JOURNAL OF WOMEN'S HEALTH
Volume 24, Number 9, 2015

DOI: 10.1089/jwh.2015.5363

Editorial

Pregnancy as a Window to Cardiovascular Disease Risk: How Will We Know?

Janet M. Catov, PhD, MS

The American Heart Association Guidelines for the prevention of cardiovascular disease (CVD) in women now include pregnancy complications as a major risk factor.[1] It is well established that women with a history of preeclampsia, pregnancy induced hypertension, or gestational diabetes have excess CVD risk, and evidence is accumulating that those delivering small or preterm infants are also at excess risk. Carter et al. make an important contribution to this field in this issue of the *Journal of Women's Health*.[2] They have developed and systematically tested a brief questionnaire to solicit valid self-reporting of pregnancy complications by women within 4 years of pregnancy. Although not totally representative of their source population, they report many important features of a screening tool (sensitivity, specificity, positive and negative predictive value). The result of their work is a brief, validated tool to query women about pregnancy complications that has utility in both research and clinical settings. The National Institutes of Health (NIH) working group Bridging Preeclampsia and Future Cardiovascular Disease proposed the development of a ''clinometric'' that could be added to current CVD risk scoring systems to identify women who may benefit from earlier surveillance for CVD.[3] The tool, developed and tested by Carter et al., is an important step toward this goal.

The result of their study is a maternal recall tool comprising five questions that have the best performance when validated against the pregnancy medical record. Researchers can now utilize these questions to gather the most reliable data on pregnancy history via maternal recall, and results can be compared across studies. Their tool also makes an important translational contribution, as clinicians now can include these questions in their medical history interviews and feel confident that they are querying women in the most validated, robust fashion.

The results of their study are remarkably consistent with the few other studies in this area. The Coronary Artery Disease Risk in Young Adults (CARDIA) study was in the forefront of collecting pregnancy outcome information from women enrolled between the ages of 18 and 24 years. Evidence from validation studies in this longitudinal cohort revealed that maternal recall of gestational diabetes, infant birth weight, and gestational age of delivery was remarkably consistent with the metrics summarized by Carter et al.[4,5] CARDIA also demonstrated the tremendous difficulty women have accurately recalling pregnancies complicated by preeclampsia or gestational hypertension.[6] Carter et al. report significantly improved recall of hypertensive disorders of pregnancy in a contemporary cohort with deliveries between 2006 and 2009.

An important observation, albeit quite obvious, is that women can recall what they are told. Aligned with this, the American College of Obstetricians and Gynecologists' guidelines for management of hypertension in pregnancy now emphasize the importance of discussing with women the occurrence of preeclampsia and gestational hypertension.[7] Women may therefore become even better equipped to take this information into their next pregnancy and indeed to their primary care physician in the years after pregnancy.

Detection of risk in the reproductive years for hypertension, for example, is critical, as treatment is widely available, relatively inexpensive, and provides substantial cardio protective benefits. Yet, 32%–38% of hypertension goes undetected in adults younger than 40 years of age.[5] Hypertension is the leading preventable risk factor for cardiovascular morbidity and mortality and contributes to more CVD events in women relative to men (32% compared to 19%, $p = 0.02$).[8] The translation of the evidence linking pregnancy complications to clinical care, such as early detection of hypertension, may therefore make an important contribution to improving women's health.

There are important next steps that must follow the development of this screening tool. There are profound and persistent race disparities in pregnancy complications and in cardiometabolic disease risk. As noted by the Institute of Medicine, optimizing blood pressure in younger populations has tremendous opportunity to prevent premature morbidity and mortality, and these efforts must include a special focus on minority populations to ensure that strategies to reduce hypertension do not exacerbate disparities due to unequal access to health care.[9] Pregnancy care is universally accessible, and thus even women lacking health insurance or otherwise at high risk have access to care during pregnancy that may not be paralleled again until older adulthood. Pregnancy, therefore, is a unique opportunity to assess CVD risk in women. Carter et al. had a limited opportunity to test the validity of their recall tool in minority women, and replication of their results among African American, Hispanic, and Asian women will be important. There are also other

Magee-Women's Hospital, Pittsburgh, Pennsylvania.

pregnancy features that may be valuable to include in the continued development of this clinometric, such as breast feeding duration, gestational weight gain, and recurrent pregnancy loss. In addition, we need to incorporate these questions into longitudinal cohorts to determine if lifetime CVD risk estimation is improved by incorporating pregnancy history.

The reproductive years are an ideal time to assess preclinical CVD risk and launch strategies to prevent or delay onset of disease in women. Although CVD events occur, on average, a decade later in women compared with men, those with elevated risk factors prior to menopause remain at the highest risk post menopause.[10] Thus, early detection of risk unmasked by pregnancy offers great, but to date untested, opportunity to improve women's health. We need more tools to translate this potential into meaningful improvements in women's health, and the contribution of a brief tool to gather valid pregnancy history information via maternal recall is an important step in this direction.

References

1. Mosca L, Benjamin EJ, Berra K, et al. Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 update: A guideline from the American Heart Association. J Am Coll Cardiol 2011;57:1404–1423.
2. Carter E, Stuart J, Farland L, et al. Pregnancy complications as markers for subsequent maternal cardiovascular disease: Validation of a maternal recall questionnaire. J Womens Health 2015;24:702–712.
3. NHLBI Workshop Bridging Preeclampsia and Future Cardiovascular Disease: Executive Summary. 2010. Available online at www.nhlbi.nih.gov/meetings/workshops/bridging-pe.htm Accessed February 4, 2013.
4. Catov JM, Ness RB, Wellons MF, Jacobs DR, Roberts JM, Gunderson EP. Prepregnancy lipids related to preterm birth risk: the coronary artery risk development in young adults study. J Clin Endocrinol Metab 2010;95:3711–3718.
5. Gunderson EP, Lewis CE, Tsai AL, et al. A 20-year prospective study of childbearing and incidence of diabetes in young women, controlling for glycemia before conception: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. Diabetes 2007;56:2990–2996.
6. Gunderson EP, Chiang V, Lewis CE, et al. Long-term blood pressure changes measured from before to after pregnancy relative to nonparous women. Obstet Gynecol 2008;112:1294–1302.
7. Hypertension in pregnancy. Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. Obstet Gynecol 2013;122:1122–1131.
8. Cheng S, Claggett B, Correia AW, et al. Temporal trends in the population attributable risk for cardiovascular disease: The Atherosclerosis Risk in Communities study. Circulation 2014;130:820–828.
9. Institute of Medicine Committee on Public Health Priorities to Reduce and Control Hypertension. A population-based policy and systems change approach to prevent and control hypertension. Washington, DC: National Academies Press, 2010.
10. Matthews KA, Kuller LH, Sutton-Tyrrell K, Chang Y-F, Tietjen GE, Brey RL. Changes in cardiovascular risk factors during the perimenopause and postmenopause and carotid artery atherosclerosis in healthy women. Editorial comment: Premenopausal risk continuum for carotid atherosclerosis after menopause. Stroke 2001;32:1104–1111.

Address correspondence to:
Janet M. Catov, PhD, MS
Department of Obstetrics and Gynecology
Magee-Women's Hospital
Univeristy of Pittsburgh School of Medicine
300 Halket Street
Pittsburgh, PA 15213

E-mail: catovjm@upmc.edu