Prevalence of Polycystic Ovarian Syndrome among urban adolescent girls and young women in Mumbai

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Co-Investigators: Dr. Srabani Mukherji, Dr. Pervin Meherji
Consultant: Dr. Rama Vaidya
Collaborating Hospital: KEM Hospital

National Institute for Research in Reproductive Health
Indian Council of Medical Research, Mumbai

Training Course in Reproductive Health Research
WHO 2008
WHO Scholarship
Polycystic Ovarian Syndrome

PCOS

Genetic

Hyper Androgenemia

Menstrual irregularities

Anovulatory Infertility

Environmental

Hyper Insulinaemia

Hirsutism, Acne, Alopecia

Metabolic Syndrome

DM-2 Hypertension CVD
<table>
<thead>
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<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
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<tbody>
<tr>
<td>Hyper androgenemia</td>
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<tr>
<td>Hirsuitism</td>
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<tr>
<td>Oligo anovulation</td>
<td>+</td>
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<td>Polycystic ovaries on USG</td>
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<td>NIH Criteria 1990</td>
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<td>Rotterdam criteria 2003</td>
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<td>AES criteria 2006</td>
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Ref: AES Position Statement. J Clin Endocrinol Metab. 2006
### Public Health Importance

<table>
<thead>
<tr>
<th>Maternal and infant morbidities</th>
<th>OR</th>
<th>95% CI</th>
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<tbody>
<tr>
<td>Gestational Diabetes</td>
<td>2.94</td>
<td>1.98-6.81</td>
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<td>Pre eclampsia</td>
<td>3.47</td>
<td>1.95-6.17</td>
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<td>Preterm birth</td>
<td>1.75</td>
<td>1.16-2.62</td>
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<tr>
<td>Perinatal mortality unrelated to multiple births</td>
<td>3.07</td>
<td>1.03-9.21</td>
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<tr>
<td>Admission of neonates to neonatal intensive unit care</td>
<td>2.31</td>
<td>1.25-4.26</td>
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PCOS is linked to a host of health problems

- Subfertility
- Infertility
- T2DM
- Hypertension
- Heart disease (7.4 times as likely as healthy women)
- Endometrial cancer
- Persistent dysfunctional bleeding that affects some women with PCOS can lead to anemia

Early detection can prevent future morbidities
Adolescents a vulnerable group

- Stress
- Depression
- Food habits - overweight, obesity
- Lack of exercise
- Premature puberty

Early diagnostic signs are mistakenly dismissed as normal changes of adolescence
Adolescent PCOS

- Cases first screened and diagnosed in infertility clinics.

- Dermatological effects of PCOS can have deleterious effect on an adolescent’s self-image and peer interaction.

- Weight gain and menstrual uncertainties affect body image and lead to further stress including the family members.

- Widespread screening for the disorder appears to be a cost effective strategy? The total cost of diagnosis is only 2% of the total cost of evaluating and providing care to PCOS women in US ($4.36 billion).

(Azziz R et al. 2005 J Clin Endocrinol Metab)
<table>
<thead>
<tr>
<th>Country</th>
<th>Prevalence</th>
<th>Reference</th>
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<tbody>
<tr>
<td>United States</td>
<td>4-10%</td>
<td>Knochenhaeuer et al 1998</td>
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<tr>
<td></td>
<td></td>
<td>Franks et al 1995</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>22%</td>
<td>Clayton et al 1992</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>23%</td>
<td>Polson et al 1988</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>34%</td>
<td>Michelmore et al 1999</td>
</tr>
<tr>
<td>New Zealand</td>
<td>21%</td>
<td>Farquhar et al 1994</td>
</tr>
<tr>
<td>South Asian emigrants settled in England</td>
<td>52%</td>
<td>Rodin et al 1998</td>
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Objectives

**Overall objective:**
To determine prevalence of PCOS among urban adolescents and young girls in Mumbai, India

**Specific objectives:**
- To assess the *phenotypes and biochemical parameters* among obese and lean adolescent population with PCOS
- To estimate the *metabolic syndrome* among cases diagnosed with PCOS
- To understand their *awareness and health seeking behaviour* on this disease
Methodology

Study Design: Cross Sectional (Diagnostic)
Duration: 1 year (3 Phases i.e. preparatory, screening and diagnosis and data analysis, report writing and analysis)

Prevalence will be detected at three levels

- based on self reported symptoms suggestive of PCOS
- based on clinical examination
- based on investigation such as biochemical tests and or ovarian ultrasonography
Sampling

Option 1:
Assuming a low prevalence of 5%, a sample of 1875 (approx 1900) eligible adolescent girls is required so that the prevalence may be estimated to within 1% point (3%-5%) of the true value with 95% confidence.
Sample size = \( n = (1.96 \times 1.96) \times 0.04 \times 0.96 / 0.0001 = 1875 \sim 1900 \)

Option 2:
Assuming a low prevalence of 5%, a sample of 292 (approx 300) eligible adolescent girls is required so that the prevalence may be estimated to within 0.025% point of the true value with 95% confidence.
Sample size = \( n = (1.96 \times 1.96) \times 0.05 \times 0.95 / 0.025 \times 0.025 = 292 \) i.e. \(~300\)
Sampling

A 300 college going adolescents – Check list 100 each from low, middle and high SEC

B - Normal

C - Eligible

D - Confirm by Clinical evaluation

E - Rule out other DD

F - Confirm PCOS by biochemical tests

Controls - 100
Inclusion criteria for screening

Checklist: Any of the following symptoms:

- Premature puberty
- Oligomenorrhea/amenorrhea (two years after menarche)
- Signs of hyperandrogenism: Hirsutism, severe acne, male pattern alopecia
- Signs of hyperinsulinemia: Obesity, acanthosis nigricans
- History of PCOS in mother/siblings
Clinical evaluation

**History**

- Age
- Age at menarche
- Cycle History – Oligomenorrhea or amenorrhea
- Sexual history
- Family history: History in mother/sibling
- Diabetic history
- History of drug intake (hormone treatment)
Clinical evaluation

The physical examination

- **anthropometry** - BMI, central obesity i.e. waist to hip ratio
- blood pressure
- Secondary sexual characters
- **assessment of androgen status** (hirsutism, temporal recession of hair, acne, muscle bulk, clitoromegaly)
- **evidence of insulin resistance** (acanthosis nigricans)
- Moon facies/striae
Laboratory diagnostic criteria for the PCOS

First rule out
- Pregnancy – History, UPT
- Hypothyroidism (elevated TSH and reduced T4)
- Hyperprolactinemia
- Adrenal hyperandrogenemia (basal morning 17-OHP)
- Cushing’s disease - Referral

<table>
<thead>
<tr>
<th>PCOS Diagnosis</th>
<th>Metabolic syndrome</th>
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<tbody>
<tr>
<td>•SHBG</td>
<td>• Fasting glucose</td>
</tr>
<tr>
<td>•Total Testosterone</td>
<td>• Serum insulin</td>
</tr>
<tr>
<td>•LH / FSH ratio</td>
<td>• Glucose insulin ratio</td>
</tr>
<tr>
<td>•DHEAS</td>
<td>• Triglycerides</td>
</tr>
<tr>
<td></td>
<td>• HDL-cholesterol</td>
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Interventions
At Adolescent Friendly Centers

The diagnosed cases will be subjected to the following interventions at the already established Adolescent Friendly Centers.

1. **Counselling** - Diet modification, lifestyle changes
2. **Treatment** of menstrual problems and hyperandrogenism, hyperinsulinemia
3. **Referrals**
Implications

- Community data base
- Assess the need for larger study
- Assess the need for including in the management protocol on job aids being developed on adolescent problems by WHO India Office
- Prevention of long term sequelae
- Disease pattern among lean and obese PCOS
- Interventions would create more awareness about the problem
Budget

- Personnel
- Diagnostics
- Survey tools and IEC material
- Miscellaneous
- Overheads

Total: 30,000 US Dollars
Acknowledgement

Dr. Katherine Ba-Thike - WHO
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Dr. Regina Kulier - GFMER
Dr. Mario Merialdi - WHO
Mr. Tom Allen - WHO
Dr. Pervin Meherji - NIRRH
Dr. Chauhan - NIRRH

THANK YOU