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Dyslipidemia and high waist-hip ratio in women with self-reported social anxiety

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Summary Previous research has indicated that phobic anxiety is associated with coronary heart disease. In this study, the possible association between social anxiety and various anthropometric, metabolic, and endocrine measurements known to be associated with cardiovascular disease were studied in a population-based cohort of 216 women 41–42 years old. Each participant was assessed by means of a DSM-IV based self-report questionnaire regarding social anxiety and related psychiatric diagnoses. Waist-to-hip ratio (WHR), body mass index (BMI), and serum levels of lipids and hormones were assessed. The prevalence of social anxiety was 14% ($n = 31$). The social anxiety group displayed higher serum levels of triglycerides (1.3 ± 0.9 vs. 1.0 ± 0.5, $P = 0.003$) and low-density lipoprotein (LDL) (3.3 ± 0.8 vs. 3.0 ± 0.7, $P = 0.03$), but lower high-density lipoprotein (HDL) (1.4 ± 0.3 vs. 1.6 ± 0.4, $P = 0.04$) and HDL/LDL ratio (0.46 ± 0.15 vs. 0.57 ± 0.22, $P = 0.008$) than the other women. Serum levels of total testosterone (1.6 ± 0.8 vs. 2.2 ± 1.1, $P = 0.013$) and free thyroxin (14 ± 2 vs. 16 ± 4, $P = 0.04$) were lower in subjects confirming social anxiety. While WHR was significantly higher in the social anxiety group (0.83 ± 0.06 vs. 0.80 ± 0.07, $P = 0.016$), BMI did not differ between the groups. Our data suggest that self-reported social anxiety is associated with two established risk factors for cardiovascular disease: dyslipidemia and increased WHR.
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1. Introduction

Social anxiety denotes a condition characterized by extreme discomfort upon exposure of the possible scrutiny of unfamiliar people. When this discomfort leads to avoidance of the anxiety provoking situations and thereby interferes with the professional or social life, the diagnosis social phobia is warranted (American Psychiatric Association, 1994; Kessler et al., 1998b). These patients are at risk for social isolation, markedly compromised quality of life, and impaired psychosocial functioning (Mendlowicz and Stein, 2000;

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Kessler, 2003). The prevalence of social phobia ranges from 2% to 15%—higher among women than men—which makes social phobia one of the most common psychiatric disorders (Schneier et al., 1992; Kessler et al., 1994; Weiller et al., 1996; Kessler et al., 1998a; Pelissolo et al., 2000).

An increasing body of literature suggests that not only depression (Musselman et al., 1998; Penninx et al., 2001; Rudisch and Nemeroff, 2003), but panic disorders (Zaubler and Katon, 1996; Fleet et al., 2000) and phobic anxiety, which is a construct closely related to panic disorder (Gorman and Sloan, 2000), are associated with enhanced morbidity in cardiovascular disease (Haines et al., 1987; Kawachi et al., 1994a,b; Haines et al., 2001). Recently, seven possible mechanisms for the relationship between depression and cardiovascular disease were overviewed (Joynt et al., 2003). Among them was a hyperactive hypothalamic-pituitary–drenocortical (HPA) axis, which has been found in depressed patients (Ehlert et al., 2001; Pariante, 2003) and that is known to damage the cardiovascular system. Another mechanism could be risk factor clustering. Several studies have namely found that depression, anxiety, and psychosocial distress are associated with anthropometric and metabolic risk factors for arteriosclerosis and coronary mortality (Wing et al., 1991; Lloyd et al., 1996; Rosmond and Björntorp, 1998; Raikkonen et al., 1999; Chen et al., 2001) such as high WHR (Pereira et al., 2000), increased high-density lipoproteins to low-density lipoproteins ratio (HDL/LDL ratio) (Schwertner and Fischer, 2000), and increased serum levels of triglycerides (Austin et al., 1991; LaRosa, 1997; Gotto, 1998; Cullen, 2000).

With respect specifically to social anxiety, however, studies of cardiovascular functioning are scant, and to the best of our knowledge, no previous study has explored the relationship between social anxiety and metabolic and anthropometric risk factors. To fill this gap, we set out to explore this relationship in a population-based cohort of women who were all 41–42 years old. Women endorsing social anxiety were compared with those who did not, with respect to waist-to-hip ratio (WHR) and body mass index (BMI), serum lipids, and a number of hormones known to influence WHR and/or serum lipids. For comparison, we also stratified the cohort by whether or not they endorsed anxiety attacks, depressed mood, bulimia nervosa, obsessive-compulsive symptoms, or premenstrual dysphoria.

2. Methods

2.1. Subjects

All women born on uneven days in 1956 and living in Göteborg, Sweden, were identified from the national registration. A questionnaire in which the women were asked to report their weight, height, and waist and hip circumference was mailed to this cohort of 1464 women whereof 1137 women responded. For further investigations, 450 women were selected based on their self-reported WHR; women with low WHR ($<$0.738), high WHR ($>$0.895) and median WHR (0.798–0.822). The rationale for this procedure was to obtain a cohort displaying a broad range of WHR. Women who had entered menopause—defined as no menstruation during the past six months—were excluded from the study. Of the selected women, 273 (61%) volunteered to participate in the somatic investigations and 216 (48%) volunteered to participate in both the somatic and psychiatric investigation. The women were examined during November 1997–December 1998 and were at the time of the investigation 41–42 years old.

2.2. Assessments

All examinations were conducted in the morning after an overnight fast during the follicular phase of the menstrual cycle (cycle day 6–10). Two physicians (F.B. & R.R.) performed all clinical interviews and physical examinations. Body weight and height were measured and BMI (weight/height^2) was calculated. The waist circumference was measured half way between the lower rib and the iliac crest, the hip circumference over the widest part of the gluteal region. The WHR was calculated. Two blood pressure measurements, on the right arm with the participants sitting after 5 min of rest, were taken with a random-zero mercury sphygmomanometer. Systolic and diastolic blood pressures were registered as the mean of the two measurements. Signs and symptoms of somatic diseases were recorded.

2.3. Hormones and serum lipids

Hormone and lipid determinations were performed in venous blood obtained after overnight fasting. Total serum testosterone and sex hormone binding globulin (SHBG) were analyzed using chemoluminiscent enzyme immunoassays (Diagnostic Products, Los Angeles, CA). Adrenocorticotrophin hormone (ACTH), free testosterone, and dehydroepiandrosterone sulfate (DHEAS) were determined by radioimmunoassays (RIA), utilizing