

Factors associated with high blood pressure and stress in men deprived of liberty

Fatores associados à hipertensão arterial e estresse em homens privados de liberdade
Factores asociados a la hipertensión y el estrés en hombres privados de libertad

Alexandre Inácio Ramos^I

ORCID: 0000-0002-8443-4943

Kassiano Carlos Sinski^{II}

ORCID: 0000-0001-9718-9388

Mateus Rodrigo Palombit^{III}

ORCID: 0000-0003-3199-6384

Ediani da Cruz^{III}

ORCID: 0000-0001-6474-2618

Erica de Brito Pitilin^{III}

ORCID: 0000-0003-3950-2633

Marcela Martins Furlan de Léo^{III}

ORCID: 0000-0003-3457-5999

Jeferson Santos Araújo^{III}

ORCID: 0000-0003-3311-8446

Vander Monteiro da Conceição^{III}

ORCID: 0000-0003-0972-0795

^IFundação Universitária de Cardiologia, Instituto de Cardiologia. Porto Alegre, Rio Grande do Sul, Brazil.

^{II}Universidade Federal da Fronteira Sul. Chapecó, Santa Catarina, Brazil.

^{III}Pesquisadora independente. Chapecó, Santa Catarina, Brazil.

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Corresponding author:

Kassiano Carlos Sinski

E-mail: kassianosinski@gmail.com



ABSTRACT

Objectives: to identify and classify blood pressure and self-reported stress in inmates and investigate the association of these events with clinical and sociodemographic data.

Methods: a cross-sectional and quantitative study with 240 inmates. A sociodemographic questionnaire, Lipp's Inventory of Stress Symptoms for Adults, blood pressure classification, waist circumference and Body Mass Index were used. **Results:** mean age of 37.17 years (SD 11.5), 48.8% (n=117) single, 42.9% (n= 103) brown. The majority 67.9% (n=163) had been incarcerated for less than 4 years and 33.8% (n=81) were hypertensive. Blood pressure was compatible with the general population. Smoking, consumption of antihypertensive and hypoglycemic medications, concern about salt consumption, and a family history of hypertension were associated with self-perceived stress (resistance and exhaustion).

Conclusions: the group is exposed to modifiable risk factors, especially stress, which favor hypertension and lack preventive strategies and access to health.

Descriptors: Hypertension; Prisons; Risk Factors; Cardiology; Nursing.

RESUMO

Objetivos: identificar e classificar a pressão arterial e o estresse autorrelatado em apenados e investigar a associação desses eventos com dados clínicos e sociodemográficos. **Métodos:** estudo de corte transversal e quantitativo com 240 apenados. Foram empregados questionário sociodemográfico, Inventário de Sintomas de Stress para Adultos de Lipp, classificação da pressão arterial, circunferência abdominal e Índice de Massa Corporal. **Resultados:** média de idade de 37,17 anos (DP 11,5), 48,8% (n=117) solteiros, 42,9% (n= 103) pardos. A maioria 67,9% (n= 163) reclusa há menos de 4 anos e 33,8% (n=81) estavam hipertensos. A pressão arterial foi compatível com a população geral. Tabagismo, consumo de medicamentos anti-hipertensivos e hipoglicemiantes, preocupação com consumo de sal e histórico familiar de hipertensão foram associados com estresse autopercebido (resistência e exaustão). **Conclusões:** o grupo está exposto a fatores de risco modificáveis, sobretudo ao estresse, que favorecem a hipertensão e carecem de estratégias preventivas e acesso à saúde.

Descritores: Hipertensão; Prisões; Fatores de Risco; Cardiologia; Enfermagem.

RESUMEN

Objetivos: identificar y clasificar la presión arterial y el estrés autoinformado en internos e investigar la asociación de estos eventos con datos clínicos y sociodemográficos. **Métodos:** estudio transversal y cuantitativo con 240 internos. Se utilizó un cuestionario sociodemográfico, el Inventario de Síntomas de Estrés para Adultos de Lipp, la clasificación de la presión arterial, la circunferencia de la cintura y el Índice de Masa Corporal. **Resultados:** edad media de 37,17 años (DE 11,5), 48,8% (n=117) solteros, 42,9% (n=103) pardos. La mayoría del 67,9% (n=163) había estado encarcelado menos de 4 años y el 33,8% (n=81) eran hipertensos. La presión arterial fue compatible con la población general. El tabaquismo, el consumo de antihipertensivos e hipoglucemiantes, la preocupación por el consumo de sal y los antecedentes familiares de hipertensión se asociaron con el estrés autopercebido (resistencia y agotamiento). **Conclusiones:** el grupo está expuesto a factores de riesgo modificables, especialmente estrés, que favorecen la hipertensión y carecen de estrategias preventivas y de acceso a la salud.

Descriptorios: Hipertensión; Prisiones; Factores de Riesgo; Cardiología; Enfermería.

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INTRODUCTION

Hypertension (HP) is a multifactorial clinical condition found worldwide, characterized by increased levels of blood pressure (BP)⁽¹⁾. In Brazil, the prevalence of HP varies between 16.1% and 30.7% among Brazilian capitals, with an expected growth of 60% by 2025⁽²⁾. The BP level is genetically determined and responds to environmental events. Among the predictive factors for the development of HP are sex, race and age as non-modifiable individual characteristics, and harmful consumption of alcohol, smoking, hypercholesterolemia, obesity, sedentary lifestyle, eating habits and stress as modifiable factors⁽³⁾.

Social isolation is believed to be a trigger for chronic stress, as identified in research on social isolation, in which more than 50% of the study audience reported feeling stress due to isolation⁽⁴⁾. Therefore, men deprived of liberty, while serving a sentence, are exposed to this factor that, added to others, can trigger HP. An integrative review of cardiovascular risk factors among prisoners indicates that age and exposure to traumatic events are associated with the likelihood of developing mental disorders, stress, and HP⁽⁵⁾.

Historically, the Brazilian penitentiary system is a space configured in unhealthy conditions, overcrowding, permanent confinement, violence and lack of government investment⁽⁶⁾, with deprivation of liberty being a stressful factor that needs attention from health professionals⁽⁷⁾. Monitoring blood pressure levels and early detection of HP are recommended by the World Health Organization (WHO) and can reduce cardiovascular morbidity and mortality⁽⁸⁾.

Still, studies that address HP and perceived stress in prison spaces are still incipient. In view of this problem, this study assumes that men deprived of liberty in a closed prison term are exposed to risk factors, especially stress, for the development of HP, higher than that presented by the general population.

OBJECTIVES

To identify and classify BP and self-reported stress in inmates and investigate the association of these events with clinical and sociodemographic data.

METHODS

Ethical aspects

The research project was approved by the study's penitentiary complex locus and approved by the Institutional Review Board of the *Universidade Federal da Fronteira Sul* and CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration), respecting if the ethical precepts of Resolution 466/12 of the Brazilian National Health Council (*Conselho Nacional de Saúde*). Ethical care was doubled, in the case of a population in a condition of vulnerability, given its reduced autonomy, as is the case of people exposed to the influence of authorities, even if they present themselves fully capable. At the time of submission of the Informed Consent Form (ICF), candidates for participation were duly informed about their full freedom to

decide on their participation and their freedom to give up at any time and withdraw their consent, guaranteed exemption from any form of penalty or damage in their relationship with the prison institution and with the university. All those invited to participate voluntarily agreed by signing the ICF.

Study design, period, and place

This is a cross-sectional, quantitative study carried out with men who are serving sentences in a closed regime in a prison complex in southern Brazil, and the research was guided by the STROBE tool. Data collection was carried out between February and September 2019.

Population or sample: inclusion and exclusion criteria

Inmates who were serving a sentence for a minimum period of 12 months were included, whose mental and self-psychic orientation was preserved, evaluated by questions such as name, age, date of birth and place where they were at the time. Men who were on wards or were in a serious state of health, in hospital and/or outside the penitentiary complex were excluded, as well as those who presented a high level of danger, as considered by the penitentiary management.

For the sample calculation, the universe of detainees in the year prior to collection was considered (n=627), with a confidence level of 95% and a sampling error rate of 5%. From the T-test analyses, 240 men were required. There were no refusals by respondents to participate in the study.

Study protocol

First, a semi-structured instrument, created by the researchers themselves, containing socio-demographic and health characteristics (age, education, marital status, color/race/ethnicity, length of confinement, BP classification, waist circumference classification (> or < 102 cm), Body Mass Index (BMI) classification) was used. BMI was calculated from height and weight and categorized according to the WHO classification as underweight (<18.5 kg/m²), adequate weight (18.5 - 24.9 kg/m²), overweight (25 - 29.9 kg/m²) and obesity (≥30 kg/m²)⁽⁹⁾. Subsequently, Lipp's Stress Symptoms Inventory for Adults (ISSL) was applied⁽¹⁰⁾.

The instruments used for clinical data collection were stethoscope, sphygmomanometer, tape measure, calculator, Segma® digital tempered glass scale and oximeter. The sphygmomanometer used was manual, mechanical (aneroid), light (50 grams), manometer with measuring range from 0 to 300 mmHg and smaller division 2 mmHg, cuff with circumference of 14 x 51cm (large) and with Velcro, suitable for adult and large adult size (INMETRO/IPEM certification) with a total length of 52 cm. The sphygmomanometer was considered appropriate after verifying the measurement of the circumference of the right arm at half the distance between the olecranon and the acromion.

To measure BP, there was a 15-minute wait after individuals were in the sitting position. Vesical emptying and denial of caffeine or tobacco ingestion in the 30 minutes prior to measurement were considered, in addition to denial of physical exercise in the interval

between 60 and 90 minutes prior to measurement. To measure weight, participants removed their shoes and kept their clothes. For institutionally ensured safety reasons, the handcuffs were kept throughout the data collection process, it being necessary to weigh this device separately, deducting the value obtained from participants' total weight. To check height, the participant was positioned standing, barefoot, with the body distributed evenly on a measuring tape attached to the wall.

For BP classification, the VII Brazilian Directive on Hypertension (*VII Diretriz Brasileira de Hipertensão Arterial*) guidelines were followed⁽³⁾. Inmates whose BP values were in accordance with normal levels were instructed to monitor their BP annually and those whose values matched the pre-hypertension range (SBP 121 - 139 mmHg and DBP 81 - 89 mmHg) were instructed to monitor it at every six months. In both cases, participants were advised to observe their lifestyle habits, health behaviors and to pay attention to the existence of risk factors for HP.

The ISSL application lasted approximately 15 minutes, being performed individually. The instrument presents the self-reported stress, in phases. The first phase (alert) consists of 15 items that investigate organic or psychological symptoms experienced in the last 24 hours. The second (resistance) is composed of ten physical/somatic and five psychological symptoms, and is related to the symptoms experienced in the last week. The third phase (exhaustion) consists of 12 physical/somatic and 11 psychological symptoms, referring to symptoms experienced in the last month. In total, the instrument consists of 53 items, 34 items related to somatic symptoms and 19 to psychological symptoms⁽¹⁰⁾.

Participants were approached at the penitentiary complex's health unit, while they were waiting for a nursing, dental, psychological, psychiatric or general practitioner consultation. It is worth noting that the data collection took place in a private room provided by the complex management, in the presence of the researchers only, ensuring confidentiality and anonymity of responses, safeguarding the safety of all by the prison officers who waited outside the room. A pilot test was carried out with 30 participants to mark the adequacy of the variables.

Stress was considered as a dependent variable (study outcome), which was classified dichotomously, with stress (any phase of stress) or without stress (participant with no reported symptoms). Stress data from ISSL (2000) were scored and analyzed by a psychologist who is part of the research team.

Analysis of results, and statistics

The collected data were tabulated and evaluated by pairs to correct any typing errors and then analyzed using the Statistical Package for the Social Sciences (SPSS), version 20.0. First, descriptive statistics were performed for numerical variables through measures of central tendency (mean, median, quartiles, minimum, maximum), and, for those of a categorical nature, proportions.

To test the differences between measurements in the groups, the Mann-Whitney test (non-parametric) was performed. To study the association between independent variables and stress, univariate analysis of variables at each level of determination was performed using Pearson's chi-square test. For the association between the variables, Odds Ratio (OD) was used. Outliers were

excluded, and the multicollinearity test was evaluated according to the Tolerance and Variance Inflation Factor (VIF) parameters. The variables that were statistically significant in this first analysis ($p < 0.20$) were selected for multivariate analysis, using the unconditional forward stepwise (likelihood ratio) method. For all inferential statistical tests, a significance level of $p < 0.05$ and Nagelkerke's R2 values were used. The goodness of fit was assessed using the Hosmer-Lemeshow test. To verify data normality, the Kolmogorov-Smirnov test was used.

RESULTS

A total of 240 adult males deprived of liberty with a mean age of 37.17 years (SD 11.5 years) were evaluated, with 48.8% (n=117) single, 42.9% (n=103) brown and 39.2% (n=94) reported between 5 and 8 years of formal education. The majority, 67.9% (n=163), had been in prison for less than 4 years and 33.8% (n=81) were classified as hypertensive (Table 1).

Regarding Lipp's Stress Inventory domains, according to the physical/somatic (n=93) and psychological (n=30) variables, the results scored as resistance (n=95) and exhaustion (n=28) were presented. Those who scored as insignificant (n=117) were not presented (Table 1). It is noteworthy that there were no participants in the self-perceived stress alert phase.

Table 1 - Clinical sociodemographic characteristics in adult men deprived of liberty, in a closed sentence of compliance, Santa Catarina, Brazil, 2020

Variable	Total = 240	
	N	%
Age group		
18 to 59 years	225	93.7
≥ 60	15	6.3
Education (years of study)		
No education	15	6.3
1 to 4	61	25.4
5 to 8	94	39.2
9 to 11	60	25
≥ 12	10	4.1
Marital status		
Married	48	20
Divorced	37	15.4
Stable union	29	12.1
Widow	9	3.7
Single	117	48.8
Color/race		
White	99	41.3
Yellow	5	2.1
Brown	103	42.9
Black	23	9.6
Indigenous	10	4.1
Reclusion time		
≤ 4 years	163	67.9
5 to 8 years	45	18.8
≥ 9 years	32	13.3
BP classification		
Normotensive	159	66.2
Hypertension	81	33.8
HR classification		
Normocardic	220	91.7
Tachycardic	20	8.3
Waist circumference classification		
Normal	134	55.8
Altered	106	44.2

To be continued

Table 1 (concluded)

Variable	Total = 240	
	N	%
BMI classification		
Low weight	3	1.3
Adequate	84	35
Overweight	120	50
Obesity	33	13.7
Lipp classification		
Insignificant	117	48.7
Resistance	95	39.6
Exhaustion	25	11.7
Domains (Lipp)		
Physical	93	75.6
Psychological	30	24.4
Risk factor		
≤ 4	16	6.7
≥ 5	224	93.3

BP – blood pressure; BMI – Body Mass Index; HR – heart rate.

The association between sociodemographic and clinical characteristics with the occurrence of self-perceived stress in adult men deprived of liberty, from LIPP's inventory, are described in Table 2. The risk factors variable refers to the sum of events related to HP that were presented by participants, in this case, BMI, abdominal circumference, BP and HR classification at the time of their measurement. In this analysis, the variables that correlated with stress were: abdominal circumference and HP and risk factor greater than or equal to five.

Table 3 shows the results of the analyses according to health habits and lifestyle associated with the occurrence of stress in adult men deprived of liberty. In this analysis, smoking, reports of regular consumption of antihypertensive and hypoglycemic drugs, concern with salt consumption and report of known family history of HP were significantly associated with the occurrence of the event.

Table 2 - Association between sociodemographic and clinical characteristics and self-perceived stress in adult men deprived of liberty, Santa Catarina, Brazil, 2020

Variable	Stress		Raw OR	Total n (%)	p value
	No (n=117)	Yes (n=123)			
Age group					0.540
18 to 59 years	110 (45.8)	115 (47.9)	1	225 (93.8)	
≥ 60 years	7 (2.9)	8 (3.3)	1.09	15 (6.2)	
Marital status					0.182
With a partner	41 (17.1)	36 (15.0)	0.76	77 (32.1)	
Without a partner	76 (31.7)	87 (36.2)	1	163 (67.9)	
Reclusion time					0.206
≤ 5 years	76 (31.7)	87 (36.2)	0.76	163 (67.9)	
> 5 years	41 (17.1)	36 (15.0)	1	77 (32.1)	
BMI					0.245
Adequate	44 (18.3)	40 (16.7)	1	84 (35)	
Altered	73 (30.4)	83 (34.6)	1.25	156 (65)	
Waist circumference					0.022
Normal	73 (30.4)	61 (25.4)	1	134 (55.8)	
Altered	43 (17.9)	63 (26.2)	1.75	106 (44.2)	
BP classification					0.017
Normotensive	74 (30.8)	60 (25.0)	1	134 (55.8)	
Hypertensive	43 (17.9)	63 (26.2)	1.80	106 (44.2)	
HR classification					0.280
Normocardic	109 (45.4)	111 (46.2)	1	220 (91.7)	
Tachycardic	8 (3.3)	12 (5.0)	1.44	20 (8.3)	
Risk factor					0.000
≤ 4	16 (6.7)	0 (0)	1	16 (6.7)	
≥ 5	101 (42.1)	123 (51.2)	2.24	124 (93.3)	

BP – blood pressure; BMI – Body Mass Index; HR – heart rate.

Table 3 – Association between health habits and lifestyle with the existence of stress in adult men deprived of liberty, Santa Catarina, Brazil, 2020

Variable	Stress		Raw OR	Total n (%)	p value
	No	Yes			
Smoking					0.041
Non-smoker	45 (18.8)	34 (14.2)	1	79 (32.2)	
Former smoker	71 (29.6)	90 (37.5)	1.67	161 (67.1)	
Problems with alcohol					0.063
Yes	14 (5.8)	25 (10.4)	1.84	39 (16.2)	
No	102 (42.5)	99 (41.2)	1	201 (83.8)	
Use of antihypertensive and hypoglycemic medication					0.002
Yes	11 (4.6)	30 (12.5)	3.04	41 (17.1)	
No	105 (43.8)	94 (32.2)	1	199 (82.9)	
Concern about salt consumption					0.002
Yes	67 (27.9)	48 (20)	0.46	115 (47.9)	
No	49 (20.4)	76 (31.7)	1	125 (52.1)	

To be continued

Table 3 (concluded)

Variable	Stress		Raw OR	Total n (%)	p value
	No	Yes			
Concern about fat					0.232
Yes	56 (23.2)	53 (22.1)	0.80	109 (45.4)	
No	60 (25)	71 (29.6)	1	131 (54.6)	
Drink coffee					0.465
Yes	93 (38.8)	101 (42.1)	1.08	194 (80.8)	
No	23 (9.6)	23 (9.6)	1	43 (19.2)	
Physical exercise					0.100
Yes	95 (39.6)	92 (38.3)	0.63	187 (77.9)	
No	21 (8.8)	32 (13.3)	1	53 (22.1)	
History (known) of hypertension in the family					0.033
Yes	48 (20)	67 (27.9)	1.66	115 (47.9)	
No	68 (28.3)	57 (23.8)	1	125 (52.1)	

DISCUSSION

The study corroborates the findings of a Brazilian research with 1,110 men in prison, in which the mean age was 30.7 years (SD 10.4 years), with 46.5% (n=516) single, 50.8% (n=564) with education time between 5 and 8 years and inmates between 1 and 4 years (46.6%; n=517), a sample in which a percentage of 35.8% (n=397) of hypertensive at the time of data collection⁽¹¹⁾. The white and brown public identified as prevalent in the sample of this study is in line with ethnic racial characteristics inherent in southern Brazil and clashes with the studies cited, in which inmates are predominantly brown and black.

In the present study, half of the sample presented stress, based on the self-identification of signs and symptoms proposed in Lipp's inventory. It was evident that the vast majority of participants were in the resistance phase, i.e., even if chronically and/or intensely exposed to stressors that discontinue biopsychological homeostasis, these subjects resist and promote efforts to self-regulate their organism in an attempt to adapt to the environment, in this case, to the challenging territory of interdiction/norm, institutional violence and massification, the prison institution, which dramatically affects the psychosocial and organic functioning among those deprived of liberty - and also among those who guarantee this deprivation in daily life, prison officers⁽¹²⁾.

More than 90% of those who scored the stress criteria had somatic signs and symptoms, revealing the psychoneuroendocrinological impact, mainly from the activation of the hypothalamic-pituitary-adrenal axis, inherent to chronic exposure to stressful events⁽¹³⁾. Research on stress in deprived of liberty has been incipient. Brazilian researchers applied Lipp's inventory to 1,110 incarcerated men and identified stress in 35.8% (n=397)⁽¹⁴⁾. Although this data has not been stratified according to the stress phases proposed by Lipp's inventory, the finding was similar to this study.

When associating sociodemographic and clinical data with the occurrence of stress, the variables that were significant were waist circumference, BP classification and the sum of risk factors.

People deprived of liberty have reduced autonomy to define their lifestyle. The institutional menu is established by the Brazilian National Food and Nutrition Policy (PNAN - *Política Nacional de Alimentação e Nutrição*) and by the Brazilian National Food and Nutrition Security Policy (PNSAN - *Política Nacional de Segurança Alimentar e Nutricional*), based on the Food Guide for the Brazilian

population, which provides for the offer of minimally processed and salt-restricted foods, sugar, oils and fats⁽¹⁵⁾. Outdoor physical activities/exercise can be performed in two hours of sunbathing per day, guaranteed by the Criminal Enforcement Law (CEL)⁽¹⁶⁾, whose structure follows recommendations of the United Nations (UN) regarding the organization of systems for the execution of sentences, ensuring minimum conditions suitable for physical activities⁽¹⁷⁾ and emphasizing preventive health activities⁽¹⁸⁾.

However, the scarce literature on the subject has drawn attention to the insufficient and inadequate food and health care/health promotion conditions for the public deprived of liberty, which weaken and compromise the resocialization project of these people, in the final analysis⁽¹⁹⁾.

Waist circumference greater than 102 cm in men, overweight and BP greater than 130/85 mmHg predispose to metabolic syndrome, one of the main contemporary causes of mortality, whose pathophysiological complexity seems to be modulated by the environment, including inadequate diet, sedentary lifestyle, overweight and stress, modulators of hemodynamic and neuroendocrine reactions⁽¹³⁾.

Stress is a factor constantly associated with pressure level instability⁽¹³⁾. A survey of 106 patients analyzed cardiovascular risk factors in people diagnosed with HP, identified that most respondents were obese, sedentary, used alcohol or nicotine, had a level of exposure to stressors and an excessive salt consumption when the meal was made for several people⁽²⁰⁾. The same study identified sociodemographic characteristics potentially related to the development of HP, such as sex, marital status, professional occupation and age⁽²⁰⁾, which corroborates the findings of the current research, by demonstrating that hypertensive patients had more than five risk factors.

Individuals who are married or who live with other people tend to have lower levels of stress and BP, as they share daily life, especially routine, lack of time and concerns⁽²⁰⁾, in contrast to what is experienced in the territory of deprivation of freedom, naturally restrictive for social relations.

The specific literature recommends that health services monitor the BP level in the general population, considering the insidious and asymptomatic nature of HP, especially with the aim of diagnosing and treating the condition early on⁽²¹⁾. It is important to consider that the PNAISP, guaranteeing the principle of integrality, provides for promotion, protection, prevention and health surveillance actions, carried out at different levels of health care,

to be developed in accordance with the epidemiological and institutional reality⁽¹⁸⁾.

In the penitentiary locus of this study, those deprived of liberty require an assessment of their health status in light of clinical changes. Considering the extensive variability in the prevalence of HP in the population (10 to 30%)⁽²⁻⁸⁾ and the cross-section of this study, in which a single BP measurement was provided, which would make a medical diagnosis of HP unfeasible, it can be considered that the examined public presented a BP level in accordance with that presented by the general population.

Table 3 evidenced the association between health habits and lifestyle, represented in the study by the variables smoking, report of regular consumption of antihypertensive and hypoglycemic drugs and concern with salt consumption, with the occurrence of stress in adult men inmates.

A study with 47,328 Brazilian workers looked into tobacco use in association with alcohol consumption, self-perceived stress and sociodemographic factors, and associated nicotine consumption with stress⁽²²⁾.

Individuals who do not adhere to treatment with antihypertensive medication are predisposed to the manifestation of resistant HP⁽²³⁾. A minority of study participants (17%) reported using hypoglycemic and antihypertensive medications, and among them, most scored for stress on Lipp's inventory, while, among the 83% who denied taking medications of this nature, most did not score for stress. Medication consumption was not verified in clinical records and included hypoglycemic agents, which may have biased the relationship between stress and medication consumption, although statistically this last variable was positively associated with stress.

A systematic review that analyzed the responses of the central nervous system and HP by sensitivity concluded that sodium chloride is a contributing factor to the development of HP, indicating the relevance of salt intake in pathogenesis, in addition to genetic and environmental influence⁽²⁴⁾. A Brazilian survey, which analyzed cardiovascular risk factors in people diagnosed with HP, related the number of people living with salt consumption, thus, the more people who live in the same space, the use of the product is greater, even if among these people, none has diseases⁽²⁰⁾.

Even though the food of incarcerated people follows national regulatory requirements, the preparation of large amounts of meals is subject to a disproportionate amount of salt. The popular awareness to moderate salt consumption to, on average, 5 grams daily, is recognized as an important permanent maneuver to reduce the impact of HP and other chronic diseases that affect cardiovascular morbidity and mortality⁽²⁵⁾.

In Portugal, the prevalence of concern with salt consumption is approximately 76% of the population, predominantly in women and increases with age⁽²⁶⁾. In Brazil, recent studies were not found on the concern with salt consumption. It is estimated that daily salt intake among the general population is twice that recommended by the WHO, although estimates are often developed by applying inaccurate dietary surveys⁽²⁷⁾.

In confinement territories, as already pointed out, the autonomy to decide on the quality of the food that will be consumed is highly limited and the concern with sodium consumption is subject to institutional determinations. Even so, it can be inferred that half

of participants in this study seem enlightened on the subject to the point that it constitutes a dietary concern that possibly focuses on lifestyle or self-care, which had a positive impact on coping with stressful environmental conditions. Considering that salt consumption in the diet is a modifiable risk factor for HP and that it was associated with a lower rate of self-perceived stress, another modifiable factor, the relevance of health education as a protective factor against chronic non-communicable diseases (CNCDs) in this public is evidenced.

According to Brazilian research with 45 health professionals, the risk factors for cardiovascular diseases and stress were identified in a teaching hospital. It was found that 25 individuals had a family history of HP as a risk factor. Regarding stress, it was mentioned that 55.5% of respondents had stress in the intermediate group through the Job Stress Scale (JSS) questionnaire⁽²⁸⁾. A research carried out with men that evaluated the effect of stress on cardiac autonomic modulation in normotensive people with a family history of HP, reported that stress and a family history of HP are associated factors that contribute to the increase in cardiovascular disease⁽²⁹⁾. Thus, both studies converge with current research, which demonstrates that these two factors are associated with high BP found at the time of data collection.

Legitimized as a regulatory device in society, the prison territory needs to be consolidated as a health space as a right. Despite the rigid totalizing structure historically built, it is noteworthy that penitentiaries have been a source of important scientific evidence that can support expanded health and education practices potentially influencing the resocialization process, bringing to light the responsibility and professionals' role within the system and researchers/universities to investigate this reality, expand extension interventions and, ultimately, transform this scenario.

Study limitations

The purpose of this study was to identify the pressure level and self-perceived stress in the penitentiary space and limitations to its reach and generalization were identified. The characteristic of the studied group, conditioned to the influence of authority and using handcuffs, may have influenced its pressure level at the time of data collection. The cross-sectional nature of this study, with a single episode of BP measurement, prevents the precise identification of the public's pressure pattern. Participants' clinical records were not accessed so that information about regularly consumed medications depended only on participants' reports. Men deprived of liberty are prevented from consuming alcohol and tobacco in the institution and a significant fraction of them declared themselves ex-smokers. It is possible that the prohibition of access to psychoactive substances, possibly related to withdrawal symptoms and demand, represents a stress-inducing variable, which was not verified. The scarce literature on the subject is also a limiting factor for generalization of data.

Contributions to nursing, health, or public policies

From this analysis, the study results intend to contribute with scientific evidence on health and stress reactions in the prison population, highlighting the modifiable factors associated with

potentially manageable HP by health and psychology professionals involved in the assistance to this group, in accordance with the national health policy provisions in the context of deprivation of liberty, as well as by directors of prison institutions with regard to the prison environment and institutional practices and norms that may favor a healthy lifestyle. With regard to nursing, the results intend to sensitize this category in basic and specialized care for the prevention of cardiovascular diseases and health promotion for men deprived of liberty, considering that this group highly exposed to environmental stressors circulates through multiple sectors; however, they may be restricted in accessing preventive health services, emphasizing their vulnerability in the face of confinement and deprivation of their autonomy, a problem of special interest for nursing.

CONCLUSIONS

Almost half of the sample had harmful stress levels, according to Lipp's inventory (exhaustion and resistance). The risk factors identified among the participants, which are abdominal circumference, high BP, family history of HP, consumption of antihypertensive and hypoglycemic drugs and concern with salt consumption, were associated with stress, and this association is compatible with the presented by the general population. The frequency of HP among participants was comparable to that of the Brazilian population, considering a single measurement. However, it is noteworthy that the hypertensive participants in data collection had a higher rate of self-perceived stress, which

makes this public vulnerable to the development of CNCDs and consequently affects the health system.

Institutional restrictions initially impact exposure to environmental stressors (institutional violence, isolation, regulation), sedentary lifestyle, overweight, dietary quality, access to health services and access to health education. The control of stressful conditions/environmental stress and the monitoring of health status in an environment of deprivation of freedom, massive, limiting self-care and decisions about lifestyle, are challenges for health professionals and managers in the implementation of the national health policy for people deprived of liberty, especially in the field of disease prevention and health promotion. Although the objective has been achieved, it is inferred that it is necessary to expand scientific investigations that overcome the limitations of this study, based on methodological designs that provide opportunities for comparisons and that capture pressure patterns and stress reactions in this public.

SUPPLEMENTARY MATERIAL

The file with the data produced in this investigation is available at the link <https://doi.org/10.48331/scielodata.ELZR9G>.

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