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Impaired Lipid Profile is a Risk Factor for the Development of Sexual Dysfunction in Women

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ABSTRACT

Introduction: Dyslipidemia is a common risk factor for cardiovascular disease which may contribute to sexual dysfunction in women.

Aims: To assess the impact of dyslipidemia compared with other metabolic alterations on female sexual function.

Methods: In total, 466 women were enrolled in the study, of which 256 were postmenopausal. Dyslipidemia was defined based on high-density lipoprotein, low-density lipoprotein, or triglycerides levels. Women completed the Female Sexual Function Index (FSFI), the Female Sexual Distress Scale (FSDS), and the Middlesex Hospital Questionnaire (MHQ). Biochemical and anthropometric measurements were performed and the Framingham risk score (FRS) was calculated for each subject.

Main Outcome Measurements: FSFI, FSDS, and MHQ scores, prevalence of FSD and FRS.

Results: Median age of the population enrolled was 51.5 (range 42.0−58.0) years. The overall prevalence of FSD, according to FSFI and FSDS scores, was 24%. A significantly higher prevalence of FSFI ($P = .001$) and FSDS ($P = .006$) pathological scores were found in women with dyslipidemia compared with the control group. The prevalence of FSD was significantly higher in dyslipidemic women ($P = .001$). Women with dyslipidemia had significantly higher total scores in areas of depression, somatization, and obsession in the MHQ questionnaire compared with control women. Multivariate analysis showed that dyslipidemia (OR:1.7, CI 1.1−2.9, $P = .037$), postmenopausal status (OR:2.7, CI 1.5−4.7, $P = .001$), higher education (OR:0.6; CI 0.3−0.9, $P = .038$), and somatization (OR:1.7, CI 1.0−2.8, $P = .045$) were independently associated with FSD. The FRS was higher in dyslipidemic women ($P = .001$) and in those with FSD ($P = .001$), being associated with an almost doubled risk of developing FSD.

Conclusion: Our results indicate that dyslipidemia is an independent risk factor for FSD irrespective of postmenopausal status. Also, psychopathological alterations such as somatization are strongly associated with sexual dysfunction. The direct correlation between FSFI score and FRS suggest the importance of cardiovascular integrity in female sexual health.

Key Words: Dyslipidemia; Female Sexual Dysfunction; Female Sexual Function Index; Female Sexual Distress Scale; Middlesex Hospital Questionnaire; Framingham risk score

INTRODUCTION

Female sexual dysfunction (FSD) is a common problem affecting women of all ages resulting in personal distress and poor quality of life.[1,2] A complex network of both psychological and physiological mechanisms regulates women's sexual function and as a consequence a number of factors, including psychological and metabolic alterations, as well as sleep disturbances, may contribute to the onset of FSD.[3]

Recently, cardiovascular risk factors (CRF) have emerged as one of the main contributors to the onset of sexual dysfunction

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in both men and women.[4–7] Growing evidence suggests that in men, the clinical relevance of erectile dysfunction (ED) goes beyond impairment of sexual function. Indeed, several reports, including meta-analysis, showed that ED was associated with an increased risk of cardiovascular disease (CVD), as determined by the Framingham risk score,[8,9] including coronary heart disease and stroke, all of which can cause mortality in men.[10–13] To further confirm these results, the impairment of penile vascular flow, assessed by Doppler ultrasound, is a risk factor for CVD.[14,15] In light of these results, a clinical assessment of CVD risk in men with persistent ED but without current symptoms of CVD is now recommended.[8,9,16] Conversely, despite evidence regarding the association between CRF and FSD having already been reported, more research in this specific field is warranted to establish similar recommendations for women.[4]

The link between CRF and ED or FSD lies in the vascular alterations occurring at the onset of CVD.[4] Vascular impairments affect sexual response by disrupting the fine regulation of vasocongestive and neuromuscular events responsible for clitoral erection, increased vaginal lubrication, and wall engorgement.[3] CRFs such as diabetes and hypertension are the most studied and their association with FSD, as well as the related pathophysiological mechanisms leading to FSD, has been partially elucidated;[17–19] however, data regarding the association between dyslipidemia and FSD is scant.[4] The association between hyperlipidemia and cardiovascular disease is widely accepted[20] and there is evidence to support the interplay between altered lipid profile and vascular tone and blood flow, as well as microvascular alterations, which may subsequently impact women's sexual function. In fact, Esposito *et al* reported an increased prevalence of FSD in premenopausal women with hyperlipidemia, finding both high-density lipoprotein cholesterol (HDL-C) and triglycerides (TG) levels as independent predictors of reduced Female Sexual Function Index (FSFI) score.[21] In the same way, subsequent work found that reduced HDL-C together with increased low-density lipoprotein cholesterol (LDL-C) or TG were associated with an increased risk of FSD in premenopausal and postmenopausal women.[6,22,23]

Aims

The aims of our study were to evaluate the association between dyslipidemia and FSD in premenopausal and postmenopausal women, also focusing on the distress related to sexual dysfunction, as well as psychopathological aspects, which may affect female sexual response. We also evaluated the relationship between the presence of FSD and the 10-year risk of CVD as assessed by the Framingham risk score.

PATIENTS AND METHODS

Subjects

Women were screened from those who attended the outpatient Clinic of Gynecology and the Centre of Metabolic Disease and Clinical Dietetics of the S Orsola-Malpighi University Hospital for regular check-ups.

Inclusion criteria for all women were age $\geq$ 18 years, body mass index (BMI) $<$ 36 and no current or recent (in the previous 6 months) hormone therapy intake. Exclusion criteria were irregular menstrual cycles ($<$ 24 or $>$ 36 days), hormonal contraceptive intake, major gynecological pathologies (fibroma, urogynecologic problems, endocrinologic illness, endometriosis), clinically relevant comorbidities (cardiovascular, neurologic, hepatic, renal, oncologic), and diagnosis of depression with or without treatment. All women enrolled in the study provided informed written consent and the study protocol was approved by the ethical committee of the S Orsola-Malpighi University Hospital in accordance with the 1975 Helsinki Declaration.

Study Design and Definitions

At the time of inclusion, clinical, biochemical, and anthropometric parameters were recorded for each subject. Height and weight were measured with women wearing lightweight clothing and no shoes; body mass index (BMI) was calculated as weight in kilograms divided by the square of height in meters (kg/m^2); waist-to-hip ratio (WHR) was calculated as waist circumference in centimeters divided by hip circumference in centimeters; systolic and diastolic blood pressure were measured 3 times for all participants in a seated position using a standard sphygmomanometer on the right arm, with a wait time of 5 minutes between each reading; fasting plasma glucose, total cholesterol (TC), HDL-C, LDL-C, and TG concentrations were assessed in our hospital laboratory according to previously reported procedures.[7] Socio-demographic conditions, marital profiles, personal health, and medical history also were recorded for each subject.

Subjects were defined as dyslipidemic according to the Adult Treatment Panel III (ATP III) guidelines: LDL-C $\geq$ 160 mg/dL, HDL-C $\leq$ 50 mg/dL or TG $\geq$ 150 mg/dL.[24] Women who did not meet one of the previous criteria but were currently taking lipid-lowering drugs were included in the same group. The diagnosis of diabetes was made according to the American Diabetes Association guidelines,[25] whereas the presence of metabolic syndrome was also evaluated based on the International Diabetes Federation (IDF) criteria,[26] named central obesity (defined as waist circumference $\geq$ 80 cm), plus any 2 of the following risk factors: systolic blood pressure $\geq$ 130 or diastolic blood pressure $\geq$ 85 mmHg; fasting plasma glucose concentrations $\geq$ 100 mg/dL; plasma TG on $\geq$ 150 mg/dL; and plasma HDL-C concentrations $\leq$ 50 mg/dL. For women ranging from 20 to 79 years of age the Framingham risk score (FRS) was calculated in order to estimate the 10-year risk of developing coronary heart disease (CHD) according to the Adult Treatment Panel III guidelines.[27]

Assessment of Sexual Function

All women included in the study anonymously completed the FSFI,[28] the Female Sexual Distress Scale (FSDS)[29] questionnaire,