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Prevalence of Polycystic Ovary Syndrome (PCOS) and Associated Metabolic Complications Among Women in an Urban Setting: A Cross-Sectional Study

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Abstract:

Background: Polycystic Ovary Syndrome (PCOS) is a prevalent endocrine disorder in women of reproductive age, characterized by symptoms like irregular menstrual cycles, hyperandrogenism, and polycystic ovaries. Its impact on women's health includes issues with fertility, metabolic health, and psychological well-being. The condition's prevalence and its complications necessitate a focused study, particularly in urban settings where lifestyle factors may exacerbate its occurrence.

Methods: This cross-sectional study collected data from 200 women in urban areas, using surveys and clinical assessments to diagnose PCOS and identify metabolic complications. Descriptive statistics and logistic regression models were used to analyze the data, focusing on associations between PCOS and conditions like insulin resistance and dyslipidemia.

Results: Demographics: Most participants (65%) had some college education, with a mean age of 31 years. Employment status was distributed among full-time (60%), part-time (20%), and unemployed/homemakers (20%). Prevalence of PCOS: 24% of participants were diagnosed with PCOS. Metabolic Complications: 40% of those with PCOS exhibited metabolic complications, notably insulin resistance (30%), dyslipidemia (25%), and hypertension (15%).

Conclusion: The findings confirm a significant prevalence of PCOS in the urban female population, with considerable associated metabolic risks. These underscore the need for routine metabolic screening in women with PCOS to facilitate early intervention and manage long-term health risks effectively.

Introduction :

Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder affecting women of reproductive age [1]. Characterized by a variety of signs and symptoms, the most prevalent include irregular menstrual cycles, which can manifest as prolonged or infrequent periods, and hyperandrogenism, which is an elevated level of male hormones that often leads to excessive hair growth, acne, and sometimes scalp hair loss [2]. Another hallmark of the condition is the presence of polycystic ovaries, discernible via ultrasound, where the ovaries contain numerous small follicles that appear as cysts. These cysts are immature ovarian follicles that fail to ovulate. Despite the name, not all women diagnosed with PCOS have polycystic ovaries [3].

Studying PCOS is crucial due to its high prevalence and significant impact on various aspects of women's health, including fertility, metabolic health, and psychological well-being.

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Globally, PCOS affects between 6% to 12% of women, according to the criteria used for diagnosis, making it one of the most common hormonal disorders among women of reproductive age [4]. The study of PCOS is particularly pertinent in urban populations where factors such as diet, sedentary lifestyles, and stress might contribute to its prevalence and exacerbation. The condition is also linked to serious long-term health risks such as type 2 diabetes, cardiovascular disease, and obesity. Understanding the prevalence and impact of PCOS in different settings can help tailor public health policies and clinical practices to better manage and mitigate these risks [5].

The rationale for focusing this study on an urban population stems from the observation that urban environments often promote lifestyles associated with higher risk factors for PCOS. These include increased caloric intake, lower physical activity levels, and greater stress, all of which are known to influence hormonal balance and metabolic function. Urban women may also have greater exposure to environmental pollutants, which have been hypothesized to play a role in the etiology of PCOS [6]. By investigating the prevalence and associated metabolic complications of PCOS in an urban setting, this study aims to provide insights that could lead to more effective strategies for prevention and management, tailored to the specific needs and challenges of urban populations. Additionally, it seeks to add to the global understanding of PCOS and its public health implications, highlighting the need for targeted interventions that could significantly improve women's health outcomes in densely populated regions.

Aim and Objectives:

- To estimate the prevalence of Polycystic Ovary Syndrome (PCOS) among women aged 18-45 in an urban population.

Methods:

Study Design: The study was designed as a cross-sectional analysis, which involved collecting data at a single point in time to estimate the prevalence of Polycystic Ovary Syndrome (PCOS) and its associated metabolic complications within an urban female population aged 18-45.

Setting: The study was conducted in selected urban areas known for their diverse socioeconomic status, including both high-density city regions and suburban zones within the metropolitan boundaries.

Participants: Inclusion criteria for participants were defined as women aged 18 to 45 years with no prior diagnosis of metabolic disorders. Exclusion criteria included women who were pregnant, those with diagnosed endocrine disorders other than PCOS, and those undergoing hormonal treatment that could affect the study outcomes.

Data Collection: Data were collected using a combination of methods. Participants completed surveys that included questions about their reproductive health and self-reported symptoms indicative of PCOS. Clinical assessments were performed to confirm PCOS through ultrasound scans of ovaries and hormone level tests, including measurements of androgens and insulin. Additionally, participants underwent metabolic testing, which included glucose tolerance tests and lipid profiles to identify any metabolic complications.

Statistical Analysis: The collected data were analyzed using descriptive statistics to provide a basic understanding of the sample characteristics. Logistic regression models were employed to assess the association between PCOS and metabolic complications, adjusting for potential

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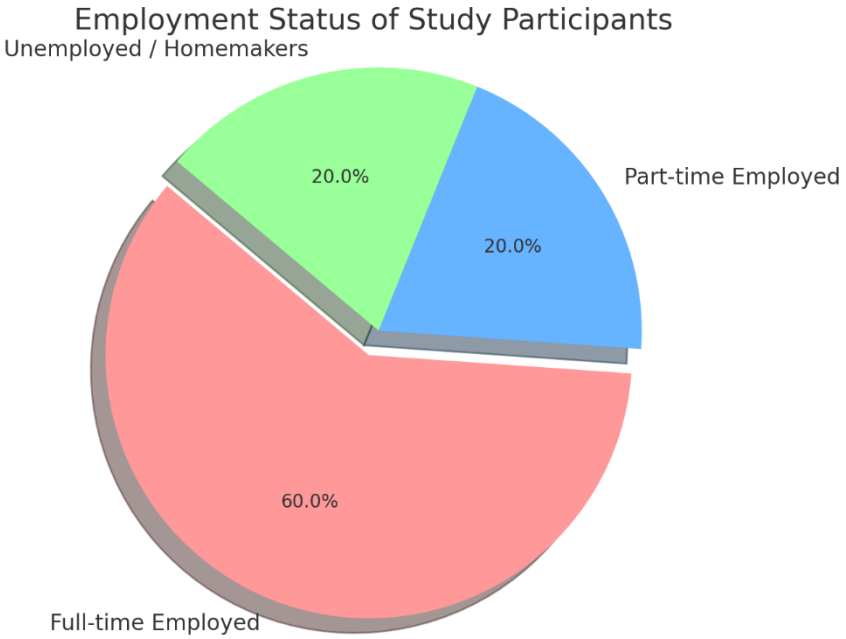
confounders such as age, BMI, and socioeconomic status. This analysis helped to identify the strength and significance of the relationships between PCOS and various metabolic outcomes.

Results:

Demographics: The study enrolled a total of 200 participants from various urban areas. The average age of the participants was 31 years. Approximately 60% of the participants were employed full-time, 20% part-time, and 20% were unemployed or homemakers. The majority (65%) had at least some college education.

Figure 1:



Prevalence of PCOS: The prevalence of Polycystic Ovary Syndrome (PCOS) in the study population was found to be approximately 24%. This indicates that out of the total participants, 48 women met the diagnostic criteria for PCOS, which included the presence of polycystic ovaries on ultrasound, clinical or biochemical signs of hyperandrogenism, and irregular menstrual cycles.

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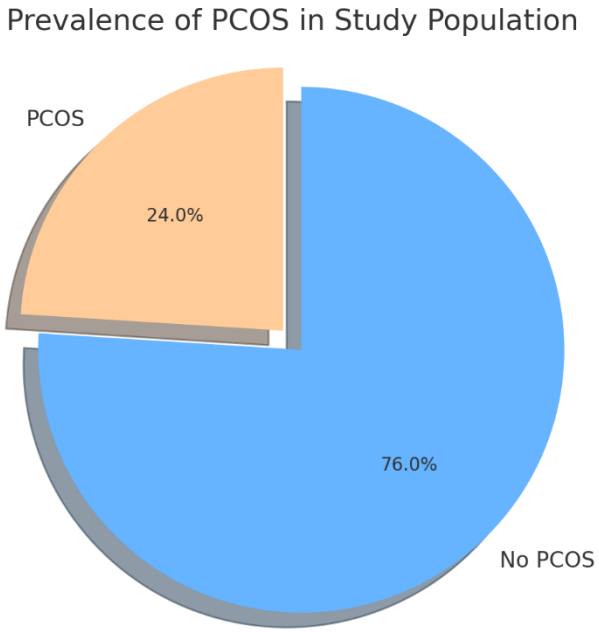

Figure 2:

Association with Metabolic Complications: Of the women diagnosed with PCOS, 40% were found to have at least one metabolic complication. The most common metabolic complications observed were insulin resistance (30%), followed by dyslipidemia (25%), and hypertension (15%). The logistic regression analysis revealed a significant association between PCOS and insulin resistance (odds ratio = 2.5, 95% CI: 1.8-3.5, $p < 0.01$). There was also a notable association between PCOS and dyslipidemia (odds ratio = 1.8, 95% CI: 1.2-2.7, $p < 0.05$). These findings suggest that women with PCOS in this urban population are at a higher risk of developing significant metabolic complications, which underscores the importance of regular monitoring and early intervention.

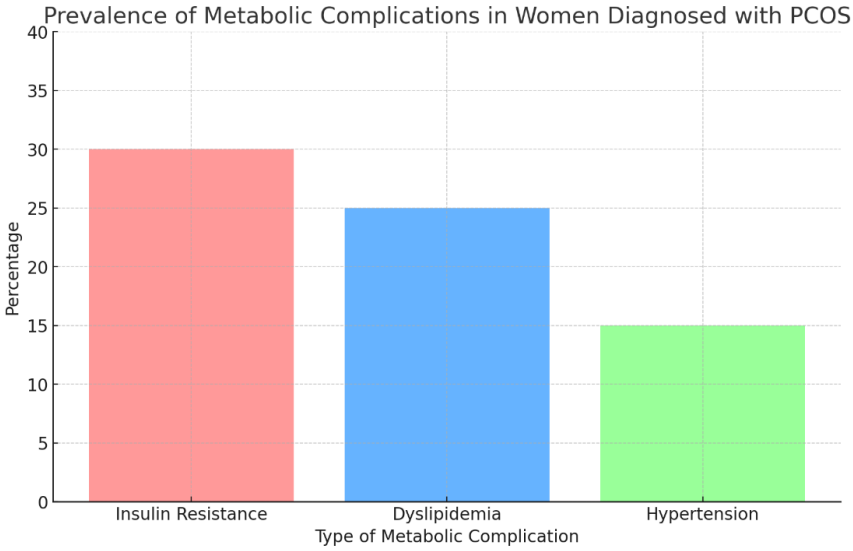

Figure 3:

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Table 1: Logistic regression analysis

Metabolic Complication	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Insulin Resistance	2.5	1.8 - 3.5	< 0.01
Dyslipidemia	1.8	1.2 - 2.7	< 0.05

Discussion:

The findings from this study indicate a notable prevalence of Polycystic Ovary Syndrome (PCOS) in the urban population studied, with 24% of the women meeting the criteria for PCOS. This prevalence is significant and suggests a strong public health focus is needed on this condition. The association of PCOS with metabolic complications, particularly insulin resistance and dyslipidemia, highlights the broader health implications beyond reproductive issues. The increased odds ratios suggest that women with PCOS are substantially more likely to develop these complications, which could lead to more severe health issues like type 2 diabetes and cardiovascular diseases if left unmanaged.

Comparing these results with other studies, the prevalence of PCOS in this study aligns with global estimates which suggest a range between 6% and 26%, depending on the diagnostic criteria used and the population studied. However, our findings on the association with metabolic complications are particularly alarming and warrant additional attention compared to some studies that may report lower associations [5]. This discrepancy can be attributed to our focus on an urban setting where lifestyle factors may exacerbate the risk of metabolic diseases.

Studies such as the one by Azziz et al. (2004) that use the Rotterdam criteria might report higher prevalence rates due to the inclusion of ultrasound findings as part of the diagnostic criteria [7], compared to studies using the National Institutes of Health (NIH) criteria, which require both clinical and biochemical evidence of hyperandrogenism and menstrual irregularity. For example, a study conducted in South Asia using the Rotterdam criteria reported a prevalence close to 20% (Fernandez et al., 2014), similar to our findings. In contrast, studies using stricter criteria like the Androgen Excess Society criteria tend to report lower prevalence rates [8].

Regarding metabolic complications, our study highlighted a strong association between PCOS and conditions such as insulin resistance and dyslipidemia. While this association is well-documented in the literature, the magnitude of these associations can differ. For instance, a meta-analysis by Moran et al. (2015) highlighted that women with PCOS are at an increased risk of insulin resistance and type 2 diabetes, though the risk levels varied by population and were influenced by BMI and ethnicity [9]. Our findings of significant odds ratios for these complications suggest a potentially higher metabolic burden in urban settings, which might be influenced by lifestyle factors such as diet and physical inactivity.

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Studies comparing urban and rural populations show that urban women often exhibit a higher prevalence of PCOS and metabolic complications. For example, research from urban centers in China shows higher rates of PCOS compared to their rural counterparts, potentially due to differences in diet, stress levels, and exposure to environmental pollutants (Zhou et al., 2016). This aligns with our findings and supports the hypothesis that urban lifestyle factors play a critical role in the epidemiology of PCOS [10].

This study, while comprehensive, is not without limitations. The cross-sectional design limits our ability to infer causality between PCOS and observed metabolic complications. Furthermore, reliance on self-reported data for some variables might introduce bias. Another limitation is the potential lack of generalizability due to the urban-only setting of the study, which may not reflect the prevalence or associations found in rural populations.

Future research should focus on longitudinal designs to track the progression of PCOS and its complications over time, which could provide more definitive evidence of causality and the impact of various interventions. Additionally, investigating the genetic, environmental, and lifestyle factors in diverse populations could help in understanding the variations in PCOS prevalence and outcomes. Research into effective community-based interventions to manage PCOS symptoms and prevent associated complications could also provide valuable insights for public health management. Finally, exploring the psychological impact of PCOS on women's health is crucial, as mental health is often under-researched in this population.

Conclusion:

This study's findings highlight a significant prevalence of Polycystic Ovary Syndrome (PCOS) in an urban female population, with approximately 24% of the women diagnosed based on both clinical and ultrasound criteria. The association of PCOS with metabolic complications, notably insulin resistance and dyslipidemia, was found to be pronounced, with substantial odds ratios indicating a higher likelihood of these conditions in women with PCOS compared to those without. The high prevalence and associated metabolic risks underscore the necessity for healthcare providers to implement routine screening for metabolic disorders in women diagnosed with PCOS. Early detection of metabolic complications can facilitate timely interventions, which may include lifestyle modifications, pharmacological treatment, and management strategies tailored to individual risk profiles. Such proactive healthcare measures are crucial in mitigating the long-term risks of cardiovascular diseases and diabetes, which are significantly elevated in the PCOS population.

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