



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

Lynn Guo,^{1,2} Nancy P. Gordon,^{2,3}
Malini Chandra,² Olumayowa Dayo,⁴
and Joan C. Lo^{2,3}

Diabetes Care 2021;44:e129–e130 | <https://doi.org/10.2337/dc21-0373>

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/m²) 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–E11.13) 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),

¹Albany Medical College, Albany, NY

²Division of Research, Kaiser Permanente Northern California, Oakland, CA

³The Permanente Medical Group, Oakland, CA

⁴Department of Obstetrics and Gynecology, Kaiser Permanente Oakland Medical Center, Oakland, CA

Corresponding author: Joan C. Lo, joan.c.lo@kp.org

Received 13 February 2021 and accepted 10 March 2021

© 2021 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. More information is available at <https://www.diabetesjournals.org/content/license>.

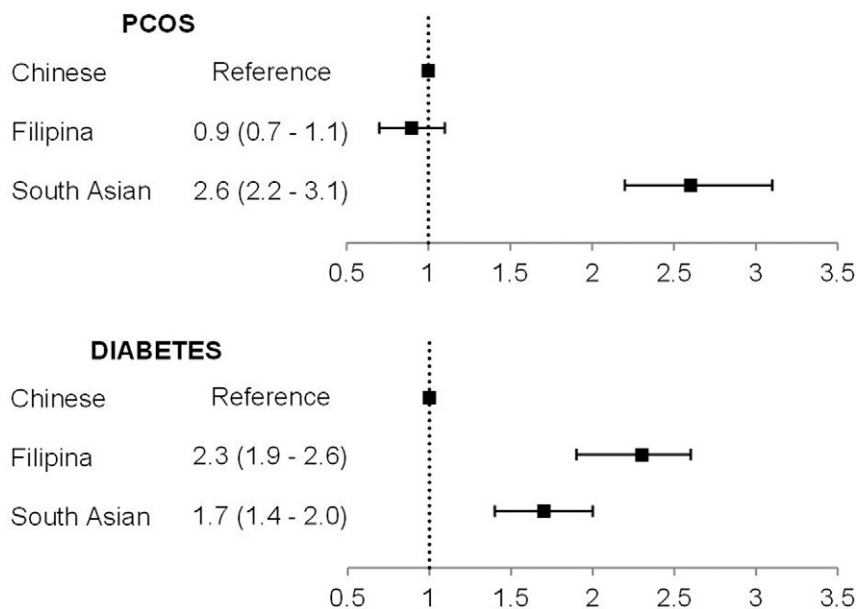


Figure 1—Multivariable odds of PCOS and diabetes among reproductive-aged women, comparing Filipina and South Asian women to Chinese women. Separate models with PCOS and diabetes as the outcome were adjusted for age, BMI, and current smoking status. aOR and 95% CI are shown for Asian ethnicity as the 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.

Funding. This study was supported in part by the KPNC Community Benefit Grant Program and the National Institutes of Health National Institute of Diabetes and Digestive and Kidney

Disease T32 Training Program in Diabetes Translational Research (T32DK116684).

Duality of Interest. J.C.L. has a family member who has received research funding from Novartis, Pfizer, and Bristol-Myers Squibb unrelated to the current study. No other potential conflicts of interest relevant to this article were reported.

Author Contributions. L.G. contributed to the design, provided important intellectual content, interpreted results, and wrote the manuscript. N.P.G. and M.C. obtained the data, conducted data analyses, provided important intellectual content, and edited the manuscript. O.D. reviewed and interpreted results and edited the manuscript. J.C.L. contributed to the design and supervision, researched the data, contributed to the writing of the manuscript, and was responsible for the decision to submit and publish the manuscript. J.C.L. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Prior Presentation. These results were presented as an oral abstract at the Endocrine Society’s ENDO 2021 meeting (virtual), 20–23 March 2021.

References

1. Kakoly NS, Earnest A, Teede HJ, Moran LJ, Joham AE. The impact of obesity on the incidence of type 2 diabetes among women with polycystic ovary syndrome. *Diabetes Care* 2019;42:560–567
2. American Diabetes Association. Addendum.
3. Ezech U, Ida Chen YD, Azziz R. Racial and ethnic differences in the metabolic response of polycystic ovary syndrome. *Clin Endocrinol (Oxf)* 2020; 93:163–172
4. Kim JJ, Choi YM. Phenotype and genotype of polycystic ovary syndrome in Asia: ethnic differences. *J Obstet Gynaecol Res* 2019;45: 2330–2337
5. Kudesia R, Illions EH, Lieman HJ. Elevated Prevalence of Polycystic Ovary Syndrome and Cardiometabolic Disease in South Asian Infertility Patients. *J Immigr Minor Health* 2017;19:1338–1342