

PUBLISHED ABSTRACT

Prevalence and Risk Factors of Polycystic Ovarian Syndrome Among an Ethnically Diverse Overweight/Obese Adolescent Population

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Keywords: adolescents; young adult; polycystic ovary syndrome; risk factors; overweight; obesity; mental health

Background

More remains to be known about polycystic ovary syndrome (PCOS) among overweight/obese adolescents across different ethnicity especially in regards to mental illness as an associated comorbidity.

Hypothesis/Aim

To determine the prevalence of PCOS among overweight and obese adolescents, to further evaluate known risk factors for PCOS in a diverse population, and to discern cardiovascular risk and mental health comorbidity.

Methods

Electronic medical records of patients at an Adolescent Clinic between April 1, 2016 and July 30, 2018 were filtered using the following: obese, overweight and BMI $\geq 85\%$. Charts were reviewed to identify the presence of PCOS using NIH criteria, race/ethnicity, and known risk factors for PCOS (lipid, BMI, HA1c, BP) and mental health conditions associated with PCOS (anxiety/depression and self-harm/suicidal ideation).

Results

Of the 451 charts reviewed, 447 were analyzed. Of those, 47% of adolescents were overweight, 53% were obese and 10.5% were diagnosed with PCOS. Ages ranged from 14 to 22 years with a median of 17 years. Patients were predominantly Hispanic (76.1%), and the majority of non-Hispanic patients were from South Asia (Pakistan, Bangladesh, and India). Patients with PCOS were more likely to be hyperlipidemic (19% vs 9.9%, $p = 0.04$) and obese (67.4% vs 50.9%) than those without PCOS and more likely to have acanthosis (68.9% vs 28.2%). Interestingly, PCOS was not more common among the Hispanic population – 57.8% of Hispanic ethnicity with PCOS versus 77.9% of non-Hispanics. Although we were able to identify a significant percentage of our population with depression and anxiety, there was no difference in the prevalence of depression and anxiety with or without PCOS (37% vs 33%, respectively, $p = 0.590$). Reporting of self-harm and suicidal ideation were comparable in those with and without PCOS (17% vs 17%, $p = 0.96$). In a logistic regression model, after adjusting for all demographics and clinical features of interest, ethnicity, acanthosis and BMI were all significant risk factors for PCOS.

Conclusion

Patients with PCOS are more likely to be obese, have hyperlipidemia, have a diagnosis of acanthosis and be of Non-Hispanic ethnicity. However, there was no difference in the prevalence of depression/anxiety and self-harm/suicidal ideation among adolescents with or without PCOS.

Table 1: Demographics and Clinical Features of Obese and Overweight Adolescents.

	Overweight and Obese Adolescents (N = 447)	
	No. Observed	n (%)
PCOS	438	46 (10.5)
Ethnicity (Hispanic)	444	338 (76.1)
Elevated Lipids	439	49 (11.2)
Acanthosis	440	141 (32.0)
Hemoglobin A1c	386	
Normal		328 (85.0)
Elevated (Pre-DM)		51 (13.2)
Diabetes Mellitus		7 (1.8)
Weight Status^a	445	
Overweight		209 (47.0)
Obese		236 (53.0)
Blood Pressure	443	
Normal		390 (88.0)
Elevated BP		48 (10.8)
Hypertension		5 (1.1)
Depression and/or Anxiety	445	148 (33.3)
Self-Harm and/or Suicidality	446	77 (17.3)

^aAverage (\pm SD) for BMI was 30.1 ± 4.8 ; Median [IQR] for BMI was 29.1 [26.9, 32.7].

Table 2: Demographics and Clinical Features of Obese and Overweight Adolescents Stratified by PCOS status.

	No PCOS (N = 392)		PCOS (N = 46)		p-value
	No. Observed	n (%)	No. Observed	n (%)	
Ethnicity	390		45		0.003
Hispanic		304 (77.9)		26 (57.8)	
Non-Hispanic		85 (21.8)		19 (42.2)	
Elevated Lipids	384	38 (9.9)	46	9 (19.6)	0.05
Acanthosis	387	109 (28.2)	45	31 (68.9)	<0.001
Hemoglobin A1c	337		42		0.02
Normal		291 (86.4)		31 (73.8)	
Elevated (Pre-DM)		39 (11.6)		11 (26.2)	
Diabetes Mellitus		7 (2.1)		0 (0.0)	
Weight Status^{ab}	391		46		0.03
Overweight		192 (49.1)		15 (32.6)	
Obese		199 (50.9)		31 (67.4)	
Blood Pressure	389		46		0.70
Normal		343 (88.2)		39 (84.8)	
Elevated BP		42 (10.8)		6 (13.0)	
Hypertension		4 (1.0)		1 (2.2)	
Depression and/or Anxiety	391	129 (33.0)	46	17 (37.0)	0.59
Self-Harm and/or Suicidality	391	67 (17.1)	46	8 (17.4)	0.97

^aAverage (\pm SD) for BMI was 29.8 ± 4.4 and 33.3 ± 6.6 in the no PCOS and PCOS group, respectively (t-test p-value < 0.001).

^bMedian [IQR] for BMI was 29.0 [26.7, 32.2] and 32.7 [28.6, 36.4] in the no PCOS and PCOS group, respectively (Wilcoxon rank-sum test p-value < 0.001).

Table 3: Logistic Regression Model Results for PCOS (Yes v. No).

Clinical Features	OR (95% CI)	p-value
Ethnicity^a (Hispanic)	0.31 (0.15, 0.66)	0.002
Elevated Lipids	1.33 (0.50, 3.54)	0.57
Acanthosis	2.84 (1.28, 6.29)	0.01
Hemoglobin A1c^b (Pre-DM/DM)	1.49 (0.64, 3.47)	0.35
BMI	1.10 (1.02, 1.19)	0.01
Blood Pressure^c		
Elevated BP	0.33 (0.10, 1.15)	0.08
Hypertension	0.38 (0.03, 5.18)	0.47
Depression and/or Anxiety	1.79 (0.79, 4.06)	0.16
Self-Harm and/or Suicidality	0.86 (0.32, 2.31)	0.76

^aReference set to “Non-Hispanic”.

^bReference set to “Normal”; note that Pre-DM and DM were combined due to the lack of DM cases in the PCOS group.

^cReference set to “Normal”.

Table 4: PCOS, Metabolic Abnormalities, Psychiatric Diagnosis Stratified by Ethnicity Status.

	Hispanics	Non Hispanics	p-value
	n (%)	n (%)	
PCOS	26 (7.8)	19 (18.2)	0.003
Obesity	18 (69.2)	12 (63.2)	0.670
Elevated Lipids	7 (26.9)	2 (10.5)	0.264
Acanthosis Nigricans	14 (56.0)	16 (84.2)	0.05
Depression and/or Anxiety	11 (42.3)	6 (31.6)	0.543
Self-Harm and/or Suicidality	6 (23.1)	2 (10.5)	0.435

Acknowledgements

Statistical Support Provided by the Department of Pediatrics-Icahn School of Medicine at Mount Sinai.

How to cite this article: Maya J, Siegel J, Cheng TQ, Rousseau-Pierre T. Prevalence and Risk Factors of Polycystic Ovarian Syndrome Among an Ethnically Diverse Overweight/Obese Adolescent Population. *Journal of Scientific Innovation in Medicine*. 2019; 2(2): 26. DOI: <https://doi.org/10.29024/jsim.38>

Submitted: 06 August 2019 **Accepted:** 06 August 2019 **Published:** 27 November 2019

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