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Article

Job strain and arterial hypertension in nursing professionals from the municipal healthcare network in Belo Horizonte, Minas Gerais, Brazil

Estresse no trabalho e hipertensão arterial em profissionais de enfermagem da rede municipal de saúde de Belo Horizonte, Minas Gerais, Brasil

Adriano Marçal Pimenta [a]
Ada Ávila Assunção [b]

[a] Universidade Federal de Minas Gerais, Departamento de Enfermagem Materno-Infantil e Saúde Pública. Belo Horizonte, MG, Brazil.

[b] Universidade Federal de Minas Gerais, Departamento de Medicina Preventiva e Social. Belo Horizonte, MG, Brazil.

Contact:
Adriano Marçal Pimenta
E-mail:
adrianompimenta@gmail.com

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Abstract

Objective: to assess the association between job strain and arterial hypertension (AH). *Method*: cross-sectional study with random sample of 273 nursing professionals from the municipal healthcare network in Belo Horizonte, Minas Gerais, Brazil, conducted between September 2008 and January 2009. Job strain was measured using the demand-control model and hypertension by self-report medical diagnosis of the disease or use of antihypertensive medication. Prevalence ratios (PR) of AH and their respective 95% confidence intervals (95% CI) were adjusted by Poisson multivariate regression. *Results*: among the professionals studied, 42.1% were nurses and 57.8% were nursing technicians or assistants. The AH was diagnosed in 16.9%. Female sex (PR = 0.56), increasing age (p of linear trend < 0.001), household income of 4 or more minimum wages (PR = 0.39) and job strain (PR = 2.53) were independently associated to AH after the multivariate adjustment. *Conclusions*: job strain is associated with AH among nursing professionals from the municipal healthcare network in Belo Horizonte. This finding must be considered in the formulation of public policies involving the health promotion of these workers.

Keywords: job strain; hypertension; nursing.

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Introduction

Arterial hypertension (AH) is a serious public health problem that affects approximately 20% of the adult population in Brasil[1]. Increased blood pressure is considered a linear, continuous and independent risk factor for cardiovascular diseases (CVD). Such diseases are responsible for over one-third of the total deaths in the country, with emphasis on the ischemic heart diseases (IHD) and stroke.

AH explains 47% and 54% of IHDs and strokes, respectively[2], which justifies investigations to elucidate preventable risk factors. Among them, we mention job strain (combination of high demand of work activities and low control over them), which increases by 30% the occurrence of AH in different occupational groups[3].

It is estimated that job strain triggers hyperactivity of the sympathetic nervous system and dysfunction of the hypothalamic-pituitary-adrenal axis, causing, in the long term, persistent elevation of blood pressure[4-5]. However, despite the plausibility of the association between job strain and AH, there is, to our knowledge, only one single research regarding the Brazilian population, which was conducted with a group of technical and administrative employees of a University in the state of Rio de Janeiro, in which there was no association between job strain and AH[6]. When the analyzed outcome was not specifically AH, but the averages of systolic and diastolic arterial pressures monitored 24 hours (at work, at home awake and at home during sleep), there is one study developed with 175 nurses from a public hospital of the city of Rio de Janeiro who worked during the day. Job strain was positively associated with the highest average of systolic blood pressure at home awake, and agreed only on the group of participants with domestic work overload[7].

Therefore, more studies are necessary to clarify the relationship between job strain and AH, particularly among nursing professionals, since this occupational group plays a fundamental role in the healthcare network from the Brazilian Unified Health System (SUS), providing direct and 24-hour-a-day assistance to users.

Despite of being the largest workforce among health sector's professionals, with approximately 1,900,000 workers[8], there is still a shortage of nurses in Brazil when considering that the World Health Organization (WHO) recommends the ratio of two nurses per 1,000 inhabitants and, in the Country, this goal has not yet been reached (1.42 nurses/1,000 inhabitants)[9].

The shortage of nursing professionals has led to workers' overload (high demand). At the same time, the technical division of work (nurses and nursing technicians/assistants) and hierarchical and conflicting relationship with other health sector's categories have decreased the autonomy and decision-making power over their actions (low control). Thus, nursing professionals are very vulnerable to job strain, which has been shown in researches with this occupational group[10].

Given the above, this study aimed to analyze the association between job strain and arterial hypertension (AH) in nursing professionals from the municipal healthcare network of Belo Horizonte.

Method

This is a cross-sectional study, conducted between 2008 and 2009, with professionals of the nursing team in effective professional practice at the municipal healthcare network of Belo Horizonte, Minas Gerais, Brazil. At the time of data collection, all professionals who have declared having a degree in nursing (technical or university level) were considered eligible, regardless of their employment link. In accordance to such criterion, the population universe comprised 3,770 professionals. The subjects randomly selected to participate – who were not at work due to holidays, transference, retirement or death – were replaced, respecting the geographical territory and the level of care complexity.

The sample consisted of 268 subjects, based on the following parameters: 30% of AH prevalence[11-13], 80% of statistical power, 95% of confidence level, prevalence ratio of 2.00. At the end, 273 participants were included in the study, with 115 (42.1%) nurses and 158 (57.9%) nursing assistants or technicians.

For the selection of the workers studied, we initially consulted the list available at the human resources department of the Municipal Health Secretariat of Belo Horizonte to identify how these workers were distributed within the geographical territory (the municipal healthcare network in Belo Horizonte was structured in nine health districts) and the level of care complexity (primary and secondary, without the participation of professionals from the tertiary level). Then, we proceeded to the proportional stratified sampling, considering the two strata mentioned. Finally, we conducted a raffle of the workers to be recruited based on a list of random numbers generated by the Epi Info statistical software (version 3.5.1).

Data collection was carried out between September 2008 and January 2009 using a self-administered questionnaire, previously tested in a pilot study, with questions relating to demographic and socioeconomic characteristics, general information about the work, characteristics of the environment, psychosocial factors of the work, domestic activities and life habits, quality of life, health-related aspects and acts of violence-victimization.

The exposure variable, job strain, was measured by the demand-control scale adapted by Theorell in 1988, using its Brazilian Portuguese version[14] widely used in studies of association with AH[3]. To characterize the work demand, the questionnaire incorporated five questions on the following aspects: a) quickness to perform work tasks; b) intensive work; c) overwork; d) insufficient time to carry out the activities; e) conflicting demands. The questions had the following answer options: "often", "sometimes", "rarely" and "never or almost never", and each of them received scores from 1 to 4 (1 indicates low demand, and 4, high). The total score for work demand was calculated from the sum of the score of each question, and could vary between 5 and 20. To characterize the work control, the questionnaire had six questions on the following aspects: a) opportunity to learn new things at work; b) specialized skills/expertise required by the work; c) decision-making power in the process of work; d) repetitive work; e) power of choice in carrying out activities; f) power of choice in how to perform work activities. The answer options and the score for each one of them are identical to the scale of work demand (1 indicates low control, and 4, high). The total score for the work control was calculated by the sum of the score of each question, and can vary between 6 and 24. The variable demand-control was built with the stratification of the demand and control scales in two halves, based on the medians of the total scores (demand = 15 points, control = 10 points). Later, we combined these fractions, generating four quadrants: a) low strain = low demand and high control; b) active = high demand and high control; c) passive = low demand and low control; d) job strain = high demand and low control.

The following covariables were included in the study: sex (male, female); age (20-39 years, 40-49 years, 50 or more); skin color (white and not white, comprising brown, black, yellow and indigenous); marital status (single, married/law marriage, divorced/widowed), household income (up to 2 minimum wages, 2 to 4 minimum wages, 4 or more minimum wages – the minimum wage at the time was 415 Brazilian Reais (equivalent to 182 USD by the time of the survey); professional category (nurses, nursing technicians/assistants); night work (never, rarely/sometimes, always); weekly workload (up to 40 hours, more than 40 hours); time in the current job in months (< 24, 24 to 47, 48 or more); level of care of the municipal healthcare network (primary, secondary). For the "physical activity" variable, we asked how often the participant performed physical activities, with the possible answers: Never, 1 to 2 times a week, 3 or more times a week. Medical diagnosis of obesity (no, yes); smoking (considering as smoker someone who has smoked at least 100 cigarettes or 5 packs, how do you classify yourself? Non-smoker, former smoker, current smoker). For alcohol dependence, we relied on the questionnaire *Cut down, annoyed by criticism, guilty and eye-opener* (CAGE), which is composed of four questions with answer options "yes" and "no": 1) Have you ever felt you should cut down on your drinking? 2) Have people annoyed you by criticizing your drinking? 3) Have you ever felt bad or guilty about your drinking? 4) Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover (eye opener)? The participant who obtained two or more positive answers to the instrument was included in the category "yes" for self-perception on drinking problems[15]. For the "social support at work" variable, we used the demand-control questionnaire, which includes six questions on the following aspects: a) work environment; b) relationship with other workers; c) support from coworkers; d) understanding from coworkers, if you are not on a good day; e) relationship with the bosses; f) pleasure in working with coworkers. The questions have as answer options: "totally agree"; "agree more than disagree"; "disagree more that agree" and "totally disagree", and each of them received a score from 1 to 4 (1 indicates low support, and 4, high). The total score for social support at work was calculated by adding the score of each question, and could vary between 6 and 24. This variable was also divided in two halves from the median (14 points), with the lower part of the scale indicating low support and the upper part, high support[14].

The outcome variable, AH, was based on the answers to two questions of the questionnaire: a) Do you have a medical diagnosis of high blood pressure (arterial hypertension)? b) Currently, are you making use of medication prescribed by a doctor for high blood pressure (arterial hypertension)? To both questions, the answer options were: "no" and "yes". We considered as hypertensive workers who said "yes" to at least one of the two questions. When the participant answered negatively to the two questions, he/she was classified as normotensive.

The statistical analyses were carried out by the Stata program (version 13.1). Initially, the sample was characterized by absolute and relative frequencies distribution of the following variables: demographic (sex, age, skin color, marital status), socioeconomic (household income), lifestyle (smoking, alcoholism, physical activity), anthropometric (obesity diagnosis) and working conditions (demand-control, professional category, night work, weekly workload, time in current job, social support, level of care).

Then, we carried out a bivariate analysis to assess the crude association of the demand-control and of each covariable with the AH. Statistical differences were assessed by Pearson's chi-squared test, and, for the ordinal qualitative variables, we calculated the chi-squared test of linear trend. Prevalence ratios (PR) and their 95% confidence intervals (95% CI) were estimated by Poisson's regression with robust variances.

Finally, independent associations of demand-control at work and other covariables with AH were assessed by Poisson regression with robust variances, considering a hierarchical conceptual model adapted from Da Costa et al[16]. In this model (**Figure 1**), we arranged three blocks of variables: 1) demographic, socioeconomic (distal); 2) lifestyle, working conditions (intermediate); 3) anthropometric (proximal). The PR and their respective 95% CI were adjusted by the variables of the same block or by those of upper blocks, when the values of statistical significance in the bivariate analysis were less than 20% ($p < 0.20$). In this stage, we also calculated the p values of linear trend for ordinal qualitative variables. In the end, the established level of statistical significance was alpha = 5%.

This study was approved by the Human Research Ethics Committee in Humans of Universidade Federal de Minas Gerais (Opinion no. 542/07). All participants signed the Informed Consent Form (ICF).

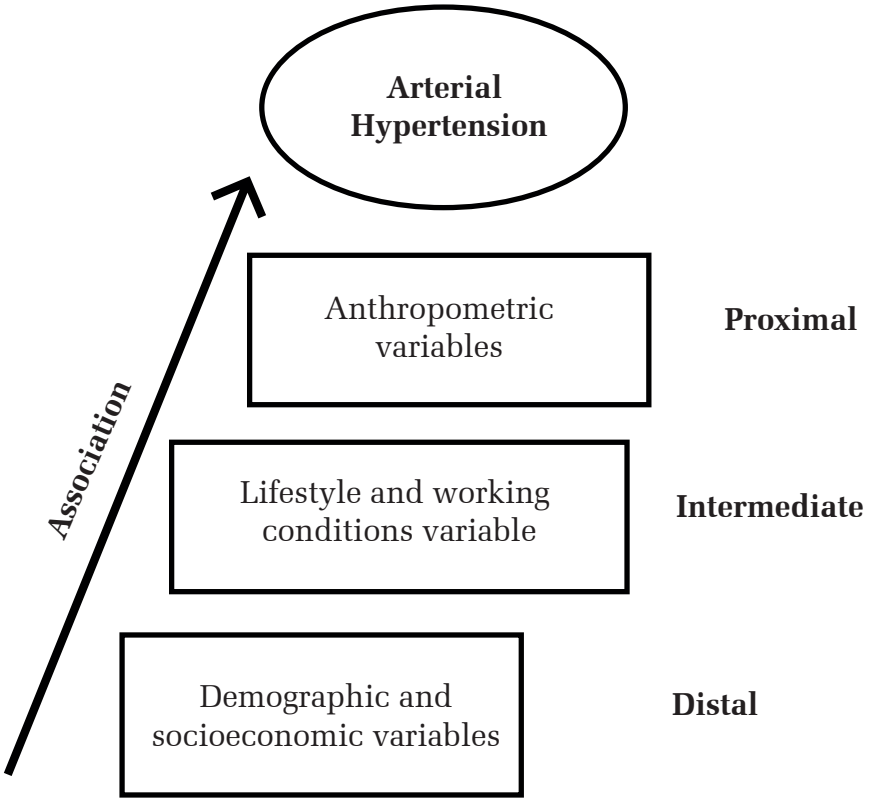

Figure 1 Hierarchic theoretical model for association of demographic, socioeconomic, lifestyle, working conditions and anthropometric variables with arterial hypertension

Note: Adapted from Costa et al.[16]

Results

In this study, the prevalence of AH among nursing team workers from the municipal healthcare network in Belo Horizonte (MG) was 16.9%.

Regarding their demographic and socioeconomic characteristics, we found that most were female (90.5%), between 20 and 49 years old (80.6%), with nonwhite skin color (64.5%), married/law marriage (51.7%) and earned up to 4 minimum wages (70%). In addition, the following frequencies of life habits were present among them: 11% smoking; 5.4% alcohol dependency; and 55.7% sedentary lifestyle. Age, skin color and income were associated with AH in bivariate level ($p < 0.05$), while sex and smoking were variables selected to the multivariate analysis of data ($p < 0.20$) (**Table 1**).

Table 1 Demographic, socioeconomic and lifestyle characteristics of nursing professionals from the municipal healthcare network in Belo Horizonte and their crude associations with arterial hypertension. Belo Horizonte, MG, 2008/2009

Characteristics	*Population*	*Hypertension*			
	n (%)	*%*	*PR*	*95% CI*	*p-value**
Sex					0.149
Male	26 (9.5)	26.9	1.00	-	
Female	247 (90.5)	15.8	0.59	0.29-1.18	
Age (years)					< 0.001†
20-39	123 (45.1)	5.7	1.00	-	
40-49	97 (35.5)	18.6	3.26	1.42-7.50	
50 or more	53 (19.4)	39.6	6.96	3.15-15.40	
Skin color‡					0.032
White	97 (35.5)	10.3	1.00	-	
Nonwhite	176 (64.5)	20.5	1.98	1.02-3.83	
Marital status					0.826
Single	87 (31.9)	16.1	1.00	-	
Married/Law marriage	141 (51.7)	16.3	1.02	0.55-1.86	
Divorced/Widowed	45 (16.5)	20	1.24	0.58-2.65	
Household income (minimum wages)					0.026†
Up to 2	75 (27.5)	17.3	1.00	-	
2 to 4	116 (42.5)	22.4	1.29	0.71-2.36	
4 or more	82 (30)	8.5	0.49	0.21-1.17	
Smoking					0.115
Non-smoker	193 (70.7)	14	1.00	-	
Former smoker	50 (18.3)	26	1.86	1.04-3.34	
Current smoker	30 (11)	20	1.43	0.64-3.18	
Problems with alcohol					0.928
No	256 (93.8)	15.8	1.00	-	
Yes	17 (6.2)	18.6	1.18	0.69-2.01	
Physical activity (times/week)					0.574†
Never	152 (55.7)	15.8	1.00	-	
1 to 2	75 (27.5)	17.3	0.89	0.41-1.91	
3 or more	46 (16.9)	19.6	0.81	0.40-1.61	

Note: *p-value of Pearson's chi-squared test; †p-value of chi-squared test of linear trend; ‡Nonwhite skin color = brown, black, yellow, indigenous.

In relation to labor and anthropometric characteristics, we observed that most professionals in the nursing team did not work at night (72.5%), had weekly workload up to 40 hours (54.6%), was in the current job for more than 48 months (55.3%), with low social support (50.2%), were nursing technicians/assistants (57.9%) and worked at the primary level of the healthcare network (68.9%). Regarding the demand-control, 19.4% of participants reported job strain (high demand). Time in the current job, professional category and demand-control were associated with AH in bivariate level ($p < 0.05$), while the level of care was the variable selected to the multivariate analysis of data ($p < 0.20$) (**Table 2**).

Table 2 Working conditions and anthropometric characteristics of nursing professionals from the municipal healthcare network in Belo Horizonte and their crude associations with arterial hypertension. Belo Horizonte, MG, 2008/2009

Characteristics	*Population*	*Hypertension*			
	n (%)	*%*	*PR*	*95% CI*	*p-value*[*]
Night work					0.817
No	198 (72.5)	17.2	1.00	-	
Yes	75 (27.5)	16	0.93	0.51-1.70	
Workload (hours/week)					0.539
Up to 40	149 (54.6)	18.1	1.00	-	
More than 40	124 (45.4)	15.3	0.86	0.49-1.45	
Time in current job (months)					0.018[†]
< 24	54 (19.8)	9.3	1.00	-	
24 to 47	68 (24.9)	10.3	1.11	0.37-3.31	
≥ 48	151 (55.3)	22.5	2.43	1.00-5.91	
Social support					0.346
High	136 (49.2)	14.7	1.00	-	
Low	137 (50.2)	19	1.29	0.76-2.20	
Professional category					0.001
Nurses	115 (42.1)	7.8	1.00	-	
Technicians/assistants	158 (57.9)	23.4	2.99	1.50-5.96	
Level of care					0.058
Primary	188 (68.9)	16	1.00	-	
Secondary	85 (31.1)	18.8	1.18	0.68-2.04	
Demand-control					0.010
Low strain	65 (23.8)	9.2	1.00	-	
Active	64 (23.4)	9.4	1.02	0.35-2.99	
Passive	91 (33.3)	20.9	2.26	0.95-5.36	
High strain	53 (19.4)	28.3	3.07	1.28-7.36	
Obesity diagnosis					0.344
No	232 (85.0)	16.0	1.00	-	
Yes	41 (15.0)	22.0	1.38	0.72-2.64	

Note: [*]p-value of Pearson's chi-squared test; [†]p-value of chi-squared test of linear trend.

In **Table 3**, we present the multivariate analysis to the independent association of demand-control, and the other covariables, with the AH, following the hierarchical model for the adjustment (**Figure 1**). In this table, we included only variables whose level of statistical significance with the AH was less than 20% ($p < 0.20$) in the bivariate stage. We opted for the non-inclusion of the "time in the current job" variable in the multivariate analysis, because of its strong correlation with the "age" variable (Pearson's correlation coefficient = 0.73). Sex, age, household income and demand-control remained independently associated with AH after the multivariate data adjustment, while skin color

and professional category have lost their effect. Sex became significantly associated with AH. Thus, the prevalence of AH was: 44% lower in females compared to males; 61% lower in the group of participants with high household income (4 or more minimum wages) compared to low household income (up to 2 minimum wages); 153% greater in the group of respondents who reported performing tasks under high strain in relation to those exposed to low strain; and it increased with advancing age.

Because of the small number of male participants, the data analysis have been reproduced only for females. In bivariate level, age, demand-control, time in the current job and professional category were associated to AH ($p < 0.05$), while skin color, household income, smoking and obesity diagnosis were selected to the multivariate analysis ($p < 0.20$) (data not presented). Thus, the multivariate analysis is presented in **Table 4**. In the same way as for the sample as a whole, age, household income and demand-control remained independently associated with AH.

Table 3 Demand-control independente associations of work and other covariables of interest with arterial hypertension in nursing professionals of the municipal healthcare network in Belo Horizonte, MG, 2008/2009

Characteristics	*PR*	*95% CI*	*p-value*[*]
Sex			
Male	1.00	-	-
Female	0.56	0.32-0.99	0.046
Age (years)			< 0.001[†]
20-39	1.00	-	-
40-49	3.69	1.60-8.53	0.002
50 or more	7.49	3.32-16.85	< 0.001
Skin color[‡]			
White	1.00	-	-
Nonwhite	1.53	0.81-2.86	0.187
Household income (minimum wages)[§]			0.035[†]
Up to 2	1.00	-	-
2 to 4	0.73	0.40-1.32	0.296
4 or more	0.39	0.18-0.88	0.023
Smoking[‖]			
Non-smoker	1.00	-	-
Former smoker	1.01	0.54-1.90	0.978
Current smoker	1.15	0.56-2.37	0.706
Demand-control[‖]			
Low strain	1.00	-	-
Active	1.08	0.40-2.97	0.888
Passive	1.69	0.72-3.91	0.226
High strain	2.53	1.03-6.20	0.042
Professional category[‖]			
Nurses	1.00	-	-
Technicians/assistants	1.57	0.70-3.52	0.276
Level of care[‖]			
Primary	1.00	-	-
Secondary	1.06	0.64-1.75	0.819

Note: PR = Prevalence Ratio; 95% CI = 95% Confidence Interval; [*]p-value of Poisson multiple regression with robust variances; [†]p-value of chi-squared test of linear trend; [‡]Nonwhite skin color = brown, black, yellow and indigenous; [§]PRs adjusted by variables of block 1 (sex, age, skin color and household income); [‖]PRs adjusted by the variables of blocks 1 and 2 (smoking, demand-control, professional category and level of care).

Table 4 Demand-control independente associations of work and other covariables of interest with arterial hypertension in female nursing professionals of the municipal healthcare network in Belo Horizonte, MG, 2008/2009

Characteristics	*PR*	*95% CI*	*p-value*[*]
Age (years)			< 0.001[†]
20-39	1.00	-	-
40-49	4.69	1.68-12.04	0.003
50 or more	10.45	3.62-30.14	< 0.001
Skin color[‡]			
White	1.00	-	-
Nonwhite	1.56	0.76-3.23	0.229
Household income (minimum wages)			0.189[†]
Up to 2	1.00	-	-
2 to 4	0.71	0.34-1.48	0.354
4 or more	0.40	0.17-0.94	0.035
Smoking[§§]			
Non-smoker	1.00	-	-
Former smoker	1.02	0.46-2.28	0.953
Current smoker	1.27	0.56-2.86	0.570
Demand-control[§§]			
Low strain	1.00	-	-
Active	0.89	0.30-2.66	0.841
Passive	1.66	0.62-4.49	0.316
High strain	2.36	1.01-6.46	0.047
Professional category[§§]			
Nurses	1.00	-	-
Technicians/assistants	1.60	0.72-3.55	0.243
Obesity diagnosis[§§]			
No	1.00	-	-
Yes	1.75	0.86-3.56	0.122

Note: PR = Prevalence Ratio; 95% CI = 95% Confidence Interval; [*]p-value of Poisson multiple regression with robust variances; [†]p-value of chi-squared test of linear trend; [‡]Nonwhite skin color = brown, black, yellow and indigenous; [§]PRs adjusted by variables of block 1 (sex, age, skin color and household income); [§§]PRs adjusted by the variables of blocks 1 and 2 (smoking, demand-control, professional category and level of care).

Discussion

The evidenced prevalence of AH in this study, 16.9%, was lower than those estimated in other studies of cross-sectional design that focused nursing team professionals in Brazil whose average age was similar to that identified in our sample (approximately 40 years). Three studies about AH in the nursing category observed 23%, 23% and 36.4% of prevalence. The first was carried out in a university hospital in the city of São Paulo (SP), in a group of 279 nursing professionals[12]; the second, in 606 nurses from an emergency hospital in Porto Alegre (RS)[13] and the third 494 subjects from an emergency hospital in Salvador (BA)[11].

The difference of magnitude among AH results can be attributed, at least in part, to methodological discrepancies in the definition, measurement, data collection strategy and sample size determination. In this study, as already explained, the outcome of interest was obtained by self-report. Thus, the individuals without confirmation of the diagnosis of AH by a doctor would not be contemplated. On the other hand, in the mentioned studies, AH has been confirmed by direct measurement of blood pressure obtained by confined readings. Although this methodological procedure is acceptable in population surveys, the possibility of overestimation of the obtained rates is not excluded[17]. Besides, in this study, participants were recruited in the primary and secondary levels of the healthcare network, while the previous studies were restricted to the

tertiary level, especially to the emergency sectors. In such locus, due to its assistance feature, workers are exposed to higher levels of stress when executing their tasks. Consequently higher frequency of AH cases becomes plausible.

The relations that are independent of sociodemographic factors with AH, (advancing age, female sex, high household income) highlighted in this study, have also been found in investigations concerning the topic with the professional category of nursing[12,13].

The increase in blood pressure among older individuals is usually associated with atherosclerosis, which results in isolated systolic AH[18]. In our study, the prevalence of AH was almost six-fold in individuals aging 50 or more compared to those aging 20 to 39 years.

The presence of AH is more frequent in men under 50, moving to the opposite direction after that age. Among women, such result can be explained, at least in part, as an effect of biological nature: in general, until menopause, women have the protective effect of the estrogen hormone[19]. It is worth noting that, in our sample, most women (80%) was less than 50 years old.

The influence of the socioeconomic level in the occurrence of AH is rather complex and difficult to be fully established; nonetheless, people with high income are more likely to have full access to health services and to be more prone to healthy lifestyles (less addicted to smoking, with higher frequency of physical activity and better dietetic habits) than their counterpart with low income earnings[20].

Regarding the association of job strain with AH, such a finding is consistent and supported by the results of a recent meta-analysis on the topic. In this study, the authors considered exclusively cohort and case-control studies whose target populations were composed of adults and the outcome was set on the confirmation of blood pressure > 140/90 mmHg or when the participant reported medical diagnosis of AH. In addition, in the majority of investigations included in the meta-analysis, job strain was also assessed by the questionnaire of demand-control of Karasek. Thus, the Odds Ratio (OR) of all studies included in the meta-analysis was 1.30 (95% CI: 1.14-1.148; $p < 0.001$); for the studies of case-control, 3.17 (95% CI: 1.79-5.60; $p < 0.001$); and for the cohort studies, 1.24 (95% CI: 1.09-1.14; $p < 0.001$)[3].

In Brazil, as mentioned above, we found one single published study on the relationship between job strain and AH, whose design was cross-sectional and within which 1,716 technical and administrative employees of a University were addressed. The authors found no association between job strain and AH[6].

Regarding the category of nursing professionals, our study seems to be pioneer, because we did not identify previous studies that specifically explored the relationship between job strain and AH, neither at national nor at international level. Two investigations addressed the association of job strain in the category of nursing, but the outcomes evaluated were the levels of systolic and diastolic blood pressure, and not the AH specifically.

In the first of them, a study that concerned with a homogeneous sample of 56 professionals (nurses or nursing assistants at a hospital in Stockholm, Sweden), job strain was associated to the increase in systolic and diastolic blood pressure during the working time, and with the diastolic blood pressure during free time[21].

In the other research, a study with 175 nurses from a public hospital in the city of Rio de Janeiro, the job strain was also related to the higher average of systolic blood pressure at home awake in participants with domestic work overload[7].

We emphasize that the increased averages of systolic and diastolic blood pressure in different moments of the monitoring do not ensure the diagnosis of AH, and, as for that, we need high averages of systolic and diastolic blood pressures, respectively, 130 mmHg and/or 85 mmHg, in period of wakefulness, during the hemodynamic evaluation[22].

The plausibility of the relation between job strain at work and AH is explained by the effects of psycho-emotional stress on the neuroendocrine dynamics. The constant exposure to psycho-emotional stress causes hyperactivity of the sympathetic nervous system and dysfunction of the hypothalamic-pituitary-adrenal axis, with release of noradrenaline and adrenaline in high concentrations in the synaptic cleft and in the bloodstream, respectively, which causes, in the long term, persistent elevation of blood pressure[4-5]. It could be said that individuals performing psychosocially demanding tasks deal with emotions and thoughts whose psychic load exceeds the possibilities of recovery in a certain environment, considering the low control margins that characterize – according to the demand-control model – such situations of job strain. Greater reactivity and lower margin for the recovery of the resulting psychosocial stress are two factors that, in the long term, influence the increase in blood pressure and the risk of both hypertensive and cardiovascular diseases.[23-24].

Although consistent, the results found in this study must be interpreted with caution because of at least two limitations: a) data on the diagnosis of AH was not obtained by blood pressure measurement, but by self-report. However, this has been a standard measure of AH already validated in other studies, including the cohort of American nurses[25]; b) since it is a cross-sectional study, the confidence on findings in terms of temporality and causality of associations decreases, but such effect is intrinsically related to the very design of study.

Despite these limitations, it is worth highlighting the following strengthness of this study: a) the probabilistic character of the sample represents nursing professionals of the municipal healthcare network in Belo Horizonte (Minas Gerais). Not only the studies that have estimated the prevalence of AH but also the one that addressed the association between this outcome and demand-control at work in nursing team professionals focused subjects who exercised their labor activities only in hospitals (tertiary level), which was not repeated in this study, whose participants were distributed in the primary and secondary levels of the healthcare network, strengthening its innovative character; b) the fit of potential confounding factors by the multivariate analysis technique – the most suitable for the type of study design – avoids overfitting, once those variables overly correlated with exposure are not used in the model.

Conclusion

The relationship between job strain and AH in nursing professionals shows that psychosocial conditions increase the vulnerability of these workers to a disease of major importance for the Brazilian Public Health: arterial hypertension. It is also known that such disorder is the main risk factor for cardiovascular diseases, responsible for the majority of deaths in the country and for social and economic problems, mainly on social security – early disability retirement and pension payment. In this sense, modifications in the nursing work process are essential to reduce the exposure of these professionals to psychosocial stress and to the primary prevention of AH and CVDs. In this scope, the expansion of nursing training in Brazil is necessary to achieve the goal of two professionals for every 1,000 inhabitants proposed by WHO. Moreover, it is up to health services managers to gather adequate (in quantity) nursing staffs to avoid the overload of tasks; it also important establishing a more democratic and participatory administrative model to improve staffs' autonomy in their labor activities.

Lastly, the results of this study and others related to nursing working conditions with health outcomes can contribute to justify these professionals' political demands.

Authors' contributions

Pimenta AM: contributed to the analysis and interpretation of data; prepared the manuscript; approved the final version to be published. Assunção AA: contributed to the project and design, to data collection and its analysis and interpretation; contributed importantly on the critical review of the manuscript; approved the final version to be published.

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