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PHYSICAL FITNESS OF MILITARY POLICE OFFICERS IN THE STATE OF GOIÁS

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ABSTRACT

The different functions assumed by military police officers demand a lot from them, both physically and emotionally. Thus, having good physical fitness becomes essential for military police officers to be able to fulfill their role and maintain their health in good condition. Objective: to investigate the physical fitness levels of military police officers in the state of Goiás. Methodology: Cross-sectional study that included 350 military police officers

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(47.8 + 11.6 years) with administrative-GADM and operational-GOP functions. Results: The GOP performed better in the 12-min Cooper test than the GADM (41.6 x 30.1 ml/kg/min, respectively; p<0.0001). The GADM had better lean mass than the GOP (75.06 + 13.8 x 72.3 + 9.7, respectively; p<0.0001), but the GOP presented greater arm muscle strength (41 + 15.5 x 38 + 17.8, respectively; p<0.0001). The body fat percentage of the GOP was higher than that of the GADM (16+2.1 x 12.6+6.1, respectively; p<0.0001). Final considerations: Except for the Vo2 max of the GADM, the military police officers of Goiás had a good level of physical fitness to the variables verified. Those of the GADM had a lower body fat percentage and greater lean mass, however, those of the GOP had a better VO2 max and more muscle strength in the arm. We suggest differentiated nutritional monitoring for military police officers in operational service, in addition to the engagement of all in a regular physical exercise program to improve their quality of life and health.

Keywords: Physical fitness. Health. Military police.

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INTRODUCTION

Throughout its historical trajectory, the Military Police of Goiás has experienced notable growth and development, through the establishment of several operational units, both in the capital Goiânia, and in rural areas. Currently, the force consists of around 10,593 military police officers (https://www.pm.go.gov.br/historia/). The Military Police of Brazil represent an auxiliary reserve force of the Brazilian army. As such, they adhere to the principles outlined in the army regulations, from the training of recruits to the daily practices within the battalions and other military police organizations (MPOs). In addition, they are also subject to the specific statutes and laws of each state, as established by their legislation (de Lima, 2018).

Providing adequate security services to the population plays a crucial role in the performance of police activities, especially given the increasing increase in crime and violence in contemporary Brazilian society, both at the social and community levels. However, it is notable that the tasks performed by military police officers are often associated with the risk of illness and impairment of their ability to work. The health of these professionals has a direct relationship with the effectiveness of their work activities, becoming an issue of considerable relevance for occupational health in contemporary times. (Pereira, 2021; Clemente, 2024)

Before entering the profession, military police officers must pass two stages, namely the theoretical test with subjects related to the area and the practical test or Physical Aptitude Test - TAF. In the public tender notices, we can see the high demand for good physical fitness for the candidate to be successful in the demanding selection process for future military police officers. Furthermore, in the exercise of the profession itself, the physical conditioning of the military police officer plays an extremely important role throughout his or her career, since he or she performs functions that demand agility, strength, and endurance, among other physical skills. (Cavalcanti, J.C., 2023)

The different roles assumed by military police officers demand a lot from them, both physically and emotionally. Police officers often work under physical and mental stress, always on alert, dealing with human lives, with the heavy burden of protecting the population in the face of so many situations of imminent danger of death (Freitas and Facas, 2013; Clemente, 2024). Given this reality, having excellent physical fitness becomes essential for military police officers to be able to fulfill their role and maintain their health in good condition.

Health-related physical fitness is understood as the attributes considered fundamental for

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an active and healthy life. This is because the elements described involve aspects that influence disease prevention, the willingness to perform daily activities, and the construction of a life with more autonomy and longevity. The following attributes make up health-related physical fitness: muscular strength and endurance, flexibility, cardiorespiratory fitness, and body composition (Glossário Saúde Brasil, 2022).

Military Police officers need to develop their physical abilities to perform well in their work, and also for their well-being in their daily lives. The Constitution of the Federative Republic of Brazil (1988), in article 144, states that to perform their duties, military police officers must have excellent technical and physical preparation to fulfill their constitutional mission. Several factors make the routine of military police officers stressful, including almost constant work outside the base, exhausting work hours of the small number of personnel and limited rest periods, and, in many cases, the absence of a structured and mandatory physical activity program (Bernardo et al., 2016). This reality ends up causing health problems such as obesity, hypertension, and anxiety, among others. Military police officers need to link their quality of life to elements related to health and the practice of appropriate physical exercises, to reach satisfactory levels in their career. This is essential for the effective execution of their duties, given the daily exposure to physical, mental, and cognitive wear and tear in the performance of their professional activities (Rosa, 2012, Stapassoli and Silva, 2025).

According to the World Health Organization - WHO, the following variables are part of health-related physical fitness: muscular strength, muscular endurance, flexibility, cardiorespiratory endurance, and body composition. Therefore, all human beings, and of course military police officers who have such high physical demands, should plan to develop the five components mentioned by the WHO. However, as shown by Junior, M, and collaborators (2018) this is not always the reality. The authors found that in the 22nd Independent Company of the Military Police of the State of Goiás, there was a prevalence of sedentary lifestyle, obesity, and high abdominal circumference, demonstrating a high risk of developing some types of diseases. It is important to highlight that within the police, some police officers assume more administrative positions and others more operational, and the function of each group within the police can also influence their health-related physical fitness. Thus, the objective of this study is to investigate the physical fitness levels of military police officers in the state of Goiás.

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METHODOLOGY

RESEARCH DESIGN

This is an analytical cross-sectional study with a quantitative approach, duly approved by the Ethics and Research Committee under Opinion number: 5,279,914. Only police officers who read and accepted the Free and Informed Consent Form regarding the research participated in the study. Scientific articles published between 1968 and 2023 in the following databases were considered: scielo.br, Google Scholar, efdeportes.com, and Pubmed, in Portuguese and English. The following keywords were used: physical fitness, health, military police officer.

DESCRIPTION OF RESEARCH SUBJECTS

Military police officers from the Capital Police Command (CPC), which is responsible for public security in the city of Goiânia, as well as police officers from the interior of the state of Goiás, were evaluated between April and June 2022. Active male military police officers from different battalions of the Military Police, who worked in administrative services (Administrative Group - GADM) or external operational services (Operational Group - GOP), were included. Military police officers who had serious injuries on the date of collection that prevented them from performing the physical tests or made it impossible for the evaluator to take the correct measurement were excluded. We approached the police officers in the morning, at 8:00 am, before they began their activities in the battalions. The battalions that took part in the research and belong to the capital were: PM 3 (Operational Planning), PM 2 (Intelligence Planning) CALTI (Logistics Support and Information Technology Command), COPOM (Military Police Operations Center), BPMESC (School Battalion), BPMTerminal (Terminal Battalion), BPMRodoviário (Road Battalion), CCDPM (Military Police Discipline and Corrections Command), 6th BPM, 7th BPM, 9th BPM, 13th BPM, 30th BPM, 38th BPM, 42nd BPM, CAPM (Military Police Academy Command), ASPM AL (Military Police Assistance at the Legislative Assembly of the State of Goiás - ALEGO), SECAMI (State Secretariat of the Military Household and Assistance), CEPMG (State College of the Military Police of the State of Goiás), BPM MP (Maria da Penha), CME (Special Missions Command), BPMROTAM (Metropolitan Tactical Patrol Military Police Battalion), GIRO (1st Rapid Ostensive Intervention Group), COC (Cerrado Operations Command); 3rd CIPM (Independent Military Police Company - Jaraguá-GO), 9th CIPM (Independent Military Police Company - Specialized Policing Company - Trindade), 12th CIPM (Independent Military Police Company - Quirinópolis-GO), 22nd CIPM (Independent Military Police

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Company - Itapuranga-GO), 21st CIPM (Independent Military Police Company - SANTA HELENA-GO), 10th BPM (LUZIÂNIA-GO), 1st BPM (Cidade de Goiás - GO), 23rd BPM (GOIANÉSIA-GO), 24th BPM (POSSE-GO), 34th BPM (ITABERAÍ-GO) and 41st BPM (Aparecida de Goiânia).

SPECIFIC PROCEDURES

Data collection was performed by physical education students from the Military Police College, duly assisted by the professor responsible for the project, strictly following the rules for each measurement:

• The body mass of the police officers was measured using a Tanita® brand mechanical scale with a 100g graduation and a maximum capacity of 150kg. The participants were placed with their backs to the scale, upright, wearing only shorts. The measurement was recorded in kilograms.

• Waist circumference was measured with a flexible and inelastic tape around the waist at the smallest curvature located between the ribs and the iliac crest, keeping it tight, without compressing the tissues.

• Cardiorespiratory fitness test – the Cooper Test (Cooper, 1968) was performed to measure cardiorespiratory fitness by estimating maximum oxygen consumption - VO2max. In this test, the individual must run for 12 minutes without interruptions (walking is not desirable, but does not invalidate the test), on a flat running track, maintaining a constant pace. After the 12 minutes are over, the individual stops and checks the distance covered (in meters) using it in the formula to calculate VO2max: VO2max = (D – 504) / 45. According to the VO2 obtained, it is then possible to assess the aerobic capacity and cardiovascular health of the individual. In this study, we consider the classification of Herdy and Caixeta (2015) presented in Table 1:

Table 1. Stratification of VO2max measured on a treadmill in a robust national sample for functional assessment of active and healthy individuals according to sex and age group.

Men	MF < 50%	F 50-80%	R 80-95%	B 95-105%	E > 105%
G1	<25.30	25,30-40,48	40.49-48.07	48.08-53.13	> 53.13
G2	< 23,70	23.70-37.92	37.93-45.03	45.04-49.77	> 49.77
G3	< 22.70	22.70-36.32	36.33-43.13	43.14-47.67	> 47.67
G4	<20.25	20.25-32.40	32.41-38.47	38.48-42.52	> 42.52
G5	<< 17.54	17.65-28.24	28.25-33.53	33.54-37.06	> 37.06
G6	< 15	15,00-24,00	24.01-28.50	28.51-31.50	> 31.50

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Translation

The selection results included individuals aged 15 to 74, distributed as follows: G1 (15–24); G2 (25–34); G3 (35–44); G4 (45–54); G5 (55–64); and G6 (65–74). Good cardiorespiratory fitness was determined by the average VO_2 max obtained in each group, leading to the following subclassifications: Very Weak (VW) VO_2 ≤ 50% of the average; Weak (W): 50%–80%; Regular (R): 80%–95%; Good (G) 95%–105%; and Excellent (E) > 105%.

- **Body composition assessment using skinfold measurements** – The Sanny skinfold caliper (model AD1010-1) and the Sanny anthropometric measuring tape were used. The Pollock 3-site protocol (Jackson & Pollock, 1978) was applied, measuring the thickness of the chest, abdominal, and medial thigh skinfolds in men, and the triceps, suprailiac, and medial thigh skinfolds in women. To perform the measurement, the professional used the caliper to pinch the skin and subcutaneous tissue in the specified areas, applying constant pressure. Each skinfold measurement was taken three times, and the final value was obtained by calculating the arithmetic mean of the three readings. The obtained values were then inserted into specific equations to calculate body fat percentage, using the body composition calculator available at https://www.cdof.com.br/gordura.htm.
- **Upper limb strength assessment through the push-up test in one minute** – The participant was required to assume a prone position, with hands placed on the ground at a distance of 10 to 20 cm from the shoulder line, fingers facing forward, and without abdominal contact with the floor. For female participants, the test was modified by allowing knee support on the ground. The participant had to lower their chest close to the floor by bending the elbows while maintaining body alignment. The result recorded was the maximum number of correct repetitions in one minute (Queiroga M, 2005).

STATISTICAL ANALYSIS

The initial statistical analysis was performed using descriptive statistics, including the calculation of mean, standard deviation, and percentages to describe the sample across all variables. The Kolmogorov-Smirnov test was then used to assess data normality. Subsequently, the Chi-square test was applied to examine potential associations between the evaluated parameters, and the Wilcoxon test was used to compare variables between the GADM and GOP groups. The significance level was set at $p < 0.05$.

RESULTS

A total of 350 male military police officers from the state of Goiás were evaluated, with an average age of 47.8 years (±11.6) and a body mass of 86 ± 16.8 kg, performing either administrative (GADM) (n = 122) or operational (GOP) (n = 228) duties.

The descriptive statistics presented in Table 2 allowed for an assessment of the overall group profile concerning the evaluated variables.

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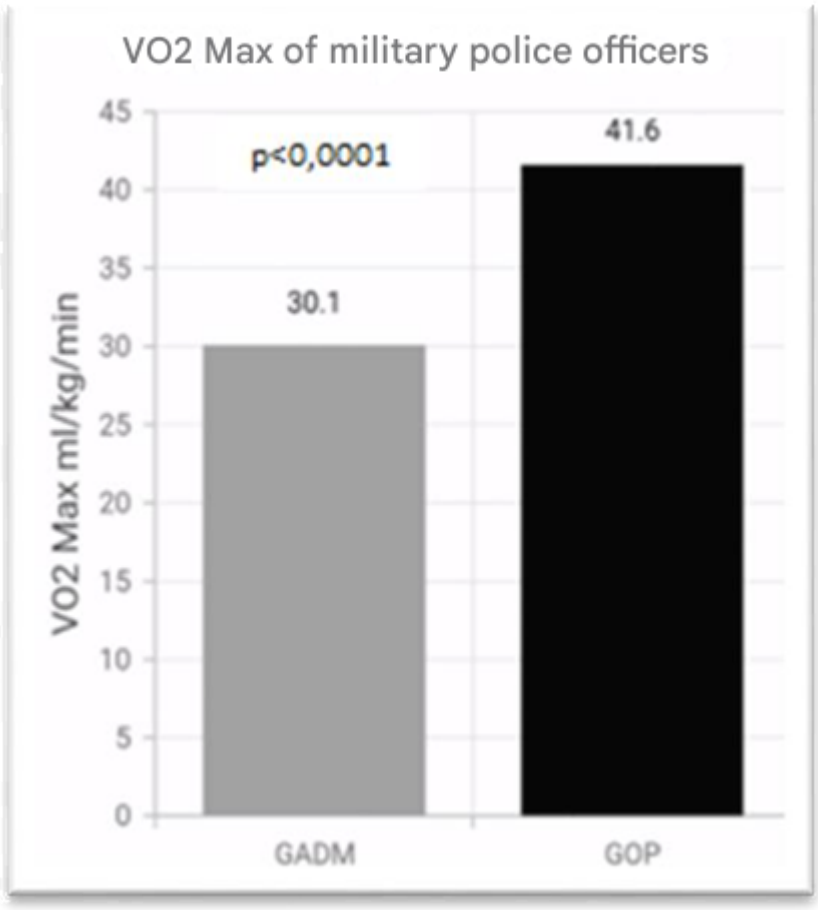
Table 2. Profile of all police officers (mean and standard deviation) concerning the analyzed variables.

Variable	Mean	Standard Deviation
Age (years)	47.8	11.7
Body mass (kg)	86	16.8
Systolic Blood Pressure (mmHg)	120	11
Diastolic Blood Pressure (mmHg)	80	08
Waist circumference (cm)	88	11
Body fat (%)	14	02
Lean mass (kg)	72	10.35
Push-up strength (n° of repetitions)	40	16
Distance covered in 12 minutes (m)	2070	878

The Chi-square test showed a weak but significant association between some variables. Across the entire group, participants with a higher percentage of body fat had a poorer performance in the Cooper test ($r = 0.2$ and $p < 0.001$), while those with greater lean mass had a lower body fat percentage ($r = 0.2$ and $p < 0.001$).

The Wilcoxon test revealed that police officers in the GOP group had a significantly higher VO_2 max than those in the GADM group, as shown in **Figure 1**.

Graph 1. Comparison of VO2max between the groups evaluated.



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The other findings comparing the variables studied in both groups, as assessed by the Wilcoxon test, are presented in Table 3.

Table 3. Comparison between the GOP and GADM groups regarding the evaluated anthropometric parameters.

Variable	GOP	GADM	p-value
Push-ups on the floor (n of repetitions)	41 ± 15.5	38 ± 17.8	0.0001
Lean mass (kg)	72.3 ± 9.7	75.06 ± 13.8	0.0001
Body fat (%)	16 ± 2.1	12.6 ± 6.1	0.0001
Waist circumference (cm)	89 ± 10.9	89 ± 11.7	0.053

Results are expressed as mean and standard deviation. GOP: Operational Group; GADM: Administrative Group.

DISCUSSION

This study assessed the physical fitness of 350 military police officers from the state of Goiás, who were then divided into administrative (GADM) and operational (GOP) roles. We observed that the entire group had systolic and diastolic blood pressure values of 120/80 mmHg, which are considered normal according to the Brazilian Society of Cardiology. In contrast, in another study by Campos (2022), it was found that a group of 264 military police officers had significant levels of arterial hypertension in up to 41% of the sample. These results are in contrast to those found in our study, and we believe that the good blood pressure values in this study are because most of those evaluated had body weights within the normal range and satisfactory levels of lean mass and muscle strength.

Still analyzing the group as a whole, we found that those police officers who had a higher percentage of fat obtained worse results in cardiorespiratory fitness, measured by the Cooper test. Menezes and collaborators (2016) also found this inverse relationship between the body fat percentage of military police officers and cardiorespiratory fitness (Cooper test), which leads us to think about the great need for body composition control, combining a good nutritional strategy with a regular exercise program.

In the same vein, those military police officers who had greater lean mass had a lower body fat percentage, suggesting that these health-related physical fitness variables pointed out by the WHO influence each other. BRASIL and BALBINOT (2024) found an average body fat percentage of 9.8% in the military police officers studied; however, their average age was 20 years old, unlike our group, which had an average age of 47.8 years

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old, and therefore had a slightly higher body fat percentage of 14%. In the study by BRASIL and BALBINOT (2024), a good correlation was found between the variables of muscle strength measured by the push-up test on the ground and the 1-minute sit-up test (r=0.667). Therefore, it would be very important for military police officers to be able to practice physical exercises that improve these parameters for an overall improvement in the health of these professionals.

Moving on to the analysis of the group studied divided by the function performed by the military, we found that the average VO2 max of the GOP was significantly higher than that of the GADM (41.6 x 30.1 ml/kg/min, respectively; p<0.0001). This result was already expected, since the police officers in the operational group move more during their work, get in and out of their vehicles, respond to incidents, and, therefore, end up being more active in their daily lives. Thus, for the average age of the group (47 years), the Vo2 max level found in the GADM was considered weak, while the GOP presented a VO2 max considered good, according to Herdy and Caixeta (2015). These results suggest that GADM police officers need to reinforce their physical conditioning program since they spend more time inactive due to their administrative function, which was reflected in a weak physical fitness that was lower than that observed in the operational group. Souza et al. (2022) performed the 12-minute Cooper test on graduates of the sergeants course of the Military Police of the state of São Paulo, in a cross-sectional study, to discover the average VO2 Max of this population. For this purpose, 1,526 graduates were selected, with an average age of 32.22 ± 7.36 years, who obtained an average VO2 max value of 44.4 ± 5.66 ml/kg/min, which led to a cardiorespiratory fitness considered good for their age. Costa e Silva et al (2019) also assessed the cardiorespiratory fitness of 46 military personnel (32.22 ± 7.36 years old) using the 12-minute Cooper test and found an average VO2 max result of 47.70 ± 6.50 ml.kg-1.min-1, which is considered normal for this average age.

It is worth noting that in our study, data collection took place between April and June 2022, precisely when Ordinance No. 12,868 was amended by Ordinance No. 16,339 on April 25, 2022. This document established that military police officers in Goiás should reserve the time from 8:00 to 9:30 on Mondays, Wednesdays, and Fridays for physical education. Thus, up until the date of our data collection, not all police officers were exercising regularly, and after the publication of the aforementioned ordinance, everyone

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mobilized to do so, so currently the cardiorespiratory fitness levels of military police officers in Goiás should be better.

Although we found a slightly better total lean mass in the GADM than in the GOP (75.06+13.8 x 72.3+9.7; p<0.0001), the police officers with external services in the GOP showed greater upper limb strength (number of repetitions of push-ups on the ground in 1 minute). To) when compared to those of GADM (41+ 15.5 x 38+17.8, respectively; p<0.0001), perhaps because they hold the weapon during their daily actions.

Castro et al. (2019) used the arm flexion strength test to assess the level of physical fitness of military police officers in the city of Porto Velho. To this end, fifteen male military personnel with an average age of 32.73+4.64 years participated in the study and found that the group's VO2max was 40.66 (±8.73) ml/kg/min, results very similar to ours, which indicates excellent upper limb strength, according to Pollock and Wilmore (1993). Regarding body fat percentage, we found an interesting result in our study: police officers on external service (GOP), despite being more physically active during their work, had a higher fat percentage (16+2.1) than that found in police officers on administrative service (GADM) (12.6+6.1), theoretically less active during work activity, and this difference was statistically significant (p<0.0001). We infer that this reality is because operational service is more stressful, with sudden calls for action in dangerous situations within the community, with increased anxiety and binge eating triggered by a high production of cortisol, a stress hormone that signals the accumulation of body fat and increased anxiety levels, which can lead to increased binge eating (Wolpe et al., 2021; Pena, 2011; Lima, 2022). In addition, police officers on duty end up eating poorly, eating fatty or sugary foods, such as sandwiches, chips, and soft drinks, which leads to an increase in body fat.

It would be important to offer a special dietary control program for GOP police officers so that they can be evaluated by a nutritionist who can show them healthier eating options that are still viable within the stressful routine of their work outside the home. Furthermore, engaging these military police officers in a regular physical exercise program structured and prescribed by a physical education professional could help improve body composition components, in addition to other parameters of health-related physical activity (STAPASSOLI and SILVA, 2024). Our data showed that, although the GADM police officers had a better body fat percentage, considered excellent for their age, the average fat percentage of the GOP, despite being higher, was still classified as good, denoting good control of body composition by these police officers, according to the classification of

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Pollock and Wilmore (1993). We also found that the waist circumference of GOP and GADM were the same, with average values of 89 cm. This shows that military police officers in the state of Goiás have a waist circumference within normal parameters with a low risk of metabolic diseases due to the accumulation of fat in this area. We know that waist circumferences above 94 cm indicate an increased risk of metabolic complications in men, and values above 102 cm indicate a much higher risk in this regard (ABESO, 2016).

CONCLUSION

Except for the GADM's VO2 max, considered low for their age, the military police officers of Goiás have a good level of physical fitness to the variables verified. The GADM police officers had a lower percentage of fat and greater lean mass, however, those of the GOP had a better VO2 max and more muscle strength in the upper limbs.

We believe that the higher percentage of fat presented by the GADM is due to the stressful situations of operational service, which would increase the release of the stress hormone Cortisol, causing accumulation of body fat, increased anxiety, and compulsive eating, with a consequent increase in the percentage of body fat.

We suggest special nutritional support for military police officers on operational duty so that the nutritionist can offer healthy and practical food options that can be consumed even amid a busy and stressful work routine.

In addition, engaging military police officers in regular physical exercise programs prescribed by physical education professionals would help improve all parameters of physical fitness related to health, improving the quality of life of the police officer and facilitating the execution of their daily work tasks.

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