

Nutritional Status and Lipid Profile of Postmenopausal Women with Coronary Heart Disease

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Objective

To assess the nutritional status and lipid profile of postmenopausal women with coronary heart disease.

Methods

A retrospective cross-sectional study was conducted with information obtained from the medical records of 217 women on the occasion of their first visit to the InCor Nutrition Outpatient Care Clinic. The data referred to the patients' nutritional status, body mass index, use of lipid-lowering medication, and serum lipid levels (cholesterol and fractions).

Results

The mean age was 60.98 ± 9.23 years, and obesity prevailed in 56% of the patients. The use of lipid-lowering drugs was observed in 73% of the population. In regard to lipid profile, 56% had adequate serum levels of HDL-C. The nutritional status was inadequate due to the prevalence of obesity, which results in the appearance of other chronic diseases, such as dyslipidemias. Although the dosages of the lipid-lowering drugs used were not assessed, their use by the population studied did not seem to be favorable, because high levels of total cholesterol and LDL-C were observed, and those high levels in that condition are strongly related to the occurrence of cardiovascular diseases.

Conclusion

Multidisciplinary action in the form of programs to promote women's health is required, comprising preventive aspects related to coronary heart disease, to improve the quality of life in that population.

Key words

dyslipidemia, menopause, coronary heart disease

It has been known for a long time that some women when reaching climacteric experience uncommon stress and physical discomfort. Currently, these "changes" may be understood as marking a gradual transformation, beginning in the climacteric and progressing until the hypoestrogenism status with implications throughout life ¹.

The reduction in estrogen levels favors the appearance of central obesity, which may trigger metabolic complications, such as dyslipidemia ²⁻⁵.

Results of the Framingham study, of studies in other North American cities, and also studies in other countries ⁶⁻⁸ have shown that the elevated values of total cholesterol and LDL-C levels indicate the risk for the occurrence of clinical events of coronary heart disease ⁹.

The general population has a low incidence of hypertriglyceridemia, and, although its role in the genesis of the atherosclerotic plaque has not been sufficiently elucidated, that lipid alteration is frequently associated with coronary heart disease alterations, mainly in the presence of obesity and low levels of high-density lipoprotein (HDL-C) ⁹.

Prospective studies have reported a negative relation between the serum levels of HDL-C and coronary risk in both sexes, and this is potentiated when low HDL-C levels and high LDL-C levels are simultaneous ^{4,9,10}.

It has also been observed that, although individuals with abdominal obesity frequently have normal serum concentrations, the proportion of small, dense particles is increased in that condition, elevating the atherogenic risk in those patients ⁹⁻¹¹.

This study aimed at assessing the clinical features of postmenopausal women with coronary heart disease related to nutritional status and lipid profile. These data allow appropriate intervention, therefore contributing to the prevention of that disease in postmenopausal women.

Methods

This was a cross-sectional study, which used secondary data. The population studied was selected from all female patients individually treated by the team of nutritionists at the Nutrition Outpatient Care Clinic of the Nutrition and Diet Service of the Instituto do Coração of the Hospital das Clínicas of the Medical School of the Universidade de São Paulo between January 1997 and December 2001. The patients underwent a standardized routine of previously established treatment in the service.

The women included in the study had the following character-

ristics: were at their first visit to the nutritionist; had coronary heart disease diagnosed on cine coronary angiography (with obstruction > 70%); had no menstrual cycles for at least one year; had not undergone previous myocardial revascularization; had the necessary data available for the research.

We chose to assess nutritional status by using body mass index¹²⁻¹⁴ after obtaining the weight and height measurements according to the criteria proposed by WHO¹².

The use of lipid-lowering drugs was investigated in the medical records by assessing the prescription of statins, exchange resins, and fibrates, which are used to reduce LDL-C, cholesterol, and endogenous triglyceride levels in adults, respectively¹⁵.

The levels of triglycerides, total cholesterol, HDL-C, and LDL-C were also obtained from the medical records immediately before the first consultation with the nutritionist.

Blood collections and laboratory analyses were performed as a routine procedure according to the following techniques: 1) all blood samples were collected through peripheral venous puncture after a 12-hour fasting period; 2) the automated enzymatic method was used for assessing triglyceride levels, and the colorimetric-enzymatic method for total cholesterol and HDL-C; 3) for determining the LDL-C level, the Friedewald formula was used¹⁵: $LDL-C = \text{total cholesterol} - (\text{HDL-C} + \text{triglycerides}/5)$. That formula was valid for triglyceride levels < 400 mg/dL, and when they were greater than 400 mg/dL, the colorimetric-enzymatic method was used.

Later, the values found were compared with the reference values recommended for secondary prevention of coronary heart disease¹⁵.

The present study was evaluated and approved by the scientific and ethics committee of the Instituto do Coração and by the ethics committee for analysis of research projects of the Hospital das Clínicas of the FMUSP.

Because the data were secondary, it is worth emphasizing that they were primarily collected by the team of nutritionists responsible for the nutritional care at the cited outpatient care clinic, and, therefore, neither specific questionnaires nor interviews were used in this study.

The data were stored in a database of the Excel 2000 – Microsoft Office (Microsoft Corporation, USA), and analyzed later.

The quantitative variables (triglycerides, total cholesterol, HDL-C, and LDL-C) were analyzed through the observation of the minimum and maximum values, calculation of the means, standard deviations, and medians.

For the qualitative variables (use of lipid-lowering drugs and categorization of the lipids), the relative frequencies were calculated.

The multiple comparisons were performed with the Bonferroni¹⁶ and Dunn¹⁷ tests.

For assessing the correlation between the 2 variables, the Pearson correlation coefficient was used¹⁶.

The significance level used for the tests was 5%.

Results

During the period studied, 217 women were assessed, and their mean age was 60.98 ± 9.23 years (median, 61; minimum and maximum, 45 and 86 years, respectively).

The most frequent age group was that from 55 to 65 years

(35%). Table I shows the distribution of the mean, standard deviation, and median for age (in years) in each age group.

In regard to nutritional status, the mean body mass index was 31.37 ± 6.34 kg/m², with a greater frequency of obesity (56%), although the category preobesity in isolation was the most frequent (30%). In regard to age group, obesity was more frequent (65%) between 45 and 55 years of age. The distribution of the population studied according to the nutritional status (body mass index) and the age group is shown in table II and figure 1, respectively.

In regard to treatment with lipid-lowering drugs, 73% of the women studied were receiving those drugs (80% of which were statins), and the frequency of that treatment was greater in the age group ≥ 75 years (87%). The distribution of the population studied according to the use of lipid-lowering drugs and age group is shown in figure 2.

Table III shows the descriptive analysis of the lipid profiles observed in the population studied.

Figure 3 shows the distribution of the population using lipid-lowering drugs according to the serum levels of cholesterol, LDL-C, HDL-C, and triglycerides.

No correlation was observed between age and the serum levels of total cholesterol ($r=0.07818$; $P=0.2514$), LDL-C ($r=0.02837$; $P=0.6777$), HDL-C ($r=0.06053$; $P=0.3749$), and triglycerides ($r=0.04412$; $P=0.6777$).

Concerning age group, no significant difference was observed in regard to total cholesterol ($P=0.3242$), LDL-C ($P=0.3749$), triglycerides ($P=0.0948$), and HDL-C ($P=0.9149$).

Table I - Distribution of the population studied as mean, standard deviation, and median of age (in years) and age group

Age group (in years)	Number of observations	Mean (years)	Standard deviation (years)	Median (years)
45 55	62	49.94	2.61	50
55 65	76	59.63	3.02	60
65 75	64	69.13	2.89	69
≥ 75	15	78.73	2.89	78

Table II - Distribution of the population studied according to nutritional status, assessed by use of body mass index

Body mass index	AF	RF
Low weight: < 18.5 kg/m ²	0	0%
Normal: 18.5 – 24.9 kg/m ²	31	14%
Preobesity: 25.0 – 29.9 kg/m ²	66	30%
Degree I obesity: 30.0 – 34.9 kg/m ²	62	29%
Degree II obesity: 35.0 – 39.9 kg/m ²	41	19%
Degree III obesity: ≥ 40 kg/m ²	17	8%
Total	217	100%

AF - absolute frequency; RF - relative frequency.

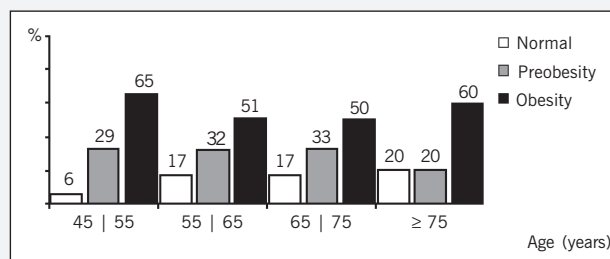


Fig. 1 - Distribution of the population studied according to nutritional status, by use of the body mass index, and age group.

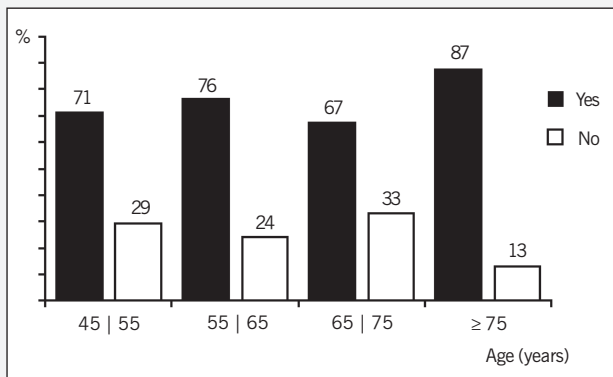


Fig. 2 - Distribution of the population studied according to the use of lipid-lowering drugs and age group.

Table III - Mean, standard deviations, median, minimum, and maximum serum lipid levels in the population studied

Variable (mg/dL)	Mean	SD*	Median	Minimum	Maximum
Total cholesterol	234.23	43.23	232	132	380
HDL-C	43.53	10.26	43	20	72
LDL-C	156.43	43.40	151	24	391
Triglycerides	171.80	82.80	157	11	691

*SD: standard deviation.

Table IV shows the descriptive analysis of the lipid profiles observed in the population studied according to age group.

No correlation was observed between the age groups, body mass index, and serum lipid levels except for the age group from 65 to 75 years, in which a positive and significant correlation ($r=0.42987$; $P=0.0004$) was observed between body mass index and serum levels of triglycerides (fig. 4).

Discussion

From the fifth decade onwards, cardiovascular disease may be an important determinant of morbidity in the female population¹⁸, because the increase in age is associated with obesity, dyslipidemias, glucose intolerance, and hypertension¹⁹.

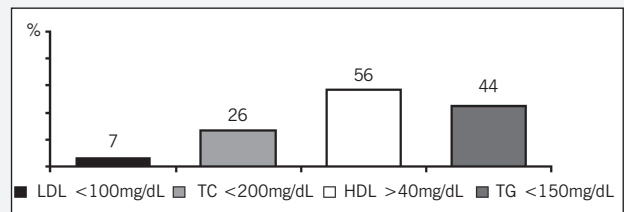


Fig. 3 - Distribution of the population studied using lipid-lowering drugs according to the serum total cholesterol levels (TC), fractions levels (HDL, LDL) and triglycerides (TG).

Compared with men, women have a worse prognosis and die more frequently after their first cardiac event²⁰.

Coronary heart disease in women manifests, on average, 10 years later than that in men, due to the protective effect of estrogens, and the worse prognosis is due to the fact that women have a greater number of risk factors when they undergo infarction. The existence of a distinct biological factor that places women on a higher plateau is questioned²¹.

The complications after the revascularization procedure, both angioplasty and coronary artery bypass grafting, were observed to be more common among women because of their smaller body area, their lower response to aspirin (which favors platelet aggregation), and, possible biological factors²¹.

Caramelli²², studying the tendencies of the population with ischemic heart disease in a specialized hospital, observed a significant increase in age and frequency of the female sex among patients with the acute and chronic forms of ischemic heart disease, and a greater prevalence of elderly women as compared with that of men.

The presence of younger women in the population studied is of concern, because with the increase in life expectancy, a greater number of women will be able to live 30 to 40 years in a condition of significant hormone reduction, which may increase the prevalence of several chronic diseases²³⁻²⁵.

Postmenopausal women, in addition to their tendency to gain weight, are also susceptible to alterations in lipid metabolism, due to estrogenic deprivation, which increases the serum levels of total cholesterol, lipoproteins, and triglycerides, resulting in a lipid profile

Table IV - Distribution of the values of the mean, standard deviations, minimum, and maximum of the serum lipid levels (mg/dL) of the population studied according to age group

Age group	Variable	n	Mean	SD*	Minimum	Maximum	P
45 55 years	Cholesterol	62	227.65	38.29	137.00	312.00	0.324
	HDL - C	62	43.05	9.03	25.00	72.00	
	TG†	62	164.40	70.23	110.00	384.00	
	LDL - C	62	152.27	44.01	70.00	391.00	
55 65 years	Cholesterol	76	234.47	46.18	132.00	373.00	0.375
	HDL - C	76	43.50	11.59	20.00	70.00	
	TG†	76	171.14	88.85	56.00	691.00	
	LDL - C	76	157.67	42.05	72.00	301.00	
65 75 years	Cholesterol	64	241.53	44.24	137.00	380.00	0.095
	HDL - C	64	43.02	10.01	22.00	64.00	
	TG†	64	189.27	89.12	59.00	479.00	
	LDL - C	64	159.67	45.73	24.00	312.00	
≥ 75	Cholesterol	15	229.00	41.78	161.00	302.00	0.915
	HDL - C	15	47.87	8.75	31.00	60.00	
	TG†	15	137.73	45.23	56.00	215.00	
	LDL - C	15	153.53	40.07	87.00	224.00	

*SD: standard deviations; †TG: triglycerides.

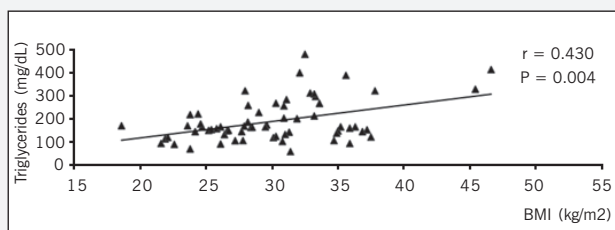


Fig. 4 - Correlation between the body mass index and the serum triglyceride levels in the age group between 65 and 75 years.

highly favorable to atherogenesis in that population, mainly when associated with diabetes mellitus and hypertension^{26,27}.

The study²⁸ of a population sample of 9 Brazilian capitals – the cities of Manaus, Fortaleza, Salvador, Goiânia, Belo Horizonte, São Paulo, Curitiba, Porto Alegre, and the Federal District – aiming at tracing the lipid profile of the Brazilian population, showed a significant variation in regard to sex and age, because women had greater mean serum levels of total cholesterol than men did (183.0 mg/dL x 178.1 mg/dL; $P=0.0035$), and they progressively increased with age, mainly after 49 years (206.2 mg/dL x 190 mg/dL; $P=0.0002$), as compared with those of men.

In addition, the serum levels of LDL-C and triglycerides increase with age, mainly in women²⁹⁻³¹.

In this study, no correlation was observed between serum lipid levels and age; such results are in accordance with those reported in studies comparing pre- and postmenopausal³²⁻³⁴ women as follows: the elevation in serum lipid levels in the latter does not depend on age, ie, menopause per se seems to cause an increase in the serum levels of total cholesterol and LDL-C.

In the population studied, no correlation was observed between the categories of nutritional status, according to body mass index,

and serum lipid levels. This may be explained by the greater frequency of lipid-lowering drug use, which may have partially favored the better lipid profile in more obese women, and also by factors related to analytical variation, such as biological variability, fasting duration, and posture during collection¹⁵.

Evidence has shown that hormone replacement therapy after menopause has a beneficial effect on lipid and bone metabolism, the vascular system, and the coagulation and fibrinolytic system³. However, despite some risks, such as genital bleeding and risk of endometrial and breast cancer, the great reduction in mortality due to cardiovascular causes, resulting from estrogen replacement, offsets those risks³⁵.

Although that was not the object of our study, little mention of hormone replacement therapy was observed, maybe because of the lack of its use or because the cardiologist did not ask about it. The use of hormone replacement therapy may perhaps explain the favorable lipid profile in the population studied.

In conclusion, nutritional status, assessed by use of body mass index, is inadequate due to the prevalence of obesity in the population studied, mainly in the younger, causing the appearance of other chronic diseases and a reduction in the quality of life, explaining, at least partially, the occurrence of coronary heart disease.

Although the dosage of lipid-lowering drugs was not assessed, their use in the population studied did not seem to be favorable, because increased serum levels of total cholesterol and LDL-C were observed, which are strongly related to the occurrence of cardiovascular diseases.

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