

ASSOCIATION BETWEEN CARDIOVASCULAR RISK FACTORS AND ANTHROPOMETRIC INDICATORS IN MILITARY POLICE OFFICERS

ASOCIACIÓN ENTRE FACTORES DE RIESGO CARDIOVASCULAR E INDICADORES ANTROPOMÉTRICOS EN POLICÍAS MILITARES

ASSOCIAÇÃO ENTRE FATORES DE RISCO CARDIOVASCULAR E INDICADORES ANTROPOMÉTRICOS EM POLICIAIS MILITARES

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ABSTRACT

Objective: To evaluate the association between cardiovascular risk factors and anthropometric indicators in Military Police officers. **Methods:** This is a cross-sectional study, with a quantitative approach, carried out in two municipalities in the State of Ceará, Brazil. Data collection was performed by means of interviews to obtain sociodemographic variables, police practice, clinical data and behavioral aspects; and physical examination to obtain anthropometric indicators. Data were analyzed by descriptive and inferential statistics. **Results:** 107 military police participated in the study. There was a predominance of men, with an average age of 37.17 years, who performed operational activities. An association and statistical significance were verified between two anthropometric indicators and four cardiovascular risk factors, namely: conicity index with alcoholism, arterial hypertension, diabetes mellitus and role in the police; waist-hip ratio with alcoholism, arterial hypertension, diabetes mellitus and family history of cardiovascular disease. Each of the other anthropometric indices evaluated (weight, waist circumference, hip circumference, abdominal circumference, body mass index, waist-to-height ratio) had statistical significance with only two cardiovascular risk factors. The presence of arterial hypertension showed a statistically significant association with all anthropometric indicators evaluated, while a sedentary lifestyle had no significant association with any of them. The simplified Framingham score described low cardiac risk among the participants and only showed statistical significance with arterial hypertension and diabetes mellitus. **Conclusion:** Anthropometric indicators, especially the conicity index and waist-hip ratio, can be used to track cardiovascular risk factors in military police officers.

Keywords: Heart Disease Risk Factors; Anthropometry; Cardiovascular Nursing; Police; Chronic Disease.

RESUMO

Objetivo: Avaliar a associação entre fatores de risco cardiovascular e indicadores antropométricos em Policiais Militares. **Métodos:** Trata-se de um estudo transversal, com abordagem quantitativa, realizado em dois municípios do Estado do Ceará, Brasil. A coleta de dados foi realizada por meio de entrevista para obtenção de variáveis sociodemográficas, exercício policial, dados clínicos e aspectos comportamentais; e exame físico para obtenção dos indicadores antropométricos. Os dados foram analisados por estatística descritiva e inferencial. **Resultados:** Participaram do estudo 107 policiais militares. Predominaram homens, com idade média de 37,17 anos, que exerciam atividades operacionais. Foi verificada associação e significância estatística entre dois indicadores antropométricos e quatro fatores de risco cardiovascular, a saber: índice de conicidade com alcoolismo, hipertensão arterial, diabetes mellitus e função exercida na polícia; relação cintura-quadril com alcoolismo, hipertensão arterial, diabetes mellitus e antecedente familiar de doença cardiovascular. Cada um dos demais índices antropométricos avaliados (peso, circunferência da cintura, circunferência do quadril, circunferência abdominal, índice de massa corporal, razão cintura-estatura) possuíam significância estatística com somente dois fatores de risco cardiovascular. A presença de hipertensão arterial apresentou associação estatisticamente significativa com todos os indicadores antropométricos avaliados, enquanto sedentarismo não teve associação significativa com nenhum deles. O escore de Framingham simplificado descreveu baixo risco cardíaco entre os participantes e só apresentou significância estatística com hipertensão arterial e diabetes mellitus. **Conclusão:** indicadores antropométricos, especialmente o índice de conicidade e a relação cintura-quadril, podem ser empregados para rastrear fatores de risco cardiovascular em policiais militares.

Palavras-chave: Fatores de Risco de Doenças Cardíacas; Antropometria; Enfermagem Cardiovascular; Polícia; Doença Crônica.

RESUMEN

Objetivo: Evaluar la asociación entre factores de riesgo cardiovascular e indicadores antropométricos en Policías Militares. **Métodos:** Se trata de un estudio transversal, con abordaje cuantitativa, realizado en dos municipios del Estado del Ceará, Brasil. La recolección de datos fue realizada a través de entrevista para obtención de variables sociodemográficas, ejercicio policial, datos clínicos y aspectos conductuales; y examen físico para obtención de los indicadores antropométricos. Los datos fueron analizados por estadística descriptiva e inferencial. **Resultados:** Participaron del estudio 107 policías militares. Predominaron los hombres con edad media de 37,17 años, que realizaban actividades operacionales. Se verificó asociación y significancia estadística entre dos indicadores antropométricos y cuatro factores de riesgo cardiovascular, a saber: índice de conicidad con alcoholismo, hipertensión arterial, diabetes mellitus y función ejercida en la policía; relación cintura-cadera con alcoholismo, hipertensión arterial, diabetes mellitus y antecedente familiar de enfermedad cardiovascular. Cada uno de los demás índices antropométricos evaluados (peso, circunferencia de cintura, circunferencia de cadera, circunferencia abdominal, índice de masa corporal, razón cintura-estatura) tuvieron significación estadística con sólo dos factores de riesgo cardiovascular. La presencia de hipertensión arterial mostró asociación estadísticamente significativa con todos los indicadores antropométricos evaluados, mientras que el sedentarismo no tuvo asociación significativa con ninguno de ellos. La puntuación de Framingham simplificado describió bajo riesgo cardíaco entre los participantes y solo mostró significación estadística con hipertensión arterial y diabetes mellitus. **Conclusión:** indicadores antropométricos, especialmente el índice de conicidad y la relación cintura-cadera, pueden ser empleados para rastrear factores de riesgo cardiovascular en policías militares.

Palabras-chave: Factores de Riesgo del Enfermedades del Corazón; Antropometría; Enfermería Cardiovascular; Policía; Enfermedad Crónica.

INTRODUCTION

Military police officers have risk factors for cardiovascular diseases associated with their professional practice⁽¹⁻²⁾, demanding continuous actions to screen this risk and promote health. From this perspective, nurses need to define practical and low-cost methods for this verification, so the use of anthropometric indicators can be used. Such indicators represent a set of low-complexity and low-cost methods, widely used in epidemiological studies and which are associated with the assessment of cardiometabolic diseases⁽¹⁻²⁾. However, it was not identified in the literature which anthropometric indicators present the best correlation with cardiovascular risk factors in these professionals.

Military Police have several factors that trigger stress, which are reactions with a negative impact on physical and mental health, including constant exposure to danger and aggression, in addition to the threat of violence and risk of life in conflict zones⁽¹⁾. Furthermore, the inherent character of the profession, the nature of the activities performed, the work overload, the internal and external relations to the corporation, are some of the peculiar characteristics of the profession, which contribute to the exposure of military police officers to cardiac risk factors, the that affects their personal life and the performance of work activities⁽²⁾. In addition to being exposed to the most varied types of health problems, these professionals have high rates of lack of attendance at work caused by some illness⁽¹⁾.

In this context, Cardiovascular Diseases (CVD) (ischemic heart disease, cerebrovascular disease, hypertensive heart disease and other heart diseases) stand out, which are multicausal and are influenced by genetic and biological factors, such as age, sex, family history of CVD, race and chronic comorbidities, such as arterial hypertension and diabetes mellitus⁽³⁾. Added to this are socioeconomic, environmental and behavioral conditions to cardiovascular health, namely: education, income, overweight, obesity, accumulation of fat in the abdominal region, stress, smoking, alcoholism⁽⁴⁾.

The nurse, as a health promoting agent, plays an indispensable role in providing care to people with CVD or at high risk for such diseases. Acting in the clinical management, promotion, prevention and rehabilitation of these individuals, in addition to being responsible for educating them on the importance of adopting a healthy lifestyle (which includes a healthy diet, adequate physical activity and abandoning harmful health behaviors). Furthermore, in the context of CVD, nursing can act synergistically with other health professionals⁽⁵⁾.

In view of this scenario, one of the methods used to assess cardiovascular risk are anthropometric indicators, such measures comprise a set of simple procedures, with high reliability and low cost⁽⁶⁾. Anthropometric indicators that have a good predictive ability to classify cardiac risk are: waist-hip ratio (WHR), conicity index (CI), weight, body mass index (BMI), waist circumference (AC), waist circumference (WC) and waist-to-height ratio

(WHtR)⁽⁷⁻¹⁰⁾. However, it remains unclear which anthropometric variable is most associated with cardiovascular risk factors in military police.

Thus, studies that investigate the relationship of anthropometric indicators with cardiovascular risk factors in this population, and that take into account occupational activities and behavioral habits are necessary. Therefore, the objective of the study was to evaluate the association between cardiovascular risk factors and anthropometric indicators in military police officers. It is hoped that the results can help nurses to choose the best methods for this continuous screening.

METHOD

Cross-sectional study, with a quantitative approach, carried out in two cities in the Sertão Central Cearense, State of Ceará, in Brazil during the months of July and August 2019. Military police officers who effectively carry out their activities in the municipalities selected for the study were selected, totaling 166 military police.

Police officers of both sexes, active in the selected municipalities, participated in the study. The invitation to participate in the study was made by the researchers at the professionals' workplace, and those who agreed to participate signed the Free and Informed Consent Form, responded to the interview and performed the physical examination, characterizing convenience sampling. Those away from work due to illness, vacation period and/or leave were excluded.

Data collection was performed using a structured form, developed by the researchers based on the risk factors for cardiovascular diseases in military police officers mentioned in the literature⁽¹⁻²⁾. The variables analyzed were divided into categories, namely: sociodemographic data (sex, age, education level, race/color, personal income and marital status), police practice [police role (operational or administrative) and length of practice], clinical data (presence of comorbidities and family history of CVD), behavioral aspects [sedentary lifestyle, alcohol consumption, smoking, regular physical activity (frequency of three to five sessions per week, lasting 30 to 40 minutes), healthy eating (daily intake of one serving of beans, two servings of fruits and three servings of vegetables), consumption of red meat and sleep (adequate average of 7 to 8 hours per night)].

Furthermore, questions about cardiovascular risk factors used in the Simplified Framingham score were added to the form, namely: systolic blood pressure (SBP), use of antihypertensive medication and diabetes status⁽¹¹⁾. Blood pressure was measured using the indirect method, that is, using a Littmann Classic III® stethoscope and a Premium® aneroid sphygmomanometer. It should be noted that in this research specific instruments were not used to verify the level of alcoholism and smoking, these categories were evaluated based on the police officers' self-report.

The anthropometric indicators measured were: waist circumference (AC), conicity index

(CI), waist-to-height ratio (WHtR), waist circumference (WC), hip circumference (HC), waist-hip ratio (WHR), weight, height and body mass index (BMI). All anthropometric measurements were performed by the same examiner on all participants in this study to reduce bias. The collection of physical examination data was performed in a reserved room in the Battalion.

The AC was measured from the point of greatest diameter in the abdominal region, which may or may not coincide with the height of the navel⁽⁷⁾. The CI was determined by measuring WC in meters, body weight and height⁽⁸⁾. To obtain the WHtR measurement, WC (cm) was divided by the height measurement (cm)⁽⁹⁾. WHR was calculated using the measurement of WC between the midpoint of the last rib and the iliac crest, and the HC at the level of maximum gluteal protrusion, subsequently dividing the values obtained⁽¹⁰⁾.

For weight measurement, individuals were instructed to stand, barefoot and with as little clothing as possible, we used the Dubai Magazine® model glass digital body scale that supports up to 180 kg for such measurement. To assess height, participants were instructed to be barefoot, as upright as possible and with their backs against the two-meter inelastic measuring tape of the Corporal® brand that was placed vertically on the wall. Based on weight and height measurements, BMI was calculated using the formula $\text{kg}/\text{height}^2$. The weight-postural classification followed the current guidelines and protocols⁽¹⁰⁾.

The data obtained were organized and analyzed using the Statistical Package for the Social Sciences version 20.0, using descriptive statistical analysis (absolute and relative frequencies, mean, median and standard deviation). For quantitative variables, the Kolmogorov-Smirnov test was applied to verify the data adherence to the normal distribution. In the inferential analysis, the significance level adopted was $p < 0.05$. The Mann-Whitney U test was used to verify the association between risk factors and anthropometric indicators.

The study complied with the formal requirements contained in national and international regulatory standards for research with human beings, being submitted for ethical consideration (CAAE 14715419.1.0000.5046) and approved by the Ethics and Research Committee of the Centro Universitário Católica de Quixadá (Approval Protocol 3.372. 879).

RESULTS

107 military police participated in the study, representing 64.4% of the intended population. It is noteworthy that of the eligible population (166 military police officers), 23 were on vacation; 5 refused to answer the form; 4 were transferred to another company; 25 were in occurrence on the day for data collection; 1 was away from work due to illness and 1 carried out his activities in the forum.

Among the participants, there was a predominance of men (95.3%), mixed race (72.8%), married or in a stable relationship (70.1%), with an average personal income

greater than three minimum wages (76.7%) and higher education (37.4%). As for the police function, the majority performed operational activities (77.6%), were soldiers (38.4%), worked in ostensible policing (42.9%) and worked 24-hour shifts with a 72-hour break (46.7%) (Table 1).

Regarding eating habits, few said they followed a healthy diet (24.2%), so that the

consumption of beans, fruits, vegetables and red meat was present, but not in an adequate amount. The majority practiced physical exercise on a regular basis (81.3%), maintained good sleep and rest (54.2%), had a family history of CVD (62.6%) and denied smoking (97.3%) and alcohol consumption. (65.4%) (Table 1).

Table 1 – Distribution of participants in terms of sociodemographic data, professional practice in the police and risk factors dependent and not dependent on lifestyle. Quixadá-CE, Brazil, 2019.

Variables	n (%)
Gender	
Male	102 (95,3)
Female	5 (4,7)
Marital status	
With partner	75 (70,1)
Without partner	32 (29,9)
Role in the Police	
Operational	83 (77,6)
Administrative	24 (22,4)
Has a Family Background for CVD	67 (62,6)
Alcoholic	37 (34,6)
Non-Smoker	104 (97,3)
Performs Physical Activity	87 (81,3)
Consider your Healthy Eating	26 (24,2)
Adequate consumption of beans	100 (93,4)
Adequate fruit consumption	76 (71,0)
Adequate consumption of vegetables and greens	70 (65,4)
Red Meat Consumption	58 (54,2)
Preserved sleep/rest	58 (54,2)

Source : The authors

The mean age was 37.17 (\pm 8.83) years, with an average length of service in the corporation of 13.46 (\pm 10.06) years. Regarding comorbidities, systemic arterial hypertension was the most prevalent chronic condition (14%), followed by diabetes mellitus (3.7%). The mean blood pressure values were: 125.83 mmHg for

SBP and 112.00 mmHg for DBP. As for anthropometric values, mean weight and height were found to be 83.5 kg and 1.71 m, respectively. The mean BMI obtained was 28.4 kg/m², situated in the overweight range, and the mean Framingham Simplified score was 7.2%, considered to be of low cardiac risk (Table 2).

Table 2 – Distribution of measures of central tendency and dispersion of age, length of service in the military police, blood pressure and anthropometric data of the participants (n=107). Quixadá-CE, Brazil, 2019.

Variables	Average	SD ¹	Medium	Valuep ²
Age years)	37,17	8,83	35,0	0,017
Length of service in the military police (years)	13,46	10,06	10,0	0,004
Systolic blood pressure (mmHg)	125,83	11,55	130,0	0,003
Diastolic blood pressure (mmHg)	112,00	84,63	80,0	0,005
Weight (Kg)	83,5	11,93	82,0	0,196
height (m)	1,71	0,06	1,70	0,006
CC (cm)	93,9	9,85	91,0	0,000
QC (cm)	105,2	6,58	105,0	0,014
AC (cm)	97,6	10,19	95,0	0,000
BMI (Kg/m ²)	28,4	3,72	27,8	0,153
WHR	0,8	0,11	0,8	0,000
WHtR	0,5	0,06	0,5	0,002
CI	1,2	0,06	1,2	0,000
Simplified Framingham Score (%)	7,2	6,01	5,5	0,000

¹SD: Standard Deviation. WC: waist circumference; HC: hip circumference; AC: abdominal circumference; BMI: body mass index; WHR: waist-hip ratio; WHtR: waist-to-height ratio; CI: conicity index; ²Kolmogorov-Smirnov test.

Source: The authors.

From the inferential analysis, it can be seen that the cardiovascular risk factors that

showed association and statistical significance with the anthropometric indicators were systemic

arterial hypertension and diabetes mellitus. It is important to emphasize that the CI and WHR

showed a statistically significant association with four cardiac risk factors (Table 3).

Table 3 – Inferential analysis between cardiovascular risk factors and anthropometric indicators. Quixadá-CE, Brazil, 2019.

Variables	Gender	Sedentary lifestyle	Alcoholism	Family history	HAS	DM	Role in
							the Police
Weight (Kg)	0,04	0,78	0,69	0,06	0,00	0,14	0,21
CC (cm)	0,33	0,61	0,06	0,95	0,00	0,01	0,82
QC (cm)	0,95	0,29	0,77	0,02	0,00	0,15	0,26
AC (cm)	0,53	0,36	0,08	0,96	0,00	0,04	0,31
BMI (Kg/m ²)	0,35	0,28	0,88	0,36	0,00	0,06	0,46
WHR	0,13	0,20	0,00	0,04	0,00	0,00	0,25
WHtR	0,99	0,26	0,16	0,49	0,00	0,01	0,43
CI	0,95	0,11	0,01	0,05	0,00	0,00	0,04
Simplified Framingham Score (%)	0,64	0,11	0,28	0,14	0,00	0,00	0,71

WC: waist circumference; HC: hip circumference; AC: abdominal circumference; BMI: body mass index; WHR: waist-hip ratio; WHtR: waist-to-height ratio; CI: conicity index.

Source: The authors.

DISCUSSION

Despite the proposed cut, the sociodemographic characteristics of the studied sample are similar to national studies, especially regarding gender, age, race, marital status, level of education and personal income⁽¹²⁻¹³⁾. In addition, the length of service in the police is associated with cardiovascular risk and metabolic syndrome, with the worst percentage of body fat in police officers with more than 10 years in the profession⁽¹³⁾.

In the present investigation, most of the participants worked in the operational area. The literature points out that military police officers who work in this area tend to have lower levels of physical activity, due to the workday, family commitments, and lack of energy at the end of the police shift⁽¹⁴⁾. Sedentary lifestyle and lack of leisure time are identified as risk factors for cardiovascular diseases.

In addition to this, a work schedule that implies a change in the sleep pattern can be harmful, because according to the Brazilian

Society of Cardiology, inadequate sleep represents a cardiovascular risk factor⁽¹⁵⁾. In this way, the guidance and monitoring of these professionals inside and outside the military corporation to change harmful habits to health, deserves to be highlighted, since this category constitutes a distinct group from the general population, due to the nature of their activities.

Among these harmful habits that can be modified is inadequate nutrition. Among the reports obtained, the daily consumption of beans, fruits, vegetables and red meat stands out, but it was seen that the intake was not done properly. In this way, these professionals must build strategies to improve the daily intake of healthy foods and the adoption of a balanced diet, respecting the work context and the particularities of the profession, since excess weight and high cardiovascular risk are related to inadequate food consumption. healthy⁽¹²⁾.

Excess weight and unhealthy diet imply changes in blood pressure, where the investigated sample was classified in stage 3 of arterial hypertension. Given this scenario, health education measures, adoption of a healthy lifestyle and physical activity are recommended, jointly identifying with the individual the various obstacles and barriers present in daily life and the determinants that influence self-care. In this context, nurses' actions, such as screening for cardiovascular risk, can contribute to improving quality of life and controlling risk factors for CVD, favoring a qualified, assertive and safe care practice based on scientific evidence⁽¹⁶⁾.

In the analysis of the screening performed, different levels of cardiovascular risk were obtained from each measure investigated. According to the Simplified Framingham score, the participants had low cardiovascular risk, however, based on the individual analysis of the anthropometric indicators, this risk increased, as shown by the data on weight, BMI, WC and WHtR. evaluated the body composition of military police officers, having observed a prevalence of overweight and obesity^(7,17).

As for WC, an average of 97.6 cm was obtained, classifying them as medium cardiovascular risk. Other studies also found a predominance of increased AC in military police officers, which deserves attention, given that visceral fat can increase the risk for heart disease and other comorbidities^(12,18). Regarding the WHtR, an average of 0.50 was observed in the investigated population, presenting an average risk for CVD. This data is worrying, considering that this anthropometric indicator is associated with different cardiovascular risk factors, a fact that can compromise police activity, which requires health and excellent physical shape^(9,19). According to the assessment of the CI, the risk for cardiovascular events can be considered low (normal), being the only anthropometric indicator that was associated with the variable role in the police, and can be used to screen for cardiovascular risk in military police. It is noteworthy that the CI is an important indicator of cardiovascular risk because it considers the total body mass. Such an anthropometric parameter can be easily applied in the

assessment of the individual, especially by the professional nurse in the family health strategy in primary health care for the longitudinal follow-up of people at medium or high risk for cardiovascular diseases, helping in the prognosis and preventive measures for these diseases. diseases⁽²⁰⁾.

From the analysis of cardiovascular risk factors present in military police, it is recommended that institutional public policies for coping be implemented in these services, such as food intervention programs, stress control and adequate sleep/rest, with the objective of reducing health problems caused by the lifestyle of the military police. It is noteworthy that part of the risk factors mentioned in this study are environmental and behavioral, subject to modification.

New studies on the subject are expected, especially with the inclusion of interventions that develop a greater connection between primary care nurses and military police, in addition to strategies to strengthen self-care, in order to understand the difficulties of preventing cardiovascular risk.

CONCLUSION

Anthropometric indicators, especially the conicity index and waist-hip ratio, were associated with a greater number of cardiovascular risk factors. However, weight, waist circumference, hip circumference, abdominal circumference, body mass index and waist-to-height ratio can also be used to track cardiac risk factors in military police. In this

sense, it is recommended the use of these indicators for the screening and monitoring of this public.

Among the limitations of the study, the unavailability or lack of time cited by some military police stood out, since the form was applied in the work environment. In addition, research with more representative samples, with a longitudinal cut, use of laboratory tests and in other regions of Brazil are necessary to understand cardiovascular risk factors in military police and their association with anthropometric indicators.

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