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Influence of Body Composition Measures about Cardiovascular Risks in the Elderly Practitioners of Physical Activity

ORIGINAL

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Abstract

Objective: Analyze the influence of the measures body composition cardiovascular risk in elderly practitioners of physical activity.

Method: This is an exploratory study, transversal and quantitative. Held from May to June 2015, in the municipality of João Pessoa/Paraíba, with elderly patrons of sport aerobics. Were selected for the study 21 people, with inclusion criteria does not own metallic structure in the body to prevent the measure through bioimpedance equipment octopolar InBody 720, less than 60 years of their own age and practice aerobics activity at least three months.

Results: Most of the individuals represented unfavorable health condition being more prone to cardiovascular risks. Identified that normal systolic blood pressure was the variable that most contributed to the score designed to show the possibility of a lower cardiovascular risk, while the visceral fat and fat-free mass were the factors that contributed for increased cardiovascular risk.

Conclusion: Optimization of preventive practices is necessary for cardiovascular diseases that propitiate the awareness of affected subject.

Keywords
Anthropometry; Elderly; Body Composition.

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Introduction

The chronic non-communicable diseases (NCD) constitute a serious public health problem in Brazil, and along with cardiovascular diseases, respiratory and feature high incidence in neoplastic elderly population. [1-2] thus, necessitating intensified in prevention in the elderly population, because the greater the number of risk factors, the greater the probability of presenting a cardiovascular event. [3]

Cardiovascular diseases (CVD) are the leading cause of morbidity and mortality in developed and emerging countries, this scenario persists even with changes in lifestyle and the numerous existing therapeutic processes. [4] In Brazil, the incidence of CVD grows over the years and, associated with this, the public expenditure on health supplements with the treatments have been progressively bigger. [5]

In this sense, the ageing of the population reflects a constant challenge for the health services working in the perspective of prevention, aiming to promote the increase of quality of life and reduce morbidities. [6] Promote healthy ageing world is no easy task, because it requires changes in the lifestyle of the population, and this includes the sedentary lifestyle. [7]

One of the consequences of physical inactivity, overweight, and is considered important in addition to the excess fat, its location, as it can cause Metabolic complications. The literature points to this variable as a cardiovascular risk factor, constituting its assessment essential in monitoring and targeting of actions aimed at health promotion, prevention and control of obesity and its Comorbidities. [8]

In this perspective, the studies to check the various cardiovascular risk factors should be accomplished. Thus, studying the influence of anthropometric standards with regard to cardiovascular risk factors are also important to evaluate how much of the modifications of these factors depend on changes in body composition. [9]

In Brazil, studies that assess the theme in question are still scarce, especially when it comes to elderly individual's practitioners of physical activities, justifying the conduct of this study.

To this end, information related to the influence of body composition measures about cardiovascular risks can collaborate on multidisciplinary approach to the health of the elderly, focused on prevention of complications related to cardiovascular diseases and for the development of public policies for healthy ageing.

On the exposed, this work aimed to evaluate the influence of body composition measures about cardiovascular risks in the elderly practitioners of physical activity.

Methodology

This is an exploratory study, transversal and quantitative. Held from May to June 2015, in the municipality of João Pessoa/Paraíba-Brazil, with elderly regulars of sport aerobics. Were selected for the study 21 people, aged 60 years or more, with inclusion criteria to participate in physical activity in water aerobics at least three months and not have the metallic structure in the body to prevent the measure through bioimpedance equipment octopolar InBody 720. Important to point out that in this study were considered elderly, as the status of the elderly that is regulated by law 10.741/2003, those aged over 60 years, justifying the inclusion criterion. [10]

The blood pressure was checked by auscultation method, following rigorously the protocol proposed by the VI Brazilian Guideline of hypertension, [11] as advocated by the Brazilian Association of Cardiology/Brazilian Society of hypertension/Brazilian Society of Nephrology, using a sphygmomanometer aneroid (Missouri, Embu, São Paulo-Brazil), previously calibrated against a mercury column. The measurements were made at home (after 10 minutes sitting). For the measurement of the blood pressure was used a precision of two mmHg, being considered as hypertension blood pressure greater

than or equal systolic pressure 140 and diastolic pressure 90 mmHg.

The blood glucose rate was obtained by use of test strips in venous blood capillary (fingertip indicator), using disposable stilettos with instrumental reading of Optium Xceed Medi Sense. It was performed in 8-hour fasting and the desired value for the normal capillary blood glucose is at most 100 mg/dL. The value considered greater than or equal 126 milligrams per deciliter (mg/dL) will be considered high level, as the Brazilian of Dyslipidemias and Guideline V prevention of Atherosclerosis. [12]

The weight (P), fat mass (MG), the area of visceral adiposity (AAV), fat-free mass (MIG) and skeletal muscle mass (MME) were evaluated with use of bioimpedance octopolar InBody 720 (Biospace, Seoul, Korea), with patients in 2 to 3 hours fasting and without practicing physical exercise in the hours leading up to the test preparations defined in the literature. [13] The InBody 720 uses 8 electrodes, being 2:00 pm contact with the Palm (E1 and E3) and thumb (E2 and E4) of each hand and 2:00 pm contact with the front part (E5 and E7) and heel (E6 and E8) of each foot, allowing to evaluate 4 compartments of body mass (total body water, proteins, minerals and fat mass). Five segmental impedances (right arm, left arm, torso, right leg and left leg). Several studies documenting the accuracy of this equipment in the estimation of total and segmental body composition. [14]

The data observed in this research were transposed to a spreadsheet in EXCEL and then converted to a file compatible with the statistical package Statistical Package for the Social Sciences (SPSS) that has enabled the preparation of statistical analyses with the models and techniques employed for the construction and validation of the scoring. Considering the normal category of blood glucose, blood pressure diastolic, systolic blood pressure, weight, visceral adiposity, fat-free mass and skeletal muscle mass was determined a score represented by the sum of these variables in dichotomized 1 = Normal and 0 = not normal. This naturally score ranges from 0 to 7. To assess the meaning of this indicator was a cluster analysis with Euclidean metric and connection method for hierarchical groupings. To evaluate the one-dimensionality of this score applied to factor analysis for dichotomous data determining the correlation matrix tetrachoric between the variables and then determined the eigenvalues of this matrix. It is also used for the ROC curve for classification of cardiovascular risk score.

The study was approved by the ethics and Research Committee of the Centro Universitário de João Pessoa/Paraíba, Brazil. CEP/UNIPÊ, CAEE: 38840214.7.0000.5176. All participants were asked to sign the informed consent (TFCC) in accordance with resolution 466/2012 National Health Council that governs the survey among human beings. [15]

Results

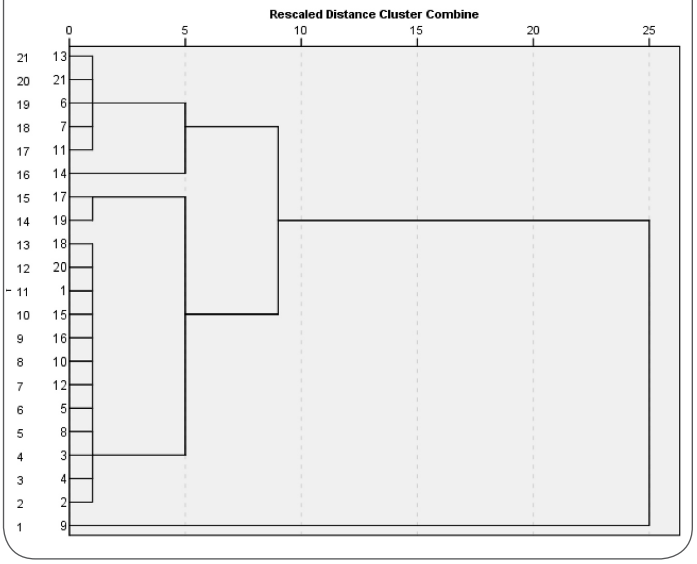
The demographic data of the participants of the study can be verified in the **Table 1**.

Table 1. Demographic Data: sex, educational level, marital status and age. João Pessoa, PB. N = 21.

Variables	N	%
Sex		
Female	20	95.2
Male	1	4.8
Schooling		
Illiterate	1	4.8
Elementary School	2	9.5
High School	10	47.6
Higher Education	8	38.1
Marital status		
Married	12	57.1
Single	3	14.3
A widower	5	23.8
Divorced	1	4.8
Age (Medium age ± SD)	65.9 ± 6.92	
	SD = standard deviation	

The meaning of the indicator on the blood glucose, blood pressure diastolic, systolic blood pressure, weight, visceral adiposity, fat-free mass and skeletal muscle mass, is represented in the dendrogram in **Figure 1**.

Figure 1: Dendrogram to the score achieved by the dichotomized variables.



It can be observed in **Figure 1** the clear formation of two groups: the first consisting of five individuals to the numbers in **Figure** designated (6, 7, 11, 13, 21) and these have scores 2 and 3 respectively. That is, these individuals represent a condition unfavorable in terms of health and therefore more prone to cardiovascular risks since they represent the presence of the factors associated with an increase of this kind of risk. Therefore, values of this score less than or equal to three represents a greater risk of cardiovascular problems. It is observed that the individual is the 9 that has a lower cardiovascular risk.

To evaluate the one-dimensionality of this score applied to factor analysis for dichotomous data determining the correlation matrix tetrachoric between the variables and then determined the eigenvalues of this matrix. The first eigenvalue of this matrix presents explanatory power in relation to the total variance contained in the data equal to 42.6% featuring a strong influence of a single factor. Therefore, it can be considered that this score evaluates a one-dimensional construct that can be interpreted as the cardiovascular risk in the face of literature cited in presence of risk factors that were used in this work to the composition of this score.

For the variables on which it was possible to determine the risk of affect to values below 4 (score that means higher risk of cardiovascular disease), the results presented in **Table 2**.

It is observed in **Table 2** that the systolic blood pressure was normal the variable that most contributed to the score designed to show the possibility of a lower cardiovascular risk.

The classification of the score as quoted above was evaluated by ROC curve and 99.5% sensitivity and specificity 58.3% and is likely that in a larger sample these values can be larger.

Table 2. Risk of each variable calculated on the basis of the scores below 4.

Variable	Risk	IC 95%
Systolic Blood Pressure	0.031	0.002 to 0.420
Diastolic Blood Pressure	0.400	0.036 to 4.411
Visceral fat	0.867	0.711 to 1.057
Skeletal Muscle Mass	0.154	0.017 to 1.369
Fat-free mass	0.933	0.815 to 1.069

Discussion

With regard to the demographic aspect identified that the average age of the elderly ranged from 65.9 ± 6.92 years, with 95.2% (20) female, 4.8% (1) male, most 57.1% (12) married, followed by 23.8% (5) widows, 14.3% (3) singles, 4.8% (1) divorced, with 47.6% high school (10), higher education 38.1% (8), 9.5% complete primary school (2), illiterate 4.8% (1).

The female prevalence is related to greater longevity compared to men. However, the decrease in the fertility rate, is also related to the increase of the elderly population, as well as the female birth

rate be greater compared to men, may explain the feminization of the sample. [16]

As for the level of education, there is a predominance of elderly with high school, followed by higher education. It's worth considering that the years of influence on social life, economy, and in the search for health services, constituting justification measures of public initiatives and non-governmental actions regarding literacy and continuing education of adults and the elderly. [17]

The low level of schooling may favor the policies of health risks, due to restrictions on access to information, as a result of the commitment of the skills of reading, writing and speaking, as well as the understanding of the complex mechanisms of disease and treatment. [18]

With regard to the health of individuals studied, the first group shown in **Figure 1**, shows an unfavorable condition in terms of health, thereby, increasing cardiovascular risks, since these individuals have one of the factors that increase the risk for cardiovascular disease.

With respect to the variables in which it was possible to determine the increased risk for cardiovascular disease (score below 4) are: systolic blood pressure, diastolic blood pressure, skeletal muscle mass, visceral fat, and fat-free mass. Noting that the fat-free mass and visceral fat have contributed more to the risk of disease.

Although the systolic blood pressure has constituted the most influential to the absence of risk, the monitoring and control of this variable, whereas the presence of systemic Arterial hypertension (SAH) contributes proportionately in the profile of Brazilian, where mortality predisposes the three leading causes of death: acute myocardial infarction, stroke and heart failure. [19]

The HAS it is a multifactorial clinical condition characterized by high and sustained levels of blood pressure. Associates often to functional changes and/or structural target organs (heart, brain, kidneys and blood vessels) and the metabolic changes, with increased risk of fatal and non-fatal cardiovascular events. [19]

Another risk factor found in this study encompasses the visceral fat that is present in the tissues, is an important influential for changes in metabolism, such as insulin resistance, type II diabetes, which can lead to hyperadrenergic state dyslipidemia, promoting the vasoconstriction of the muscles, raising your blood pressure and consequent increased sodium reabsorption. [20]

As a method of prevention of these factors has been the practice of physical activity with minimum frequency of five times a week, because it triggers a reduction of body weight and visceral fat, while preserving lean body mass, preventing excessive energy expenditure. [21]

Physical activity and nutrition are two behaviors considered priorities for health promotion and chronic disease prevention. Several institutions and organizations such as the American Heart Association, the World Health Organization and the American College of sports medicine, have emphasized the importance of the adoption of regular physical activity for the improvement of individual and collective health levels, especially for prevention and rehabilitation of Cardiovascular Disease. [22]

Body mass is an important determinant of the elevation of the PAS. A study conducted in a low-income urban population (Fortaleza) concluded that the increased prevalence of SAH is directly proportional to the increase in body mass, that overweight and obese individuals have a prevalence of HAS 59% and 149% respectively greater than individuals with normal weight. [23]

In this sense, the main preventive measures are reducing the body weight, the intake of salt and alcohol consumption, the practice of physical exercises regularly and not using drugs that raise blood pressure. [19]

Another indicator assessed consisted in skeletal muscle mass, presenting significant risk value (0.154) for cardiovascular disease. The gradual loss

of skeletal muscle mass and strength with the advancement of age, known as sarcopenia.

The sarcopenia is a generic term that indicates the loss of mass, strength and quality of the skeletal muscle and that has a significant impact on public health, has functional consequences on the floor and in the balance, increasing the risk of a fall and loss of physical functional independence, but also contributes to increase the risk of chronic diseases such as osteoporosis. [24]

The presence of sarcopenia is influenced by several factors that affect the quality and the amount of muscle mass, or may act as risk factors manifesting itself in physiological processes, changing body composition, causing the decline of the muscular system and the musculoskeletal system as a whole. [25]

In this way, the decline of the muscular system modifies the composition of the muscle fiber, with considerable reduction of innervation, the Vascularity of contractility and commitment of tendon units. [26]

On the exposed, the health team has the responsibility to identify cardiovascular risk factors and accompanying elderly people, considering the variables that affect the quality of life and that significantly influence on sustainability of cardiovascular diseases.

Conclusion

The research aimed to evaluate the influence of body composition measures about cardiovascular risks in the elderly practitioners of physical activity, being identified the visceral fat and fat-free mass as the most contributed factors for classification of the subject with greater risk cardiovascular.

It is observed that although the subjects investigated practice physical activity, were found problems that need to be reduced or resolved by implementing action strategies. However, this practice must be drawn up in collaboration and participation of the subjects involved in the process. Soon, the researchers propose the need for a method of intervention for this population.

It should be noted, as a limitation to the study, the possibility of reverse causality, typical in cross-sectional studies, which does not allow to establish causal links safely between the events. However, the results identified in this research are awake for the indispensability of ways of optimization of outcomes of physical exercise programs intended for the elderly, guidelines and awareness process for cardiovascular risks.

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