FREQUENCY AND FACTORS ASSOCIATED WITH DYSLIPIDEMIA AMONG PEOPLE WITH TYPE 2 DIABETES MELLITUS

Frequência e fatores associados à dislipidemia entre pessoas com Diabetes Mellitus tipo 2

Frecuencia y factores asociados con la dislipidemia entre las personas con Diabetes Mellitus tipo 2

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ABSTRACT

Objective: to evaluate the frequency and factors associated with dyslipidemia in people with type 2 Diabetes Mellitus. **Method:** cross-sectional study, carried out with 45 people diagnosed with diabetes and followed up at a Basic Health Unit. Sociodemographic variables related to lifestyle and related to lipid profile analysis were investigated. **Results:** the prevalence of dyslipidemia was 82.2%, significantly associated with female gender (p = 0.005), smoking (p = 0.002) and sedentary lifestyle (p = 0.050). The components of dyslipidemia, total cholesterol, triglycerides and low-density lipoproteins were elevated in 68.9%, 57.8% and 11.1%, respectively. **Conclusion:** the prevalence of dyslipidemia was high in the patients analyzed. The existence of a significant association between the occurrence of dyslipidemia and different types of females, smoking habits and sedentary lifestyle calls attention to the need for better conduct for this population.

DESCRIPTORS: Dyslipidemias; Type 2 diabetes mellitus; Nursing; Primary health care.

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RESUMO

Objetivo: avaliar a frequência e os fatores associados à dislipidemia em pessoas com Diabetes Mellitus Tipo 2. **Método:** estudo transversal, desenvolvido com 45 pessoas diagnosticadas com diabetes e acompanhadas por uma Unidade Básica de Saúde. Foram investigadas variáveis sociodemográficas, relacionadas ao estilo de vida e referentes à análise do perfil lipídico. **Resultados:** a prevalência de dislipidemia foi de 82,2%, significativamente associada ao sexo feminino (p=0,005), ao tabagismo (p=0,002) e ao sedentarismo (p=0,050). Nos componentes da dislipidemia, as taxas de colesterol total, triglicérides e *low density lipoprotein* se mostraram elevados em 68,9%, 57,8%, 11,1%, respectivamente. **Conclusão:** a prevalência de dislipidemia mostrou-se elevada nos pacientes analisados. A existência de associação significativa entre a ocorrência de dislipidemia e variáveis como o sexo feminino, os hábitos de tabagismo e sedentarismo chama a atenção para a necessidade de melhores condutas para essa população.

DESCRITORES: Dislipidemias; Diabetes mellitus tipo 2; Enfermagem; Atenção primária à saúde.

RESUMEN

Objetivo: evaluar la frecuencia y los factores asociados a la dislipidemia en personas con Diabetes Mellitus tipo 2. **Método:** estudio transversal, desarrollado con 45 personas diagnosticadas con diabetes y acompañadas por una Unidad Básica de Salud. Se investigaron las variables sociodemográficas, de estilo de vida y de análisis del perfil lipídico. **Resultados:** la prevalencia de dislipidemia fue del 82,2%, asociada significativamente al sexo femenino (p=0,005), al tabaquismo (p=0,002) y al sedentarismo (p=0,050). En los componentes de la dislipidemia, las tasas de colesterol total, triglicéridos y lipoproteínas de baja densidad estaban elevadas en el 68,9%, 57,8% y 11,1%, respectivamente. **Conclusión:** la prevalencia de la dislipidemia fue elevada en los pacientes analizados. La existencia de una asociación significativa entre la ocurrencia de dislipidemia y variables como el sexo femenino, los hábitos de tabaquismo y el sedentarismo hace que se preste atención a la necesidad de mejores conductas para esta población.

DESCRIPTORES: Dislipidemias; Diabetes mellitus tipo 2; Enfermería; Atención primaria de la salud.

INTRODUCTION

Type 2 Diabetes Mellitus (DM2) can be defined as a metabolic disease characterized by sustained blood glucose levels, resulting from multiple factors such as sedentary lifestyle, fat accumulation, and excessive sugar consumption. When poorly controlled, DM2 also affects the lipid metabolism of the patient with the disease and can lead to dyslipidemia.[1-3]

Added to this, the person with diabetes also tends to have an accumulation of adiposity that, in turn, generates a pro-inflammatory state, insulin resistance, and increases the risk of developing atherosclerosis and other major cardiovascular complications. Such an imbalance can lead to dysregulation of the immune system, facilitating infection of the patient by infectious diseases, such as COVID-19.[4-6]

In Brazil, overweight and obesity have increased in most sociodemographic strata in recent years, rising from 11.8% in 2006 to 20.3% in 2019, with a progression of 3.8% per year.[7] In the Northeast region of the country, overweight is present in more than half of the adult population, which added to risk behaviors and DM2 diagnosis, facilitates the elevation of lipid levels and favors the onset of cardiovascular diseases and endothelial dysfunction, leading to a picture of dyslipidemia.[8] In this sense, the investigation and early detection of dyslipidemia in patients with DM2 and its respective treatment becomes a priority, in order to avoid morbidity and mortality of these patients from possibly preventable causes.[9-10]

Furthermore, the contribution of nurses working in Primary Health Care is emphasized as necessary in the management of chronic diseases and, especially, in the prevention of complications caused by diabetes. Through the nursing consultation, these professionals can provide comprehensive quality care to patients with chronic conditions, through educational actions to promote health and prevent risks and encourage adherence to pharmacological treatment, encouraging the adoption of healthy behaviors and lifestyle modification, and developing empowerment and self-care actions to minimize the obstacles arising from high lipid levels in patients with DM2. [11-12] Moreover, there is a gap in scientific knowledge about the association of dyslipidemia in people with DM2, making it difficult to identify other comorbidities linked to this fact, such as Metabolic Syndrome.

Thus, knowing the profile of patients with diabetes who have dyslipidemia and assessing whether they are adequately controlling the disease becomes essential to guide health professionals in their care practices. In view of the shy national scientific production on the evaluation of dyslipidemia patterns in patients diagnosed with DM2, especially in the Northeast region of Brazil, this study aimed to evaluate the prevalence and factors associated with dyslipidemia in patients with DM2.

METHODS

This is a cross-sectional study, with a quantitative approach, developed between August and November 2019, with people diagnosed with DM2, registered and followed-up in a Basic Health Unit (BHU) in the municipality of Parnaíba, Piauí, Brazil.

The population was composed of adult patients of both sexes, with a medical diagnosis for at least two years for DM2.

The sample of this research was of the non-probabilistic type, by convenience, in a consecutive manner, that is, all patients who had attended nursing consultations for the treatment of diabetes were invited to participate. Inclusion criteria were: having a diagnosis of DM2, age between 18 and 80 years, and using oral antidiabetics. The exclusion criteria were: patients on insulin, pregnant and lactating women. Thus, 45 people were selected.

Data collection occurred during nursing consultations with DM2 patients in the UBS. The information was collected by previously trained nursing students and nurses, in order to ensure good quality in the operationalization and standardization of the collected material. To this end, a form developed by the researchers was used, containing sociodemographic information (age, gender, marital and work status, among others), related to lifestyle (practice of physical activity, tobacco use, alcohol consumption) and concerning the analysis of the lipid profile, based on the Brazilian Guidelines on Dyslipidemia and Prevention of Atherosclerosis.[13]

The classification of the lipid profile followed the definitions of the Brazilian Society of Cardiology[13], and the cut-off points were: desirable total cholesterol (TC) < 190 mg/dl; desirable high density lipoprotein (HDL) > 40 mg/dl; desirable triglycerides (TG) < 150 mg/dl; desirable low density lipoprotein (LDL) < 160 mg/dl. It should be noted that, for the tests, the participants fasted for 12 hours. The blood was collected by venipuncture, where a 10 ml sample was obtained for later analysis of the lipid profile in a laboratory. The participants were instructed not to engage in vigorous physical activity in the 24 hours preceding the test, and to avoid drinking alcohol in the 72 hours preceding the blood draw.

Information about physical activity, tobacco and alcohol use was self-reported. Participants who engaged in physical activities for less than 150 minutes a week were classified as sedentary.[14] Regarding tobacco, participants who said they used tobacco were considered smokers. For alcohol consumption, the Single Question Alcohol Screening Test was used.[15]

The data collected were double entered into an Excel spreadsheet, version 2010, to prepare the database. For descriptive, inferential, and bivariate statistical analysis the Statistical Package for the Social Sciences - SPSS, version 25.0 was used, which supported calculations of absolute frequency, measures of dispersion, and central tendency. The Fisher's exact test was used to verify the presence of statistically significant associations, considering the sociodemographic and lifestyle variables as independent and the presence of dyslipidemia as dependent variable. The significance level adopted was 5%.

The research was submitted and approved by the Ethics Committee for Research with Human Beings, under protocol number 3.447.415 and CAAE number 13595019.0.0000.5209. Only after the consent of the interviewee and the signature of the Informed Consent Form (ICF) did data collection begin, respecting all the ethical precepts established in Resolution No. 466/12 and 580/18.

Table 1 – Sociodemographic and clinical characteristics of the study participants. Parnaíba, PI, Brazil, 2019

Variables	n	%
Dislipidemia		
Yes	37	82,2
No	8	17,8
Gender		
Female	30	66,7
Age Group		
30 to 39 years old	1	2,2
40 to 49 years old	7	15,5
50 to 59 years old	16	35,6
60 years and older	21	46,7
Education		
Illiterate	10	22,2
Up to 8 years of study	25	55,6
Up to 12 years of study	10	22,2
Skin Color		
Yellow	1	2,2
White	13	28,9
Black	1	2,2
Brown	30	66,7
Marital status		
Married	30	66,7
Single	8	17,8
Widower	7	15,5
Employment situation		
Retired	17	37,8
Unemployed/household	16	35,5
Has a job	12	26,7
Diabetes diagnosis time		
From 2 to 5 years	14	31,1
From 5 to 10 years	19	42,3
From 11 to 20 years	11	24,4
More than 20 years	1	2,2
Drug treatment used		
Metformin	18	40
Glibenclamide	7	15,6
Metformin and Glibenclamid	19	42,2
Glimepiride	1	2,2

Source: the authors.

RESULTS

The prevalence of dyslipidemia found in the study population was 82.2%. Of the 45 participants investigated, there was a predominance of females (66.7%), with age range of 60 years or older (46.7%) and with education of up to eight years of study (55.6%). The age of those investigated ranged from 32 to 79 years, with an average of 58.3 years (SD = 10.5), and the average education was 5.13 years. People were predominantly brown (66.7%), married (66.7%), and retired (37.8%). About seven out of 10 participants had a DM2 diagnosis time of up to 10 years, and 42.2% used the combined therapy of metformin and glibenclamide as drug treatment (Table 1).

As for the distribution of the prevalence of the components of dyslipidemia, table 2 shows that 68.9% of the participants had high total cholesterol, 11.1% had low HDL, 2.2% had high LDL, and 57.8% had high triglycerides (components considered prerequisites for the diagnosis of dyslipidemia, whether isolated or mixed).

Figure 1, in turn, shows the percentage of people who present one or more components of the lipid fraction altered. Thus, it was evidenced that most of the people investigated (48.7%) had two high components.

Table 3 presents the association between the presence of dyslipidemia in patients with DM2 and sociodemographic and lifestyle-related variables. It is possible to identify that female (p = 0.005), smokers (p = 0.002) and sedentary (p = 0.050) subjects showed statistically significant relations with dyslipidemia. Furthermore, it was verified that most DM2 patients were sedentary (78.4%), did not use alcohol (91.9%) or tobacco (91.9%).

DISCUSSION

In this study, it was possible to observe a high prevalence of dyslipidemia among patients with diabetes. This result is similar to that found in foreign studies carried out in Thailand[16] and Spain[17], where the prevalence of dyslipidemia in DM2 patients was 88.9% and 85.3%, respectively. People with DM2, especially those with poorly controlled glucose levels, are more prone to elevated lipid levels.[3,10]

In this research, there was a predominance of females and a higher prevalence of dyslipidemia among women. A population--based epidemiological study conducted in Brazil with 60,202 people showed that at least 15% of the women investigated had dyslipidemia.[6] This occurrence may be associated with the hormonal status of women, with LDL and TG increasing substantially during pregnancy as well as after menopause, when the ovaries cease to function and the production of steroid hormones decreases. In view of this, an increase in the levels of atherogenic lipids occurs.[18,19]

The mean age of the study participants brings up the importance of taking this factor into consideration during the evaluation of the patient with DM2, since research shows a positive association between age and increased prevalence of

Table 2 – Distribution of the prevalence of dyslipidemia components. Parnaíba, PI, Brazil, 2019

Lipid Components	n	%
Total Cholesterol, mg/dL (DP *)	205 (37)	-
Median (min.**/max.***)	200 (105, 298)	-
Normal	14	31,1
High	31	68,9
HDL, mg/dL (DP)	50 (7)	-
Median (min./max.)	52 (33, 65)	-
Normal	40	88,9
Decreased	5	11,1
LDL, mg/dL (DP)	118 (28)	-
Median (min./max.)	114 (47, 197)	-
Normal	44	97,8
High	1	2,2
Triglycerides, mg/dL (DP)	183 (89)	-
Median (min./max.)	154 (63, 401)	-
Normal	19	42,2
High	26	57,8

*DP=Standard Deviation; **Min=Minimum; ***Max.=Maximum.
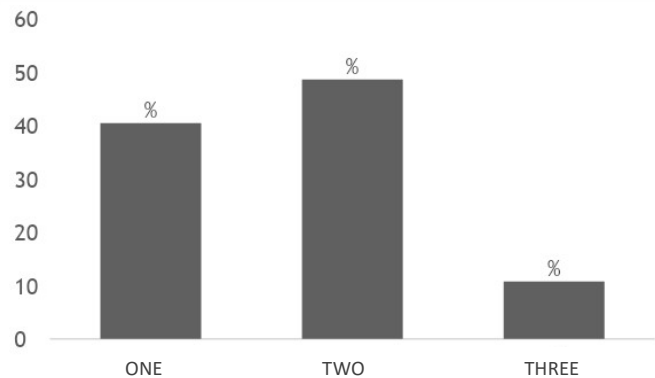Source: the authors.

Figure 1 – Percentage of people with high lipid fractions. Parnaíba, PI, Brazil, 2019
Source: the authors.

diabetes.[20] This association may be favored by changes inherent to the aging process, reduced physical activity, and the presence of unhealthy eating habits.

In turn, other investigations[20-21] also show that low educational level can negatively influence diabetes management, interfere with learning about the disease, and hinder adherence to drug treatment, which ultimately reflects on functional health literacy and control of other comorbidities such as dyslipidemia. This reinforces the need for clear and easily applicable strategies - considering the instructional level of patients, making them have a better management of chronic diseases.

Table 3 – Association of dyslipidemia with sociodemographic and lifestyle variables. Parnaíba, PI, Brazil, 2019

Variables	Dyslipidemia				p*
	Yes		No		
	n	%	n	%	
Gender					
Female	27	73,0	3	37,5	0,005
Male	10	27,0	5	62,5	
Skin Color					
Yellow and White	13	35,1	1	12,5	0,912
Brown and Black	24	64,9	7	87,5	
Marital status					
Married	24	64,9	6	75,0	0,130
Single	7	18,9	1	12,5	
Widower	6	16,2	1	12,5	
Employment situation					
Retired	12	32,4	5	62,5	0,565
Unemployed/household	15	40,6	1	12,5	
Has a job	10	27,0	2	25,0	
Education					
Uneducated	8	21,6	2	25,0	0,090
Up to 08 years of study	20	54,1	5	62,5	
Up to 12 years of study	9	24,3	1	12,5	
Smoking					
Yes	3	8,1	1	12,5	0,002
No	34	91,9	7	87,5	
Alcoholism					
Yes	3	8,1	2	25,0	0,788
No	34	91,9	6	75,0	
Sedentary lifestyle					
Yes	29	78,4	4	50,0	0,050
No	8	21,6	4	50,0	

* Fisher's exact test; Source: the authors.

It is noteworthy that smoking and sedentary lifestyle were statistically associated with the presence of dyslipidemia in patients with DM2. In Brazil, according to data from the Ministry of Health, being a smoker, being diagnosed with dyslipidemia or DM2 are factors related to higher occurrence of hospital admissions, generating costly costs to the Brazilian health system.[22] Studies have shown that sedentarism is frequent in populations with DM2, which may be related to older age, overweight and negative self-perception of health. These factors make it difficult to reach desirable glycemic and lipid levels and increase cardiovascular risk.[2,22]

In view of the above, there is a need to clarify to these patients the importance of adopting lifestyle changes, such as physical exercise and smoking cessation, as well as the recognition and ways to deal with risk factors to improve disease management. Although the variable alcohol consumption did not show sta-tistical significance, it is important to inform the patient about the harm that excessive alcohol consumption can cause, such as increased risk of hypertriglyceridemia.[1]

Most of the participants investigated presented high TC, with the mean value of this component being higher than that recommended by the Brazilian dyslipidemia guidelines, which may be related to the higher intake of carbohydrates and high fat content in the diets, sedentarism and obesity.[9,16] Higher TG was also observed in almost three out of five participants, whose mean value was higher than desirable. These data were also found in other studies with the same target audience.[10,17,21] It should be noted that hypertriglyceridemia is the most common lipid abnormality in patients with DM2 and represents one of the main predictors of atherosclerotic cardiovascular disease.[23]

Lower than recommended HDL also represents a very common alteration in DM2[17,23] patients; however, in our study, its

prevalence only occurred in about one out of 10 investigated subjects. HDL has the ability to mediate the reverse transport of cholesterol from peripheral tissues, such as large vessels, to the liver and, therefore, its decrease represents a sensitive biomarker for the development of cardiovascular diseases.[23] Moreover, the isolated increase in LDL was observed in a small portion of the participants. It is noteworthy that studies have shown a decreased risk of cardiovascular events when patients with diabetes have low LDL levels.[23,24]

With the increase of associated comorbidities and lack of disease control, patients with diabetes are subject to compromised immune systems and increased susceptibility to infectious conditions that, due to the frequent occurrence of hyperglycemia, promote the worsening of the course of infections, such as the one caused by SARS-CoV-2, etiologic agent of COVID-19. Several studies have shown that patients with DM2, when infected by the new coronavirus, are more likely to present a more severe and prolonged infection when compared to individuals who do not have the disease, as well as being more vulnerable to suffer complications such as respiratory failure, acute cardiac injury, and need to be admitted to the intensive care unit.[5,25,26] Therefore, it is of utmost importance that the nursing professional develop effective strategies in the management of chronic diseases and their risk factors, implementing techniques that involve the health service user, as well as his family and community, in an attempt to increase quality of life, reduce health risks, and prevent the need for hospital admissions.

Among them, we have the nursing consultation as a resource that contributes to the comprehensive health care of the patient, through health promotion and prevention of diseases and development of self-management of their clinical condition. The nurse must always look for more efficient methods in an attempt to increase the patient's level of knowledge, enabling self-care and greater autonomy in managing their health-disease situations.[12,27] Other strategies that can be used by nurses involve therapeutic groups, home visits, and the use of technological resources such as telemedicine and electronic platforms.[12,27]

A study conducted in China with DM2 patients, using electronic messages and free access to a telemedicine platform for disease management, showed that there was a significant decrease in glycated hemoglobin, fasting and postprandial glycemia, insulin, TC, and LDL after the intervention, thus proving to be an effective way to reduce cardiovascular risk in these patients.[28] Another investigation conducted in Bangladesh with DM2 patients using interactive voice call had good acceptance and satisfaction by most participants, proving to be useful in the proper management of the disease and strengthening the relationship between patient and professional responsible for the call, which made the patient feel responsible for taking care of his own health.[29]

Furthermore, the use of Integrative and Complementary Health Practices by people with chronic diseases has brought benefits to the users' health in the psychological, physical, and emotional dimensions. Researchers have shown that ginger supplementation by DM2 patients promoted improvement in glycemic, lipidic, and anthropometric levels.[30] But other practices such as acupuncture, aromatherapy, yoga, reiki, and/or foot reflexology can also be adopted in chronic patients, increasing the scope of advanced Nursing practices.

Among the limitations of this research, we can highlight the impossibility of measuring cause-effect in relation to the study variables. Although the findings corroborated several international studies with the same approach, further investigations with multicenter evaluation are suggested. Furthermore, it is important to consider other variables for further support in patient management.

CONCLUSION

In view of these results, the prevalence of dyslipidemia is high in DM2 patients, with the main alteration expressed by the elevation of TC. It is evident the existence of a significant association between the occurrence of dyslipidemia and variables such as female gender, smoking and sedentary lifestyle, which emphasizes the need for special attention to the populations that present these risk factors. It is noteworthy that studies regarding the analysis of dyslipidemia in patients with diabetes should be carried out with different publics, with larger samples and using different methodological designs in order to expand and intensify the knowledge of the scientific community about this issue.

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