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Analysis of the Lipid Profile of Elderly Women in Curitiba - Parana

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Summary

Background: Dyslipidemia is considered one of the main risk factors for cardiovascular disease (CVD), which is more frequent in older individuals. However, evidence suggests that a large number of elderly individuals is not aware of their lipid profile status; additionally, many of them do not have access to adequate treatment.

Objective: To analyze the lipid profile and the frequency of lipid-lowering therapy use in elderly women from the city of Curitiba, state of Parana, Brazil.

Methods: The sample consisted of 312 women (mean age = 68.8; SD = 6.0 years). The lipid profile was determined by plasma levels of total cholesterol (TC), high-density cholesterol (HDL-C), low-density cholesterol (LDL-C) and triglycerides (TG). The number of subjects that reported being on lipid-lowering therapy was self-reported; therefore, the groups were divided into two subgroups, satisfactory and unsatisfactory.

Results: A high prevalence of individuals with unsatisfactory levels of lipid profile components was observed in the group that self-reported not being on lipid-lowering therapy; of these, 74.2% of women with CVD presented levels above the LDL-C goal. On the other hand, 45.8 to 49.3% of the individuals from the group that self-reported being on lipid-lowering therapy had unsatisfactory values of TC, TG and LDL-C, and 25.4% had HDL-C levels lower than 40.0 mg/dl.

Conclusion: The results of this investigation indicate a high prevalence of elderly women, regardless of self-reports of being on lipid-lowering therapy, with an unsatisfactory lipid profile, mainly related to LDL-C goal for those individuals with CVD. (Arq Bras Cardiol 2008; 90(5): 299-304)

Key words: Risk factors; dyslipidemias/therapy; aging.

Introduction

The cardiovascular diseases (CVD) are considered the main cause of mortality in Brazil[1], affecting mainly elderly individuals. According to the Ministry of Health[2], the mortality rate due to CVD in the southern region of Brazil among individuals aged 60 to 69 years is 264.62/100,000 inhabitants. Additionally, national data published in 2004 regarding cardiac ischemic diseases, reported that 27.59% of the elderly population in this age range needed hospital admission due to CVD.

Therefore, the diagnosis of individuals with higher risk for CVD can alter this picture through primary prevention, allowing the public health departments to lower their costs with CVD and its consequences. One of the main risk factors for CVD is dyslipidemia, due to its association with the development of CVD[3] and the progression of atherosclerosis in the elderly[4]. However, studies concerning its frequency in the Brazilian population are still scarce, mainly among the elderly[5-7].

Evidence suggests that a large number of elderly individuals does not have access to adequate treatment or is unaware of their lipid profile[8]. Additionally, national[7,8] and international[9,10] studies that investigated the efficacy of the lipid-lowering therapy in the reduction of the levels of total cholesterol (TC), low-density cholesterol (LDL-C) and triglycerides (TG), observed that many of the individuals were unable to achieve their lipid goals even when undergoing treatment with lipid-lowering drugs – according to the recommendations by the IV Brazilian Directives on Dyslipidemia[11]. Therefore, there seems to be a consensus that these results would be the consequence of the lack of a more aggressive drug therapy and/or lifestyle modifications, such as adopting a healthier diet and the regular practice of physical exercises[3, 12-15].

The objective of this study was to analyze the lipid profile and the frequency of lipid-lowering therapy use in elderly women from the city of Curitiba, state of Parana, Brazil, aiming at increasing the knowledge about dyslipidemia and its treatment.

Methods

The study design is characterized as a Descriptive, Transversal and Observational Study. Data collection was carried out between April and July 2006.

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Population and sampling

With the objective of performing a stratified sample selection, the following steps were carried out:

1) Records of the existing community groups in the city of Curitiba, state of Parana, Brazil, obtained with the help of a partnership with institutions that promote recreational activities for the population of the respective geographical region were assessed;

2) Charting of all the groups registered at the eight regional zones of the city;

3) Simple randomized allocation of the groups that would be invited to participate in the study, per regional zone;

4) Visiting the group, with the objective of explaining the research procedures and inviting people to become volunteer participants in the study, not only the individuals that belonged to the community group, but also their family members and close friends.

After the aforementioned sample selection was carried out, the chronogram for the data collection was established. The initial sample consisted of 354 women (mean age=68.8 years; SD=6.0 years) who were, at the time of the data collection, 60 years or older. However, 42 individuals were excluded due to being diabetics and three others were excluded regarding the LDL-C analyses, as their levels of triglycerides were higher than 400.0 mg/dl.

After being informed about the purpose of the investigation, procedures to be used, associated benefits and possible risks, the participants signed the informed consent form, ascertaining their voluntary participation. The research protocol was approved by the Ethics Committee of the Biological Science Division of the Federal University of Parana, according to the directives established at the Declaration of Helsinki and Resolution 196/96 of the *Conselho Nacional de Saúde* (National Health Council) on researches involving human participants.

Instruments and procedures

All the participants fasted for 12 hours prior to blood collection. The enzymatic method was used to determine triglycerides and total cholesterol levels. High-density cholesterol (HDL-C) was measured through a selective precipitation system of low-density (LDL) and very low-density (VLDL) lipoproteins. After centrifuging, HDL-C was determined in the supernatant using the enzymatic method. All measurements were analyzed at the COBAS MIRA PLUS spectrophotometer (Roche Diagnostics), with DIASYS calibration system and control serum. The LABTEST kit was used to perform the measurement of total cholesterol and triglycerides, whereas HDL-C was measured with a DIASYS kit. The cholesterol was calculated according to Friedewald's formula[16]: LDL-C = total cholesterol - (HDL-C + triglycerides /5).

The number of subjects that reported being on lipid-lowering therapy at the time of data collection was self-reported, therefore, the groups were divided into two groups (0 = without lipid-lowering therapy, or 1 = undergoing lipid-lowering therapy). Similarly, LDL-C was divided in two groups, due to the presence of individuals that self-reported a previous medical diagnosis of CVD, according to the lipid goal attainment recommended for individuals without CVD (LDL-C: <130.0 mg/dl) and for those with CVD (LDL-C for CVD: <100.0 mg/dl). Both groups were subdivided in subgroups - satisfactory and unsatisfactory- classified based on the values recommended nationally for each component of the lipid profile (Table 1)[11]. Among the individuals from this sample, 15.7% of them reported having CVD.

Statistical analysis

The *Kolmogorov*-Smirnov test of normality was used, characterizing the distribution of all the variables in this study as parametric (p<0.005). Central trend and variability measures were applied for the descriptive analysis of the data; subsequently, the relative frequency was calculated and analyzed by the Chi-square test. The independent T-test was used to verify differences between the means, of each component of the lipid profile and of the satisfactory and unsatisfactory groups.

The data analysis of the present study was carried out with the Statistical Package for the Social Sciences (SPSS, version 13.0) for Windows.

Results

Table 2 shows the means and standard deviations for levels of TC, HDL-C, TG and LDL-C as well as LDL-C for CVD in the group that self-reported not being under lipid-lowering therapy. The mean values showed a significant difference between the subgroups regarding all the components of the

Table 1 - Used cutoffs according to the goals established for each lipid profile component[11]

	Satisfactory	Unsatisfactory
TC (mg/dl)	< 200.0	≥ 200.0
HDL-C (mg/dl)	> 40.0	≤ 40.0
TG (mg/dl)	< 150.0	≥ 150.0
LDL-C (mg/dl)	< 130.0	≥ 130.0
LDL-C for CVD (mg/dl)	< 100.0	≥ 100.0

Table 2 - Characteristics of the lipid profile of subjects that reported not undergoing lipid-lowering therapy

	Satisfactory		Unsatisfactory	
	mean	SD	mean	SD
TC (mg/dl)	166,5	24,6	242,9 *	39,9
HDL-C (mg/dl)	53,7	9,7	33,3 *	4,7
TG (mg/dl)	96,2	27,8	206,4 *	89,4
LDL-C (mg/dl)	96,1	26,2	167.6 *	37,4
LDL-C for CVD (mg/dl)	84,6	8,7	134,5 *	23,9

*SDP - standard deviation. Independent. T-Test - Difference between Satisfactory and Unsatisfactory groups. *p<0.001.*

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lipid profile. Most individuals presented satisfactory levels for all variables of the lipid profile; however, there was a high prevalence (74.2%) of individuals with CVD who had values above the lipid goal recommended for LDL-C ($\geq$100.0 mg/dl). All observed frequencies showed significant differences between the studied subgroups (Figure 1).

Table 3 shows the means of the components of the lipid profile for the individuals that self-reported undergoing lipid-lowering therapy. The mean values showed a significant difference between the subgroups for all components of the lipid profile. Although the observed frequencies did not show a significant difference (p>0.05) between the subgroups, almost 50% of the elderly women did not attain the recommended lipid goals, except for the HDL-C, for which most individuals (74.6%) presented values > 40.0 mg/dl (p<0.001). Additionally, 47.4% of the individuals with CVD presented LDL-C values that were higher than the lipid goal ($\geq$100.0 mg/dl) (Figure 2).

Discussion

The present study showed that a large number of the elderly women that reported not undergoing lipid-lowering therapy had unsatisfactory levels of the lipid profile components, with 74.2% of the elderly women with CVD presenting values that were above the recommended lipid goal for LDL-C (< 100.0 mg/dl). These results are similar to those observed at other studies[9,17], which reported a high frequency of dyslipidemia in adult individuals of both sexes without drug therapy. According to Goff et al[17], only 16% of the participants of the Multi-Ethnic Study of Atherosclerosis reported undergoing lipid-lowering therapy; among those individuals classified as having high or moderate risk for CVD, more than 50% were not receiving any drug treatment for dyslipidemia and presented lipid levels above the established goal.

Arnett et al[10] in the Minnesota Heart Survey (MHS), after a follow-up of 20 years, showed that only 33% of the women and 28% of the men were aware of their lipid profiles; however, although they presented undesired levels of total cholesterol, they were not receiving any drug therapy. Additionally, 55% of the women and 53% of the men with elevated levels of TC ($\geq$200.0 mg/dl) were unaware of their condition. The authors also verified that the incidence of hypercholesterolemia awareness, treatment and control was lower among women (6%), when compared to the men (13%) of the sample, suggesting that women have less control over their TC.

The HDL-C levels are considered to be very important for post-menopausal women[18], due to their cardioprotective effect[19,20]. However, the results of the present study showed that almost one-third of the elderly women presented HDL-C levels below the recommended range. Similarly, Cervato et al[21], observed a prevalence of dyslipidemia of 25.9% in the population of the city of Cotia, state of Sao Paulo, Brazil,

Table 3 - **Characteristics of the lipid profile of subjects that reported undergoing lipid-lowering therapy**

	Satisfactory		Unsatisfactory	
	mean	SD	mean	SD
TC (mg/dl)	159,6	23,6	252,4 *	42,6
HDL-C (mg/dl)	51,5	9,2	30,9 *	6,3
TG (mg/dl)	100,1	23,1	246,0 *	89,5
LDL-C (mg/dl)	98,7	20,3	176,71 *	31,3
LDL-C for CVD (mg/dl)	72,2	20,7	129,9 *	27,7

*SDP - standard deviation. Independent T-Test - Difference between Satisfactory and Unsatisfactory groups. *p<0.001.*
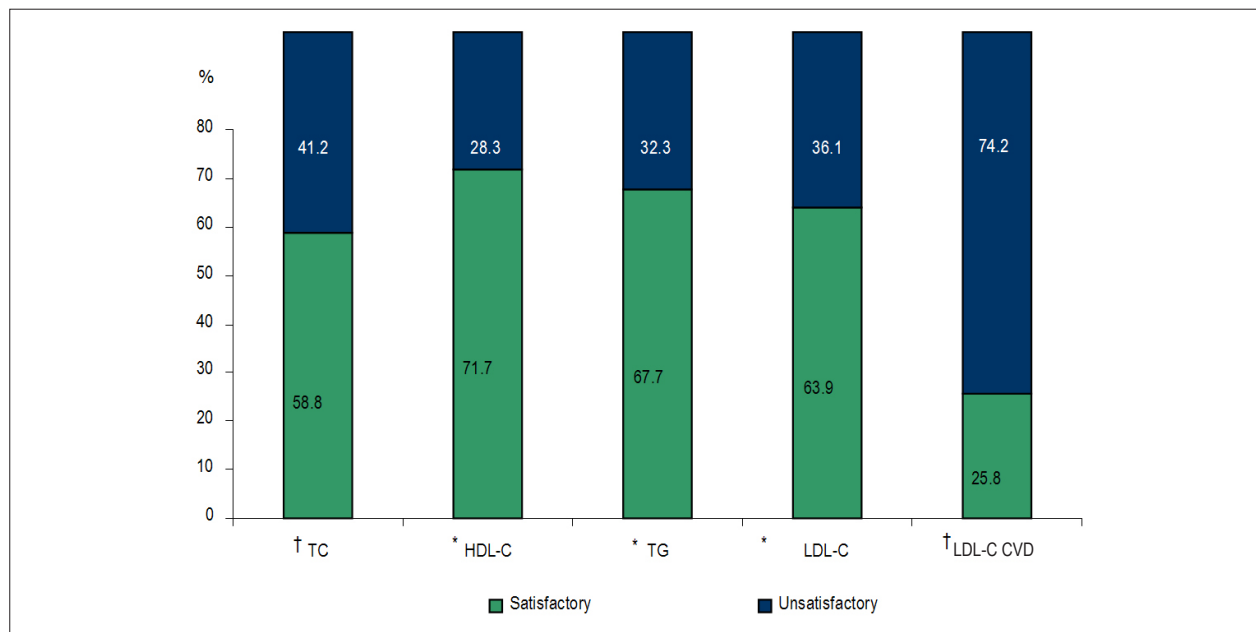
*Figure 1 - Relative frequency of the subjects that reported not undergoing lipid-lowering therapy. Chi-Square - difference between the frequency of individuals in the Satisfactory and Unsatisfactory groups for each component of the lipid profile. *p<0.001 and †p<0.010.*
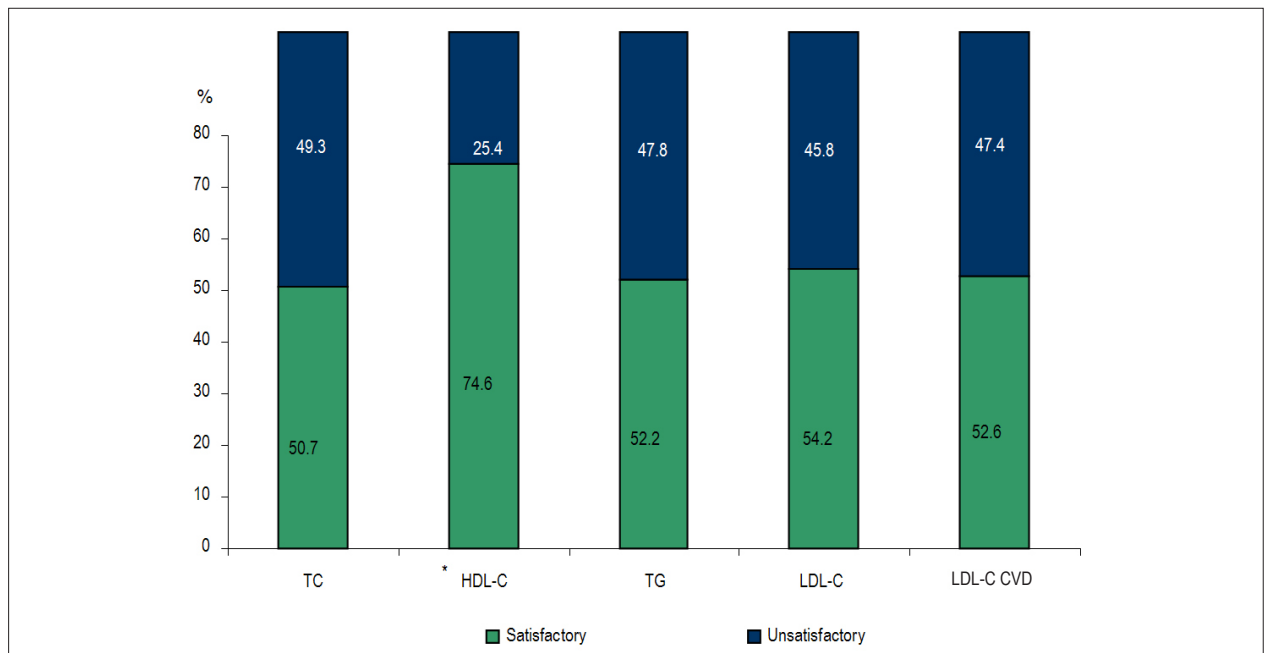
Figure 2 - *Relative frequency of the subjects that reported undergoing lipid-lowering therapy. Chi-Square - differences between the frequencies of individuals in the Satisfactory and Unsatisfactory subgroups. *p<0.001.*

mainly due to the low levels of HDL-C.

The LDL-C is considered one of the main risk factors for CVD[22], as it is involved in the formation and destabilization of atheromatous plaques in asymptomatic patients and also in those with coronary atherosclerosis[3,23]. Thus, the primary target of the lipid-lowering therapy is the decrease in the LDL-C levels[3,22]. However, it was observed that 74.2% of the elderly women with CVD that were not undergoing lipid-lowering therapy presented LDL-C levels above the goal (<100.0 mg/dl), in spite of the previous medical diagnosis of this picture. Similarly, a higher prevalence of elevated LDL-C (>160.0 mg/dl) was observed in women when compared to the men, in a study with 516 elderly women and men carried out by Alencar et al[24].

The international[3] and national[16] recommendations advise the decrease in LDL-C, considering its proven efficacy in decreasing mortality due to CVD[3] and, mainly, reducing the incidence of further cardiovascular events, such as acute myocardial infarction[25,26].

However, the attainment of lipid goals has not been broadly achieved. The cost of medication[3,11] and the social behavior[27,28] have been indicated as some of the factors that might explain why the medical recommendations are not being followed. Additionally, the patients' lack of awareness and poor access to information about the risk factors for CVD and how to prevent this pathology also contribute to the problem.

As for the women in the group that self-reported undergoing lipid-lowering therapy, 45.8% to 49.3% of them presented values that were above the lipid goal regarding total cholesterol, LDL-C and triglycerides and 25.4% of them were classified as presenting HDL-C levels that were lower than the lipid goal (>40.0 mg/dl). Recent studies have shown similar results to the ones found in the present study, in which a large number of individuals, although undergoing lipid-lowering therapy, did not reach the recommended lipid goals[7,9,10].

Oliveira and Mancini Filho[29] carried out a study with post-menopausal women undergoing lipid-lowering therapy and verified that only 7% of them presented LDL-C levels <100.0 mg/dl, 26% presented TC levels <200.0 mg/dL, 56% had HDL-C levels >40.0 mg/dl and 44% had TG levels <150.0 mg/dl. Another study[8] carried out with 190 elderly individuals of both sexes with dyslipidemia, who were divided in two risk groups according to the Framingham score, verified that only 50.9% in the low-moderate risk group and 30.2% in the high-risk group attained the lipid goals for LDL-C.

Similar results were also observed in the city of Sao Paulo, Brazil, where 67% of the patients from a public hospital reported that the price of the medication becomes an impediment for the pharmacological treatment; additionally, the lack of supervision on the medication use is responsible for 31% of the lipid-lowering therapy irregularity[30]. International studies have suggested that the lack of control regarding the lipid levels can be a consequence of the lack of a more aggressive drug therapy, drug ineffectiveness and low adherence to treatment[9,26,31]. Other factors that are related to the success or failure of the lipid-lowering therapy are associated to lifestyle habits, such as sedentarism and smoking[7].

In spite of the aforementioned national researches, studies on the prevalence of dyslipidemia in Brazil are still scarce. A study carried out in the South, Southeast, Midwest and Northeast regions of Brazil, which evaluated 81,262 individuals, reported that the prevalence of hypercholesterolemia was 40% (mean of all regions) and 44% in the city of Curitiba, state of Parana[32].

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The present study did not assess the type and dose of medication used and thus, the results presented here prevent the inference of causality among the factors responsible for the lack of dyslipidemia control, either due to the inadequate drug dose, the prescribed drug or treatment adherence. Additionally, this is a transversal study and therefore, the results obtained do not demonstrate causality, such as the time effect on the incidence of dyslipidemia in the studied individuals. However, it is worth mentioning that the aim of this study was to increase the knowledge about dyslipidemia and its treatment, verifying the frequency of dyslipidemia among the elderly population according to the groups that reported undergoing treatment with lipid-lowering drugs.

The results of the present study showed that a large number of elderly women presented an unfavorable lipid profile, regardless of the lipid-lowering therapy use. Additionally, it is noteworthy the elevated number of women with CVD that reported not undergoing lipid-lowering therapy and presented unsatisfactory LDL-C levels (>100.0 mg/dl). Further studies are necessary in order to verify the reasons why a large number of women are unaware of their lipid profiles and also to analyze which factors can interfere with treatment adherence in this situation, mainly among those individuals with a previous medical diagnosis of CVD. Therefore, the primary and secondary prevention can become more comprehensive, which would possibly attenuate the consequences of dyslipidemia, such as higher risk of coronary artery disease[4,33], hypertension[34] and cerebral vascular accident[35].

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