

CHOLESTEROL, LIPOPROTEINS, AND BREAST CANCER RISK IN AFRICAN AMERICAN WOMEN

Background: Lipid levels, including high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), and triglycerides, have been reported to be associated with breast cancer risk.

Methods: We studied African American women (97 breast cancer cases and 102 controls) accrued through a population-based, case-control study in the Washington, DC metropolitan area during 1997 and 1998. Plasma lipid levels were measured using enzymatic methods. Logistic regressions (adjusted for age, age at menarche, parity, previous alcohol consumption, and education) were used to explore the associations between lipid levels and breast cancer.

Results: Through multivariable-adjusted regression, we observed a significant inverse association between breast cancer risk and increasing levels of total cholesterol (OR=.46, 95% CI=.25-.85) and LDL (OR=.41, 95% CI=.21-.81), whereas lower levels of HDL were associated with a significant increase in risk (OR=1.99, 95% CI=1.06-3.74).

Conclusions: Our data demonstrate significant reductions in breast cancer risk with high levels of total cholesterol and significant increase in risk when HDL levels are low. These data are in support of a protective effect of cholesterol which has been reported in other populations; further, these findings add to the literature in an understudied population, African American women. (*Ethn Dis.* 2012;22[3]:281-287)

Key Words: Breast Cancer, Cholesterol, HDL, LDL, Triglycerides, African Americans

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INTRODUCTION

Diet and obesity are important factors that have been extensively shown to be related to breast cancer risk.¹⁻⁴ Obesity, as a result of unhealthy diet as well as physical inactivity, is plausibly related to unfavorable lipid profiles, which have also been linked to breast cancer. Several recent epidemiological studies⁵⁻¹³ have investigated lipid profiles in the context of breast cancer, and some have indicated possible associations between cholesterol and lipoprotein levels and breast cancer risk. However, data on these associations remain inconclusive.

Five recent case-control studies have investigated the association between cholesterol levels and breast cancer.^{6,8,9,11,13} A hospital-based case-control study in Italy⁶ demonstrated significantly higher total cholesterol and higher low density lipoprotein (LDL) among cases (226.4 vs 215.0; and 148.3 vs 138.7, respectively) and no difference in high density lipoprotein (HDL) or triglyceride levels (54.5 vs 52.9; and 112.7 vs 109.6, respectively). In contrast, another Italian study,⁹ demonstrated no significant differences in total cholesterol, HDL, LDL or triglyceride levels between breast cancer cases and controls.

In a case-control study of Korean women,¹³ it was demonstrated that among premenopausal women, high HDL levels were inversely associated with breast cancer (OR=.49, 95% CI=.35-.68), whereas no association between triglyceride levels and breast cancer was found in this group. Conversely, among postmenopausal women in this study, there was no association between HDL and breast cancer and a

positive association between triglyceride levels (OR= 1.96, 95% CI= 1.29-2.98). In a case-control study of Taiwanese women,¹¹ no associations were observed between total cholesterol, LDL, or triglyceride levels and breast cancer, whereas an inverse association was observed for HDL (OR= 2.59, 95% CI= 1.41-4.77). This is an indication, that lower HDL levels may significantly increase breast cancer risk by almost 3-fold.

A nested case-control study⁸ conducted in the United States, investigated the association between HDL and breast cancer risk by menopausal status. This study demonstrated no association between HDL and breast cancer in neither premenopausal nor postmenopausal women.

Additionally, four recent cohort studies^{5,7,10,12} have investigated the associations between cholesterol, lipoproteins and breast cancer. In a study of Danish women,⁵ it was shown that the relative risk of breast cancer was highest among women in the fourth quartile of total cholesterol (RR=1.0, 95% CI=.4-2.2) and lowest among those in the fourth quartile of HDL (RR=.3, 95% CI=.1-.8). Furthermore, this study demonstrated no association between LDL or triglyceride levels and breast cancer risk. In a study of Norwegian women,⁷ no association was found between total cholesterol, HDL, LDL, or triglycerides and breast cancer. Furberg et al¹⁰ demonstrated a significant inverse association between total cholesterol (RR=.63, 95% CI=.48-.82), HDL (RR=.75, 95% CI=.58-.97) and postmenopausal breast cancer in a Norwegian population. In the Atherosclerosis Risk in Communities (ARIC) cohort, no association

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