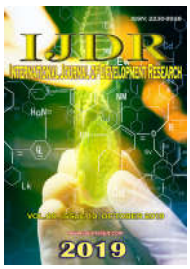
ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 09, Issue, 10, pp. 30670-30675, October, 2019



RESEARCH ARTICLE OPEN ACCESS

PROFILE EPIDEMIOLOGICAL AND CORRELATION OF RISK FACTORS CARDIOVASCULAR IN WOMEN IN PHASE CLIMACTERIC

[1]Larissa Alves Guimarães, [2]Beatriz Rocha Sousa Duarte, [3]Adriana Vanderlei do Amorim, [4]Michela Macedo Lima Costa [5]Isabela Arruda Soares, [5]Diêgo Andrade de Oliveira, [5]Rafael Cerqueira Campos Luna, [6]Stenio Fernando Pimentel Duarte and *[2]Iaggo Raphael David

[1]Expert Professor in the University Maurício de Nassau; Researcher in the Research Institute, Public Health Extension, INPES, Brazil
[2]Expert Professor and Researcher in the Research Institute, Public Health Extension, INPES, Brazil
[3]Expert Professor in the Brazilian Association of Dentists Specialists, ABEPO, Brazil
[4]Professor in the St. Augustine Educational Institute, FASA, Brazil
[5]MD. Professor in the St. Augustine Educational Institute, FASA, Brazil
[6]Doctor Professor and Researcher in the Research Institute, Public Health Extension, INPES, St. Augustine School of Health, FASA, Brazil

ARTICLE INFO

Article History:
Received 08th July, 2019
Received in revised form
17th August, 2019
Accepted 20th September, 2019
Published online 23rd October, 2019

Key Words:
Climacteric, Cardiovascular diseases.
Menopause, Women's Health.

Corresponding author:
Iaggo Raphael David

ABSTRACT

Introduction: With advancing age women suffer from physiological and morphological changes that may culminate in chronic diseases. Among these changes is menopause, recognized as a risk factor for cardiovascular disease, affecting both the quality of life and longevity. ***Objective:*** evaluate the correlation and to draw the epidemiological profile of risk factors in climacteric women. ***Methodology:*** This is a cross-sectional epidemiological research. The sample consisted of 148 women, divided into age groups, group A consisting of women aged 40 to 49 years and group B women aged 50 to 59 years. Women underwent body measurements such as waist circumference to identify abdominal obesity and body composition using the bioimpedance scale to obtain the percentage of body fat, visceral fat and muscle mass. Behavioral habits were also evaluated, such as the practice of physical activity, the use of alcohol, tobacco, stress and anxiety. ***Results:*** It was found that body composition was very associated with the onset of cardiovascular risk, since most had high% body fat, visceral, waist circumference, with increased risk for the onset of illness. ***Final considerations:*** The climacteric period is marked by physiological and morphological changes that increase the risk for the onset of cardiovascular disease and even metabolic syndrome.

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Citation: ***Larissa Alves Guimarães, Beatriz Rocha Sousa Duarte, Adriana Vanderlei do Amorim, Rafael Cerqueira Campos Luna, Stenio Fernando Pimentel Duarte and Iaggo Raphael David*. 2019.** "Profile Epidemiological and correlation of risk factors Cardiovascular in Women in phase Climacteric", *International Journal of Development Research*, 09, (10), 30670-30675.

INTRODUCTION

With advancing age, women suffer physiological and morphological changes that may culminate in chronic diseases. Among these changes are menopause, cessation of menstrual cycles that marks the end of female reproductive life (Kat *et al.,* 2017; Mota MP dos*et al.,* 2018; Al-Safi *and* Polotsky, 2015; Gonçalves *et al.,* 2016 and Taneri *et al.,* 2016), recognized as a risk factor for cardiovascular disease, affecting both quality of life and longevity of these patients (Stachowiak *et al.,* 2015). Cardiovascular disease is the leading cause of morbidity and mortality in postmenopausal women (Sun *et al.,* 2017; Melo*et al.,* 2018 and Collins *et al.,* 2016).

The risk increases substantially in climacteric when estrogen levels decrease. Women are typically about a decade older than men in first heart disease, and this may be related to the decline in ovarian hormone concentrations during the menopausal transition (Mota MP dos *et al.,* 2018; Kang *et al.,* 2017; Newson, 2018; Newson, 2018; Schmidt, 2017 and Ertunc *et al.,* 2015). Due to hormonal changes, some women may have vasomotor symptoms, such as sweating and hot flashes (Schmidt, 2017 and Avis *et al.,* 2015), and mental disorders, the most common being anxiety and stress, which are also risk factors for cardiovascular disease due to weight gain. and body circumferences (Emdin *et al.,* 2016).

In addition, stress and anxiety may result in autonomic activation, leading to increased blood pressure and heart rate and decreased endothelial function, which may cause vascular injury and remodeling (Muka *et al.,* 2016). Depression may also be linked to inflammatory processes, autonomic nervous system dysfunction, and impaired coronary flow reserve that increases the risk of myocardial ischemia (Penninx, 2017). Poor adherence to physical activity and anti-inflammatory drugs may increase inflammation, which may, in turn, increase depressive symptoms (Emdin *et al.,* 2016; Batelaan *et al.,* 2016 and Dhar *et al.,* 2016). With regard to hypertension, some studies suggest that depression may increase cardiovascular risk by decreasing the drop in blood pressure at night (Cohen *et al.,* 2015). As for waist circumference, patients with ischemic heart disease who accumulate abdominal fat have twice the risk of death compared to those who store fat elsewhere in the body (Savukoski *et al.,* 2019). Body mass index is only a measure of weight in proportion to height. The most important data is the place where fat is being stored. Therefore, abdominal obesity is the most important risk factor (Ángel*et al.,* 2017).Another contributor associated with weight gain and fat distribution is the atherogenic lipid profile, characterized by decreased HDL cholesterol and increased LDL cholesterol and triglycerides, with menopause associated with these changes (Savukoski *et al.,* 2019).

Climacteric and aging in women may, therefore, be associated with a lipid profile that converges with the atherogenic profile, in addition to the change in dietary pattern with advancing age that may also contribute to this profile (Anagnostis *et al.,* 2016).Smoking, alcoholism and physical inactivity are also important risk factors. These are considered modifiable (Mota MP dos *et al.,* 2018) because life and eating habits and physical activity patterns are largely similar in groups that have the same culture or custom (Sun *et al.,* 2017). As for exercise, menopausal women who exercise compared to non-exercise or placebo have more significant benefits in body fat, waist circumference, triglyceride level, and lumbar spine mineral density. In short, aerobic exercise helps menopausal women improve their body fat and triglyceride level (Al-Safi and Polotsky, 2015; Yeh *et al.,* 2017 and Carey, 2014). Thus, this study aims to evaluate the increased risk for cardiovascular disease in women attending the public service who are in the climacteric phase, which factors are associated in order to work on prevention and quality of life. Also, observe the epidemiological profile of these patients.

MATERIALS AND METHODS

Type and place of research: This is a cross-sectional and quantitative epidemiological study conducted in the city of Vitória da Conquista - Bahia, Brazil (-14 ° 51 '58', longitude of -40 ° 50 '22). It currently has a population of 320,129. This paper is a cross-sectional view of an umbrella project: "Epidemiological Profile of Obesity and the Associated Factors in the Southwestern Bahia Region". The work methodology is part of a work already published, being a work of the umbrella research itself, which guides the use of all questionnaires, protocols, procedures and evaluation methods (David*et al.,* 2019).

Sample and grouping: The sample consisted of 148 women, divided into age groups: group A composed of women aged 40 to 49 years, and group B women aged 50 to 59 years. The age range chosen includes the climacteric as well as the pre and post menopause. Postmenopause is said to happen from 40 to 50 years of age; For this hormonal transition the groups were divided according to age group the hormonal transition. Group A consisted of 80 premenopausal women and group B with 68 postmenopausal women.

Inclusion and exclusion criteria: Women who had no pre-existing pathology such as hypertension, diabetes and cardiovascular disease were included. Women who had a mental illness such as Alzheimer's and dementia as well as women with cancer were withdrawn.

Variables and data collection methods: After separation for the groups, the women underwent body measurements such as waist circumference to identify abdominal obesity and body composition using the bioimpedance scale to obtain fat percentage. Body fat, visceral fat and muscle mass. Behavioral habits were also evaluated, such as the practice of physical activity, the use of alcohol, tobacco, stress and anxiety (David *et al.,* 2019). Biochemical and hemodynamic variables were verified to improve the identification of the risk for the onset of cardiovascular diseases. Total cholesterol, triglycerides, LDL and HDL cholesterol, as well as systolic and diastolic blood pressure were analyzed. Other variables were also verified to compose the characteristics of the sample, namely: social class, work, education, type of education and marital status. More information about the sample characteristics, table 1 details the data in both groups A and B.To obtain the variables, the LIPP and BECK questionnaire for stress and anxiety was used (Dias *et al.,* 2018). The IPAQ was also used to verify the practice of physical activity, being classified as "active" and "not active". Waist circumference was made according to pre-established protocols and the smallest circumference between the last rib and the upper edge of the iliac crest was measured. Blood pressure was measured with a digital device, and the arm size was measured before the correct cuff was used, avoiding measurement bias. Three measurements were taken, and the mean was used (David *et al.,* 2018). Biochemical tests were collected under fasting guidance from 8 to 12 hours as predicted under the blood collection rules (David *et al.,* 2019).

Treatment and Statistical Analysis

Data were processed and tabulated in an Excel spreadsheet and later transferred and analyzed using the SPSS 25.0 statistical program, which initially verified the descriptive analysis of the data, as well as the mean and standard deviation of age. , total cholesterol, triglycerides, LDL cholesterol, HDL and systolic and diastolic blood pressure (David*et al.,* 2019). The significance of the data was set at 95%, predicted for health research. The nonparametric Spearman correlation test between age and continuous numerical variables was also applied. To make this possible, groups A and B were unified to identify the variation in the correlation between the variables. The correlation between body fat and muscle mass (Meira*et al.,* 2019) was also verified.

Ethical Aspects

This paper is approved by the Research Ethics Committee under Human Opinion No. 1,859,545. All participants were established regarding the research, the risks and benefits, agreed to participate and signed the Informed Consent Form (ICF). The research met all the requirements of Law 466/2012 of the National Health Council (CNS) (31) that regulates the

ethical and legal aspects in scientific research with humans, either directly or indirectly.

RESULTS AND DISCUSSION

The sample consisted of 148 women divided into two groups (A and B), with 80 women belonging to group A and 68 women to group B. Data were described in frequencies and percentages and are detailed in table 2. Risk factors for the onset of cardiovascular disease in women groups were identified. The average age of group A was 44.15 ± 2.83 and group B was 54.09 ± 3.30, similar to that used in another study (Moor*et al.,* 2016). As described in table 1, women were matched according to their socioeconomic characteristics so that comparisons were possible. In both groups it was found that body composition was very associated with the onset of cardiovascular risk, since most had high% body fat, visceral, waist circumference, with increased risk for the onset of disease. The skeletal muscles of group A 70% had normality indicators, with fall for group B that 55.9% were normal, corroborating with Kang *et al.* (2017)who also found in their study the increase and accumulation of fat mass in the central region and reduction of muscle mass(lean)and postmenopausal women.

Among behavioral factors and mental health, the majority of both groups were active, did not smoke, but alcohol use seems to increase with increasing age, as group A responded that 62.5 % consumed and in group B consumption was present in 70.6% of the sample. A study conducted in 2016 (Anagnostis *et al.,* 2014) showed, however, that smokers and alcoholics were more common in premenopausal, in line with our findings that corroborate research published the following year (Sun *et al.,* 2017) that states the increased use of tobacco and alcohol with advancing age. In a 2016 study (Moor*et al.,* 2016), no woman was considered an alcoholic, although 71.3% of them occasionally consumed alcohol, a result very similar to this research. In addition, the results were also concomitant with the low rate of people with smoking habits and almost all women with physical activity. Smoking is the leading preventable cause of death worldwide and is associated with the onset of cardiovascular disease in women. For menopause, tobacco is an important influence on the severity of symptoms, in addition to reducing the age at which women enter the climacteric by interfering with estrogen production and reducing eggs (Ertunc *et al.,* 2015).

As for alcohol, it has also been linked to decreasing age for menopause because it may be associated with higher levels of follicle stimulating hormone (FSH) in women of childbearing age, which were associated with ovarian damage (Taneri *et al.,* 2016).Regarding hemodynamic profile and lipid metabolism, it was found that systolic and diastolic blood pressure was slightly higher in group B than in group A. This difference in increase can also be seen in relation to total cholesterol, triglycerides, LDL cholesterol, as already seen in the literature, including regarding HDL cholesterol there was no difference (Stachowiak *et al.,* 2015). Anagnostis *et al.* (2016) also reported that their study of menopause was associated with an increase in total cholesterol, LDL and triglycerides. This can be explained by the fact that increased apolipoprotein B (contained in each LDL particle) and decreased apolipoprotein AI (contained in HDL) are predictive of cardiovascular disease (Anagnostis *et al.,* 2016). However, unlike this study and that of Stachowiak (2015), a decrease in HDL was observed. To reduce LDL cholesterol, estrogen replacement therapy is suggested, as shown in the study by Stachowiak *et al.* (2015). Cardiovascular risk tends to increase with decreased ovarian function and should be considered in prevention and treatment strategies, such as hormone therapy (Sun et al., 2014; Ertunc *et al.,* 2015).

For more information on the risk factors mentioned, see Table 2. Increased weight and blood pressure become more common in women in climacteric. According to Jocelyne *et al.* (2016) found in their research about 80% of women in this phase with overweight or obesity and approximately 77% with high blood pressure (more than half of them with changes in systolic blood pressure) (Moor*et al.,* 2016). These data corroborate this study in view of the large number of women with high fat percentage (94.1%) and with altered blood pressure. Table 3 shows the Spearman correlation values for continuous variables. Visceral fat, systolic blood pressure and triglyceride levels were found to have a strong significance level and were linearly correlated with increasing age. More details regarding the correlation of variables are shown in Table 3. Postmenopausal women have higher levels of total cholesterol, LDL cholesterol, triglycerides, and HDL than premenopausal women. In premenopausal women, Delitala *et al.* (2016), after adjusting for age, BMI, smoking, insulin and glycemia, observed that TSH (hormone that influences lipoprotein metabolism) showed a direct relationship with total cholesterol, LDL and triglyceride levels.

Table 1. Sample Characteristics

		Group A 40 to 49 years		Group B 50 to 59 years	
		n	%	n	%
Age	Average± SD	44.15 ± 2.83		54.09 ± 3.30	
Social Class	C	14	17.5	10	14, 7
	D	44	55.0	40	58.8
	E	22	27.5	18	26.5
Work	Yes	62	77.5	36	52.9
	No	18	22.5	32	47.1
Education	Fund. Incomplete	18	22.5	28	41.2
	Fund. Complete	8	10.0	4	5.9
	Med. Incomplete	2	2.5	4	5.9
	Med. Full	36	45.0	20	29.4
	Sup. Full	16	20.0	12	17.6
Type Education	Public	74	92.5	60	88.2
	Private	6	7.5	8	11.8 Marital
Status	Single	28	35.0	28	41.2
	Married	52	65.0	40	58.8

Source: Own survey 2019. Group A - premenopausal; Group B – postmenopause.

Table 2. Epidemiological Profile of Risk Factors for Cardiovascular Disease

		Group A 40 to 49			Group B 50 to 59	
		n	%		n	%
BODY COMPOSITION						
%Body Fat	High	28	35.0		20	29.4
	Very High	42	52.5		44	64.7
	Normal	10	12.5		4	5.9
Visceral Fat	High	28	35.0		42	61.8
	Normal	52	65.0		26	38.2
Waist Circumference	Ideal Range	30	37.5		12	17.6
	Increased Risk	20	25, 0		22	32.4
	Very much increased risk	30	37.5		34	50.0
Skeletal Muscle	Low	24	30.0		30	44.1
	Normal	56	70.0		38	55.9
BEHAVIORAL AND MENTAL HEALTH						
Physical Activity	Active	68	85.0		50	73, 5
	No Active	12	15.0		18	26.5
Smoking Habit	Yes	12	15.0		24	35.3
	No	68	85.0		44	64.7
Ethical Habit	Yes	50	62.5		48	70.6
	No	30	37.5		20	29, 4
Stress	Without	28	35.0		30	44.1
	With	52	65.0		38	55.9
Anxiety	Without	60	75.0		46	67.6
	With	20	25.0		22	32.4
LIPID HEMODYNAMIC AND METABOLIC PROFILE						
Blood	Systolic Pressure	124.50 ±			18.224 130.12 ± 21.450	
	Diastolic	78.65 ± 10.067			79.91 ± 11.190	
Total Cholesterol		189.80 ± 30.832			200.94 ± 39,942	
Triglycerides		127.22 ± 65,532			162.3 ± 78,932	
LDL cholesterol		113.59 ± 28.061			119.79 ± 32.236	
HDL cholesterol		48.47 ± 11.179			48.94 ± 13.622	

Source: Own research 2019. Group A - premenopausal; Group B – postmenopause.

Table 3. Nonparametric correlation of variables with age

VARIABLES	C. CORRELATION	SIG. (2 END)
Body Fat	ρ = 0.047	p <0.567
Visceral Fat	ρ = 0.377 **	p <0.000 **
Skeletal Muscle	ρ = -0.047	p <0.568
Waist Circumference	ρ = 0.199 *	p <0.015 *
Systolic Blood Pressure	ρ = 0.230**	p <0.005 **
Diastolic Blood Pressure	ρ = 0.114	p <0.167
Total Cholesterol	ρ = 0.074	p <0.369
Triglycerides	ρ = 0.215**	p <0.009 **
HDL Cholesterol	ρ = 0.055	p <0.510
LDL Cholesterol	ρ = -0.027	p <0.751

*Source: Own research, 2019. Correlation C. Correlation Coefficient. Follow - Meaningfulness. ** Correlation is significant at level 0.01 (2 extremities). * Correlation is significant at level 0.05 (2 ends).*

In the postmenopausal group, TSH was directly associated with triglyceride levels (Delitala*et al.,* 2016).Weight gain, increased blood pressure, changes in lipid levels and obesity drive the increase in metabolic syndrome (Stachowiak *et al.,* 2015), risk factors observed in the women of this study. Concomitantly, there is an increase in abdominal fat and a decrease in energy expenditure, which may suggest that these women are more likely to develop menopausal syndrome.

Susceptibility to obesity-related cardiometabolic complications is not only mediated by total body fat mass, but is largely dependent on individual differences in regional body fat distribution (Piché *et al.,* 2018). Because of this, only BMI assessment is not sufficient to determine risk profile, but to analyze the location of this fat, as the findings of this research.

In addition, the change in the patient's lifestyle may also mean a higher risk for mental illness, such as anxiety, depression and stress (Batelaan *et al.,* 2016), or may be an indication that these diseases may be present. Smoking, alcoholism and low physical activity index are mediating mechanisms for the onset or aggravation of cardiovascular diseases (Penninx, 2017; Cohen *et al.,* 2015 and Chauvet-Gelinier *et al.,* 2017).

It was also verified the correlation between body fat and skeletal musculature, in which they obtained negative and strong correlation (ρ = -0.905; p <0.001), demonstrating that the greater the increase in body fat, the lower the skeletal muscle mass and vice-versa. versa. Obese patients tend to have a higher chance of having cardiovascular disease and vasomotor symptoms (Gonçalves *et al.,* 2016 and Avis *et al.,* 2015). According to Al-Safi *et al.* (2016), this association may occur due to the insulating effects of adipose tissue, even though this effect may decrease later in the menopausal transition due to decreased estradiol in climacteric women (Al-Safi *et al.,* 2015;Collins *et al.,* 2016 and Baber *et al.,* 2016).A study published in 2016 using groups to assess body fat, skeletal muscle mass and BMI found that the specific subgroup of high muscle mass and low fat mass had the lowest mortality risk compared to the other body composition subtypes (Srikanthan *et al.,*2016). This suggests the importance of assessing body composition in predicting cardiovascular and total mortality in patients with cardiovascular disease. This makes it evident that sarcopenic obesity (localized fat within the muscle) is an obvious problem

with increasing age (Chuang *et al.,* 2016) and can be accentuated during the climacteric period, as shown by Kang *et al.* (2017) who studied the effect of sarcopenia and obesity on the risk of changes in postmenopausal women and their results showed a significant relationship (Kang *et al.,* 2017).

Final considerations

The menopause period, and later the climacteric period, are marked by important and significant physiological and morphological changes that interfere with both the physical and mental health of women. These changes increase the risk for cardiovascular disease and even metabolic syndrome. Risk factors such as amount and location of body fat, amount of skeletal muscle mass, lifestyle habits such as alcoholism, smoking, physical activity and anxiety are some that can predict the onset and severity of cardiovascular disease. Prevention and treatment strategies aimed at improving the quality of life.

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