

Polycystic Ovarian Syndrome in a population of obese adolescents

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Background

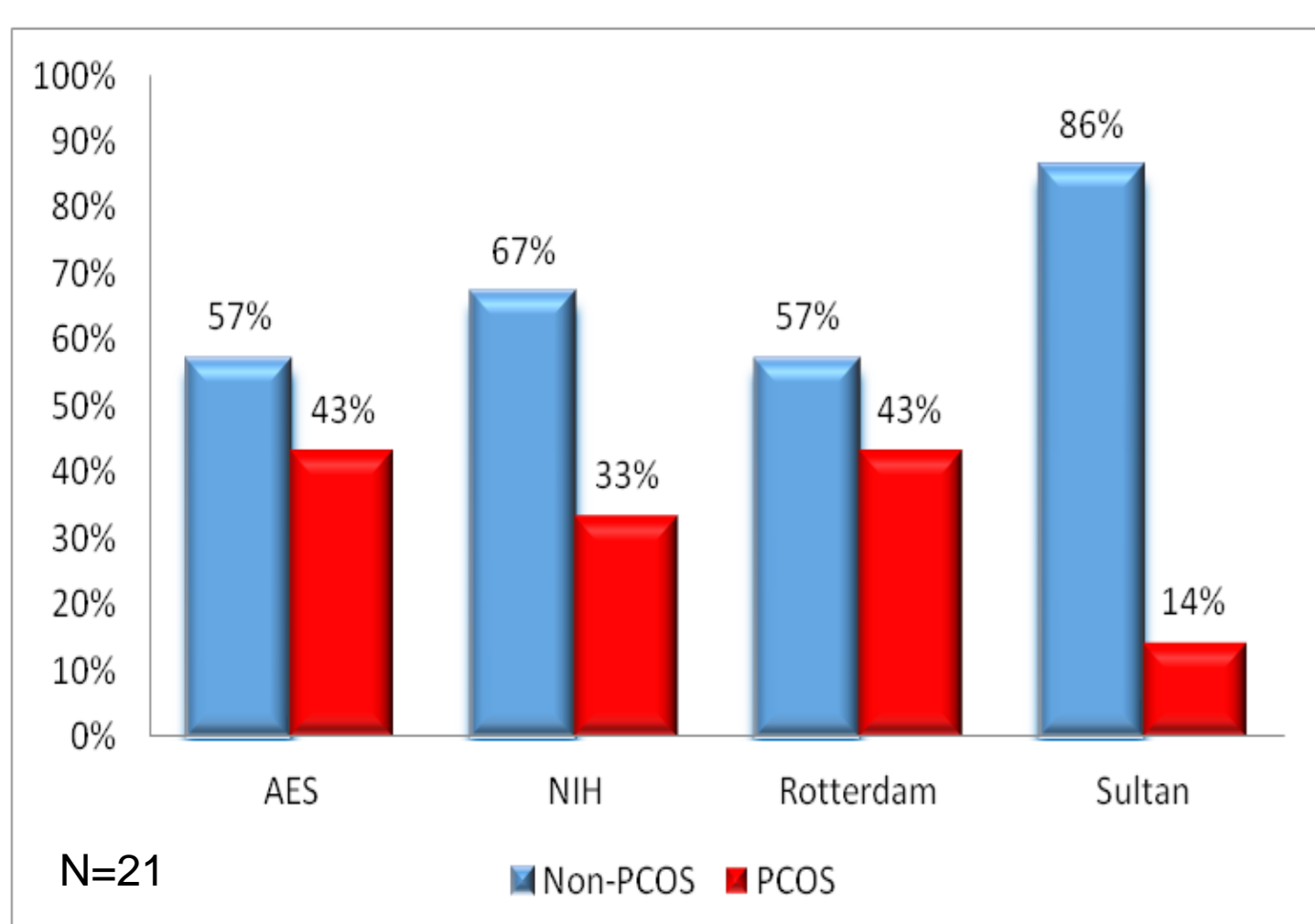
- Polycystic Ovarian Syndrome (PCOS) is the most frequent endocrine disorder in women of reproductive age with a prevalence of 8.5-12%¹.
- Establishing clinically relevant diagnostic criteria for adolescents is challenging because of overlap with physiological puberty i.e acne, irregular menses.
- PCOS is closely linked to obesity and strongly associated with hypertension & metabolic problems (dyslipidemia & type 2 diabetes).

Aims

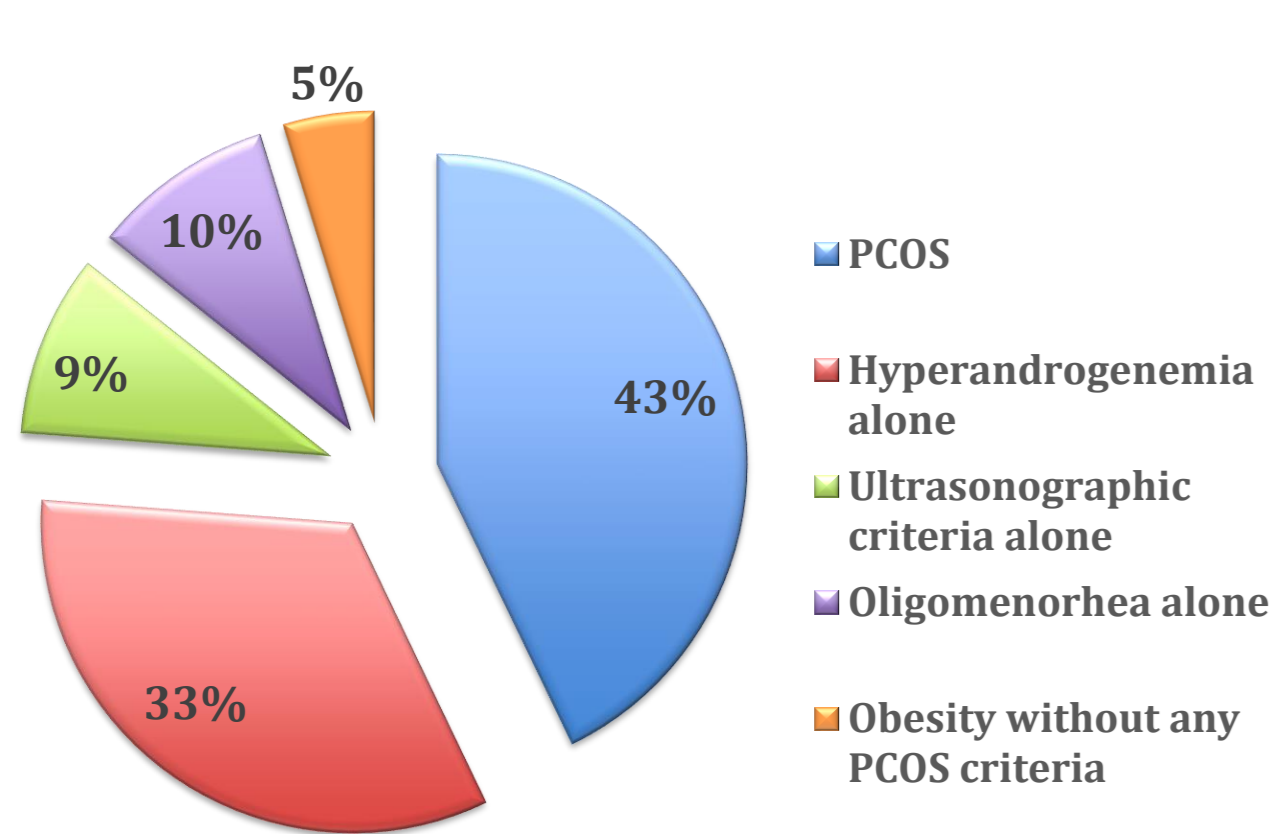
- To determine the prevalence of PCOS in a population of obese adolescents using the Androgen Excess Society (AES) criteria³ compared to those using NIH, Rotterdam, and Sultan diagnostic criteria for PCOS.
- To compare the clinical & biological features of PCOS vs. non-PCOS obese patients using AES criteria.

Results

Frequency of PCOS according to different diagnostic criteria



Frequency observed for each AES criterion



Patient characteristics (AES criteria)

	Non-PCOS N=12	PCOS N=9	P value
Age (years)	14.4 ± 1.7	15.1 ± 0.9	0.34
Weight (kg)	90.5 ± 11.8	88.1 ± 6.2	0.58
Height (cm)	161 ± 6.8	163 ± 5.6	0.49
BMI Z-Score (SDS)	3.1 ± 0.6	2.7 ± 0.2	0.12
Medical History			
Age of menarche (yrs)	11.4 ± 1.4	12.2 ± 1.0	0.17
FH of PCOS/hirsutism/oligomenorrhea	17%	0	0.20
Macrosomia	20%	0	0.18
Small for gestational age	0	25%	0.09
Clinical characteristics			
Hypertension	17%	22%	0.75
Acanthosis nigricans	58%	67%	0.70
Clinical hyperandrogenism	58	78	0.35
○ Acne	42	55	0.53
○ Hirsutism	25	22	0.88
Irregular menses	17%	78%	0.05
○ Amenorrhea	0	22%	0.08
○ Oligomenorrhea	17%	56%	0.06
PCO morphology by pelvic ultrasound	17%	78%	0.05

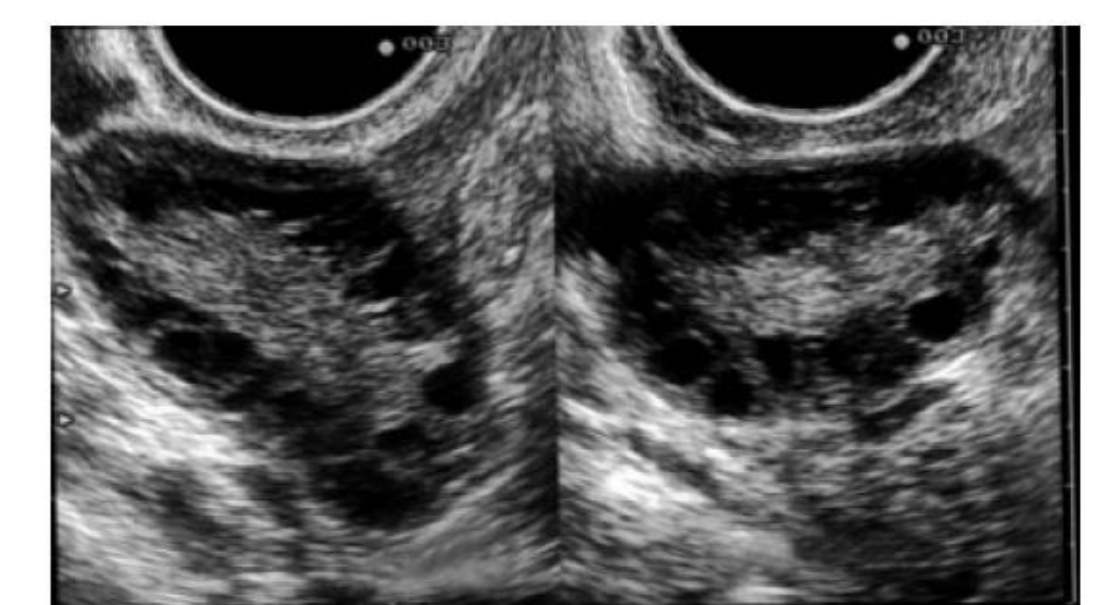
Data reported as mean ± SD unless otherwise noted

Patients & Methods

- Prospective observational study of 21 patients.
- **Inclusion criteria:**
 - ✓ from menarche to 20 years of age
 - ✓ or primary amenorrhea
 - ✓ BMI > +2 SDS (WHO criteria)
- **Exclusion criteria:** ↑ prolactin, thyroid dysfunction, CAH, pregnancy, tumors, antidiabetic medication, oral contraceptives.

Definitions

- PCOS defined by AES criteria³:
 - ✓ clinical and/or biochemical hyperandrogenism
 - ✓ AND oligo-amenorrhea and/or ultrasonographic criteria⁴:
 - ≥ 12 follicles (2-9 mm diameter)
 - and/or ovarian volume ≥ 10 mL.



PCOS on ultrasound (Balen et al, 2003)

Hormonal profile (AES criteria)

	Non-PCOS N=12	PCOS N=9	P value
LH (mIU/L)	5.3 ± 3.3	10.6 ± 6.6	0.029
FSH (mIU/L)	4.2 ± 2.3	5.2 ± 0.93	0.27
LH/FSH ratio	1.8 ± 1.3	2.0 ± 1.14	0.63
AMH (pmol/l)	16.6 ± 16.2	35.2 ± 14.7	0.050
Inhibin B (pg/ml)	57.5 ± 37	108.3 ± 9.8	0.023
Total T LCMS (nM)	0.9 ± 0.4	1.3 ± 0.4	0.047
SHBG (nmol/l)	24 ± 11	20 ± 8.6	0.37
DHEAS (µmol/l)	4.9 ± 3.3	4.2 ± 1.6	0.53
Δ 4 Andro (nM)	4.3 ± 1.8	9.9 ± 5.2	0.002
17-OH P (nM)	1.7 ± 1.3	2.0 ± 1.4	0.57
Leptin (µg/l)	48 ± 20	45 ± 12	0.73
Cortisol (nM)	267 ± 76	325 ± 111	0.17

Serum AMH and inhibin B levels (AES criteria)

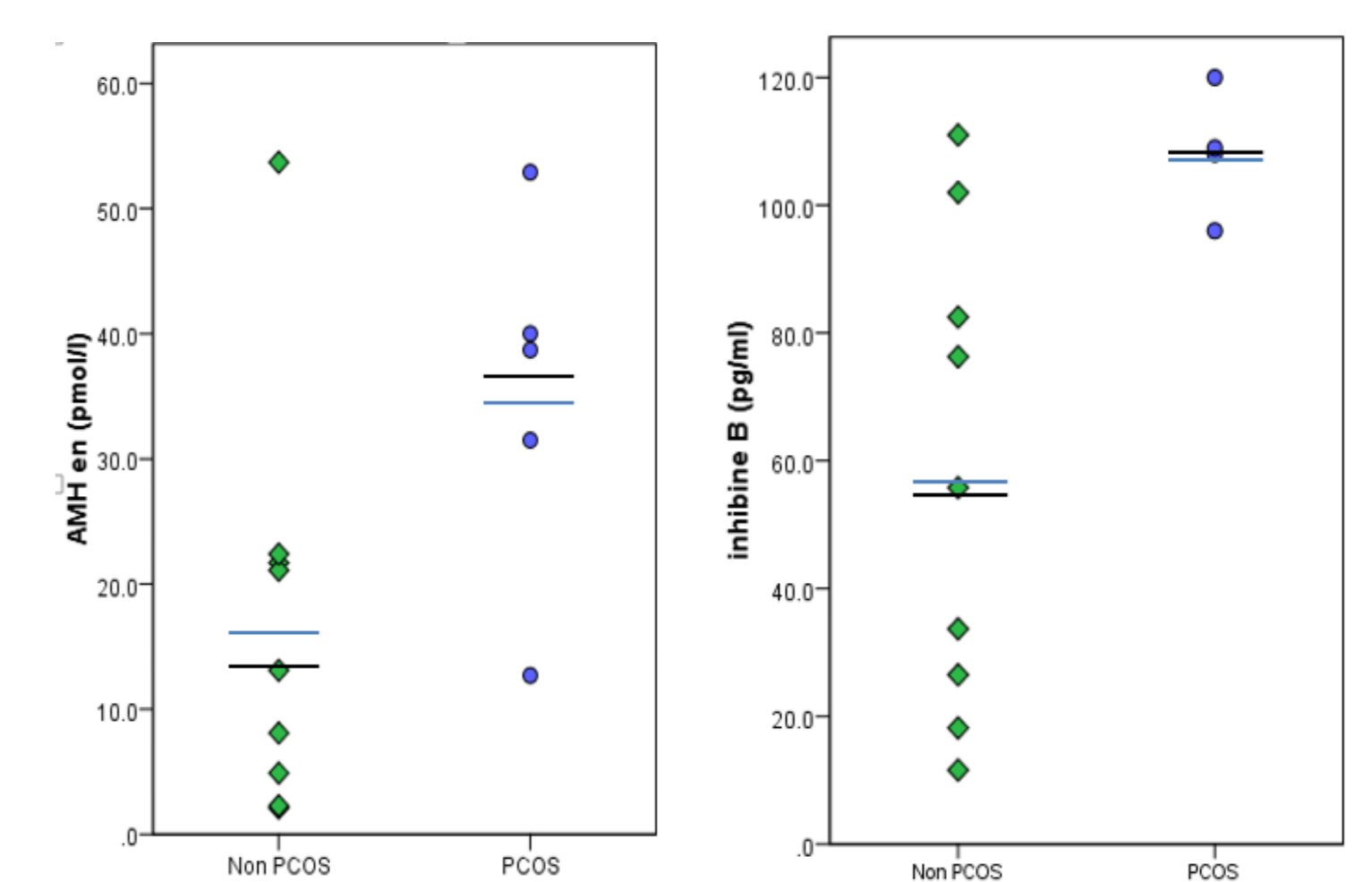


Fig. 3: AMH and Inhibin B levels comparing PCOS and non-PCOS patients. Dark lines are shown as median, light lines are mean.

Metabolic profile (AES criteria)

	Non-PCOS N=12	PCOS N=9	P value
HOMA-IR	5.46 ± 2.4	7.19 ± 4.4	0.27
GlycemiaT120 min (mM)	6.53 ± 1.2	6.84 ± 1.2	0.55
Cholesterol T (mM)	3.62 ± 0.5	4.13 ± 0.6	0.05
Triglycerides (mM)	0.97 ± 0.5	1.36 ± 0.5	0.13
LDL (mM)	2.02 ± 0.4	2.46 ± 0.6	0.06

- Trend: ↑ insulin resistance
- Significantly higher total cholesterol in PCOS group.

Discussion & Conclusions

- ✓ Rates of PCOS varies widely according to the criteria employed (AES vs. Sultan)
- ✓ PCOS (AES) was frequent in this small cohort of obese adolescents suggesting that PCOS is likely under-estimated.
- ✓ Our data suggest an increased metabolic risk in adolescents with PCOS - irrespective of obesity.
- ✓ AMH appears to be a useful diagnostic tool for PCOS.
- ✓ Difficulty assessing PCO morphology via pelvic ultrasound raises the question of using pelvic MRI in obese adolescents.
- ✓ Questions remain whether or not widespread, systematic screening of PCOS in obese adolescents is warranted, is clinically useful, and at what time points.

References

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