Duration of lactation and incidence of myocardial infarction in middle to late adulthood

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BACKGROUND AND OBJECTIVE
Heart disease remains the leading cause of death for women in the United States. Multiple lifestyle factors contribute to heart disease risk. In addition, hypertension, high cholesterol, and diabetes increase the risk for myocardial infarction (MI).

Both animal and human studies suggest that lactation may alter maternal glucose and lipid homeostasis and affect blood pressure regulation. Although these studies document metabolic differences during breastfeeding, epidemiologic data suggest these changes may persist after weaning. Collectively, these data suggest that lactation may affect the risk for cardiovascular disease.

We examined the association between lactation history and incident fatal and nonfatal MI in the Nurses’ Health Study.

MATERIALS AND METHODS
The Nurses’ Health Study began in 1976, enrolling 121,700 women from 11 states for a longitudinal, prospective study of women’s health. Every 2 years, participants completed follow-up questionnaires regarding medical diagnoses and health-related topics.

Lactation history was assessed once, in 1986, when women reported total duration of lactation for all pregnancies as a categorical variable. At that time, the youngest women in the cohort were 40 years of age. Only 75 births were reported after 1986.

In our study, we assessed incident cases of nonfatal MI from 1986, when cohort members were aged 40-65 years, to 2002, at which point they were aged 56 to 81 years.

The relative risk of MI by lactation history was assessed using a Cox proportional hazards model. We examined incident cases of MI from 1986, when cohort members were aged 40-65 years, to 2002, at which point they were aged 56 to 81 years.

Lactation history among parous women was stratified into 6 groups: none (referent), greater than 0-3 months, greater than 3-6 months, greater than 6-11 months, greater than 11-23 months, and greater than 23 months. We used midpoints of lactation categories to assess linear trend.

All models were age adjusted and included parity and whether the participant had reported any stillbirths. In our adjusted model, we included coronary risk factors and lifestyle factors. We hypothesized that lactation may affect cardiovascular risk through its effects on hypertension, diabetes, hyperlipidemia, and body mass index (BMI). We added...
these intermediates to our covariate-adjusted model to assess whether their inclusion attenuated the observed association.

To determine whether the association between lactation and MI risk diminished with time since last birth, we divided women into 2 groups: those with and without a birth in the previous 30 years. To test for differences in the effects of lactation by parity, we added an interaction term to the covariate-adjusted model.

**RESULTS**

A total of 89,326 parous women reported lifetime duration of lactation and were eligible for the study. Of these, 63% had ever breastfed. As expected, higher parity was associated with longer duration of lactation. Women who breastfed for longer periods of time were less likely to report a diagnosis of hypertension, high cholesterol, or diabetes; to report a parental history of MI; to have ever smoked; and to be postmenopausal in 1986.

During the study period, 2540 incident cases of MI or death because of coronary heart disease were diagnosed during 1,350,965 person-years of follow-up. In this analysis of a large prospective cohort, we found an inverse association between long duration of lactation and MI independent of known risk factors for cardiovascular disease, including obesity at age 18 years, parental history of MI, smoking, exercise, diet, aspirin use, alcohol consumption, hormone use, and menopausal status.

In 2005, 73% of US women had ever breastfed, 39% were still breastfeeding at 6 months, and 20% were breastfeeding at 1 year. These data suggest that at current breastfeeding rates, a substantial number of US women of childbearing age who give birth to 2 or more children will breastfeed for 2 years or longer.

Our findings must be interpreted in the context of the study design. All observational studies are subject to confounding; studies of breastfeeding are particularly challenging in this regard. Animal data and human studies have linked obesity and insulin resistance to difficulties with breastfeeding, suggesting that shortened lactation could be a marker for an aberrant metabolic profile. Successful prolonged breastfeeding depends on a wide range of factors, from a woman’s choice to begin nursing to the support she receives from her birth attendant, her infant’s pediatrician, her family, and her employer. A woman whose circumstances allow prolonged breastfeeding may live in a less stressful environment and thus face a lower risk of cardiovascular disease.

Our findings are consistent with and extend those from earlier reports linking reproductive history to cardiovascular disease risk. Lactation influences carbohydrate and lipid metabolism; oxytocin has been linked to regulation of blood pressure and cardiovascular function.

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**TABLE**

<table>
<thead>
<tr>
<th>Cumulative duration of lactation (mo)</th>
<th>None</th>
<th>&gt; 0-3</th>
<th>&gt; 3-6</th>
<th>&gt; 6-11</th>
<th>&gt; 11-23</th>
<th>&gt; 23</th>
<th>P for trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases, n</td>
<td>1037</td>
<td>627</td>
<td>304</td>
<td>224</td>
<td>241</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Person-years</td>
<td>494,667</td>
<td>306,669</td>
<td>161,586</td>
<td>132,492</td>
<td>164,746</td>
<td>90,805</td>
<td></td>
</tr>
<tr>
<td>Age, parity, and stillbirth-adjusted HR (95% CI)</td>
<td>1.0 (ref)</td>
<td>0.90 (0.81-0.99)</td>
<td>0.91 (0.8-1.03)</td>
<td>0.88 (0.76-1.02)</td>
<td>0.77 (0.67-0.89)</td>
<td>0.63 (0.51-0.77)</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Multivariate-adjusted HR (95% CI)</td>
<td>1.0 (ref)</td>
<td>1.01 (0.91-1.11)</td>
<td>1 (0.88-1.14)</td>
<td>1.02 (0.88-1.18)</td>
<td>0.93 (0.8-1.07)</td>
<td>0.77 (0.62-0.94)</td>
<td>.02</td>
</tr>
</tbody>
</table>

All models were adjusted for age, parity, and history of stillbirth.

* Hazard ratio and 95% confidence interval (CI) adjusted for age; parity; history of stillbirth; body mass index (BMI) at age 18 years; birthweight of subject; parental history of MI before age 60 years; diet quintile; physical activity; smoking; menopausal status; and use of aspirin, alcohol, multivitamins, and postmenopausal hormones.

Oophorectomy as a risk factor for coronary heart disease

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**Background and Objective**

Hysterectomy is the most common major surgery among nonpregnant women in the United States. Half of these procedures include bilateral salpingo-oophorectomy (BSO). In 1965, 25% of all hysterectomies included BSO vs 54% of the 600,000 hysterectomies performed annually from 2000 through 2004. Although BSO is common, the potential adverse consequences of this procedure have not been fully explored.

BSO is routinely offered concomitant with hysterectomy as a prophylactic procedure to prevent ovarian cancer and additional surgery for benign ovarian masses, and as treatment for pelvic pain, premenstrual syndrome, and symptomatic endometriosis. However, the absence of ovarian sex steroids following BSO has been associated with decreased sexual function, poorer mental health, and an increased risk for fractures compared with women who undergo ovarian conservation. Of greatest concern is that some studies have reported that BSO increases risk for coronary heart disease (CHD), the leading cause of death among women.

We performed a systematic review of the medical literature to clarify the association of BSO and subsequent risk for CHD. We aimed to provide an accurate summary of the existing evidence to assist in preoperative counseling for women facing the decision.