The Risks of Polycystic Ovary Syndrome and Diabetes Vary by Ethnic Subgroup Among Young Asian Women

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Previous studies demonstrated that aggregation of Asians into one group masks the variation in type 2 diabetes prevalence across U.S. Asian subgroups. However, fewer studies have assessed Asian ethnic differences in the risk of other conditions associated with insulin resistance and glucose dysregulation. Furthermore, despite the known association of polycystic ovary syndrome (PCOS) and insulin resistance (1), the risks of PCOS and diabetes, accounting for differences in adiposity, have not been investigated in the same U.S. Asian subgroup. To better understand the variation in diabetes and PCOS risk in Asians, we examined these clinical conditions among Chinese, Filipina, and South Asian women identified from a large U.S. population cohort.

Using data from Kaiser Permanente Northern California, we conducted a cross-sectional, retrospective study of 19,258 Chinese, 23,213 Filipina, and 19,108 South Asian women aged 21–44 years who had ≥1 clinical encounter in 2016 with measured (nongestational) weight and height data for calculation of BMI. Self-identified race/ethnicity was derived from electronic health record and survey data, including primary language in a subset, and assignment by ethnic surname was used for Asian women without specified ethnicity (25.2% Chinese, 16.8% Filipina, and 33.9% South Asian). Obesity was classified based on the lower intervention threshold (BMI ≥27.5 kg/m^2) recommended for Asians by the American Diabetes Association (2). Smoking status was identified using electronic health record data from 2015–2016 (current, former, or never smoker). We defined clinical PCOS as having ≥2 ambulatory diagnoses of PCOS (ICD-9 256.4, ICD-10 E28.2) in 2015–2016 and clinical diabetes as having ≥2 ambulatory diagnoses of diabetes (ICD-9 250.X, ICD-10 E10–11,13) in 2015–2016 with a history of diabetes pharmacotherapy. Risks of PCOS and diabetes among Filipina and South Asian versus Chinese women were examined using multivariable logistic regression. Sensitivity analyses were conducted excluding women identified based on surname alone.

The mean age of the cohort was 34.1 ± 6.6 years and differed minimally by ethnicity. Current smoking was reported for 3.0%, 8.0%, and 1.7% of Chinese, Filipinas, and South Asians, respectively. The prevalence of obesity was 15.3% for Chinese, 38.3% for Filipinas, and 30.0% for South Asians. Obesity was notably higher, overall and by ethnicity, among those with PCOS versus no PCOS (59.0% vs. 27.9%, $P < 0.001$) and those with diabetes versus no diabetes (69.5% vs. 27.4%, $P < 0.001$). Among Chinese, Filipina, and South Asian women, the prevalence of PCOS was 1.0%, 1.5%, and 3.3%, respectively, whereas the prevalence of diabetes was 1.1%, 4.2%, and 2.5%, respectively. The prevalence was much higher for women with obesity in these same respective ethnic groups (3.0%, 3.0%, and 5.9% for PCOS; 4.4%, 8.2%, and 5.3% for diabetes), demonstrating higher PCOS burden in South Asians and higher diabetes burden in Filipinas.

Using multivariable logistic regression and adjusting for age, BMI, and current smoking status, South Asian women had a 2.6-fold (95% CI 2.2–3.1) higher adjusted odds ratio (aOR) of PCOS than Chinese women, but the odds of PCOS for Filipinas versus Chinese women (aOR 0.9, 95% CI 0.7–1.1) was similar (Fig. 1). Both South Asian (aOR 1.7, 95% CI 1.4–2.0) and Filipina (aOR 2.3, 95% CI 1.9–2.6) women had higher odds of diabetes than Chinese women.

These findings indicate that risk profiles for PCOS and diabetes differ among younger Chinese, Filipina, and South Asian women. In our clinical population, the risk of PCOS was higher for South Asian than Chinese (and Filipina) women, while the risk of diabetes was highest for Filipina women, independent of BMI. These observations are of interest, as both PCOS and type 2 diabetes are associated with insulin resistance and PCOS is a risk factor for type 2 diabetes (1). Among women with PCOS, Asians have been reported to have lower insulin (vs. Black and Hispanic women) and higher glucose (vs. non-Hispanic White women) levels in response to an oral glucose load (3),

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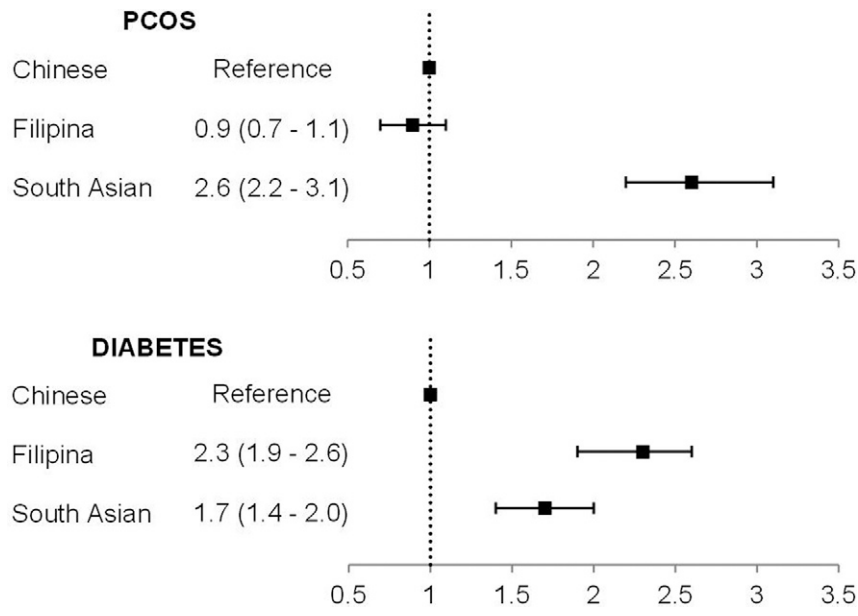

Figure 1—Multivariable odds of PCOS and diabetes among reproductive-aged women, comparing Filipina and South Asian women to Chinese women. Separate models with PCOS and diabetes as the outcome were adjusted for age, BMI, and current smoking status. aOR and 95% CI are shown for Asian ethnicity as the primary predictor of interest. In sensitivity analyses, these findings were similar when restricted to the 14,406 Chinese, 19,302 Filipina, and 12,632 South Asian women with self-reported race/ethnicity (or preferred ethnic language in 6% of Chinese, 0.2% of Filipina, and 3% of South Asian women).

but ethnic variations in the metabolic response of PCOS have not been examined by Asian subgroup. While PCOS symptomatology has not been well studied among U.S. Asians, phenotypic variations of PCOS in Asian women include increased hirsutism and earlier symptom onset in South Asian compared with East Asian women (4). Earlier PCOS presentation among South Asian women could contribute to the higher observed prevalence of PCOS in our study. Others have reported greater PCOS burden among South Asian than White women receiving infertility care in metropolitan settings (5).

In summary, a greater awareness of differences in PCOS and diabetes among Asian subgroups is important for targeting screening and prevention efforts. Future studies should also examine sociodemographic influences and associated clinical factors to inform approaches that optimize the metabolic and reproductive health of these and other Asian American populations.

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