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Do Pregnancy Experiences Predict Cardiovascular Disease in Women?

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ABSTRACT

We are beginning to learn how different women and men are in response to illness. The role of gender in health was overlooked until the 1990s. As a result, researchers may have missed some important reproductive risk factors for heart disease in women. Heart disease continues to be the leading cause of death in women, and recent literature supports pregnancy experiences as predictors of later life cardiovascular disease in women. This report reviews the literature and calls for primary care providers to collect and include these data when making recommendations for a cardioprotective lifestyle to women in their practice.

Keywords: cardiovascular, heart, pregnancy, reproduction, women

Cardiovascular disease (CVD) continues to be the leading cause of death in women. Specifically, mortality is approximately 50% greater in women ≤ 55 years old as compared with men after having an acute myocardial infarction,[1] and women have a higher stroke-related mortality compared with men.[1,2] Hypertension is a major risk factor and primary contributor to mortality in women.[3] Each year, approximately 55,000 more women than men suffer a stroke.[4] Stroke affects 3.6 million women in the United States as compared with 3 million men.[2] More women than men aged 55-75 will die from stroke (1 in 5 vs. 1 in 6).[5]

The magnitude of this disparity demands our attention to the clinical appreciation of sex-specific factors for estimating risk of CVD and stroke in women and the application of these factors in clinical practice. Strategies must be implemented that overcome patient, clinician, and system barriers to make a real difference in the lives of women.[6]

Health care delivery for women in the US is fragmented as it is based on a medical model in which primary care and specialty providers have limited resources and incentives to support a coordinated approach for the delivery of services. This partitioning negatively impacts the ability to address cardiovascular and stroke risk signaled by pregnancy,[7] parity, pregnancy complications[8,9] (ie, pre-eclampsia, gestational diabetes, and hypertension), pregnancy loss[10] (ie, stillbirth and miscarriage), menopause, and hormonal status.[11]

Disconnected health care delivery based on specialty clinical practice was further highlighted in a recent study in which internal medicine physicians were found to be less likely to obtain a pregnancy history from their female patients, and gynecologists were less likely to order appropriate testing for identified cardiovascular risk.[12] Unfortunately, the outcome from disjointed health care delivery undervalues the evidence to support the inclusion of sex-specific risk factors. Importantly, when health care providers do not accurately target risk factors for future CVD and stroke events in women, there is a cascading effect that contributes to the patient's underestimation of her own risk.[13,14]

As highlighted in the Effectiveness-based Guidelines for the Prevention of Cardiovascular Disease in Women (EGPCDW),[15] a woman's pregnancy history and menopausal status should be taken into consideration to inform health care providers who provide primary and secondary prevention of cardiovascular diseases and stroke throughout a woman's lifespan. The timely and recent release of the Institute of Medicine (IOM) report, *Improving Diagnosis in Health Care*, underscores the need for improved teamwork and collaboration among physicians, nurse practitioners, and physician

assistants.[16] The IOM recommendations propose the development of clinician payment structures to support time spent in communication with a patient's other health care providers. In addition, the IOM's report outlines opportunities to address clinician and system barriers to enhance the provision of guideline-based health care delivery and the implementation of mechanisms that allow for data sharing and aggregation approaches for linking women's health data across the life stages continuum.[16]

Clinical predictive models for understanding cardiovascular and stroke mortality are largely absent of sex-specific factors beyond male and female gender designations. The EGPCDW[15] report provides a summary recognizing the strengths of current paradigms for estimating CVD and stroke risk in women. However, 10-year estimates for global cardiovascular risks in women may be limited, based on statistical evidence showing women have CVD and stroke events later in life.[2] Often women have a seemingly low CVD risk when traditional risk factors are assessed, yet, in reality, undetected subclinical CVD poses significant risk later in a woman's life.[17,18] Inaccuracies in risk assessment hinder optimal application of appropriate risk-modifying interventions. Just as level of risk for CVD and stroke morbidity and mortality have most often been grounded in the context of traditional, non–sex-specific risk factor assessment,[19] likewise, primary and secondary prevention strategies have been applied similarly in men and women without sufficient acknowledgment of evidence supporting the inclusion of sex-specific factors to the risk equation.[20]

Experts agree there are sex-specific factors that increase CVD and stroke risk in women (see Table 1). A deeper understanding is essential to navigate pathways aimed to optimize health care delivery for women.[15,21] Unexplained variance when risk-based models are tested by retrospective analyses to predict CVD suggests evaluation of additional factors may be needed.[22] A promising example involves the inclusion of the sex-specific history of preeclampsia and evidence of improved risk analysis.[23] Until we can better estimate the contribution of traditional and sex-specific factors for CVD and stroke risk, there is limited direction for clinicians providing preventive health care for women.

Table 1. Assessing Risk Factors for Cardiovascular Disease Risk in Women

Sex-specific Risk Factors (Nonmodifiable)	Major Risk Factors (Modifiable)
Preeclampsia/eclampsia	Hypertension
Gestational diabetes	Obesity
Pregnancy-induced hypertension	Smoking
Preterm birth	Dyslipidemia
Birth of an infant small for gestational age	

Today we have a major opportunity to advance current paradigms for assessing risk in women based on precedent established through cardiovascular and stroke evidence-based clinical guidelines.[15,21] As highlighted in the EGPCDW,[15] a woman's pregnancy experience of preeclampsia, gestational diabetes, pregnancy-induced hypertension, preterm birth, or birth of an infant small for gestational age should signal the obstetrician to provide a postpartum referral to a primary care physician or cardiologist for the primary and secondary prevention of CVD throughout the woman's lifespan.[7,24] The stroke prevention guidelines in women[21] expand upon this work by outlining recommendations for short- and long-term follow-up to address a woman's increased risk for hypertension and stroke up to 30 years after delivery in those having had complications of preeclampsia or eclampsia. These guideline recommendations also emphasize monitoring and treatment of major CVD risk factors (ie, hypertension, obesity, smoking, and dyslipidemia). Table 2 presents suggested strategies and resources to address sex-specific and major risk factors.

Once considered predominantly a man's disease, much effort has been afforded to expand the paradigm that women, even before menopause, are at risk for manifestations of CVD and stroke. The challenge for clinicians is to ultimately reduce CVD and stroke morbidity and mortality. This will involve decreasing occurrences of CVD and stroke in female patients by taking into consideration earlier pregnancy complications and reproductive