



OCCURRENCE OF DYSLIPIDEMIA AND ASSOCIATED FACTORS IN ADULTS: A PREVALENCE STUDY

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ABSTRACT

Objective: to estimate the prevalence of dyslipidemia and associated factors in adults in Rio Branco, Acre. **Methods:** a cross-sectional, population-based study that assessed adults (age 18 to 59 years) living in urban and rural areas of Rio Branco in 2014. Dyslipidemias were defined according to the criteria of the Brazilian Guidelines Update on Dyslipidemias and Prevention of Atherosclerosis. Logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI_{95%}). **Results:** the prevalence of dyslipidemia, low HDL-c, isolated hypertriglyceridemia, isolated hypercholesterolemia and mixed hyperlipidemia was 56.1%, 37.4%, 23.6%, 9.8% and 3.5%, respectively. In the final multivariate model, only obesity (OR = 1.86; CI_{95%}: 1.12; 3.10) maintained a statistically significant association with dyslipidemia. Among the dyslipidemia subtypes, the following variables were associated with isolated hypertriglyceridemia: age group 40 to 49 years (OR = 2.17; CI_{95%}: 1.53; 4.80); isolated hypercholesterolemia (OR = 2.52; CI_{95%}: 1.23; 5.15); low HDL-c (OR = 2.53; CI_{95%}: 1.65; 3.86); obesity (OR = 2.10; CI_{95%}: 1.25; 3.53); and diabetes mellitus (OR = 5.41; CI_{95%}: 1.46; 20.4). **Conclusion:** the prevalence of lipid alterations was high among adults. Intervention strategies for diagnosis, treatment and intensification of preventive measures and healthy lifestyle guidelines are important in this population.

Keywords: Dyslipidemias. Lipoproteins. Epidemiological surveys.

INTRODUCTION

Dyslipidemia is characterized by abnormal concentrations of lipids or lipoproteins in the blood. It is an important public health problem, responsible for the increase in morbidity and mortality from cardiovascular diseases worldwide, including acute myocardial infarction, cerebrovascular accident and disabling peripheral arterial diseases due to its participation in the initial process of atherogenesis, especially due to elevation of plasma levels of low-density lipoprotein cholesterol (LDL-c)^(1,2). Changes such as hypertriglyceridemia are associated with other serious diseases, such as non-alcoholic fatty liver disease and acute pancreatitis⁽³⁾.

Elevated cholesterol, which is one of the criteria that defines dyslipidemia, has a worldwide

prevalence of 39% (37% for males and 40% for females) among adults. In Europe, it corresponds to 54%, and in the Americas, to 48%; and the lowest percentages were observed in Africa and Southeast Asia: 23% and 30%, respectively⁽¹⁾. In Brazilian studies, the prevalence varies between 24.2% and 66.1% in the different regions of the country⁽⁴⁻⁶⁾.

Among the factors associated with dyslipidemia, sociodemographic conditions, life habits and the presence of morbidities, especially obesity, diabetes mellitus (DM) and arterial hypertension, stand out. The adequate approach to dyslipidemia and its risk factors is related to a decrease in the incidence and progression of cardiovascular diseases^(1,3,7).

Since 2006, Brazil has been monitoring chronic non-communicable diseases (CNCDs) in the 26 capitals and the Federal District through self-

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reported measures, generating approximate estimates; the initiative presents itself as an alternative to surveys that require more complex data collection and higher costs⁽⁸⁾. However, self-reported measures are more subject to information bias and underestimation of the prevalence of the assessed diseases⁽⁹⁾.

In view of the repercussions that dyslipidemias have on the occurrence of diseases, especially cardiovascular diseases, and the importance of monitoring through assess of laboratory components in population surveys, the present study aimed to estimate the prevalence of dyslipidemias and associated factors in the adult population (aged 18 to 59 years) residing in the city of Rio Branco, Acre.

METHOD

This is a population-based cross-sectional study with data from the Study of Chronic Diseases for Adults (SCDI-A), which consisted of a household survey carried out from April to September 2014, involving the population residing in urban and rural area of Rio Branco, Acre.

Adults aged 18 to 59 years residing in the city in 2014 were included in the study. The decision to assess dyslipidemia only in adults was due to evidence that the elderly population has particularities in the etiology of dyslipidemia, with lipid alterations being more frequent secondary to hypothyroidism, diabetes, obesity, nephrotic syndrome and medication use⁽⁷⁾. However, it is considered pertinent to analyze the lipid profile of adults (under 60 years of age) separately, taking into account morbidities, the number of comorbidities and the use of medications.

Pregnant women and individuals with cognitive impairments that made it impossible to communicate or understand the questions of the applied questionnaire were excluded from the research. The sampling plan was selected in two stages: sector and household. Sectors were selected with probability proportional to their number and private households in the 2010 Demographic Census (DC 2010) of the Brazilian Institute of Geography and Statistics (IBGE). As for the households, systematic sampling was carried out at random, with all adult residents being interviewed.

The sample size was calculated considering the prevalence of alterations in kidney function of 15% in adults, with a confidence level of 95% and an

absolute error of 3% for simple random sampling of proportions. Taking into account that the sampling plan was clustered by sector, a sampling plan effect of 1.95 was arbitrated to determine the sample size, which was increased by 20% to compensate for possible non-responses. The effective sample consisted of 685 adults, being considered in this study those who underwent analysis of the lipid profile, totaling 649 individuals. Based on the data presented and after a previous literature review, this sample met the requirements for analyzing data on the prevalence of dyslipidemia, making it possible to extrapolate the data to adults in Rio Branco, Acre.

The sample weights were calculated and subsequently calibrated for population data by sex and age group in order to produce estimates on the population estimated by the IBGE for July 1, 2014, using the linear trend method. However, 36 adults in the original sample did not have blood samples measured/collected that resulted in the information of the presence of dyslipidemia, which generated a subsample; thus, the sample weight was corrected and calibrated again, generating an estimate of 211,902 adults. More details on the SCDI sampling plan, calculation and calibration of sample and subsample weights, as well as data collection procedures, were presented by Amaral et al⁽¹⁰⁾.

For data collection, a specific individual questionnaire for adults was applied, structured in thematic modules with sociodemographic information, life habits, family history of dyslipidemia and health conditions. Behavioral data included life habits, such as smoking and physical activity, based on the questions used by the Surveillance System for Risk and Protection Factors for Chronic Diseases by Telephone Survey⁽⁸⁾, whose questions deal with the type, frequency and duration of activities.

An anthropometric assessment was also performed with measurements of height, weight and blood pressure, in addition to collecting a blood sample for laboratory assessment of total cholesterol and fractions, triglycerides and blood glucose.

The weight of the participants was measured using a digital scale (BalGI 200 from G-Tech[®]), placed on a flat surface; height was determined using a portable stadiometer (Sanny[®]).

Blood pressure (BP) was measured by health professionals on the day after the questionnaire was applied, respecting the time of 30 minutes or more of the last ingestion of caffeine or cigarette smoked.

The participant was instructed to sit with legs uncrossed, feet flat on the floor, back leaning against the chair and arm at heart level, free from clothing, supported, with palm facing up and elbow slightly bent. The cuff was well adjusted, 2 to 3 cm above the cubital fossa. BP was measured using a digital device (Beurer®). Three measurements were performed: the first, after 5 minutes of initial rest; and the other two, at 2-minute intervals. The final BP value was calculated by the arithmetic mean between the second and third measurements⁽¹¹⁾.

All laboratory parameters were analyzed in the same laboratory to ensure the standardization of

methods, and the collection was performed after a 12-hour fast. Serum glucose was measured using a colorimetric enzymatic test (Labtest Diagnóstica).

Total cholesterol was measured by the enzymatic colorimetric method COD/PAD, in the same way as fractions (HDL, LDL and VLDL) and triglycerides GPO/PAP (Lab test Diagnóstica). LDL was obtained from VLDL by hydrolysis of different lipolytic enzymes.

To define changes in lipid profile variables, the criteria of the Update of the Brazilian Guideline on Dyslipidemia and Atherosclerosis Prevention⁽⁷⁾ were adopted, as described in Box 1.

Box 1. Changes in the lipid profile according to laboratory references

VARIABLE/AGE	18 AND 19 YEARS	20 YEARS OR MORE
Isolated hypercholesterolemia	LDL-c > 110 mg/dl	LDL-c ≥ 160 mg/dl
Isolated hypertriglyceridemia	TG > 90 mg/dl	TG ≥ 175 mg/dl
Mixed hyperlipidemia	HDL-c > 110 mg/dl and TG > 90 mg/dl	LDL-c ≥ 160 mg/dl and TG ≥ 175 mg/dl
Low HDL-c	HDL-c < 45 mg/dl	Isolated HDL-c reduction (men < 40 mg/dl and women < 50 mg/dl) or in association with increased LDL-c or TG
Dyslipidemia	TG > 90 mg/dl, CT > 170 mg/dl, HDL-c < 45 mg/dl and/or LDL-c > 110 mg/dl	TG ≥ 175 mg/dl, CT > 190 mg/dl, LDL-c ≥ 160 mg/dl and/or HDL < 40 mg/dl in men and < 50 mg/dl in women

Source: Update of the Brazilian Guidelines on Dyslipidemia and Prevention of Atherosclerosis⁽⁷⁾.

The independent variables assessed were classified as sociodemographic, life habits, family history of dyslipidemia and health conditions:

- a) Sociodemographic
 - Sex (male; female);
 - Age group (18 to 39 years; 40 to 49 years; 50 to 59 years);
 - Skin color [white; black; brown; others (indigenous and yellow)];
 - Marital status [married; single; other (separated, divorced and widowed)];
 - Schooling (no schooling; elementary school; high school; higher education).
- b) Life habits
 - Current smoker: smoking was considered from the report of current tobacco consumption;
 - Physical activity: it was assessed through questions related to the frequency (days per week) and duration (time per day) of activities performed in the three months prior to the interview, including moderate and vigorous activities. The information was converted into the total time of physical activity, and the regular practice was defined when individuals performed at least 150 minutes of moderate activity or 75 minutes of vigorous activity per week, according to the recommendations of the

World Health Organization⁽¹²⁾.

c) Family history of dyslipidemia: it was obtained from the indication of a first degree family history.

d) Health conditions

- Diabetes mellitus: presence was defined according to the criteria of the Brazilian Society of Diabetes (SBD) as fasting plasma glucose ≥ 126 mg/dl, as well as individuals using oral hypoglycemic agents or insulin⁽¹³⁾.

- Systemic arterial hypertension: presence was defined when diastolic blood pressure (DBP) ≥ 90 mmHg and/or systolic blood pressure (SBP) ≥ 140 mmHg or current use of antihypertensive medication⁽¹¹⁾.

- Obesity: the body mass index (BMI) was determined by calculating the ratio of weight (kg) to height (in meters squared – m²); individuals with a BMI ≥ 30 kg/m² were defined as having obesity⁽¹⁴⁾.

Descriptive statistics were used with distribution of absolute and relative frequencies, and Pearson's chi-square test was used to explore differences in proportions between groups. Crude associations were estimated, and the logistic regression technique was chosen as an adjusted measure. The variables that presented p-value < 0.20 in the bivariate

analyses were tested in the multivariate models in decreasing order of significance. Analyses with $\alpha < 0.05$ were considered statistically significant.

All analyses took into account the effect of the sample design and the calibrated weights of the observations, with the results of the observations being shown by “n” and the results considering the calibrated weights for extrapolation to the population by “n estimate (N)”. The statistical package used was the Statistical Package for the Social Sciences (SPSS), version 20.0, using the Complex samples routines.

The research was approved by the Research Ethics Committee of the Federal University of Acre by opinion n. 518,531, and all participants signed the Informed Consent Term (ICT). This article

followed the STROBE Initiative recommendations for cross-sectional studies.

RESULTS

We assessed 649 adults who had blood samples collected and tested thus providing information on the presence of dyslipidemia, which corresponded to 211,902 individuals after extrapolation of the sample to the population.

The prevalence of dyslipidemia, low HDL-c and isolated hypertriglyceridemia was 56.1%, 37.4% and 23.6%, respectively. Isolated hypercholesterolemia and mixed hyperlipidemia did not reach 10% of the study population (Table 1).

Table 1. Prevalence of isolated hypercholesterolemia, isolated hypertriglyceridemia, mixed hyperlipidemia, low HDL-c and dyslipidemia according to sociodemographic characteristics, life habits and health conditions in adults aged 18 to 59 years in Rio Branco-AC, Brazil, 2014.

Variable	Isolated hypercholesterolemia		Isolated hypertriglyceridemia		Mixed hyperlipidemia		Low HDL-c		Dyslipidemia	
	N	%	N	%	N	%	N	%	N	%
All	20855	9.8	49944	23.6	7366	3.5	79310	37.4	118856	56.1
Sex										
Male	11120	2.2	26849	26.4	3151	3.1	28381	27.9	51844	51.0
Female	9735	8.8	23094	20.9	4215	3.8	50929	46.2	67011	60.8
Age group										
18 a 39	10344	7.1	26566	18.1	2336	1.6	61179	41.8	81719	55.8
40 a 49	5116	12.8	14459	36.1	2136	5.3	11702	29.2	22603	56.4
50 a 59	5393	21.2	8918	35.1	2894	11.4	6429	25.3	14534	57.2
Skin color										
White	4712	12.3	10217	26.6	917	2.4	17768	46.2	24087	62.6
Black	2830	16.9	3820	22.8	991	5.9	7992	47.6	11644	69.4
Brown	13066	8.4	35656	23.1	5335	3.4	52148	33.7	81350	52.6
Other*	246	12.4	250	12.6	123	6.2	1401	70.6	1774	89.4
Marital Status										
Married	10076	10.5	25462	26.4	4961	5.1	35092	36.4	55169	57.2
Single	9860	9.9	20913	21.1	1696	1.7	38544	38.9	55694	56.1
Other†	918	6.0	3358	21.8	709	4.6	5673	36.8	7783	50.5
Schooling										
No schooling	2059	12.1	5786	34.1	386	2.3	4044	23.8	10456	61.6
Elementary School	8969	9.4	21262	22.3	3894	4.1	38549	40.4	51548	54.1
High School	8470	11.6	15452	21.1	2963	4.0	27351	37.3	43231	59.0
Higher education	1146	5.1	6414	28.7	123	0.5	8126	36.3	11566	51.7
Current smoker										
No	15974	9.3	39125	22.8	5500	3.2	63353	36.9	94100	54.8
Yes	4880	12.6	10508	27.1	1866	4.8	15348	39.6	23837	61.5
Physical activity										
Active	18127	9.9	44384	17.8	1395	5.1	7933	28.8	13438	48.8
Inactive	2727	9.9	4900	24.3	5971	3.3	71152	38.9	104534	57.2
Family history of dyslipidemia										
No	9804	8.9	21955	19.9	3228	2.9	38269	34.7	58943	53.4
Yes	10231	11.5	25710	29.0	3451	3.9	35643	40.2	52675	59.4
Diabetes mellitus										
No	20307	10.1	43705	21.7	6942	3.4	76916	38.2	111781	55.5
Yes	547	5.1	6238	58.7	424	4.0	2394	22.5	7075	66.6
Hypertension										
No	15270	9.2	33400	20.1	5071	3.1	63968	38.6	91111	54.9
Yes	5461	13.4	16091	39.5	2295	5.6	12922	31.7	24749	60.7
Obesity										
No	17132	10.3	32323	19.4	5332	3.2	58984	35.5	86922	52.3
Yes	2907	7.5	15336	39.4	2034	5.2	17768	45.6	26586	68.3
Total	20855	100%	49944	100%	7366	100%	132592	100%	118856	100%

* Others = indigenous and yellow; n = sample; N = estimate

† Other = separated, divorced and widowed.

‡ Highlighted in bold for variables with p-value < 0.05 according to Pearson's chi-square test.

The prevalence of isolated hypercholesterolemia was higher among adults aged 50 to 59 years (21.2%), p value < 0.005 . The highest prevalence of isolated hypertriglyceridemia was found in adults aged 40 to 49 years (36.5%) and 50 to 59 years (35.1%) and in those with a family history of dyslipidemia (29%), in addition to those with obesity (39.4%), diabetes (58.7%) and arterial hypertension (39.5%), p value < 0.005 (Table 1).

The prevalence of mixed hyperlipidemia was higher in the 50-59 age group (11.4%), while low HDL-c was more prevalent in females (46.2%), in the 18-39 age group. in (41.8%) and in adults who self-declared black (47.6%) and white (46.2%) skin color. The prevalence of dyslipidemia, in turn, was greater than 60% in

adults who self-declared black and white skin color and in obese, p value < 0.005 (Table 1).

In the crude logistic regression, the associated risk factors were isolated hypertriglyceridemia, age group 40 to 49 years ($OR = 2.55 - 95\%CI 1.56;4.16$); age group from 50 to 59 years ($OR = 2.44 - CI_{95\%} 1.42;4.18$); family history of dyslipidemia ($OR = 1.65 - CI_{95\%} 1.10;2.56$); isolated hypercholesterolemia ($OR = 2.04 - CI_{95\%} 1.23;3.39$); obesity ($OR = 2.69 - CI_{95\%} 1.75;4.14$); systemic arterial hypertension ($OR = 2.59 - CI_{95\%} 1.66;4.04$); and diabetes mellitus ($OR = 5.11 - CI_{95\%} 1.82;14.35$). For the dyslipidemia outcome, the associated risk factors were: sex ($OR = 1.48 - CI_{95\%} 1.06 - 2.08$) and obesity ($OR = 1.96 - CI_{95\%} 1.22 - 3.16$) (Table 2).

Table 2. Crude and adjusted logistic regression of isolated hypertriglyceridemia and dyslipidemia, according to independent variables in adults aged 18 to 59 years in Rio Branco-AC, Brazil, 2014.

Variables	Isolated hypertriglyceridemia		Dyslipidemia	
	OR _{crude} [†] (CI95%)	OR _{Adj} [‡] (CI95%)	OR _{crude} [†] (CI95%)	OR _{Adj} [§] (CI95%)
Sex				
Female	1	-	1	-
Male	1.36 (0.93 – 1.98)	-	1.48 (1.06 – 2.08)	-
Age				
18 to 39	1	1	-	-
40 to 49	2.55 (1.56 – 4.16)	2.17 (1.53 – 4.80)	-	-
50 to 59	2.44 (1.42 – 4.18)	1.93 (1.00 – 3.74)	-	-
Skin color				
White	-	-	1	-
Black	-	-	0.73 (0.32 – 1.66)	-
Brown	-	-	1.51 (0.93 – 2.44)	-
Others*	-	-	0.19 (0.15 – 2.57)	-
Family history of dyslipidemia				
No	1	-	-	-
Yes	1.65 (1.10 – 2.56)	-	-	-
Isolated hypercholesterolemia				
No	1	1	-	-
Yes	2.04 (1.23 – 3.39)	2.52 (1.23 – 5.15)	-	-
Low HDL-c				
No	1	1	-	-
Yes	1.43 (0.99 – 2.05)	2.53 (1.65 – 3.86)	-	-
Obesity				
No	1	1	1	1
Yes	2.69 (1.75 – 4.14)	2.10 (1.25 – 3.53)	1.96 (1.22 – 3.16)	1.86 (1.12 – 3.10)
Arterial hypertension				
No	1	-	-	-
Yes	2.59 (1.66 – 4.04)	-	-	-
Diabetes mellitus				
No	1	1	-	-
Yes	5.11 (1.82 – 14.35)	5.41 (1.46 – 20.04)	-	-

* Other = indigenous and yellow;

[†] OR_{crude} = crude odds ratio. [‡] OR_{Adj} = adjusted odds ratio.

[‡] Model adjusted by variables among themselves and by sex, education, hypertension, and family history of dyslipidemia.

[§] Model adjusted by sex and skin color.

In the final adjusted model, the factors that maintained a statistically significant association with isolated hypertriglyceridemia were: 40-49 age group ($OR = 2.17 - CI_{95\%} 1.53;4.80$); isolated hypercholesterolemia ($OR = 2.52 - CI_{95\%} 1.23;5.15$); low HDL-c ($OR = 2.53 -$

$CI_{95\%} 1.65;3.86$); obesity ($OR = 2.10 - CI_{95\%} 1.25;3.53$); and diabetes mellitus ($OR = 5.41 - CI_{95\%} 1.46;20.4$). For the outcome dyslipidemia, only obesity maintained a statistically significant association in the final model (Table 2).

DISCUSSION

In the municipality of Rio Branco, Acre, a high prevalence of dyslipidemia was observed in adults aged 18 to 59 years, and low HDL-c was the most common type. There were significantly different patterns of lipid abnormalities among sexes, age groups, skin color, among those with family history of dyslipidemia and those with diabetes, hypertension and obesity. Factors associated with isolated hypertriglyceridemia were age group 40 to 49 years, isolated hypercholesterolemia, low HDL-c, obesity, and diabetes mellitus.

The prevalence of dyslipidemia among adults identified in the present study was similar to that presented in population-based studies carried out in Rio de Janeiro and São Paulo^(4,6). In Ribeirão Preto/SP, the prevalence of dyslipidemia, isolated hypercholesterolemia, isolated hypertriglyceridemia and low HDL-c was 61.9%, 33.3%, 25% and 20.4%, respectively⁽⁵⁾. These data are worrisome considering the participation of dyslipidemia in the occurrence of atherosclerotic disease⁽¹⁾.

International studies point dyslipidemia as a worldwide problem. According to data from the National Health and Nutrition Examination Survey (NHANES), 17.1% of North American adults (40-59 years) and 7.9% (20-39 years) presented high TC (≥ 240 mg/dl), and 19.2% (20-39 years) and 20.1% (40-59 years) showed low HDL-c (< 40 mg/dl)⁽¹⁵⁾. In China, a population-based survey of 4,598 adults (≥ 18 years) revealed that the prevalence of dyslipidemia was 48.27% and that among individuals with dyslipidemia, 44.2% had isolated hypertriglyceridemia, 33.3% isolated hypercholesterolemia, 5.81% mixed hyperlipidemia, and 14.5% low HDL-c⁽¹⁶⁾.

Hypertriglyceridemia is one of the most common lipid abnormalities and is directly related to cardiovascular diseases⁽¹⁷⁾. In the present study, it was more prevalent in adults with family history of dyslipidemia, diabetes mellitus, hypertension and obesity, confirming in this population what has been observed in other cross-sectional studies^(4,17).

An association between hypertriglyceridemia and age was found in the 40 to 59 age group, corroborating the results of a population-based

cross-sectional study conducted with 6,588 adult study subjects in Madrid, in which it was observed that hypertriglyceridemia increases with age until 50 years and then decreases⁽¹⁷⁾. In addition to exposure to multiple risk factors throughout life, aging associated with multiple systemic dysfunctions, including lipid metabolism disorder and chronic inflammatory state, contribute to the occurrence of atherosclerotic cardiovascular disease⁽¹⁸⁾.

Hypertriglyceridemia is frequently related to other lipid dysfunctions, such as low HDL-c and oxidative changes in LDL, making them denser and smaller, and the occurrence of these changes is associated with increased risk of cardiovascular events⁽⁷⁾. In the present study, hypertriglyceridemia was associated with isolated hypercholesterolemia (OR = 2.52) and low HDL-c (OR = 2.53), corroborating results of another research⁽¹⁹⁾. In the study conducted in Madrid, higher associations were found (hypercholesterolemia OR = 4.6 and low HDL-c OR = 4.1)⁽¹⁷⁾. These findings reinforce the importance of screening and therapeutic approach with statins, especially in adults at increased risk for cardiovascular disease.

Obesity is a morbidity conditioned mainly by sedentary lifestyle and eating habits of individuals and has reached epidemic levels in developed and underdeveloped countries; it is an important secondary cause of dyslipidemia^(5,19,20). The significant association between obesity and hypertriglyceridemia, and the dyslipidemia observed in the present study, has been widely described in the literature^(17,19,20-22). High triglyceride concentrations accompanied by decreased HDL-c concentrations are the main characteristics of lipid alterations in obese individuals⁽²²⁾. The chronic inflammation involved in its pathogenesis has been related to metabolic dysfunction^(21,23). It is noteworthy that dyslipidemia is an important link between obesity and the development of type 2 diabetes mellitus and cardiovascular diseases^(23,24). These findings reinforce the importance of obesity prevention and control actions and effective therapeutic interventions for lipid alterations.

Diabetes mellitus has been strongly associated with hypertriglyceridemia. Studies have shown that this condition is an important

cause of secondary dyslipidemia, since insulin resistance, or insulin deficiency, results in dysregulation of lipid levels. This occurs by changes in the activities of enzymes that participate in lipoprotein metabolism and remodeling, manifesting as hypertriglyceridemia^(7,17). Because of the higher cardiovascular risk and early mortality, diabetes control assumes significant relevance for the prevention of lipid alterations and its related complications.

It is worth noting that the SCDI-A survey analyzed the lipid profile of participants at a single moment in time, which may imply an overestimation of the prevalence of dyslipidemia assessed in the present study, since numerous factors may contribute to the change in these components, especially diet and fasting time. However, it is necessary to consider that there is still no national and international consensus on the need for fasting prior to the evaluation of the lipid profile. It seems that TC, LDL and HDL vary little in relation to the fasting time, whereas triglycerides may vary 20 to 30% according to the time and content of the last meal⁽²⁵⁾. The Update of the Brazilian Guidelines on Dyslipidemia and Prevention of Atherosclerosis, published in 2017, discusses the fasting requirement and emphasizes that lipid assessment without prior fasting may benefit elderly patients, patients with diabetes, pregnant women, and children, avoiding hypoglycemia in these groups. In addition, it clarifies that the evaluation of the lipid profile should consider the indication of the test, the patient's metabolic status and risk stratification⁽⁷⁾.

Another limitation was not including alcohol abuse, considering that it has an important effect

on lipid metabolism. Finally, we emphasize the importance of prospective studies in this population to better assess the behavior of the variables observed on the outcome, besides others, such as diet, which were not explored in the present study.

CONCLUSION

In the representative sample of the adult population of Rio Branco, Acre, there is a high prevalence of dyslipidemia. Isolated hypertriglyceridemia is associated with age, isolated hypercholesterolemia, low HDL-c, obesity, and diabetes mellitus. The results demonstrate the need for early screening and effective management of dyslipidemia to reduce morbidity and mortality from cardiovascular disease. The present study innovated by performing the analyses of associated factors by laboratory tests in the survey. Further research is needed to elucidate the association between risk factors and lipid alterations in the population.

Furthermore, these results are relevant for the knowledge of the dyslipidemias panorama in Brazil, considering the regional socioeconomic and health differences. We highlight the importance of this study for the Northern Region of Brazil, as well as the need for preventive public policies aimed at the adoption of healthy habits and control of sedentarism and obesity in this population, composed mainly of young adults. It is expected that such measures may be reflected in the reduction in the prevalence of dyslipidemia and, consequently, in the improvement of cardiovascular profile of adults in this municipality.

OCORRÊNCIA DE DISLIPIDEMIAS E FATORES ASSOCIADOS EM ADULTOS: UM ESTUDO DE PREVALÊNCIA

RESUMO

Objetivo: estimar a prevalência de dislipidemias e os fatores associados em adultos de Rio Branco, Acre. **Métodos:** estudo de delineamento seccional, populacional, que avaliou adultos (18 a 59 anos) residentes nas zonas urbana e rural de Rio Branco em 2014. As dislipidemias foram definidas conforme os critérios da Atualização da Diretriz Brasileira de Dislipidemias e Prevenção da Aterosclerose. Empregou-se regressão logística para estimar as *odds ratio* (OR) e intervalos de confiança de 95% (IC_{95%}). **Resultados:** a prevalência de dislipidemia, HDL-c baixo, hipertrigliceridemia isolada, hipercolesterolemia isolada e hiperlipidemia mista foi de 56,1%, 37,4%, 23,6%, 9,8% e 3,5%, respectivamente. No modelo final multivariado, apenas a obesidade (OR = 1,86; IC_{95%}: 1,12;3,10) manteve associação estatisticamente significativa com a dislipidemia. Entre os subtipos de dislipidemias, associaram-se à hipertrigliceridemia isolada as variáveis: faixa etária de 40 a 49 anos (OR = 2,17; IC_{95%}: 1,53;4,80); hipercolesterolemia isolada (OR = 2,52; IC_{95%}: 1,23;5,15); HDL-c baixo (OR = 2,53; IC_{95%}: 1,65;3,86); obesidade (OR = 2,10; IC_{95%}: 1,25;3,53); e diabetes mellitus (OR = 5,41; IC_{95%}: 1,46;20,4).

Conclusão: a prevalência de alterações lipídicas foi elevada entre adultos. Estratégias de intervenções para diagnóstico, tratamento e intensificação de medidas preventivas e orientações de estilo de vida saudáveis são importantes nessa população.

Palavras-chave: Dislipidemias. Lipoproteínas. Inquéritos epidemiológicos.

INCIDENCIA DE DISLIPIDEMIAS Y FACTORES ASOCIADOS EN ADULTOS: UN ESTUDIO DE PREVALENCIA

RESUMEN

Objetivo: estimar la prevalencia de dislipidemias y los factores asociados en adultos de Rio Branco, Acre-Brasil. **Métodos:** estudio de investigación seccional, poblacional, que evaluó adultos (18 a 59 años) residentes en las zonas urbana y rural de Rio Branco en 2014. Las dislipidemias fueron definidas conforme a los criterios de la Actualización de la Directriz Brasileña de Dislipidemias y Prevención de la Aterosclerosis. Se empleó regresión logística para estimar las *odds ratio* (OR) e intervalos de confianza del 95% (IC_{95%}). **Resultados:** la prevalencia de dislipidemia, HDL-c bajo, hipertrigliceridemia aislada, hipercolesterolemia aislada e hiperlipidemia mixta fue de 56,1%, 37,4%, 23,6%, 9,8% y 3,5%, respectivamente. En el modelo final multivariado, solo la obesidad (OR = 1,86; IC_{95%}: 1,12;3,10) mantuvo una asociación estadísticamente significativa con la dislipidemia. Entre los subtipos de dislipidemias, se asociaron a la hipertrigliceridemia aislada las variables: franja etaria de 40 a 49 años (OR = 2,17; IC_{95%}: 1,53;4,80); hipercolesterolemia aislada (OR = 2,52; IC_{95%}: 1,23;5,15); HDL-c bajo (OR = 2,53; IC_{95%}: 1,65;3,86); obesidad (OR = 2,10; IC_{95%}: 1,25;3,53); y diabetes mellitus (OR = 5,41; IC_{95%}: 1,46;20,4). **Conclusión:** la prevalencia de cambios lipídicos fue elevada entre adultos. Estrategias de intervenciones para el diagnóstico, tratamiento e intensificación de medidas preventivas y orientaciones de estilo de vida saludables son importantes en esa población.

Palabras clave: Dislipidemias. Lipoproteínas. Encuestas epidemiológicas.

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