

The Women's Health Research Program

Health Bulletin
May 2013

Latest research findings from the Women's Health Research Program: Do hormones influence cholesterol levels after menopause?

The main risk factors for heart attacks in women are elevated cholesterol, abdominal obesity and diabetes. Hormones (estrogen and testosterone) have been implicated as being protective against heart disease in women in some studies, and contributing to risk in others. Therefore we asked the question: are hormone levels in postmenopausal women related to an increase in risk of diabetes or elevated blood cholesterol and fats?

To address this we looked at the blood test results of 800 postmenopausal women recruited for an unrelated clinical study at 65 centers in the United States, Canada, Australia, UK, and Sweden between July 2004 and February 2005. Because these women were about to participate in a clinical trial we had information about their weight, height, blood pressure and a range of other clinical variables. None of the women were diabetic. The women were on average 54 years old and 6.1 years postmenopause.

First we asked the question: are estrogen or testosterone levels related to insulin resistance (elevated insulin in

the setting of normal blood glucose, or 'prediabetes'). We found that neither estrogen nor testosterone had an independent relationship with insulin resistance. Instead, the main factors we identified as being independently associated with insulin resistance were higher body mass index (ie being more overweight), systolic blood pressure, surgical menopause and a lower blood level of the protein sex hormone binding globulin (also known as SHBG)¹. SHBG has been traditionally seen as a protein that simply transports hormones such as estrogen and testosterone in the blood stream. In more recent years it has emerged that SHBG may have more important actions. Women with low SHBG levels are at greater risk for future diabetes. Our study revealed that low SHBG is associated with the step before diabetes, insulin resistance. Importantly we found that the association between SHBG and insulin resistance was independent of body weight.

The second finding, published this month², was that none of the sex steroids measured in this study were independently related to total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density

lipoprotein (LDL) cholesterol, non-HDL cholesterol, or triglycerides. Independent of each other, insulin resistance and low SHBG were associated with low HDL cholesterol and higher triglycerides. Low HDL and high triglycerides are risk factors for heart disease in women.

This research refutes the myth that hormone levels are important determinants of heart disease risk in women. It provides further evidence of an independent role for the protein SHBG in diabetes risk in women. In practice this means that SHBG is a robust screening test for diabetes risk in women, and that women with very low SHBG levels need to be further evaluated for prediabetes and diabetes.

1. Davis SR, Robinson PJ, Moufarege A, Bell RJ. The contribution of SHBG to the variation in HOMA-IR is not dependent on endogenous oestrogen or androgen levels in postmenopausal women. *Clin Endocrinol (Oxf)* 2012;77:541-7.

2. Worsley R, Robinson PJ, Bell RJ, Moufarege A, Davis SR. Endogenous estrogen and androgen levels are not independent predictors of lipid levels in postmenopausal women. *Menopause* 2013.



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Bupa Health Foundation Research Award

The Women's Health Research Program was one of eight leading health teams nationally to receive a share in the \$2 million of grants from the Bupa Health Foundation, designed to boost Australian health research and implementation programs. The grant will support a national study to determine the prevalence and severity of menopausal symptoms, depression, sexual problems and the association between menopausal symptoms and work performance in Australian women at midlife.

We will also document the use of antidepressants, HRT, complementary and alternative therapy and compounded hormones. This study will, for the first time, evaluate the impact of menopause on women's wellbeing, and personal and workplace functioning.

Menopause affects over three million Australian women aged 40-65 years who experience a range of psychological, emotional and physical symptoms.

The greatest value of collating this knowledge will be the long-term impact of improving healthcare outcomes for women at midlife. After completion, it will identify gaps in health care for women experiencing menopause and will provide a basis for developing best practice guidelines for Australian health practitioners.



Dr Christine Bennett (Left) and Mr John Conde AO of the Bupa Health Foundation, and Professor Susan Davis.

Participate in a Research Study

A study on the absorption of two doses of testosterone cream in healthy postmenopausal women

Testosterone is in widespread clinical use for the treatment of low libido in women in Australia. However we still have limited data as to the average blood levels of testosterone achieved over several hours with the standard doses of testosterone cream regularly prescribed. We are doing a study to measure testosterone levels in postmenopausal women treated over

several weeks with standard dose testosterone cream, used daily, applied to the skin. We are seeking postmenopausal women not using any hormone replacement therapy to participate in this study. Participation will involve 4 brief visits, and two extended visits, to the Alfred Centre in Melbourne. All participants will receive two different doses of transdermal testosterone

cream over two treatment periods of three weeks each. Participants will be reimbursed for their time.

If you would like more information regarding this study please contact Ensieh Fooladi at the Women's Health Research Program on 03 9903 0374 or womens.health@monash.edu

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