [21] thought about that androgen excess is a main occasion in the pathogenesis and advancement of PCOS, and developed that this requirement ought to exist and accompanied by one of the others: oligomenorrhea and/or PCO (**Table2**).

Table 2:Criteria for the diagnosis of polycystic ovary syndrome

NIH/NICHD 1992 [19]	ESHRE/ASRM (Rotterdam criteria) 2004 [20]	Androgen Excess Society 2006 [21]
Exclusion of other androgen excess or related disorders	Exclusion of other androgen excess or related disorders	Exclusion of other androgen excess or related disorders
Includes all of the following:	Includes two of the following:	Includes all of the following:
• Clinical and/or biochemical hyperandrogenism	• Clinical and/or biochemical hyperandrogenism	• Clinical and/or biochemical hyperandrogenism
• Menstrual dysfunction	• Oligo-ovulation or anovulation • Polycystic ovaries	• Ovarian dysfunction and/or polycystic ovaries

Abbreviations: ESHRE/ASRM, European Society for Human Reproduction and Embryology/American Society for Reproductive Medicine; NIH/NICH, National Institutes of Health/National Institute of Child Health and Human Disease.

While there are certain consistencies between the requirements used by the various groups, essential distinctions exist. Each releasing group thinks about PCOS a diagnosis of exemption, and other medical diagnoses, such as hereditary adrenal hyperplasia, nonclassic adrenal hyperplasia, Cushing syndrome, androgen-secreting growth, idiopathic hyperandrogenism, idiopathic hirsutism, hyperprolactinemia, and thyroid conditions should be left out. Since 20%-- 30% of otherwise typical ladies have proof of numerous cysts on their ovaries,[21] the existence of polycystic ovaries (PCO) alone was ruled out enough by any group. The androgen and the nih/nichd Excess Society need that patients have indications or signs of hyperandrogenism such as hirsutism, or hyperandrogenemia, specified as raised totally free testosterone, minimized SHBG (sex hormone-binding globulin), ele vated complimentary testosterone index, or raised dehydroepiandrosterone sulfate [19,21]. ESHRE/ASRM (Rotterdam) requirements permits for the diagnosis of PCOS without the existence of hyperandrogenemia or medical hyperandrogenism. Females with ovulatory dysfunction and the existence of polycystic ovaries are thought about to have PCOS by the Rotterdam requirements. Another essential distinction in between the requirements is how oligomenorrhea or amenorrhea is seen. The Rotterdam requirements did not need irregular menses or ovulatory dysfunction for diagnosis pointing out that ladies with routine menstruations might be thought about to have PCOS in the existence of PCO and hyperandrogenemia or hyperandrogenism [20].

The diagnosis of PCOS utilizing the Rotterdam and AES requirements depends upon making use of a trustworthy approach to explain polycystic ovarian morphology. The requirements for polycystic ovarian morphology proposed by the Rotterdam agreement group consists of the existence of 12 or more roots determining in between 2 and 9 mm in size and/or an increased ovarian volume of higher than 10 cm^3. This discussion in one ovary adequately specifies the polycystic ovary [20]. Because that time, considerable developments in ultrasound image innovation have actually been made, enhancing resolution and allowing for the detection of smaller follicles [22].This has prompted calls for revisiting the criteria used to define polycystic ovarian morphology [22,23,24]. Allemand et al used three-dimensional transvaginal ultrasound to measure the mean follicle number per ovary (FNPO) and the maximum number of follicles in a single sonographic plane in ten patients with diagnosed PCOS and 29 normoandrogenic ovulatory controls [24]. A mean FNPO of ≥20.1 identified PCO with 100% specificity and 70% sensitivity. A maximum number of follicles in a single sonographic plane of ten identified PCO with 100% specificity and 90% sensitivity. Ovarian volume, measured by two-dimensional transvaginal ultrasound, of ≥13.0 cm^3 predicted PCO with a specificity of 100% and a sensitivity of 50%. Using two-dimensional transvaginal ultrasound, Dewailly et al measured the total number of all follicles that were less than 10 mm in diameter throughout the ovary and also measured the ovarian volume [23]. A threshold follicle number of 19 had sensitivity for predicting PCO of 81% and a specificity of 92%. Ovarian volume of 7 cm^3 predicted PCO with a sensitivity of 87% and a specificity of 89%. Lujan et al measured FNPO, follicle counts in a single cross section, and ovarian volume in images that were digitally archived for offline analysis [22]. In their analysis, a FNPO threshold of 26 follicles had a sensitivity of 85% and specificity of 94% in discriminating between subjects with PCOS and controls. A threshold of nine follicles for follicle counts in a single cross section had a sensitivity of 69% and specificity of 90%. The threshold for ovarian volume of 10 cm^3 yielded a sensitivity of 81% and a specificity of 84%.

4. CONCLUSION

This review showed that PCOS prevalence under the NIH criteria, in a predominately different communities, is higher than previously believed. However, because the definition and prevalence of PCOS symptoms, particularly hyperandrogenism and ovulatory dysfunction, differ widely between previous studies, the capacity to reconcile prevalence estimates with our study is limited. For example, in defining menstrual dysfunction, oligo-menorrhoea has been variously defined as the number of cycles per year and, or the number of days between cycles. The reported frequency of PCO morphology was over 40% in many studies, therefore these findings might guide the local use of different diagnostic criteria and adoption of treatment approaches according to geographical region.

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