COMMUNITY SCREENING FOR PCOS AMONGST ADOLESCENT GIRLS IN A SEMIURBAN AREA IN WEST BENGAL
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ABSTRACT

BACKGROUND
Adolescent PCOS in many cases is considered to be the forerunner of type 2 diabetes mellitus and cardiovascular diseases in women. Therefore, early detection of PCOS existing in adolescent period and implementation of appropriate lifestyle measures will hopefully have long-term endocrinometabolic beneficial effect.

The aim of the study is to assess the prevalence of PCOS in adolescent girls who are otherwise symptomless and/or having trivial symptoms, which according to such girls and their parents do not mandate any medical attention whatsoever.

MATERIALS AND METHODS
A total of 2015 adolescent school girls of West Bengal, India, were enquired about their age of initiation of menarche and current menstrual cyclicity like oligomenorrhea, hypomenorrhea or secondary amenorrhea. They were also examined for clinical features of androgen excess like acne/abnormal hair growth (hirsutism). Girls exhibiting any one such symptom or sign like history oligomenorrhea, which is persisting two years beyond the initiation of menarche and/or having excessive acne and or hirsutism were primarily labeled as “probable PCOS” and later evaluated by endocrine assessment and sonography.

RESULTS
Out of 2015 adolescent girls interviewed at school premises, there were as many as 307 adolescent girls who disclosed that they have either oligomenorrhea and/or were noticed to have acne/hirsutism giving rise to a prevalence rate of 15.23% of probable PCOS by symptom alone. But, when laboratory examinations were completed, the actual prevalence rate came down to 13.1%, because few girls neither had raised serum testosterone, the hallmark of androgen excess disorders nor do they exhibit PCOS morphology in ultrasonography. As many as 84.77% students had no abnormal history or clinical feature to suggest PCOS. But, what worries authors is that, there is raised prevalence of adolescent PCOS in comparison to a similar study carried out at South India where prevalence was 13.1%.

CONCLUSION
The prevalence adolescent PCOS based on community-based screening study amongst otherwise asymptomatic girls was fairly high and all such girls and their parents should be duly counseled for switching over to healthy lifestyle measures and later should have a long-term follow up under an endocrinologist.

KEYWORDS
Targeted Screening for Adolescent PCOS, Androgen Excess Disorder, Oligomenorrhea, Nascent PCOS.

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BACKGROUND
Hallmark symptoms and signs of PCOS according to Rotterdam Criteria¹ are 1) Persistent oligomenorrhea or anovulation; 2) Clinical or laboratory evidence of hyperandrogenemia, e.g. acne, hirsutism and presence of persistent oligomenorrhea and/or symptoms of anovulation; and/or 3) PCO morphology by ultrasonography. These symptoms and signs, which though are relevant in adult PCOS are also applicable in its adolescent form of the disease. We are aware that women who are suffering from polycystic ovarian syndrome are at higher risk of significant reproductive and metabolic consequences.² ³ As such, early and accurate diagnosis of PCOS preferably in adolescent period becomes imperative, so that long-term adverse effects can be averted by timely appropriate interventions like lifestyle measures and judicious use of drugs, if indicated.

Prevalence of PCOS amongst adolescent group as detected by community screening. Till date, minimal literature is available regarding the prevalence of PCOS amongst adolescent girls particularly in India. Though, no tailor made protocol or guideline is available for screening adolescent PCOS, but a thoughtful approach will be to apply Rotterdam criteria in adolescent PCOS too. By applying such criteria, the prevalence of PCOS amongst South Indian adolescent girls was 9%⁴ and at Sri Lanka in which study

also included adolescent girls who had BMI >25 were considered as an additional clinical feature of PCOS. By including such overweight girls, the community prevalence rate was 7.5%. To our knowledge, ours is the first study in community screening of PCOS in Eastern India.

MATERIALS AND METHODS

School girls of standard XI and XII were primary interviewed and examined at school premises. All the two authors accompanied by government female health workers visited nine higher secondary schools of which seven schools were located at urban areas and two at rural areas of West Bengal. Study was done during the period November 2015 to June 2016 and a total 2015 adolescents were enquired about their age of initiation of menarche and current menstrual cyclicity. Thereafter, such girls were physically examined for acne/hirsutism.

Inclusion Criteria

Girls exhibiting any one symptom or sign like history of oligomenorrhea, which is persisting two years beyond the initiation of menarche and/or having excessive acne or hirsutism were primarily labeled as “probable PCOS.” Such adolescents were requested to report to Murshidabad Medical College for further evaluation by sonography, serum testosterone, prolactin, thyroid stimulating hormone estimation. There are many international bodies who now consider that even if a girl presents with any one such symptom, e.g. oligomenorrhea or clinical feature of androgen excess, such girl should be carefully evaluated for PCOS by basic endocrine assay and ultrasonography. As such, in the present study too, girls with isolated symptoms of acne, hirsutism and irregular menstrual cycles were offered targeted screening.

Exclusion Criteria

Those adolescents who did not exhibit clinical evidence of hyperandrogenism like acne, hirsutism or denied any history of menstrual disorders were excluded from further evaluation. By doing so, it is probable we may have missed some adolescent PCOS albeit few, because few such adolescent maybe clinically normal, i.e. symptomless, but can be associated with raised serum androgens and polycystic appearance of ovaries thereby coming under the spectrum of adolescent PCOS as per Rotterdam criteria.

RESULTS

Out of 2015 adolescents interviewed, 269 girls had only one type of symptom suggestive of PCOS and 38 cases had the clinical features of both androgen excess and history of oligomenorrhea. Therefore, from history and clinical examination, a total 307 girls out of 2015 adolescents were clinically suspected to have PCOS (15.23%). But, those 38 girls who exhibited two types of symptoms by Rotterdam criteria, they straightforward qualify as having PCOS, though in our study, all such girls duly came to hospital for detailed evaluation. This implies that a routine clinical examination with a mind set about androgen excess and simple enquiry about menstrual cyclicity can pick up 1.88% cases of adolescents PCOS in the community. However, out of 269 girls having only one type of symptom only as many as 28 girls did not turn up for laboratory assessment and sonography had therefore excluded from the total figure of 2015. A total of 241 girls with single type of clinical feature were evaluated by endocrine assay and sonography. Rest 1708 girls (84.77%) in the community had no single clinical features of PCOS, therefore, were excluded from targeted screening for PCOS.

Those girls who were clinically suspected of having PCOS based on single or multiple clinical features were advised to report in batches for evaluation at our institution preferably between day 2 to day 9 of menstrual cycle. On arrival at our institution, blood was drawn from 279 cases and evaluated for serum testosterone, TSH, serum prolactin. Sonography was also done on the same day. All such symptoms giving rise to a prevalence rate of 15.3% probable PCOS in the community.

<table>
<thead>
<tr>
<th>History and Clinical Features</th>
<th>Number of Cases Out of 2015 Girls</th>
<th>Percentage in Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oligomenorrhea alone</td>
<td>212</td>
<td>10.52%</td>
</tr>
<tr>
<td>Abnormal hair growth alone</td>
<td>45</td>
<td>4.61%</td>
</tr>
<tr>
<td>Excessive and persistent acne alone</td>
<td>12</td>
<td>1.05%</td>
</tr>
<tr>
<td>No single clinical feature of PCOS</td>
<td>1708</td>
<td>84.77%</td>
</tr>
<tr>
<td>Both</td>
<td>38</td>
<td>1.88%</td>
</tr>
<tr>
<td>Oligomenorrhea and abnormal hair growth</td>
<td>87</td>
<td>4.31%</td>
</tr>
</tbody>
</table>

**Table 1. Distribution of Symptoms Amongst 2015 Girls who were Interviewed at School Premises (N-2015)**

Out of 2015 girls interviewed- a clinical suspicion of ‘probable PCOS’ was made 307 girls by virtue of presence of single or two symptoms.

<table>
<thead>
<tr>
<th>Total Cases Finally Evaluated by Laboratory Tests=279</th>
<th>Raised Total Testosterone</th>
<th>Polycystic Morphology in USG</th>
<th>Both Raised Testosterone and PCOS Morphology in USG</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=279</td>
<td>48 (17.14%)</td>
<td>118 (42.14%)</td>
<td>65 (23.21%)</td>
</tr>
</tbody>
</table>

**Table 2. Pattern of Laboratory Tests in Clinically Suspected PCOS (n=280, of whom 38 had Both Types of Clinical Features of PCOS Present)**
N.B. Fifteen girls (5.35% all cases subjected to tests) did not exhibit any abnormalities in the endocrine profile and sonography.

<table>
<thead>
<tr>
<th>Description</th>
<th>Figures</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No history of oligomenorrhea neither any clinical evidence of hyperandrogenism- so further investigations were exempted as this study was a targeted screening</td>
<td></td>
<td>84.77%</td>
</tr>
<tr>
<td>Girls having one type of clinical feature</td>
<td></td>
<td>13.34%</td>
</tr>
<tr>
<td>Girls having both types of clinical features, e.g. oligomenorrhea and clinical evidence of hyperandrogenism</td>
<td></td>
<td>1.88%</td>
</tr>
<tr>
<td>Total number of girls who had one/more types of clinical feature of PCOS and attended for laboratory and USG- full evaluation</td>
<td></td>
<td>13.86%</td>
</tr>
<tr>
<td>Laboratory as well as USG reports were negative, but they had one clinical feature of PCOS (diagnosed as probable PCOS at initial interview)</td>
<td></td>
<td>5.35%</td>
</tr>
<tr>
<td>Total number of girls who had one/more types of clinical feature of PCOS</td>
<td></td>
<td>15.23%</td>
</tr>
<tr>
<td>Total number of girls who had one type of clinical feature of PCOS, but didn't attend for further laboratory and USG screening</td>
<td></td>
<td>Dropout rate was 9.12% amongst 307 girls who had one type/multiple types of positive clinical feature of PCOS though they qualify for further screening</td>
</tr>
</tbody>
</table>

Table 3. Breakup of Symptoms and External Features in 2015 Girls Initially Interviewed

- Out of 269 girls who were clinically suspected as having PCOS based on one symptom only, as many as 28 girls did not turn up for laboratory assessment and USG evaluation. Therefore, 269-28=241 such girls could be screened by laboratory aids.
- Of the total 2015 girls interviewed as many as 279 cases finally screened both by laboratory tests and sonography. Only 15 cases had normal laboratory reports and all such girls fall in the group who had only one type of symptom or only one clinical sign (targeted screening for PCOS). Such 15 cases were subtracted from 241 girls who reported for laboratory screening with only one type of symptom giving rise to a figure of 226 girls as suffering from PCOS. Total cases diagnosed both by clinical feature and laboratory test was, therefore, 38 cases were from the group who exhibited at least one symptom and at least one sign. There were another 226 girls from the second group who presented with either one symptom or only one sign. Therefore, a total of 264 girls out of 307 symptomatic adolescents fulfilled at least one symptom or sign of Rotterdam criteria as well as documented laboratory or sonological evidence. This yields a prevalence rate of adolescent PCOS as 13.1% by applying Rotterdam criteria in the present study.
DISCUSSION
Adult PCOS has been defined by various international academic bodies, but Rotterdam Consensus Criteria (2003)\(^1\) and Androgen Excess Society Criteria (2006)\(^7\) are the most widely accepted definitions. Unfortunately, there is dearth of literature so as to what should be the ideal or appropriate definition of adolescent PCOS though most researchers and clinicians too still apply criteria as formulated by Rotterdam Consensus Workshop.\(^1\) Sadly, all such academic bodies have admitted that such symptoms and signs are not sufficient to make a firm diagnosis in adolescents, because such symptoms and signs maybe evident in normal stages of reproductive maturation in immediate postpubertal period. These changes are recently termed as “nascent PCOS” or “mini-PCOS.”\(^8\) Fortunately, in most girls, clinical and hormonal parameters induced by such ‘temporary hyperandrogenemia and/or hyperinsulinaemia of puberty’ will normalise with passage of time, but it is difficult to distinguish biologically and by ultrasonography those adolescent at the age group 14-17 years where such normal evolutionary changes will persist and aggravate giving rise to full-fledged PCOS in later life.

The relevance of screening adolescent population for PCOS have been questioned and debated. For instance, Franks\(^9\) and Rosenfield\(^10\) are of opinion that it is prudent to pick up cases of adolescent PCOS at an early stage of the diseases so that appropriate steps can be taken to prevent cardiometabolic risks in later life. But, there are some scientists who are sceptical about the benefits of screening.\(^11,12\)

Present authors screened as many as 2015 girls at schools and there were thirty eight cases who by history and examination alone qualify for PCOS and as many as 243 cases who were also had laboratory evidence of PCOS in addition one symptoms of PCOS. Therefore, out of 2015 adolescents interviewed out of 307 symptomatic adolescents who fulfilled at least one symptom or sign according to Rotterdam criteria, a total of 264 girls adolescents were positive for PCOS in community screening. This gives rise to a prevalence rate of adolescent PCOS of 13.1% in the community in Murshidabad district (State of West Bengal) of Eastern India.

Limitations of the Study
This is an observational study encompassing adolescents only in a semiurban area of West Bengal and therefore may not represent the exact prevalence of whole of adolescent population of the state. Further, total number of adolescents screened was small and the study was limited to only one subdivision of West Bengal and no screening were contemplated in all the districts of the entire state by randomisation. Moreover, the study was limited to schools only, not included teenagers who have dropped out from schools. In this context, authors like to mention that community-based study in Sri Lanka as mentioned above also adopted such policy of screening, e.g. only those adolescents who exhibited clinical abnormalities of PCOS in the field study only such selected adolescents were initially labeled as ‘probable case of PCOS’ and only those clinically suspected girls were referred to level II care centre for detailed endocrine assessment, ovarian ultrasound to confirm or refute the diagnosis of PCOS. Additionally, authors estimated total testosterone by conventional method, but ideally accurate level of free testosterone estimation should have been done by equilibrium dialysis method, which is the gold standard. Further, we did not assess the levels of serum cortisol or other androgen precursors like DHEA-SO4 or 17-hydroxy progesterone.\(^13\)
CONCLUSION
Authors are aware of the fact that some of the girls exhibiting features of adult PCOS in adolescent period like abnormal menstrual cycle or recurrent acne will eventually progress to adult PCOS. Some of them may compromise their reproductive competency and land up with metabolic abnormalities also in later life. Therefore, it is relevant to pick up as many as adolescent PCOS as possible at an early stage to avoid long-term metabolic and reproductive maladies. By picking up the adolescents at an early stage and by early lifestyle interventions backed up by long-term systemic follow up maybe instituted so that they do not fall prey to reproductive disorders and associated depression and/or become sufferer of diabetes mellitus and/or lipid abnormalities in the third or fourth decade of life. Early interference and adequate counseling will avert much of such maladies in later life.

REFERENCES
2. Coviello AD, Legro RS, Dunai AF. Adolescent girls with polycystic ovary syndrome have an increased risk of the metabolic syndrome associated with increasing androgen levels independent of obesity and insulin resistance. J Clin Endocrinol Metab 2006;91(2):492-497.
11. Duijkers II, Klipping C. Polycystic ovaries as defined by the 2003 Rotterdam consensus criteria are found to be very common in young healthy women. Gynaecol Endocrinol 2010;26(3):152-160.